



50th Anniversary of UNESCO'S MAB Programme

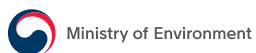
BIOSPHERE RESERVES and PEACE

Authors

Eun-Young Kim, Chul-In Yoo, Hag Young Heo, Suk-Kyung Shim, Sun-Kyung Lee

Editors

MAB National Committee of the Republic of Korea
Korean National Commission for UNESCO



Ministry of Environment



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KOREA NATIONAL PARK SERVICE



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MAB National Committee of Republic of Korea



50th Anniversary of UNESCO'S MAB Programme



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Contents

4

Biosphere Reserves – Places for Peace between Nature and People

Eun-Young Kim

Korean National Commission for UNESCO

22

Jeju Island Biosphere Reserve, the Island of Peace and the Culture of Jeju *Haenyeo*(women divers)

Chul-In Yoo

Professor of Anthropology
Jeju National University, Republic of Korea

44

Biodiversity Conservation and Peace

Hag Young Heo

Senior Research Fellow
Korea National Park Service

64

Transboundary Biosphere Reserves as Places for Cross-Border Eco-peace Cooperation

Suk-Kyung Shim

Member of the International Advisory Committee for Biosphere Reserves
Vice-chair of the MAB National Committee of the Republic of Korea

92

Education for Peace and Sustainable Development in Biosphere Reserves

Sun-Kyung Lee

Cheongju National University of Education



Biosphere Reserves – Places for Peace between Nature and People

Eun-Young Kim

Korean National Commission for UNESCO

UNESCO and Peace

In the wake of the two World Wars, people came to a decision that a lasting peace could not be achieved solely through political or economic agreements, or through military power, but must be based on the intellectual and moral solidarity of humankind. As a result, UNESCO - the United Nations Educational, Scientific and Cultural Organization - was established in 1945. The Preamble to UNESCO's Constitution declares that "since wars begin in the minds of men, it is in the minds of men that the defenses of peace must be constructed". UNESCO was established as an international organization under the umbrella of the United Nations to contribute to world peace and security by promoting international cooperation in the fields of education, science and culture.

With this mandate, UNESCO has been active in spreading the culture of peace and developing the field of peace studies. Even at the height of the Cold War in the 1960s, UNESCO made strenuous efforts to promote discussion of peace and disseminate peace education. On the basis that the achievement of peace requires the prioritization of understanding and respect, instead of hate, UNESCO has placed particular emphasis on the concepts of Education for International Understanding and Global Citizenship Education. It was at UNESCO's recommendation that the UN designated the year 2000 as the International Year for the Culture of Peace. This culture of peace focuses on ensuring political and social equality and cultural diversity and emphasizes a culture of non-violence, dialogue, tolerance and solidarity.

In the scientific field, since its inception in 1945, UNESCO has promoted major intergovernmental projects in areas that require cooperation between countries. UNESCO's international scientific programmes include the Intergovernmental Oceanographic Commission (IOC), the International Hydrological Programme

(IHP and the Man and the Biosphere Programme(MAB), which were established to conserve the ocean, water and biodiversity, respectively. The IOC promotes cooperation on ocean observation and research, while the IHP facilitates cooperation for sustainable use of freshwater and water security. MAB pursues the harmonious coexistence of nature and humans, using the designation of biosphere reserves(BRs) as its main activity to promote biodiversity conservation and sustainable development.

So how do biosphere reserves fit into UNESCO's efforts to promote world peace through international cooperation in the scientific field? Discussion on biosphere reserves has centered on three functions: conservation, development and logistical support, with emphasis on the aspects of contributing to biodiversity conservation and sustainable development. However, an examination of the activities carried out in biosphere reserves shows how they also contribute to peace. This paper looks at the aspect of peace promotion in biosphere reserves.

Establishment of Biosphere Reserves

MAB was established as a UNESCO intergovernmental programme in 1971, before the establishment of the UN Environmental Programme. The first biosphere reserve was designated in 1976. In 1972, the year after MAB was launched, the UN Conference on the Human Environment was held in Sweden, making environmental issues part of the international agenda and sparking public discussion of the environment and development. The Declaration on the Human Environment adopted at the 1972 conference stated the need for global cooperation to resolve environmental degradation and pollution caused by human

activities. The conference also called for interest in peace studies relating to environmental issues. It became a starting point for exploration of the concept of sustainable development, as well as concern for the limits of growth. Accordingly, environmental security began to be linked with peace.

In a world where development was leading to increasing environmental issues, the biosphere reserve was a breakthrough that aimed to facilitate the development of local communities while also recognizing the value of natural resources and conserving biodiversity. It emerged as a leading concept that took into account not only nature conservation but also the people living in the area. Practical limitations, however, meant that most designated biosphere reserves at that time focused on conservation in their core areas.

Biosphere reserves consist of three zones: a core area, a buffer zone and a transition area. This zoning is intended as a tool to facilitate implementation of the three functions of the biosphere reserve: conservation, development and logistic support. In the early days of MAB, however, existing protected areas, such as national parks established by a state, were often designated as biosphere reserves despite not functioning as the zoning was intended to achieve. At that time, biosphere reserves were mostly made up of core areas without adequate outer zones, so there were limits in their performance of the three intended functions of biosphere reserves.

To strengthen MAB activities in this context, UNESCO approved the Seville Strategy for Biosphere Reserves in 1995. The strategy emphasized that biosphere reserves should be used to develop and test sustainable development approaches at the regional level, clarifying the need to pay more attention to the transition area. The

Figure 1.



Zoning of a biosphere reserve: the **core area**, which must be of sufficient size for conservation purposes and subject to long-term legal protection, the **buffer zone**, which surrounds the core area and is used for research, education, tourism, etc. and the **transition area**, where various activities are encouraged for sustainable development, including in residential areas.

* Source: UNESCO MAB website (<http://en.unesco.org/mab>)

Statutory Framework of the World Network of Biosphere Reserves, approved at the same time as this strategy, stipulates the standards that biosphere reserves must meet. Since being required to comply with this framework, biosphere reserves have been properly constituted with three zones. Simultaneously, greater emphasis has been placed not just on biodiversity conservation but also on sustainable development, while the roles of biosphere reserves as places to respond to climate change and learning grounds for sustainable development are still highlighted.

An application for designation of a biosphere reserve may be made by any UNESCO member state, while two or more adjacent countries may make a joint application where an ecosystem extends beyond the borders of a country, requiring joint management. A cross-border biosphere reserve that several countries apply for together is called a transboundary biosphere reserve (TBR). Currently there are 21 TBR sites designated by

UNESCO. TBRs offer a place for cooperation between countries in pursuing biodiversity conservation and sustainable development and contribute to regional peace between neighboring countries.

This paper will now examine how biosphere reserves contribute to sustainable development and peace and highlight the implications of biosphere reserves in terms of peace between nature and humans.

The Environment and Peace

Peace is often associated with war, in that it can refer to a state in which a conflict involving armed forces has been resolved through reconciliation. The term 'conflict', however, can have many meanings, from conflicts between ethnicities and religions, conflicts within communities, inner conflicts and conflicts between nature and humans. UNESCO defines peace as something beyond war-free conditions: a state in which people of different gender, race, religion, language and culture live together, respecting justice and human rights. The concept of peace is expanding also to encompass peace between humans and nature, as well as peace between human and human and inner peace (peace in oneself).

'The Yamoussoukro Declaration on Peace in the Minds of Men, adopted by UNESCO in 1989 at the International Congress on Peace in the Minds of Men, held at Yamoussoukro, in the Republic of Cote d'Ivoire, noted the emergence of new, non-military threats to peace: unemployment, drugs, underdevelopment, imbalances between developed and developing countries and human-induced environmental destruction such as damage to natural resources, climate change, desertification, ozone depletion and pollution.

In 1992, the 20th anniversary of the UN Conference on the

Human Environment, the UN Conference on Environment and Development was held in Rio de Janeiro, addressing the links between the environment, development and peace and the need to harmonize environmental conservation with economic development in order to be able to achieve sustainable development. Of the 27 principles proposed in the Rio Declaration on Environment and Development, adopted at this conference, Principle 25 stipulates that “peace, development and environmental protection are interdependent and inextricably linked”.

Peace is also mentioned in the Earth Charter published in 2000 by the Earth Charter Commission, which was formed in 1997 following the publication in 1987 of Our Common Future, a report by the World Commission on Environment and Development, also known as the Brundtland Commission. The preamble to the Earth Charter stipulates, “we must work together for a sustainable society based on a culture of respect for nature, universal human rights, economic justice and peace”. The charter contains 16 common principles that individuals, businesses, governments and international organizations should abide by to enable a sustainable way of life. The principles are divided into four sections, one of which is titled Democracy, Non-violence and Peace. Peace is addressed in Principle 16 of the charter:

“16. Promote a culture of tolerance, nonviolence and peace.

[a. ~ e. omitted]

f. Recognize that peace is the wholeness created by right relationships with oneself, other persons, other cultures, other life, Earth and the larger whole of which all are a part.”

The foregoing are examples of ways in which public

discourse on the environment has made connections between the environment and peace. This paper will now consider various aspects of peace presented by the Earth Charter, in order to explore the links between biosphere reserves and peace from the perspectives of peace between nations, peace between nature and humans and peace in oneself.

Biosphere Reserves and Peace – Transboundary Biosphere Reserves

How can biosphere reserves contribute to peace? How can we promote peace in biosphere reserves? First, we will explore the answer in terms of peace between countries.

Transboundary biosphere reserves(TBRs) are designated following a joint application from two or more neighboring countries. Since the early days of biosphere reserves, there have been cases where biosphere reserves sharing a border were separately designated. Once the barriers between Eastern and Western Europe collapsed, however, an atmosphere of cooperation within Europe developed with the support of the EU, generating the momentum for transboundary biosphere reserves. At the MAB International Coordinating Council(MAB-ICC) Meeting held in 1992, the concept of transboundary biosphere reserves was approved and the first such reserves were designated, including Tatra, which was jointly applied for by Poland and Slovakia. The establishment of TBRs was also recommended in the Seville Strategy(1995).

Transboundary biosphere reserves, which were initiated to promote regional cooperation, function as a conservation plan that transcends national boundaries. They are internationally recognized joint management schemes expressing a willingness to co-manage shared ecosystems and to cooperate in their conservation and

sustainable use. Countries managing a TBR cooperate on joint management and coordination and in doing so promote regional peace by enhancing mutual understanding and respect for each other's cultures. Currently, direct cooperation between parties is difficult in areas where there is serious conflict. However, in places where there has been historical conflict or pain, the biosphere reserve offers an opportunity for meetings and exchanges, promoting understanding among neighbors and reconciliation.

An example is the Vosges du Nord/Pfalzerwald Transboundary Biosphere Reserve on the border between Germany and France. This area features a huge mixed forest of beech, oak and pine trees, requiring joint management. Similarities across the area include local dialects, traditions and common history. Cooperation began here in 1985 for the diplomatic purpose of establishing good neighborly relations. The two countries installed sign boards jointly and operated teacher exchange programmes and joint hiking programmes. France and Germany each applied for designation of separate biosphere reserves in the area in 1988 and 1992 respectively, before the TBR was finally established in 1998. With the support of UNESCO, a joint project plan was established for the TBR and a market for agricultural products was established in the border area, attracting many tourists. Various stakeholders, including hunters, forest managers, scientists and environmental educators, have collaborated in joint efforts to protect the Eurasian lynx, carrying out joint research, monitoring and education.

However, there have also been difficulties due to the local history of conflict between France and Germany and to social and economic differences on each side of the border, such as differences in the human population, the size of each side's management budget and the management organizations and other

institutions involved on each side. Accordingly, a coordination committee was formed and meetings were held twice a year to discuss the cooperation and resolve issues. To overcome the language barrier between the two countries, English was used as the language of communication. Additionally, trainings were conducted to increase mutual understanding of each other's cultures and informal friendship meetings were held to strengthen the foundation for strong cooperation. As a result, a regular report submitted 10 years after the designation of the TBR showed that the largest temperate forest in Western Europe had been well conserved without interference since the designation. The report praised the achievements of the TBR, saying that it was promoting mutual exchanges and enhancing mutual understanding by encouraging local residents' participation and operating markets regularly in the border area.

The Danube Delta Biosphere Reserve in Romania and Ukraine is another area where countries have faced difficulties with cross-border communication, but following its designation as a transboundary biosphere reserve, it received increased international funding, which facilitated joint projects. The benefits of the TBR designation in promoting cooperation between these two countries are not limited to the Danube Delta area. The central governments of both countries have both become more interested in cooperation, helping to create a safer and more stable atmosphere even in difficult political conditions.

Management of a biosphere reserve is not easy even within the borders of a country, when it requires joint management by several local governments with different resources and goals. Such difficulties will be even greater in the case of transboundary biosphere reserves between states. Nonetheless, since the

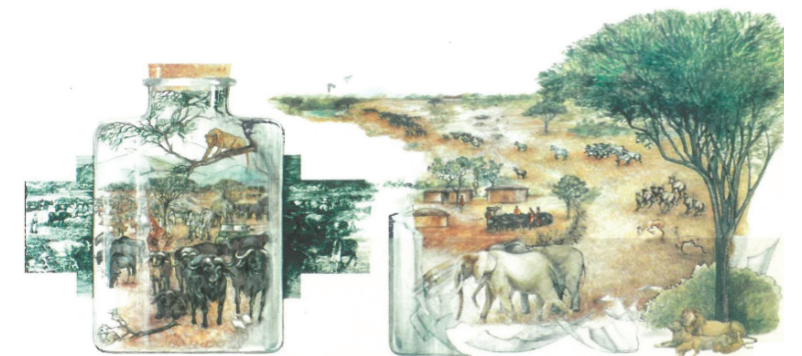
designation of the first TBRs in 1992, the number of TBRs has increased to a current total of 21, located mostly in Europe, Africa and Latin America. The number of TBRs is steadily increasing and joint nominations are currently being prepared for many more. The circumstances of each TBR are of course different, but this steady increase appears to be evidence that states see how transboundary biosphere reserves promote cooperation between neighboring countries, ultimately contributing to peace in the region.

Transboundary biosphere reserves can also be good venues for programmes offering the types of education promoted by UNESCO to achieve a culture of peace and sustainable development, such as education for international understanding and global citizenship education. A global citizen is a person who sees themselves as a citizen of a global community, transcending their identity as a citizen of a specific country or place. Education for international understanding and global citizenship education, which aim to build a culture of peace through education, are designed to foster mutual respect and recognition of different cultures and to help people live together as global citizens. UNESCO also promotes education for sustainable development, which aims to help achieve a sustainable society by encouraging people to consider the environmental, social and economic aspects of their activities as an integrated whole. The implementation of these types of education for schools and communities in transboundary biosphere reserves can promote regional peace by helping people to understand how to coexist peacefully with others through mutual recognition and respect.

Biosphere Reserves and Peace: Coexistence between Humans and Nature

The aim of biosphere reserves is to pursue the harmonious coexistence of nature and humans, rather than keeping them separate and this is reflected in their spatial zoning. A biosphere reserve consists of three zones: the core area, the buffer zone and the transition area. The core area is protected by domestic law in order to conserve its biodiversity, while the buffer zone and the transition area surrounding the core area are intended to be utilized by local communities for research and environmental education, agriculture, eco-tourism and various other activities for sustainable development. A few biosphere reserves consist mainly of transition area, with a core area that comprises less than 5% of the total site. Such reserves demonstrate the intended characteristics of biosphere reserves as areas that focus on encouraging the coexistence of man and nature, with not just a legally protected core area, but also a buffer zone and transition area that include residential sites. Through this integration of humans and nature and promotion of

Figure 2.



BRs as conservation areas open to humans. In the past, conservation has been regarded as something like a closed bottle, blocking natural areas off from the human world. Under this closed bottle concept, however, the area to be protected can instead end up being destroyed by internal and external social and ecological pressures. In order for conservation to be successful in the long term, it needs to be open and interactive with the wider surrounding area. The biosphere reserve was designed to implement this open concept.

* Source: UNESCO(2002), 'Biosphere Reserves: Special Places for People and Nature'

their coexistence, biosphere reserves can contribute to expanding the concept of peace, as well as promoting that peace.

Since biosphere reserves seek the harmonious coexistence of nature and humans, attention is also paid to the conservation of cultural diversity and the transmission of traditional knowledge. Efforts are made in BRs to seek out, disseminate and utilize long-standing traditional knowledge to conserve biodiversity. This also serves to protect and preserve the cultural diversity that has arisen from biodiversity, including local languages. The Georgian Bay Biosphere Reserve in Canada comprises 30,000 islands inhabited by indigenous tribes such as the Ojibwe, Chippewa, Odawa and Potawatomi. Their teachings, passed down for thousands of years in Canadian indigenous culture, are now influencing scientific research in the biosphere reserve.

Bare-handed fishing in the Sinan Dadohae Biosphere Reserve and haenyeo(women divers) in the Jeju Island Biosphere Reserve are other examples of the linkage between traditional knowledge

Figure 3.



The Georgian Bay Biosphere Reserve, Canada, where indigenous people use their traditional knowledge to manage the BR.

* Photo: Georgian Bay Biosphere website (<http://www.gbbr.ca>)

and bio-cultural diversity and the coexistence between nature and humans. The diving work done by haenyeo is laborious and difficult, so the numbers of would-be haenyeo are in decline, but the inscription of haenyeo on the UNESCO Intangible Heritage List has helped to attract support for the maintenance and transmission of this tradition.

Biosphere reserves make a significant contribution to the conservation of biodiversity, the conservation of nature and further to peace between humans and nature. Core areas of biosphere reserves must be protected by national law. In the early days, most areas designated as biosphere reserves were national parks, which were already protected areas. Now, as biosphere reserves have gained recognition as a way for local communities to work towards sustainable development, interest in designating biosphere reserves has increased. Even if an area is not a national park, it can contribute not only to local development but also to local preservation if a local area with significance for biodiversity conservation can be designated as the core area. In such cases, a place that might otherwise have been damaged by humans can be maintained peacefully as it is, if designated as a biosphere reserve. A biosphere reserve was first designated on Jeju Island in 2002, centering on Hallasan National Park and Seogwipo Provincial Park, but in 2019, the biosphere reserve was expanded to cover the whole province of Jeju, including Chuja Island and other nearby islands. In this case, in addition to expanding the transition area, the gotjawal forest area, which was not a national park, was added to the core area - a significant decision, since this expanded the area protected by national law.

Biosphere Reserves and Peace: Inner Peace

As noted above, conservation of biodiversity is an important function of biosphere reserves. The value of biodiversity really began to be discussed after the Convention on Biodiversity was adopted in 1992, placing emphasis on the importance of biodiversity to the health and happiness of human life. Biodiversity helps people obtain foodstuffs and materials for clothing, heating and shelter. It is also an important source of raw materials and ingredients for pharmaceuticals, as well as helping to provide fresh air and water. In a nutshell, it influences very fundamental elements of human life, from our ability to obtain the basic necessities to sustain our lives, to our ability to ensure our safety and health. Furthermore, it contributes hugely to our mental health by providing opportunities for recreation and leisure activities, a sense of belonging and wellbeing and a source of spiritual inspiration. As such, the non-material benefits of the ecosystem include spiritual richness, cognitive development, reflection, leisure activities and aesthetic experiences. People seek mental and physical recovery and stability through nature. These mental and spiritual benefits of biodiversity contribute to increasing people's inner peace, a highly significant contribution if we consider UNESCO's foundational belief that it is in the minds of men and women that the defenses of peace must be constructed.

Many of the various spiritual customs and beliefs we hold relate to nature in some way. The perception that we belong to a specific place or community derives from biodiversity. Many communities on the planet have a spiritual bond with nature. Biodiversity has enriched our minds and provided aesthetic pleasure. It allows us to understand ourselves as a part of the ecosystem and to appreciate nature. In short, it is safe to say that the conservation of biodiversity is important not only for nature but also for humans.

The diverse activities in biosphere reserves help us to see that all life is connected and to understand that biodiversity and cultural diversity are intertwined. When the diversity of living things and cultures is respected and acknowledged, we can establish our own inner peace, promote peace between humanity and nature and enhance the lives and vitality of all people.

Biosphere Reserves as Places for Peace: Community Participation and Pride

The UNESCO MAB programme and biosphere reserves, initiated in the 1970s to pursue the coexistence of nature and humans, are tools for biodiversity conservation and sustainable development, as well as peace between states, peace between nature and humans and peace of mind. Biosphere reserves are places that enable people to recognize that peace, the environment and development are interdependent, to understand the value and benefits of local biodiversity and to discover, inherit and respect the cultural diversity that is embodied by local traditions and entwined with local biodiversity. These activities serve as an opportunity for residents in and around biosphere reserves to increase their pride in their community, make greater efforts for its conservation and sustainable development and participate actively in spreading the culture of peace.

Biosphere reserves offer people the opportunity to enjoy the benefits of biodiversity, to work towards their own inner peace through education and reflection, to build peace with nature by learning to live in harmony with nature as an integral member of the ecosystem and to pursue peace with their neighbors. These activities help the culture of peace to spread beyond the borders of biosphere reserves. Biosphere reserves contribute to UNESCO's

mission of peace by being learning places for sustainable development and to the concrete realization of peace in many forms.

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Jeju Island Biosphere Reserve, the Island of Peace and the Culture of Jeju *Haenyeo*(women divers)

Chul-In Yoo

Professor of Anthropology, Jeju National University, Republic of Korea

Biosphere Reserves: Sustainable Development and Peace

UNESCO's Man and the Biosphere(MAB) Programme, with its World Network of Biosphere Reserves, promotes the sustainable use and conservation of biological diversity. The Convention on Biological Diversity, opened for signature at the UN Conference on Environment and Development in 1992, noted that the conservation of biodiversity would contribute to peace for humankind. What is peace in this context? UNESCO has defined peace as "more than the absence of war, it is living together with our differences - of sex, race, language, religion or culture - while furthering universal respect for justice and human rights on which such coexistence depends". Such a definition is based on the concept of 'positive peace' advocated by Johan Galtung, the founder of peace studies. He asserts that 'positive peace' differs from 'negative peace': positive peace is a state where human groups engage in cooperation and integration while negative peace implies no violence, but also no form of interaction between human groups.

The preamble to the Declaration and Programme of Action on a Culture of Peace, adopted by a UN resolution in 1999, also emphasized the concept of positive peace proposed by Galtung: "Peace not only is the absence of conflict, but also requires a positive, dynamic participatory process where dialogue is encouraged and conflicts are solved in a spirit of mutual understanding and cooperation". According to Article 1 of this Declaration, a culture of peace is a set of values, attitudes, traditions and modes of behaviour and ways of life based on certain attitudes and actions, including "efforts to meet the developmental and environmental needs of present and future generations". These efforts are something that biosphere reserves can contribute to. Article 3 of the same Declaration explains that the fuller development of a culture of peace is integrally linked to fourteen

conditions, one of which is the promotion of sustainable economic and social development. The promotion of sustainable economic and social development is also the basis of the Sustainable Development Goals(SDGs) adopted by the UN General Assembly in 2015 and is one of the targets specifically pursued by biosphere reserves.

The Programme of Action in the 1999 Declaration and Programme of Action on a Culture of Peace presents eight areas of action and lists specific actions to be taken under each. Biosphere reserves can make a direct contribution to one of these action areas: actions to promote sustainable economic and social development, in particular the specific action to incorporate capacity-building in development strategies and projects to ensure environmental sustainability. Under this framework, a culture of peace and sustainable development are two sides of the same coin. Sustainable development is based on good governance, which refers to a vehicle through which consensus and peace are both an end and a means.

In 2015, the MAB Strategy(2015-2025) was adopted at the 38th session of the UNESCO General Conference. The MAB Strategy(2015-2025) was developed in line with the framework of UNESCO's Medium-Term Strategy(2014-2021), which seeks peace and equitable and sustainable development. The MAB Strategy (2015-2025) presents four strategic objectives, of which the second strategic objective, society and economy in harmony with the biosphere, is important for peaceful and harmonious coexistence of humans and nature. In-depth knowledge of natural and cultural heritage, understanding of the socio-economic realities and innovative approaches to increasing resilience are all required to meet this objective.

Jeju Island: the Role of Internationally Designated Areas on the Island of World Peace

Table 1 lists the various internationally-designated areas on Jeju Island, including Biosphere Reserves, Ramsar Sites, World Heritage and Global Geoparks.

Table 1. Internationally Designated Areas(IDAs) on Jeju Island

Year	Type of IDA	Name
2002	Biosphere Reserves	Jeju Island Biosphere Reserve
2006 ~2015	Ramsar Sites	Mulyeongari-oreum, Muljangori-oreum Wetland, 1100 Altitude Wetland, Dongbaekdongsan, Sumeunmul-baengdui
2007	World Heritage	Jeju Volcanic Island and Lava Tubes
2010	Global Geoparks	Jeju Island Geopark

There are five Ramsar sites on Jeju Island: Mulyeongari-oreum(2006), Muljangori-oreum Wetland(2008), 1100 Altitude Wetland(2009), Dongbaekdongsan(2011) and Sumeunmulbaengdui (2015). Seonheul Gotjawal, where Dongbaekdongsan is located, is a part of the core area of Jeju Island Biosphere Reserve(2019) and one of the Geosites of Jeju Island Geopark. The(Mount) Hallasan Natural Reserve, in which Muljangori-oreum Wetland is located, is a World Heritage site and a core area of the Jeju Island Biosphere Reserve, as well as a Geosite of the Jeju Island Geopark. In 2007, Hallasan Natural Reserve, Geomunoreum Lava Tube System(comprising Geomunoreum volcano, Bengdwigul Lava Tube, Manjanggul Lava Tube, Gimnyeongsagul Lava Tube, Yongcheondonggul Lava Tube and Dangcheomuldongul Lava Tube) and Seongsan Ilchulbong(Sunrise Peak) Tuff Cone were designated as a World Heritage site with the name of 'Jeju Volcanic Island and Lava Tubes'. Utsanjeongul, Bugoreum and Daeringul lava tube caves, which belong to the Geomunoreum Lava Tube

System, were discovered later and added to the World Heritage site in 2018.

Jeju Island Biosphere Reserve was designated in 2002, at which time the core areas consisted of Mt. Hallasan National Park, Yeongcheon and Hydoncheon streams and Munseom-Beomseom Islands Natural Reserve, while the buffer zone was composed of a national forest adjacent to the Hallasan National Park, a northern part of the national park and a part of Seogwipo Marine Provincial Park. The transition areas roughly comprised the areas on the lower slopes surrounding Mount Hallasan, located about 200-600m above sea level(excluding urban planning areas), a 500m section on both sides of Yeongcheon and Hydoncheon streams, some parts of Seogwipo Marine Provincial Park outside the buffer zone and the sea in front of the Hydoncheon estuary.

In 2019, the Jeju Island Biosphere Reserve was expanded to cover the whole of Jeju Special Self-Governing Province, including other islands that are part of the province, such as Chujado and Udo. As part of this process, it was necessary to systematically investigate changes in land and marine species due to climate change. The biosphere reserve was expanded with a view to conserving areas with high importance to the ecosystem services and satisfying the needs of residents who wanted to have their villages designated as an 'Ecovillage with Excellent Nature' or 'Eco-Tourism Village' by the South Korean Ministry of Environment.

When the Jeju Island Biosphere Reserve was extended in 2019, Hangeong-Andeok Gotjawal, Seonheul Gotjawal(Dongbaekdongsan Hill) and Seongsan Ilchulbong(Sunrise Peak) were designated as terrestrial core areas. 'Gotjawal' is a term for a unique form of forest where viscous lava has split into large and small rock masses and accumulated following a volcanic

eruption to form a rugged terrain. This terrain has a warming and humidifying effect and helps to fill underground aquifers. As a result, *gotjawal* forests are home to both northern marginal plants growing at the northern limit of tropical plants and southern marginal plants growing at the southern limit of polar plants. Additionally, further Natural Reserves and Marine Protected Areas were included into the marine core areas: Soft Coral along the coast of Jeju(Natural Monument), Marado Island, Chagwido Island, Tokkiseom Island, Rhodoliths Beach on Udo Island(the term rhodolith refers to a rock-like substance formed when red algae is repeatedly rolled by tidal currents or waves), Chujado Island and Sasudo Island.

Jeju Island Geopark was confirmed as a member of the Global Geoparks Network in 2010. This network was later officially recognized by UNESCO in 2015. The entire area of Jeju Island, which has various volcanic topographical features and geological

Figure 1.



Gotjawal on Jeju Island

* Photo: Gotjawal Communization Foundation

resources, is a Global Geopark. Jeju Island Geopark includes 13 Geosites, the initial nine being: **a)** Mt. Hallasan, located in the center of the island, **b)** Suwolbong Tuff Ring, known as a major research site for hydrovolcanic eruptions(which occur when external water affects the eruption of magma), **c)** Mt. Sanbongsan Lava Dome, **d)** Yongmeori Tuff Ring, which preserves the history of hydrovolcanic activity in the early stages of Jeju Island's formation, **e)** Daepo Coast, which is recognized as a place for the study of columnar joints(five- or six-sided columns formed when lava splits vertically as it cools and shrinks), **f)** Seogwipo Formation, which contains shellfish fossils showing the marine environment one million years ago, **g)** Cheonjiyeon Waterfall, which shows the process of sediment erosion and formation of valleys and waterfalls, **h)** Seongsan Ilchulbong(Sunrise Peak) Tuff Cone and **i)** Manjanggul Lava Tube, the only lava tube that is open to visitors among the caves belonging to Geomunoreum Lava Tube System. Udo Island, Biyangdo Island and Seonheul Gotjawal were additionally designated as Geosites in 2014 and Gyorae Samdasu Village in 2018.

In 2005, the South Korean government designated Jeju Province as the 'Island of World Peace' under the Special Act on Jeju Free International City. As the Island of World Peace, Jeju pursues cultural, social and political activities that include a series of policies to implement the concept of positive peace, that is, a state free from all threats. Jeju Province had already been holding the Jeju Peace Forum biennially since 2001 as a part of its peace projects and since 2011 it has been held every year. The Governor of Jeju Province, Hee-Ryong Won, presented a concept of practical peace, comprising 'Peace of Healing', 'Peace of Tolerance' and 'Peace of Energy', at the opening address of the 2016 Jeju Forum for Peace

and Prosperity.

Governor Won argued that Peace of Healing originated from the nature of Jeju, saying that Jeju Island had created an ecological peace to conserve the environment and the ecosystem through the healing power of nature. He suggested that the people of Jeju had adapted to nature as it is, not plundering nature, so that the people of Jeju could themselves be regarded as representing peace. Additionally, he argued that Peace of Tolerance stemmed from the openness of the island, which was very different from the existing view of the island as isolated. Finally, he emphasized that Jeju Island would become a model for Peace of Energy under which energy would be peacefully produced and consumed. He stated his expectation that Jeju Island would use its abundant wind and sunlight to become a carbon-free island through wind power and photovoltaic power generation.

Kyeong-Min Ko, in his 2017 article, judged Governor Won's concept of peace to be feasible and proposed four associated action programmes: ① an action programme to improve human rights, ② an action programme for conflict management, ③ an action programme for ecological and environmental protection and ④ an action plan for international exchange and cooperation. Biosphere reserves are particularly relevant for the action programmes for conflict management and environmental protection. There have been frequent conflicts between development and conservation on Jeju Island. Biosphere reserves, however, are designed to promote harmonious coexistence between the ecosystem and local residents. When the three interrelated functions of biosphere reserves(conservation, development and logistic support) are fully implemented, the conflict between development and conservation can be reduced.

Kyeong-Min Ko focused on three factors in his suggested action programmes to create an eco-friendly peace culture: Jeju's 'triple crown' of UNESCO designations (with World Heritage, a Biosphere Reserve and a Global Geopark), *gotjawal* and the Jeju Olle Trail. He argued that projects to maintain the UNESCO triple crown should be recognized as a part of peace culture. Civic groups, in particular the Gotjawal Communization Foundation, have conducted and continue to conduct, campaigns to protect *gotjawal*, the lung of Jeju Island. Ko argued that when the Jeju Island Biosphere Reserve was expanded in 2019, the addition of *gotjawal* (Grade I and II of the Ecosystem Conservation Zone) to the core areas was a reflection of this work by civic groups. He considered that such grassroots community efforts for the conservation of natural resources would contribute to the spread of peace culture and that activities to promote eco-tourism, such as the construction of the Jeju Olle Trail, would also help to build such a culture.

The Jeju Peace Charter, proclaimed by Jeju Special Self-Governing Province on July 1, 2007, specifies, "we will protect and conserve nature's bounty, building a community for all life in which humans live in harmony". It signifies that compromise between humans and nature within certain boundaries, based on each unique ecosystem, is the foundation for a mutual and peaceful relationship with nature. The Environmental Subcommittee of the Action Council for Jeju Island of World Peace made sure that the management and utilization of biosphere reserves was included in its policies for such ecological peace.

Culture of Jeju *Haenyeo* (Women Divers)

One of the methods that Johan Galtung emphasizes for the building of positive peace is partnership in which humans and nature serve each other at the cultural level while satisfying each other's basic needs. Eco-feminism is one school of thought aiming at such partnership between humans and nature. Eco-feminism developed from various social movements, including the feminism movement, the peace movement and the environmental movement, in the late 1970s and early 1980s. Eco-feminism sees the natural ecosystem and humans as one and seeks the practical realization of the value of life and equality in life. It argues that the hegemony of male-dominant, Western, rational values and lifestyles have led to devastation and seeks to offer practical guidance to up-end this hegemony. Eco-feminism regards the oppression of women and the crisis in the natural world as originating from the same structure of oppression and therefore as problems to be tackled together. Meanwhile, eco-feminism also argues that there is an important link between the way we treat women, people of color and people of lower classes and the way we treat the natural environment.

Haenyeo (women divers who dive for seafood without using any breathing apparatus) are a good example of harmonious relations between humans and nature. *Haenyeo* (a term which translates to 'sea women') are also called '*Jamnyeo*' ('diving women') or '*Jamsu*' ('divers') on Jeju Island. As of the end of December 2019, 3,820 *haenyeo* were members of 102 village fishery cooperatives in Jeju Special Self-Governing Province.

On 30 November 2016, following a nomination by the Republic of Korea, the Intergovernmental Committee for the Safeguarding of the Intangible Cultural Heritage inscribed the 'Culture of Jeju *Haenyeo* (women divers)' on the Representative List of the Intangible Cultural Heritage of Humanity. According to the

Figure 2.



Jeju *haenyeo* move to the areas where they dive.

© Chul-In Yoo(2017)

decision of the Intergovernmental Committee, the culture of Jeju *haenyeo* contributes to the promotion of women's rights through an appreciation of their skills and contribution to household incomes and promotes environmental sustainability with its eco-friendly methods and community involvement in managing fishing practices. In the evaluation of the Intergovernmental Committee, the inscription of Jeju *haenyeo* culture would contribute to the global visibility of intangible cultural heritage elements that are based on local knowledge, foster nature and sustainable development and raise international awareness of the importance of women's work as intangible cultural heritage.

With the expansion of the Jeju Island Biosphere Reserve in 2019, all the areas where *haenyeo* dive were included in the reserve's transition areas. Biosphere reserves emphasize the importance of traditional knowledge in managing ecosystems,

encouraging efforts to integrate biodiversity and cultural diversity and the traditional ecological knowledge and diving skills of the *haenyeo* are excellent examples of the integration of biodiversity and cultural diversity.

The traditional local knowledge of the *haenyeo* about their environment and the diving skills needed to gather seafood without using any breathing apparatus are at the core of Jeju *haenyeo* culture. An average *haenyeo* holds her breath for up to a minute while diving up to ten meters underwater to gather marine products. The *haenyeo* must gauge their distance from the surface of the water against the depletion of oxygen in their lungs. Rather than physical factors such as lung capacity and cold tolerance, it is experience that makes the *haenyeo* good divers. The *haenyeo* must hone their physical strength and control, expand their mental map of the reefs and blend knowledge with movement efficiently.

Local knowledge of the topography of the reefs is an important factor in helping the *haenyeo* know where to go to catch seafood successfully. Through long experience of diving, they can guess

Figure 3.



A *haenyeo* catches seafood underwater.

* Photo: Cultural Heritage Administration

where the abalone may be on a particular day. Skilled *haenyeo* are acquainted with knowledge about marine creatures growing along the reef and such knowledge of what can be found where has been handed down by word of mouth. However, as shown by the saying, “A *haenyeo* mother doesn't tell her daughter where to gather abalone”, such specific knowledge on where to dive also relies very much on personal experience.

The work of the *haenyeo* is influenced by the wind, so knowledge of winds is also required. For example, on Marado Island, at the southernmost tip of Korea, where the *haenyeo* dive depends on the wind direction. *Haenyeo* on Marado Island work in the sea to the west of the island when the east wind blows and in the sea to the east when the west wind blows. Additionally, *haenyeo* must consider the direction of the sea current in relation to the wind direction, since if the wind blows in the same direction as the current, the speed of the current increases, while if the wind blows in the opposite direction to the current, the current flows more slowly. Therefore, if the wind is blowing in the same direction as the current, the *haenyeo* stay close to the shore, while if it is blowing in the opposite direction, they can swim further out to dive.

Haenyeo also consider the current conditions of the tide (called ‘tide time’) when they decide where to work and when. When they dive, *haenyeo* must make a comprehensive assessment of what the tide is doing, how fast the current is flowing, how long they can work and how clearly they can see under the sea. By understanding the ‘tide time’, they can choose where to dive without being disturbed by the tide, so that their float and net for catches are not dragged away by the tide and when they surface, they can easily put the seafood they catch in their net.

The sustainability of this eco-friendly diving work is a very

Figure 4.



A *haenyeo* association cleans the seashore and the intertidal zone.

* Photo: Haenyeo Museum

important characteristic of *haenyeo* culture. The human greed for a big catch is counterbalanced by an individual's limited capacity to remain underwater without the aid of breathing equipment. Each village fishery cooperative, which has exclusive fishing rights over the sea near its village, decides the number of days for diving each year under the law, regulates working hours per day and prohibits the use of some technology to avoid excessive fishing. Since *haenyeo* and the cooperatives consider the underwater area as a ‘sea farm’, they jointly clean the coastal area and the intertidal zone and remove unwanted seaweed several times a year to promote better growth of desirable marine products.

Ecological Peace: Fair Access and Conflict Prevention

Manifesto 2000 for a Culture of Peace and Non-Violence, declared, “The culture of peace makes possible sustainable development, protection of the environment and the personal fulfilment of each human being”. We will now examine how sustainable development and environmental conservation can be linked to peace.

The Operational Directives for the Implementation of the Convention for the Safeguarding of the Intangible Cultural Heritage clarify how the safeguarding of intangible cultural heritage contributes to sustainable development. Chapter 6 addresses how the safeguarding of intangible cultural heritage can contribute in four respects: inclusive social development, inclusive economic development, environmental sustainability and peace. In 2015, UNESCO also published a booklet titled Intangible Cultural Heritage and Sustainable Development to give additional explanation and reference material on Chapter 6 of the Operational Directives.

The explanatory booklet introduced examples to show how intangible cultural heritage contributes to the conservation and sustainable use of biological diversity. These examples included the Kikuyu women of Kenya, who play a highly important role in cultivating crops and preserving seeds. Traditionally, Kikuyu women grow multiple varieties of beans on the same field and conserve multiple seed stocks as a hedge against disease and unpredictable climate. Today, those seed stocks have become a valuable botanical repository of indigenous knowledge and have become even more valuable after agricultural genetic resources have been depleted following the several decades of monoculture at the national level. Farmers, herders, fishers and traditional healers, among other local knowledge holders, are the protectors of biodiversity.

Other examples of how local knowledge and practices concerning nature can contribute to research on environmental sustainability are traditional fishers, including Jeju’s *haenyeo*. Traditional fishers have strategic information that can help to address marine biodiversity challenges. They have developed detailed knowledge on the ecology and behaviour of fish, shellfish, seaweed and other marine products, migrations and habitats and fishing practices adapted to the seasons. Such detailed, diverse and dynamic knowledge can contribute to the conservation of marine biodiversity.

Peace, including freedom from conflict, discrimination and violence in all forms, is a prerequisite for sustainable development. Ecological peace depends on fair access to and control of natural resources by local people without any form of discrimination or exclusion.

Hijiki seaweed harvesting, which is carried out jointly by local residents on Jeju Island, is an example of fair access to natural resources. Hijiki grows everywhere on the local marine rocks and it is jointly gathered, dried and sold by the members of each village fishery cooperative. Of course, the income is also shared equally. One person from each family that joins the cooperative, regardless of gender, is mobilized to gather hijiki. As income from its sale is shared, some villages use a certain portion for village management.

The sea is divided into several zones for administration of the hijiki harvest. The income from the harvest depends on how well hijiki grows in each zone. In the case of Gapado Island, the sea is divided into 10 zones for harvesting hijiki and every year the zone for each group is changed, in an effort to use resources fairly.

Peace requires appropriate systems of conflict prevention and resolution. Local social practices of dialogue, conflict resolution

and reconciliation play an important role worldwide. Such customs, made not only to enable people to live together peacefully but also to respond to specific social and environmental contexts and to regulate access to shared spaces and nature resources, are informal but sophisticated.

For example, farmers living in the semi-arid Spanish regions of Murcia and Valencia come to communal tribunals to settle disputes over the distribution of water and the management of irrigation systems essential for the production of local specialty products. The Council of Wise Men of the plain of Murcia and the Water Tribunal of the plain of Valencia convene every Thursday and have the same legal validity as any other civil court. The members of the tribunal are farmers who are democratically elected or selected by lot and use their knowledge of agriculture, irrigation and local customs to mediate conflicting claims. The continuity of such social practices can be helpful to maintaining peace in the community by preventing and resolving conflicts in an inclusive manner that is acceptable to those involved.

In the culture of Jeju *haenyeo*, there are customary norms to resolve conflicts peacefully within the *haenyeo* community. A *haenyeo* association, an autonomous organization, is established under the village fishery cooperative which has exclusive fishing rights over the sea near its village. The *haenyeo* association, organized in each village, decides when and what to harvest and how long a rest period should be during a village event such as a funeral or a wedding ceremony. *Haenyeo* are divided into three groups according to their diving skills: higher-skilled (called *sanggun*), middle-skilled (called *junggun*) and lower-skilled divers (called *hagun*). However, at meetings of the association, each individual *haenyeo* has the right to speak and has the opportunity

to express her opinion freely. Since cooperation is the essence of diving work, the *haenyeo* association decides by unanimous vote. However, when the opinions of the three groups are too different to reach an agreement, the opinion of the higher-skilled group is respected and every member should eventually agree with the conclusion of the president of the *haenyeo* association.

Haenyeo must not only learn local knowledge about diving skills and the ecological environment, but also develop a kind of morality under which they should be generous to colleagues and humble as a human in front of the power of nature. The diving work of the *haenyeo* involves risk to their own lives and it would be easy for individual greed and overconfidence to arise in the course of the work - as the proverb says, "Opportunity makes the thief". Therefore, moral education is undertaken to reduce the risk of accidents during work, to maintain the unity of the *haenyeo* community and to foster the sense of responsibility for each other while they work under the sea. *Haenyeo* are competitors in gathering marine products but also trusting companions in their dangerous work in the sea. During a dive, they make sure that they work in groups to monitor the safety of other nearby *haenyeo*.

Moral education is also a part of *jamsugut*, a shamanistic ritual to pray for safety at sea and an abundant catch. The god's revelation during the ritual, narrated by the shaman (called a *simbang*), includes a warning that the *haenyeo* should not be greedy underwater, an acknowledgment that the hard and dangerous diving work is appreciated and a request that the *haenyeo* should live in harmony within the *haenyeo* association and collaborate with each other under the head of the *haenyeo* association and the head of the village fishery cooperative.

In such ways, the Jeju *haenyeo* have peacefully resolved

conflicts that each individual's greed can trigger within the *haenyeo* community. Their eco-friendly method of collecting seafood, limited by their ability to hold their breath underwater, is an example of harmonious relations between humans and nature. The ecological peace created by the culture of Jeju *haenyeo* shows how biosphere reserves, in contributing to the conservation and sustainable use of biodiversity, can also contribute to peace.

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Biodiversity Conservation and Peace

Hag Young Heo

Senior Research Fellow, Korea National Park Service

Introduction

In 1944, during World War II, President Franklin Roosevelt proposed a coalition and solidarity among nations on the conservation and use of natural resources, saying, “I am more and more convinced that conservation is a basis of permanent peace”.

The establishment of peace through cooperation to conserve the natural environment has continued to attract the attention of the international community. The 15th IUCN General Assembly(1981) adopted resolution 15/2 on Conservation and Peace, while the 25th Principle in the Rio Declaration on Environment and Development(1992) states, “Peace, development and environmental protection are interdependent and indivisible”. Recommendation 5.15 of the IUCN World Park Congress(2003), on Peace, Conflict and Protected Areas, emphasizes the contribution of protected areas to peace. Likewise, the UN Environmental Programme’s Programme of Work on Protected Areas(2004) put focus on protected areas and peace.

The Republic of Korea participates actively in these global efforts to establish peace by strengthening conservation cooperation in the international community. As the chair of the 12th Conference of Parties(COP) to the Convention on Biological Diversity(CBD), the Republic of Korea proposed the Peace and Biodiversity Dialogue Initiative, which was adopted in October 2014) and an MOU for a Peace and Biodiversity Dialogue Initiative was signed between the Korean Ministry of Environment and the Secretariat of the Convention on Biological Diversity in May 2015. Also, at the IUCN World Conservation Congress in 2016, South Korea’s Ministry of Environment and Korea National Park Service contributed to international efforts for transboundary conservation cooperation by developing a motion titled Transboundary Cooperation and Protected Areas and working for its adoption.

These are examples of efforts to resolve conflicts and build lasting cooperative relations in border areas prone to political and military confrontations through cooperation in non-political fields such as the environment and culture. Such cooperative efforts enable us to conserve biodiversity and build regional peace, which is a strategy for the true sustainability of humanity and the planet.

This paper will begin by examining international agreements and resolutions on conservation and peace in relation to the natural environment, as principles and guidelines for transboundary conservation cooperation. The paper will then explore the concept and examples of transboundary protected areas in which peace is pursued through conservation cooperation and the implications of protected areas for building an ecological community and peace on the Korean Peninsula, where the circumstances for cooperation are unstable and constantly changing.

International Recommendations on Environmental Protection and Peace

International agreements on environmental protection and peace have been made at various levels, but this paper examines the various agreements and resolutions adopted over time at the level of the UN and IUCN.

The Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration) was unanimously adopted by 121 countries at the United Nations Conference on the Human Environment in 1972. It presents seven Proclamations and 26 Principles. It can be said to provide guidelines for problem-solving in international discussions on the environment. The sixth Proclamation states, “to defend and improve the human environment for present and future generations has become an

imperative goal for mankind - a goal to be pursued together with and in harmony with, the established and fundamental goals of peace and of worldwide economic and social development”, clarifying that environmental issues require wide-ranging cooperation among countries and action by international organizations for the common interest.

The Declaration also emphasizes that “multilateral or bilateral cooperation and other appropriate means are essential to effectively eliminate, reduce, prevent and control negative environmental impacts”(Principle 24).

“Conservation and Peace”(Resolution 15/2) adopted at the IUCN World Conservation Congress(WCC) in 1981 noted “that many aspects of nature conservation can only be effectively addressed only through international cooperation among states” and expressed concern that “the future of humans and the environment is endangered by war and other hostile actions”. In addition, the Resolution affirmed that “peace is a contributory condition to the conservation of nature, just as conservation itself contributes to peace through the proper and ecologically sound use of natural resources” and called upon “all States to pursue diligently international discussions in the United Nations and other fora dedicated to the maintenance of peace and security within and between all States”, further calling on “all governments to give full effect to existing international agreements which contribute to the maintenance of peace and the reduction of global armaments”.

The World Charter for Nature was adopted by the General Assembly of the United Nations in 1982(UN Resolution 37/7) and admits the need for appropriate measures to protect nature and promote international cooperation in that field. It recognizes that “Mankind is a part of nature”, emphasizing that “man can

alter nature and exhaust natural resources by his action or its consequences” and that therefore, people must accept the urgent need to preserve nature and protect natural resources. The Charter sets out five General Principles, the fifth of which states, “Nature shall be secured against degradation caused by warfare or other hostile activities”.

The UN Conference on Environment and Development, known as the Earth Summit, was held in 1992 to respond to global environmental issues and eradicate wealth gaps between developed countries and developing countries. The Rio Declaration on Environment and Development, on the theme of environmentally sound, sustainable development, was adopted at this conference. The Rio Declaration proclaimed the 27 Rio Principles for sustainable development. It states that “human beings are at the center of concerns for sustainable development”(Principle 1), that international cooperation is required(with states having “common but differentiated responsibility”, Principle 7), that “peace, development and environmental protection are interdependent and indivisible”(Principle 25)’ and that “States shall resolve their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations”(Principle 26). This is in line with the promotion of peace and a society free from fear or violence as a key element of the UN Sustainable Development Goals(SDGs, 2015). Peace is one of the five key elements(5Ps: People, Planet, Prosperity, Peace, Partnership) highlighted in the preamble to the SDGs, which states that there can be no sustainable development without peace and no peace without sustainable development.

The Preamble to the Earth Charter(2000) states, “To move forward we must recognize that in the midst of a magnificent

diversity of cultures and life forms we are one human family and one Earth community with a common destiny. We must join together to bring forth a sustainable global society founded on respect for nature, universal human rights, economic justice and a culture of peace”, suggesting an ethical vision in which the natural environment, human rights, balanced development and peace are interdependent and inseparable. The Earth Charter presents 16 principles in 4 pillars as interdependent principles for a sustainable way of life. The 4 pillars are: I. Respect and Care for the Community of Life, II. Ecological Integrity, III. Social and Economic Justice and IV. Democracy, Nonviolence and Peace. Regarding peace, Principle 16,f asks that we “Recognize that peace is the wholeness created by right relationships with oneself, other persons, other cultures, other life, Earth and the larger whole of which all are a part”. The Charter also emphasizes global interdependence and the need for universal responsibility for the future and ends with the sentence “Let ours be a time remembered for the awakening of a new reverence for life, the firm resolve to achieve sustainability, the quickening of the struggle for justice and peace and the joyful celebration of life”.

The various international resolutions discussed above recognize that environmental protection, including nature conservation, requires humanity to take a shared responsibility and can only be achieved through international cooperation (bilateral and multilateral) in many areas. The resolutions ask that each state improve engagement and cooperation and assert that peace, development and environmental protection are interdependent and inseparable, implying(as the Preamble to the SDGs states) that “there can be no sustainable development without peace and no peace without sustainable development”.

Transboundary Cooperation and International Recommendations on Protected Areas

It can be argued that the interdependence and indivisibility of environmental protection, peace and sustainable development are of even greater importance in international border areas. Just as peace in a transboundary area can contribute to the conservation of nature and the environment, active cooperation for nature conservation can also contribute to the establishment of peace in the region. In this context, we will now look at the Convention on Biological Diversity(CBD) and the recommendations of the IUCN in relation to the establishment of peace through cooperation on conservation, for instance through designation of transboundary protected areas.

The CBD Programme of Work on Protected Areas(PoWPA), which is seen as a blueprint for protected areas, was adopted at the CBD's seventh Conference of Parties(COP) in 2004, recognizing "the importance of protected areas in terms of biodiversity conservation" and aiming to strengthen the role of protected areas and to reduce the rate of biodiversity loss dramatically. The overall purpose of PoWPA was to support the establishment and maintenance of national systems on protected areas which are comprehensive, effectively managed and ecologically representative, by 2010 for terrestrial areas and by 2012 for marine areas. It includes 16 goals, divided across 4 programme elements, with 92 activities under 9 themes. Goal 1.3 relates to transboundary cooperation in terms of protected areas for peace building. PoWPA Goal 1.3 emphasizes the establishment of regional networks, transboundary protected areas(TBPAs) and collaboration between neighboring protected areas across national boundaries, requiring parties to establish and strengthen transboundary protected areas, build cooperation between protected areas transcending national borders, enhance the protection of biological diversity and sustainable use, implement ecosystem-based approaches and improve international

cooperation.

The Peace and Biodiversity Dialogue Initiative(PBDI), proposed by the Republic of Korea(ROK) and adopted at the CBD COP 12 (2014), stipulates reinforcement of activities, such as regional workshops and expert meetings, that support the achievement of PoWPA Goal 1.3 and Aichi Target 11(one of 20 biodiversity targets adopted in 2010 at CBD COP 10) for the purpose of increasing international cooperation on ecosystem management and conservation among nations. The PBDI aims to showcase the value of Parks for Peace(a special IUCN designation dedicated to the promotion, celebration or commemoration of peace and cooperation that may be additionally applied to any of the three types of transboundary conservation area), the benefits of biodiversity conservation and, in particular, how conservation can help alleviate conflicts. It aims to keep updated information on transboundary conservation areas around the world, including candidate areas that can be designated as Parks for Peace, to strengthen cooperation with existing peace parks and to promote designation of new peace parks. In addition, it is designed to disseminate best practices and offer technical support and capacity building for the planning and establishment of Parks for Peace.

The Convention on Biological Diversity(CBD) is currently pursuing the PBDI as a special cross-cutting initiative, facilitating transboundary cooperation in protected areas globally. Through the PBDI, the Parties to the Convention on Biological Diversity try to share knowledge and best practices relating to transboundary cooperation. In addition, the PBDI aims to strengthen existing cooperation and develop new cooperation between the CBD Secretariat and various partners with relevant expertise.

IUCN WCC Resolution 35(Transboundary Cooperation and

Protected Areas), jointly developed by 23 organizations around the world, proposed by the ROK and adopted by the IUCN WCC in 2016, notes “that many areas with high biodiversity value straddle international borders and that transboundary conservation initiatives have been expanding in recent years”. The Resolution recognizes that transboundary cooperation for conservation goals “has the capacity to deliver multiple objectives including enhanced natural conservation outcomes, ecological sustainability, enhanced ability to respond to climate change, sustainable socio-economic development and the promotion of peace”. Additionally, the resolution acknowledges that in an era of political instability, cooperative frameworks for transboundary conservation can be used as a platform for international cooperation to tackle climate change as well as for the establishment of regional peace. Its key recommendations include providing support for communication in existing and new transboundary areas, implementing the IUCN World Commission on Protected Areas(WCPA) Guidelines for Transboundary Protected Areas(2015), strengthening transboundary conservation mechanisms, sharing relevant information, establishing and maintaining a global inventory of transboundary conservation areas and encouraging the installation of a global platform for transboundary conservation.

Concept of Transboundary Protected Areas

The IUCN Guidelines on Transboundary Conservation, released in 2015, define a transboundary protected area as “a clearly defined geographical space that consists of protected areas that are ecologically connected across one or more national boundaries and involves some form of cooperation”.

The main goals of the transboundary protected area are ① biodiversity conservation, ② social and economic development and ③ promotion of a culture of peace and cooperation. The specific goals of Parks for Peace may include the following aspects:

- Support for long-term cooperative conservation in respect of biodiversity, ecosystem services and trans-boundary natural and cultural values;
- Promotion of landscape-level ecosystem management through integrated land use planning and management;
- Trust-building, understanding, reconciliation and cooperation between countries, local communities, agencies and stakeholders;
- Prevention and relief of tensions, including over access to natural resources;
- Resolution of armed conflict and reconciliation following armed conflict;
- Sharing biodiversity and cultural resource management skills and experience, including cooperative research and information management.

The IUCN WCPA Transboundary Conservation Specialist Group classifies protected areas into three types.

Table 1. IUCN: Types of Transboundary Conservation Area

Type	Title
1	Transboundary Protected Area
2	Transboundary Conservation Landscape and/or Seascape
3	Transboundary Migration Conservation Area
Additional designation that may be applied to any of the three types of transboundary conservation area	Park for Peace

*Source: IUCN, 2015, Transboundary Conservation: A systematic and integrated approach, p.8.

A Transboundary Protected Area (TBPA, Type 1) is a clearly defined geographical space that consists of protected areas that are ecologically connected across one or more international boundaries and involves some form of cooperation. A Transboundary Conservation Landscape and/or Seascape (TBCL/Ss, Type 2) is an ecologically connected area that sustains ecological processes and crosses one or more international boundaries and which includes both protected areas and multiple resource use areas and involves some form of cooperation. Transboundary Conservation Landscapes (Seascapes) can include protected areas as well as

Table 2. Comparison of Characteristics of Each Type of Transboundary Conservation Area

Characteristics	TBPA	TBCL/Ss	TBMCA
Cross-border cooperation	Yes	Yes	Yes
Includes protected areas	Yes	Yes	Not necessarily
Includes areas that are not protected areas but are sustainably managed	No	Yes	Not necessarily
Shared ecosystem	Yes	Yes	Not necessarily
Physical proximity between unit spaces within the transboundary conservation areas	Yes	Yes	Not necessarily
Cooperation between countries to manage species and their habitats	Yes	Yes	Not necessarily
Protection of migratory wildlife is the main reason for cooperation	Not necessarily	Not necessarily	Yes
In terms of operation and management, cooperation between countries, strengthened relations between local societies, visitor management and security and safety are considered.	Yes	Yes	Not necessarily

* Source: IUCN, 2015, Transboundary Conservation: A systematic and integrated approach, p.14.

other areas that support conservation goals through sustainable development. These multiple resource use areas satisfy the objectives of protected areas and play a role in supporting the integration of transboundary protected areas into a landscape and/or a seascape. Transboundary Migration Conservation Areas (TBMCA, Type 3) are wildlife habitats in two or more countries that are necessary to sustain populations of migratory species and involve some form of cooperation. This concept differs from the previous Transboundary Migratory Corridor and can be said to better describe the geographical and spatial area.

A Park for Peace is a special designation that may be applied to any of the three types of transboundary conservation area and is dedicated to the promotion, celebration and/or commemoration of peace and cooperation. The previously used term, Peace Park, is often used in situations that are not transboundary, so IUCN has been using the term 'Park for Peace' to refer to a type of transboundary conservation area since 1997. (IUCN, 2015). The purpose of Parks for Peace is to celebrate lasting peace, to strengthen peace and cooperation and to promote peace in the future.

Examples of Transboundary Protected Areas

Cordillera del Condor Transboundary Protected Area

This transboundary area in Peru and Ecuador has a total area of 16,505.5 km², consisting of 25.4 km² in El Condor Park in Ecuador, 54.4 km² in the Zone of Ecological Protection in Peru and 16,425.7 km² in Santiago-Comaina Reserved Zone in Peru. Ecuador and Peru have had a history of border disputes as a result of a lack of border clarity since their independence from Spain in the early 19th

century, with a reputed 34 military clashes from 1828 to 1998.

In 1942, Ecuador and Peru agreed to a ceasefire under the Protocol of Rio de Janeiro, but in 1960, the Ecuadorian President declared the agreement void due to geographical contradictions and coercion during the negotiation process. In January 1995, the Cenepa War broke out between the two countries. To end this war, in February 1995 both countries began diplomatic negotiations, with the participation of the states that had been guarantors under the Rio Protocol and Ecuador and Peru both agreed to withdraw their armies from the affected area. After several rounds of negotiations, they agreed upon the Acta Presidencial de Brasilia in 1997, a treaty that included provisions on demarcation and consolidation of national borders and security agreements.

Table 3. The Brasilia Presidential Act (Acta Presidencial de Brasilia), signed in 1998

No.	Content
1	All disputed areas become areas for environmental protection. Both countries shall establish national parks in the border area. The two national parks shall share the same name.
2	Local indigenous communities are free to move in and out of both national parks at the border.
3	Ecuador is granted the right to 1 km ² of Peruvian territory in the area where battle took place in 1995.
4	Ecuadorian citizens are granted the right to free passage through a 5m-wide highway that leads to the territory of Ecuador.
5	In accordance with the Trade and Navigation Agreement, Peru gives Ecuador the right to access the Amazon River in a free, lasting and permanent way. Additionally, facilities capable of handling logistics and re-exports will be established for future trade and navigation.
6	Diplomatic documents are exchanged to manage the water supply of the Zarumilla Canal along the border to the Pacific Ocean.

* Source: The Carter Center 2010; Lee Sang-Hyun, et al. (2015) re-quoted

From 1993 to 1994, Conservation International(CI) conducted a Rapid Assessment of the ecological diversity and habitat of the Condor Mountains with government agencies and local scientists and stated the need for conservation. Thanks to the efforts of Conservation International and the International Tropical Timber Organization(ITTO), the Ecuadorian government designated 25.4 km² of border territory as El Condor National Park in 1999 and Peru established 54,4 km² of land as the Zone of Ecological Protection across the border, as well as the Santiago-Comaina Reserved Zone. CI and ITTO also implemented a bi-national project titled Peace and Conservation in the Cordillera del Condor, Ecuador-Peru from 2002 to 2004. The project was accomplished through financial support from ITTO and cooperation with government agencies, indigenous communities, national and international NGOs. It promoted technological cooperation between Ecuador and Peru, establishing the Transboundary Protected Area and integrating protected area management plans. These efforts resulted in the birth of the Condor-Kutuku Conservation Corridor Peace Park in 2004, an example of multiple organizations participating in conservation cooperation to resolve conflicts comprehensively, increasing awareness around the world of how Parks for Peace can work and what they can achieve.

Transboundary East Carpathians Biosphere Reserve(ECBR)

The Transboundary East Carpathians Biosphere Reserve(ECBR) is located in the area where the borders of Poland, the Slovak Republic and Ukraine converge and was the world's first trilateral transboundary biosphere reserve, designated in 1993 under the UNESCO MAB programme. During World War II and until mid-

1947, it was an area of military operations, but after that, the entire area became a natural habitat for flora and fauna. Ukraine occupies 27.5% of the total area, which is a well forested mountainous area with an altitude ranging from 210 m to 1,346 m. The area has been listed as a World Heritage Site since 2006, with natural birch and fir forests in the Carpathian Mountains and a primeval forest of birch. The landscape includes subalpine meadow rather than alpine vegetation and is one of the most important refuges and natural habitats for large predators native to Europe such as brown bears, foxes, lynxes and mountain cats and for large native herbivores such as red deer, reintroduced European bison and beavers, which maintain minimum viable populations in the mountains.

In May 1991, an agreement for trilateral cooperation was signed by protected area authorities in the three countries: the Bieszczady National Park in Poland, the Vychodne Karpaty Protected Landscape Area in Slovakia and the Zakarpatles Forest Service in Ukraine. They also ratified the Trilateral Protocol for the Designation of the Transboundary East Carpathians Biosphere Reserve, which was signed in September 1991 by the Ministers of the Environment for the three countries. In November 1992, UNESCO designated the East Carpathians/East Beskid Biosphere Reserve, bilaterally managed by Poland and Slovakia. The Stuzhitsa Landscape conservation area in Ukraine was designated separately in 1993. Later they were integrated and in December 1998, UNESCO finally designated the Transboundary East Carpathians Biosphere Reserve as the world's first trilateral biosphere reserve.

This designation attracted attention from international aid organizations. The Foundation for Eastern Carpathians Biodiversity Conservation (ECBC Foundation) was registered in Switzerland in 1995 and launched the first micro-investment project for NGOs

and local communities in 1996. In 2001, the ECBC Foundation opened a representative office in Poland and in 2004 it set up the Transboundary Area Cooperation Support Plan. However, political upheaval in Poland in 2006 led to changes in park staff and attitudes toward international cooperation, forcing the ECBC Foundation to halt all projects and close the local office.

Since 2007, cooperation in ECBR has been confined to scientific conferences held annually in Poland. The development of this transboundary cooperation in ECBR has been possible because of the friendly relationships among protected area managers and scientists in the three countries.

International Peace Park

In 1932, Waterton Lakes National Park(Canada) and Glacier National Park(USA), located at the border between the United States and Canada, were jointly designated as the world's first international peace park, functioning as a symbol of ever-lasting peace and friendship between the two countries. Rotary club members and national park officials from both countries proposed the designation of a peace park to ensure the ecological and geographic homogeneity across both parks, to resolve conflicts between indigenous people triggered by migration issues and to enable wildlife and indigenous people to move freely. US Congress and the Parliament of Canada decided to integrate the two parks, establishing the Waterton-Glacier International Peace Park as the first such peace park in the world. Since then, it has been seen as an icon of peace, effective in helping to resolve regional conflicts and integrate ecosystems and human populations, as well as increasing awareness of the contribution that cooperation in transboundary areas makes to peace.

IUCN Transboundary Protected Areas

The UNEP World Conservation Monitoring Centre has established a global inventory of IUCN's transboundary protected areas (TBPAs). As of 2007, there were a total of 227 TBPAs, the designation and management of which are based on the guidelines produced by the Transboundary Conservation Specialist Group of the IUCN World Commission on Protected Areas. One example is the combined 6,043.97 km² protected area comprising Mt. Baekdusan in the Democratic People's Republic of Korea (DPRK, or North Korea), Mt. Changbai and Jingbohu Lake in China and Kedrovaya Pad in Russia.

Implications of Conservation Cooperation for the Establishment of Peace

As discussed above, peace, development and environmental protection are interdependent and inseparable and conservation cooperation in border areas can be very useful as a means to promote peace and sustainable development in such areas. There are various examples of solutions to conflicts and disputes being sought through cooperation in non-political fields, such as the environment and culture, in attempts to establish mutually sustained cooperative relations in border areas subject to political or military confrontation. The two Koreas have, for example, made joint declarations agreeing to cooperation on various environmental issues on several occasions.

Representative examples of inter-Korean agreements include Chapter III (Inter-Korean Exchange and Cooperation) of the Agreement on Reconciliation, Nonaggression and Exchanges and Cooperation between the South and the North (December 13, 1991) and its Attached Agreement (September 17, 1992), which

specify inter-Korean exchanges and cooperation in the fields of science, technology and the environment. At the first meeting of the Inter-Korean Health Care and Environmental Protection Cooperation Subcommittee (December 21, 2007), the two Koreas reached an agreement to actively promote cooperation in health care, environmental protection and afforestation projects, via joint research on the Baekdusan Volcano, installation and expansion of air pollution-measuring facilities, establishment of an environmental protection center and biotope mapping on the Korean Peninsula, a step-wise project for greening forestry and investigation and removal of forest disease and pests. In addition, through the Pyongyang Joint Declaration (September 19, 2018), the South and the North agreed actively to promote inter-Korean environmental cooperation for the protection and restoration of natural ecosystems.

Further efforts are needed to reinforce the conservation cooperation based on these existing agreements in order to make a joint ecological community a reality (e.g. through the Sorak-Kumgang International Peace Park and DMZ International Peace Zone) and ensure that this kind of ecological diplomacy can effectively promote the settlement of peace on the Korean Peninsula in what is a rapidly changing environment for cooperation. In this respect, the Korean Ministry of Environment and the Korea National Park Service conducted a comprehensive review of 15 potential inter-Korean cooperation projects concerning the natural environment through the Study on Inter-Korean Cooperation in the Natural Environment and proposed the following priorities: ① to promote the designation of a Sorak-Kumgang International Peace Park, ② to support agro-forestry management and cooperation, ③ to conduct a joint project to conserve internationally-important

migratory birds (black-faced spoonbills, cranes, etc.), ④ to link and develop inter-Korean ecotourism sites and ⑤ to build an integrated database on biodiversity and representative ecosystems on the Korean Peninsula.

To promote such cooperative projects effectively, a systematic approach will be required, including formation of an international consensus and establishment of a framework for cooperation, with suitable partners. It is greatly to be hoped by all Koreans that such efforts will allow the building of a healthy ecological community across the Korean Peninsula and bring the prospect of true peace on the peninsula a step closer.

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Transboundary Biosphere Reserves as Places for Cross-Border Eco-peace Cooperation

Suk-Kyung Shim

Member of the International Advisory Committee for Biosphere Reserves
Vice-chair of the MAB National Committee of the Republic of Korea

In the wake of the global devastation wrought by World War II, the international community established UNESCO for the purpose of building global peace through education, science and culture. In line with the purpose of UNESCO's establishment, the value of peace is given great importance in the organization's various programmes and projects. In 1971, when consensus that environmental issues would become a great threat to humanity began to spread in the world, UNESCO established the Man and the Biosphere Programme(MAB) to pursue the harmonious coexistence of humans and the biosphere. Subsequently, in 1974, a scheme to designate biosphere reserves was created to translate the objectives of the MAB into reality. As of May 2021, the World Network of Biosphere Reserves comprises 714 biosphere reserves.

A biosphere reserve is a place for sustainable development in which the biosphere(or nature) and humans co-exist in harmony rather than confrontation or conflict. This value of peace between nature and humans inherent in biosphere reserves exerts a greater effect across borders. Transboundary biosphere reserves(TBRs), which are jointly designated and managed by neighboring countries and regional and sub-regional biosphere reserve networks, have a major role to play as venues for ecological peace cooperation.

This paper aims to introduce the advantages of biosphere reserves in terms of ecological conservation and peace promotion. It will also look at the current situation in relation to designations and representative examples of TBRs as places for ecological peace and cooperation transcending national borders. The paper also examines the case of an inter-Korean TBR initiative, started in early 2000. By looking back at this initiative to establish a Korea DMZ TBR, the paper aims to explore how a TBR could

contribute to conservation of the Korean DMZ region and to the establishment of inter-Korean peace.

What is a Transboundary Biosphere Reserve?

Cooperation for Ecological Peace in Biosphere Reserves that Transcend National Borders

In general, the term peace refers to 'social peace'. What, then, is 'ecological peace'? Ecological peace or eco-peace is a fairly familiar term among those who make and study ecosystem conservation policies. For Koreans, in a situation where North and South Korea still exist in a state of confrontation, the term 'ecological peace' is closely connected, above all, to the Korean Demilitarized Zone (DMZ) between the two Koreas. The three-year Korean War has not ended officially, though an Armistice Agreement was signed in 1953.

For experts in ecological conservation, eco-peace refers mostly to the simultaneous realization of peace between humans, that is, social peace and ecological conservation, or in a more positive sense, the concept of building social peace through cooperation for ecological conservation. If ecological conservation is regarded as peace between humans and nature, we can say that eco-peace encompasses both peace within human society and peace between humans and nature.

TBRs and regional/sub-regional biosphere reserve networks are useful venues for eco-peace cooperation across borders. Border areas are typically places prone to conflict and confrontation due to sensitivities in national interests. TBRs, as areas where ecosystems divided by borders are designated and managed jointly by neighboring countries, showcase the value of eco-peace. In

addition, regional and sub-regional biosphere reserve networks not only serve as a platform through which member countries can cooperate continuously with each other, but also specifically provide a basis for comprehensive eco-peace cooperation, particularly by exploring possibilities for new TBRs and supporting their designation and management.

Biosphere reserves, all of which belong to a world network, have a well-developed regional and sub-regional network system, compared to other international protected areas such as World Heritage Sites and Ramsar Wetlands. According to the Statutory Framework of the World Network of Biosphere Reserves, which regulates the designation and operation of biosphere reserves, biosphere reserves together constitute the World Network of the Biosphere Reserves and interact and cooperate within sub-network systems by region and theme. This allows biosphere reserves around the world to participate in thematic or regional/sub-regional networks to share information and experience and exchange education, training, research, etc.

Currently, the regional networks include AfriMAB(Africa), IberoMAB(South America, Caribbean, Portugal, Spain), EuroMAB(Europe, North America) and ArabMAB(Arab region). In the large Asia-Pacific region, the following four sub-regional networks are operated:

- East Asia: EABRN(East Asian Biosphere Reserves Network)
- Southeast Asia: SeaBRnet(Southeast Asian Biosphere Reserves Network)
- South and Central Asia: SACAM(South and Central Asia MAB Network)
- Pacific: PacMAB(Pacific Man and the Biosphere Network)

The East Asian Biosphere Reserve Network (EABRN) was the first sub-regional network established in the Asia-Pacific region. The Republic of Korea's government has supported EABRN through the provision of operating funds since the network was established. EABRN was initiated following the Cooperative Scientific Study of East Asian Biosphere Reserves, in which the ROK, DPRK, China, Japan and Mongolia participated. It was officially launched during the 3rd Joint Comparative Study held in the Mt. Sorak Biosphere Reserve in May 1995. The network currently has seven members, after Russia and Kazakhstan joined in addition to the five founding member states.

EABRN has made significant and sustained contributions to regional eco-peace cooperation in Northeast Asia, where there is otherwise little institutionalized regional cooperation compared to other sub-regions in Asia-Pacific. In particular, experts and government officials from North and South Korea have met and conducted exchanges at EABRN meetings, co-operating on support for the publication of North Korean books on ecology through UNESCO and the 5-year Survey Project on Natural Resources of the North, which was implemented from 2014 to 2015 but then suspended.

Establishment and Advantages of Transboundary Biosphere Reserves

A TBR is a cooperative project to manage social and ecological systems across borders. The designation and management of TBRs are much more complicated than for biosphere reserves within a country and require consideration of many more factors. The process for designation of a TBR and for periodic reviews,

through which reports are made to UNESCO every ten years after the designation, must comply with the recommendations of the Seville+5 International Meeting of Experts held in Pamplona, Spain in October 2000. These recommendations are commonly referred to as the Pamplona Recommendations.

Since 2000, when the above-mentioned Seville+5 International Meeting of Experts was held, UNESCO has been actively supporting the designation and management of TBRs in order to promote international peace and security. TBRs are a useful tool for conserving shared ecosystems across borders and are based on agreements between relevant governments to manage ecosystems in an integrated way. Joint policies are established to promote appropriate land use of shared ecosystems, joint project development, sharing of information and experience and the participation of local communities and stakeholders. In particular, in the process of officially designating the TBR, various forms of cross-border cooperation and coordination are implemented between protected areas and government authorities in the relevant countries.

■ Advantages of Transboundary Biosphere Reserves

Designation and management of biosphere reserves within a country is itself challenging. In the case of TBRs, there is also the daunting task of cooperation between neighboring countries. However, there are also many additional benefits that can be gained through TBRs.

- Integrated management of ecosystems divided by man-made borders

Integrated ecosystems that are divided by man-made

borders are subject to different legal and administrative systems on each side of the border, making it difficult to implement consistent and comprehensive conservation and management. However, TBRs can reinforce the conservation and management of ecosystems by coordinating conservation measures for species migrating across borders and providing more effective responses to large-scale disasters such as pests, wildfires and sudden floods.

• Long-term cooperative framework for eco-peace

TBRs contribute to strengthening relationships among stakeholders, including managers, administrative authorities and local communities, in their own country and neighboring countries. This helps in identifying concrete common interests among countries and facilitates cooperation with and between the government authorities of neighboring countries. Unlike inter-country cooperation projects that take place over a limited period of time, TBRs operate for decades, enabling genuine cooperation and joint institutionalization.

One special characteristic of TBRs compared to other types of transboundary protected areas is that TBRs are designated by an international organization, that is, UNESCO. The TBR is created not only by agreements between governments but also by agreements with UNESCO, which acts as a kind of 'neutral arbitrator'. If there is a problem in the TBR, the issue is open to the international community, including international aid agencies, NGOs, media and diplomatic channels, which can offer support to resolve it. The UNESCO designation provides an additional guarantee mechanism, something that becomes especially important in the event of a dispute in the area.

• Creation of the culture of peace

TBRs enable the message of peace, tolerance and hope to be shared among members of the local community and to be spread externally. If countries with a similar language and culture increase cross-border contacts and exchanges in the TBR, a new regional identity can be instilled in the border-divided community. In the case of countries with different languages and cultures, the TBR is conducive to easing tensions in the border areas, facilitating freedom of movement and promoting peace.

• Overcoming the disadvantages of the periphery

TBRs are usually located at the periphery of the countries concerned, in areas that are often marginalized and disadvantaged compared to centers such as the capital of the country. With the designation of a TBR, these peripheral border areas are put on the world stage and accordingly, awareness of and pride in the area are greatly increased. Socio-economic development can be achieved through tourism, etc., as political interest in the region increases. Poor infrastructure can be improved and the possibility of financial support from international aid organizations is also likely to be much increased.

■ **Process for Establishment of a Transboundary Biosphere Reserve**

The process to establish a TBR can be implemented in two ways. The first is to begin with individual countries establishing separate biosphere reserves on each side of the border and then combining them for a TBR nomination. The other way is for the relevant countries to establish a TBR jointly in one step. The

ultimate aim of either way is to create one biosphere reserve that can function in an integrated way.

Many TBRs have been established using the first method, which is recommended by UNESCO. As for the nomination of any biosphere reserve, the specified form for designation must be completed and submitted. An official agreement between the competent authorities and a joint action plan, which is not required in the case of general(not transboundary) biosphere reserve nominations, should also be attached. In addition to the nomination documents, the following issues should be addressed during the TBR nomination process:

- the zonation should be defined in line with the general criteria for the designation of biosphere reserves;
- local and national partners should be identified and a joint working/coordination group established, to define the basis and identify key issues for co-operation;
- a joint management structure should be identified with clear mandates;
- governmental authorities in all relevant countries should sign an official agreement regarding the TBR;
- a decision must be made as to whether each state authority will nominate the respective parts on either side of a border or the relevant state authorities in all countries will submit a joint nomination; and
- the main components of a plan for future co-operation should be provided.

Although general tasks to be implemented are suggested in line with the basic concept of biosphere reserves, the situation

in each area may vary considerable and a flexible approach is required. The Pamplona Recommendations on the establishment and function of TBRs emphasize that it is necessary to form a working group for transboundary cooperation with partners from each area and country and to identify cooperative tasks. The working group could in the future be developed into a joint coordination body for a TBR, called a bilateral committee or joint steering committee. In addition to joint coordination bodies, national governance systems to manage each national area exist in most TBRs.

Transboundary Biosphere Reserves around the World

Current Status of Transboundary Biosphere Reserves

As of December 2020, 714 biosphere reserves existed in 129 countries, of which 21 are TBRs that are managed by 31 countries in total. Most TBRs are located in Europe, Africa and Latin America and the only TBR in Asian region is the Great Altay, which is located on the border of Kazakhstan and the Russian Federation. TBRs do not only connect countries. The Intercontinental Biosphere Reserve of the Mediterranean between Morocco and Spain connects two continents: Europe and the Arab region/Africa.

In the early 2000s, there were discussions and research conducted within EABRN to promote the designation of TBRs in Northeast Asia. Tentative candidate TBR sites were proposed, targeting outstanding ecosystems located on the borders of China, the DPRK, Mongolia, the ROK and the Russian Federation, including the lower Tuman River area on the border between China, the DPRK and the Russian Federation. The Demilitarized Zone(DMZ) between the DPRK and the ROK was also included

Table 1. Transboundary Biosphere Reserves in the World Network of Biosphere Reserves

(As of May 2021)

Year of designation	Countries	Transboundary Biosphere Reserve
1992	Czech Republic / Poland	Krkokonose / Karkonosze
1992	Poland / Slovak Republic	Tatra
1998	France / Germany	Vosges du Nord / Pfälzerwald
1998	Poland / Slovak Republic / Ukraine	East Carpathians
1998	Romania / Ukraine	Danube Delta
2005	Islamic Republic of Mauritania / Republic of Senegal	Delta du Fleuve Sénégal
2006	Kingdom of Morocco / Spain	Intercontinental Biosphere Reserve of the Mediterranean
2009	Portugal / Spain	Geres - Xures
2011	El Salvador / Republic of Guatemala / Republic of Honduras	Trifinio Fraternidad
2012	Republic of Belarus / Poland / Ukraine	West Polesie
2012	Republic of Croatia / Hungary	Mura Drava Danube
2014	Republic of Albania / Republic of North Macedonia	Ohrid-Prespa
2014	France / Italy	Mont Viso / Area della Biosfera del Monviso
2015	Portugal / Spain	Meseta Ibérica
2016	Portugal / Spain	Tejo/Tajo Internacional
2017	Republic of Kazakhstan / Russian Federation	Great Altay
2017	Republic of Benin / Republic of Togo	Mono
2017	Dominican Republic / Republic of Haiti	La Selle - Jaragua-Bahoruco-Enriquillo
2017	Republic of Ecuador / Peru	Bosques de Paz
2019	Poland / Ukraine	Roztocze
2020	Republic of Benin / Burkina Faso / Republic of Niger	Complex W-Arly-Pendjari WAP

among the tentative candidates and the establishment of the Korea DMZ TBR was promoted as an inter-Korean cooperation initiative by the ROK government.

Examples and possibilities of Transboundary Biosphere Reserves

TBRs around the world are attracting attention as venues for eco-peace cooperation that transcends borders. Through cooperation on ecological conservation, TBRs are utilized to overcome distrust and stereotypes about places on the other side of a border, as well as to seek and execute joint projects for social and economic development, contributing to the establishment of peace. The 21 existing TBRs offer various examples and possibilities of cooperation between countries with different historical, social and cultural backgrounds and environments. Some of them are presented below.

■ Vosges du Nord/Pfälzerwald Transboundary Biosphere Reserve (France/Germany)

The Parc Naturel Régional des Vosges du Nord(France) was designated as a biosphere reserve in 1988 and the Naturpark Pfälzerwald(Germany) in 1992. In 1993, the two were combined to become a TBR. The two nature parks are located in low sandstone hills and belong to the same topographic zone. This was the area of Alsace-Lorraine, where there were fierce territorial disputes between France and Germany in the past and which was a battleground during the First and Second World Wars. As a result of this historical background, not much mutual exchange took place over the border between the two countries, although there were

many cultural similarities in terms of local dialects, architecture and traditions.

In the wake of the TBR designation, a coordination committee was established and a joint scientific committee was formed consisting of representatives of the scientific committees of the nature parks of both countries. The formal agreement for the TBR includes several areas of activity for transboundary cooperation and development, including conservation of biodiversity, sustainable forestry, agro-ecology, quality tourism, education for sustainable development, support for innovation, support for sustainable energy, climate change, cultural heritage, intercultural communication and participation in MAB networks.

Various cooperation projects have been carried out successfully, one example being the cross-border farmers' markets held twice a year in France and three times a year in

Figure 1.



Vosges du Nord-Pfälzerwald Transboundary Biosphere Reserve (France-Germany) produces and uses education materials on the nature and culture of the TBR for school classes

* Photo: #ProudToShare - Good Practices in French Biosphere Reserves, 2017).

Germany. Agricultural products, forest products and creative crafts produced in a sustainable manner by local residents of both countries are sold together in a market near the border, attracting many visitors. In addition, hunters, forest managers, scientists, environmental educators, representatives of government agencies and natural environment organizations are working together to form a transboundary network to protect the lynx, an important protected species in this area.

■ Bosques de Paz Transboundary Biosphere Reserve (Ecuador-Peru)

The Bosque Seco Biosphere Reserve in southwest Ecuador and the Noroeste Amotapes-Manglares Biosphere Reserve in northwest Peru became a TBR in 2017. Located at the western foot of the Andes, with peaks of around 3,000 meters, the Bosque de Paz TBR is the first TBR in South America.

When Ecuador and Peru became independent from Spanish colonial rule in the 19th century, the border between the two countries was unclear, driving them into repeated confrontation and war as each tried to secure the core route to the Amazon River. A peace agreement concluded after fierce battles in 1995 was not effective, but a more substantial peace agreement was signed in 1998 with an agreement on trade and sea routes, a security agreement to prevent further disputes and final settlement of the border line. In 1999, with the help of international organizations such as the International Tropical Timber Organization (ITTO), Ecuador designated El Condor National Park and Peru designated the Ecological Reserve and Santiago-Comaina Conservation Area. Later they were combined to establish the Cordillera del Condor transboundary peace park.

Figure 2.



An image from the brochure for the Bosques de Paz Transboundary Biosphere Reserve(Ecuador-Peru)

In 2017, the Bosques de Paz TBR was finally established. This is a result of the efforts of the two countries to strengthen ties, trust and cooperation in various fields over the 20 years since the 1998 peace agreement. The recognition by the international community of this border area, previously a conflict zone, as a UNESCO TBR helped to strengthen the peace in the area by giving it international backing. The name of the biosphere reserve, Bosques de Paz(Forest of Peace) reflects this purpose.

■ Intercontinental Biosphere Reserve of the Mediterranean (Morocco - Spain)

In 2006, land, coast and sea areas in the Andalusia region of Spain and in Morocco, together with the Gibraltar strait between them, were designated as an intercontinental biosphere reserve(total area 9,072 km²), the first of its kind. The ecosystem is very rich, providing a habitat for 117 species of migratory birds

Figure 3.



Location of the Intercontinental Biosphere Reserve of the Mediterranean (Morocco-Spain)

*Photo: UNESCO Website. <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/transboundary-biosphere-reserves/spain-morocco/intercontinental-br-of-the-mediterranean/>

in particular. A unique Andalusian culture has developed here over the course of history, as a result of continued mutual exchanges between the two countries. The TBR incorporates conservation methods from both Morocco and Spain and promotes a variety of traditional lifestyles and artistic expressions. As a result, historical relations are renewed and institutionalized and cultural similarities are rediscovered. Fresh water is a particularly important target for cooperation between the two countries. Water connects cultural and socio-economic factors and gives a common identity to the entire biosphere reserve. The water in the biosphere reserve is also a resource for the Sahara Desert and the Iberian Peninsula, which are fighting desertification.

The DMZ Transboundary Biosphere Reserve Initiative

In the early 2000s, an initiative to establish a TBR in the DMZ between North and South Korea was promoted by the ROK government as a potential North-South cooperation project, receiving attention from various national and international organizations and experts.

The DMZ was created following the conclusion on 27 July 1953 of the Armistice Agreement for the Korean War. Its purpose was to provide a buffer against military confrontation and to help maintain security. As time passed, it unexpectedly developed an ecological value hard to find elsewhere in the world. The ecological processes in the area, where nature had been brutally destroyed by the war, were restored as a result of the very special conditions brought about by prohibiting human entry for decades. The area became a habitat for numerous rare animals and plants, attracting the attention of the international community. Since the 1970s, there have been several proposals to establish an international protected area in the DMZ. These proposals had similar names, such as the International Nature Peace Park and aimed to promote eco-peace and conserve ecosystems in the DMZ. However, most of them went no further than declarations that were difficult to realize, with no specific implementation plans.

Studies and discussions have also been conducted on how UNESCO designations, such as World Heritage and Biosphere Reserves, could be used to conserve the ecosystems in the DMZ. Particular efforts were made over several years, as a major policy initiative of the ROK government, to establish an inter-Korea TBR. Subsequently, after a series of related efforts, two biosphere reserves have been designated centering on the Civilian Control Zone in South Korea, adjacent to the DMZ.

Promotion of an Initiative to Establish a DMZ Transboundary Biosphere Reserve

The early 2000s was a time ripe for inter-Korean reconciliation and cooperation under the Sunshine Policy of the Kim Dae-jung administration in the ROK, evidenced by the holding of an inter-Korean summit in 2000. Economic cooperation was active, including the development of tourism in the Mt. Kumgang area in the DPRK, the restoration of road and rail connections along the Gyeongui Line and East Sea Line and groundbreaking for the Kaesong Industrial Complex. As part of the work to connect the Gyeongui Line and the East Sea Line routes between North and South Korea, a survey on the DMZ environment was conducted, although this was very limited. Exchanges and cooperation also flourished at the private sector level. In this atmosphere, President Kim Dae-jung ordered a feasibility study on designation of the DMZ as a TBR in early 2001 at a New Year's meeting with environmentalists. After this, the DMZ TBR initiative began to be promoted as a national policy task.

The chairman of the ROK's MAB Committee sent an official letter to the chairman of the DPRK MAB Committee in April 2001, inviting North Korea to cooperate on the initiative. ROK representatives also sought the DPRK's cooperation when participants from the two Koreas met at EABRN meetings. At the time, the ROK government had adopted the approach of establishing a TBR in one step and tried to persuade the DPRK to participate in a joint designation, but the DPRK refused.

Change of Approach: Designation of DMZ Biosphere Reserve within the ROK

While the central government's policy goal of establishing an inter-Korean TBR to protect the DMZ's ecosystems was at a standstill, local governments in the border areas began to make their own policies and plans for ecological conservation of the DMZ region, together with development of the local communities. In this context, Gyeonggi Province established a plan in 2009 for the designation of the DMZ Peace and Nature Park and DMZ Biosphere Reserve, centering on the DMZ and the Civilian Control Zone in the ROK.

In line with this trend, the ROK's Ministry of Environment prepared a zonation plan for a DMZ Biosphere Reserve in December 2009 and revised the existing TBR establishment strategy in March 2011. There was a shift of approach, with the ROK now planning first to designate a DMZ Biosphere Reserve encompassing only the ROK side of the DMZ and its adjacent areas and then to persuade the DPRK to expand it to cover the northern side afterwards. In September 2011, the nomination dossier for the Korea DMZ Biosphere Reserve was submitted to UNESCO. The southern section of the DMZ and the legally protected areas in the Civilian Control Zone were set as the core areas.

■ Results and Implications of the DMZ Biosphere Reserve Nomination in 2011

During the 24th Session of the International Co-ordinating Council for MAB (MAB ICC), held at UNESCO Headquarters in Paris, France in July 2012, a decision was made to defer consideration of the DMZ Biosphere Reserve nomination. The reason given for deferral was that the nomination specified neither

a buffer zone nor a transition area in Cheorwon County, adjacent to the core area in the DMZ, failing to meet the criteria for zonation of biosphere reserves. In addition, the DPRK delegation attending the session strongly opposed the designation, citing the lack of sign-off from the UN Command and a violation of the Armistice Agreement.

The DMZ Biosphere Reserve nomination did not succeed, but some useful lessons can be drawn from it.

First, the DPRK's position and attitude must be borne in mind. The DPRK stated at the 24th Session of MAB ICC, that "According to the Armistice Agreement, the DMZ has only military functions. Only when political changes, such as a peace agreement, are made, can it be used for other purposes such as ecosystem conservation". However, in reality, the Armistice Agreement has not been implemented as written by either side and the situation is managed by agreements between the two Koreas as long as these do not conflict with the UN Command. In the case of the projects aiming to connect the railways and roads along the Gyeongui Line and East Sea Line, which were already being promoted through inter-Korean economic cooperation, the DMZ issue was dealt with via direct discussions and decisions between the two Koreas. In light of this, it can be seen that the root cause of the DPRK's opposition was not a matter of violating the Armistice Agreement, but rather the tension between North and South Korea. If political tension between the two Koreas is not alleviated, it will be difficult to make progress on inter-Korean cooperation in relation to the DMZ.

Second, the position and views of the international community must be borne in mind. In the professional examination of the International Advisory Committee for Biosphere Reserves and at the initial discussion of the MAB ICC, the zonation delineated in the

DMZ Biosphere Reserve nomination was not an issue. The unique characteristics of the DMZ and the Civilian Control Zone, where the ecosystem was conserved as an indirect result of the area's control and management for military purposes, were recognized. In fact, there have been multiple cases in which nominations have been considered by the MAB ICC to meet the criteria for the zonation of the biosphere reserve even if a buffer zone or a transition area has not been established adjacent to the core area. For instance, if a high mountain is located adjacent to the core area, then nonexistence of a buffer zone or transition area is accepted under the assumption that the adjacent high mountain can function as a buffer to substantially protect the core area. Nevertheless, the regulations for military purposes, which have made conservation of the DMZ ecosystems possible as an incidental outcome, were not considered a stable and long-term conservation measure. Measures must be put in place to legally protect the ROK side of the DMZ and the parts of the Civilian Control Zone which are ecologically important, for conservation purposes, for instance measures to designate the area as a national park or a nature reserve.

Third, the acceptance and support of the local community are important. In 2011, the DMZ Biosphere Reserve nomination was led by the central government, focusing on the conservation of the ecosystem inside the DMZ and its symbolic implications at home and abroad. Insufficient attention was paid to engaging local residents and linking the biosphere reserve to the development of neighboring communities. The lack of efforts to involve local governments and engage local people in the nomination process resulted in a situation where no part of the Civilian Control Zone in Cheorwon County was included in the biosphere reserve nomination. Biosphere reserves pursue sustainable development of

communities based on conservation. In addition to the conservation of the DMZ ecosystems, more efforts should have been made to increase the awareness and participation of residents, to empower local governments, to create trust in the government and to build practical public-private partnership.

■ Local Government Initiatives to Establish Biosphere Reserves in the DMZ Region

To address the lack of understanding and participation by the local community that had contributed to the deferral decision on the nomination for designation of the DMZ Biosphere Reserve, the Ministry of Environment and the local governments in the relevant areas began a project to raise awareness among the residents of the border area. From 2013 to 2017, education programmes for local residents were conducted on an ongoing basis in seven cities and counties in the border areas of Gyeonggi and Gangwon Provinces, to raise awareness of biosphere reserves and increase capacities for sustainable development.

In Gangwon Province(Goseong, Inje and Yanggu Counties), the DMZ Biosphere School and the DMZ Biosphere Demonstration Village were established and activities with local residents were carried out to create a village development plan in connection with the proposed biosphere reserve. In Yeoncheon County, Gyeonggi Province, the DMZ Academy for Residents operated for three years. After completing a course at the academy, residents formed small-scale cooperatives and other groups to encourage the sale of locally-produced agricultural products and other local goods. As a result of these continuous educational efforts, local residents' understanding about biosphere reserves has increased and positive perceptions have expanded.

Thanks to these achievements in promoting local awareness, two biosphere reserve nominations for the DMZ region were submitted to UNESCO in September 2018: Gangwon Eco-peace Biosphere Reserve and Yeoncheon Imjin River Biosphere Reserve. There were some differences between the Korea DMZ Biosphere Reserve nomination in 2011 and the nominations submitted in 2018. While the 2011 nomination, led by the central government, was for a single biosphere reserve that extended along the entire southern section of the DMZ, from the east to the west coast, the 2018 nominations were initiated by local governments for two separate biosphere reserves. In the 2011 nomination, the southern section of the DMZ was included as a core area of the biosphere reserve, but the 2018 nominations did not include any area actually inside of the DMZ, having instead legal-protected areas in the Civilian Control Zone (adjacent to the DMZ) as the core area.

The two biosphere reserves were approved at the 31st Session of MAB ICC held in June 2019. The Gangwon Eco-Peace Biosphere Reserve has a total area of 182,815 ha, forming an ecological network that connects the Civilian Control Zone in five

Figure 5.



A panorama of the Punch Bowl in the Gangwon Eco-Peace Biosphere Reserve

Figure 6.



Columnar joints along the Imjin River in the Yeoncheon Imjin River Biosphere Reserve

counties (Goseong, Inje, Yanggu, Hwachon and Cheorwon) and part of the legally designated Border Area. The Yeoncheon Imjin River Biosphere Reserve has a total area of 58,412 ha and covers the whole of Yeoncheon County, through which the Imjin River passes.

Conclusion

Nature knows no borders. TBRs reflect this reality, being places where neighboring countries cooperate to jointly conserve and manage an ecosystem divided by man-made borders. Through these cross-border activities, contacts and exchanges between neighboring communities increase and the message of peace spreads both inside and beyond the community. TBRs thus promote social peace through the process and results of cooperation for conservation of the ecosystem and are places for eco-peace cooperation that transcends borders. Furthermore, since TBRs are designated by UNESCO and so bear the stamp of an

international organization, they make these cooperative eco-peace efforts by neighboring countries widely known internationally, which helps to ensure that such cooperative relations are maintained and developed long-term.

Transboundary protected areas, including TBRs, have many advantages in eco-peace cooperation, but there are limitations. To date, there have been numerous initiatives around the world to improve relations between hostile neighboring countries through cooperation to establish transboundary protected areas. However, contrary to hopes and expectations, these efforts to cooperate to conserve the ecosystem have not brought about meaningful alleviation of hostile political and military relations. Most transboundary protected areas, including TBRs, were designated when the relevant states were not in a hostile relationship, or after their political or military confrontations had been completely or significantly resolved. It is generally understood that cooperation on ecosystem conservation is not political and is useful in promoting dialogue, exchange and cooperation between countries; however, it seems very unlikely that environmental conservation initiatives alone can truly turn militarily or politically hostile relations into friendly ones.

The DMZ TBR initiative is an example of the limitations of such approaches, albeit an extreme example, given the severity of the hostility in the border region between the two Koreas. It can hardly be expected that cooperation to conserve the ecosystem in the DMZ will be realized successfully as long as inter-Korean relations remain frozen. Furthermore, in addition to improvement in political relations, efforts need to be directed towards increasing the feasibility of such projects by linking conservation goals with cooperation/aid projects that bring substantial short-term benefits,

such as projects to improve forestry, agriculture, health and capacities to cope with natural disasters.

The Gangwon Eco-Peace Biosphere Reserve and the Yeoncheon Imjin River Biosphere Reserve, both designated in 2019, are the first international protected areas established for the purpose of ecological conservation in the DMZ region. Although they do not include areas actually within the DMZ, conservation of valuable ecosystems and sustainable local development in the Civilian Control Zone adjacent to the DMZ is also significant for the effective conservation of the entire DMZ region and could (and should) be implemented regardless of the political situation between North and South Korea.

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Education for Peace and Sustainable Development in Biosphere Reserves

Sun-Kyung Lee
Cheongju National University of Education

Biosphere Reserves as Laboratories for Sustainable Development

Biosphere reserves are sites with geographically representative ecosystems and importance for biodiversity conservation, requiring management based on cooperation with local governments and local communities. Biosphere reserves contribute to conservation of biodiversity and natural resources, which produces sustainable economic benefits. Those benefits are in turn used for biodiversity conservation. In short, the biosphere reserve can be a model of sustainable development.

In the biosphere reserve, natural, artificial, technological, social, economic, historical, cultural, ethical and aesthetic elements are mixed. These elements in biosphere reserves are sometimes harmonized, but sometimes they are in sharp and varied conflict, such as conflict between humans and nature, conflict between humans and humans, conflict between conservation and development and conflict between state and state. To secure the sustainability of biosphere reserves, education is required to help resolve conflicts and allow the pursuit of peace and the seeking of solutions to settle conflicts in ways that satisfy every stakeholder. In other words, peace education and education for sustainable development are necessary.

This article seeks to explore plans for education for sustainable development and peace education in biosphere reserves and the feasibility of such plans. The core goal and challenge of education for sustainable development(ESD) is to build the capacity to make our future sustainable. In this respect, biosphere reserves are an ideal laboratory for sustainable development and at the same time for environmental and social learning.

Biosphere Reserves and the Sustainable Development Goals

In order to discuss education for sustainable development and peace education in biosphere reserves, it is necessary to understand the concept of sustainable development (SD) and how it developed. The concept of sustainable development was disseminated globally through a report titled *Our Common Future*, published in 1987 by the World Commission on Environment and Development (WCED). This document, also known as the Brundtland Report, defines SD as “development that meets the needs of the present without compromising the ability of future generations to meet their needs”, proposing a new concept of development that pursues development and conservation of the environment simultaneously. The concept of sustainable development encompasses both spatial and temporal ranges, seeking to resolve conflicts and achieve peace. There are two core pillars in sustainable development: i) sustainability considering the limits of the planet (or ecological sustainability) and ii) equity between various stakeholders (or social justice). In the process of considering these two pillars, it is natural that socio-economic and environmental issues are intertwined.

At the 70th UN General Assembly held in New York in September 2015, following the end of the implementation period for the Millennium Development Goals (MDGs), the Sustainable Development Goals (SDGs) were adopted as the new global development agenda for the 15 years from 2016 to 2030. The Sustainable Development Goals, also known as the 2030 Agenda for Sustainable Development, consist of 17 goals and 169 targets (see Figure 1), dealing with social inequality, social development, economic development, the environment and means of implementation. The goals are applicable not only for sustainable development of developing countries but also for developed countries. With the slogan of 'Leave no one behind', they represent

Figure 1.



UN SDGs

an effort by the international community to achieve sustainable development at societal, national, regional and global level through five areas: People, Planet, Prosperity, Peace and Partnership. Peace relates closely to all four of the other areas.

Biosphere Reserves, Peace Education and Education for Sustainable Development

The role of education in achieving sustainable development has been emphasized through several international conferences since 1972, when the importance of education in solving environmental problems was recognized at the United Nations Conference on the Human Environment in Stockholm. A change of mindset and practices at regional and global level is a prerequisite to sustainable development. The UN Conference on Environment and Development (UNCED), held in Rio de Janeiro, Brazil in 1992, adopted Agenda 21, an action plan for sustainable development as a way to solve the problems facing the planet. Chapter 36 of Agenda 21 particularly emphasized the need to promote education, public awareness and training to achieve sustainable development.

Education for sustainable development (ESD) is defined in

diverse ways, but one of the available definitions can be found in the Action Plan for the UN Decade of Education for Sustainable Development, published by UNESCO in 2005. Under this definition, ESD is education to build a society where all people can benefit from high-quality education, through which they can learn the values, actions and lifestyles necessary for a sustainable future and social transformation. In 2010, a working group of the Korean National Commission for UNESCO defined ESD as “education to promote recognition of the interrelationships of society, the environment and the economy, which are the foundations for sustainability, intergenerational equity and global justice and based on such perceptions, to guide action at individual, regional, national and global level with a view to building a sustainable future”.

This education for sustainable development aims to integrate the ideology, values and practices of sustainable development into all aspects of education and learning. It is intended to provide opportunities for learners to acquire values, abilities, knowledge and skills, to change their behaviors and motivate learners so that every individual can and wants to, contribute to a humane, socially just, economically viable and ecologically sustainable future. The context of ESD includes not only formal education such as school education, but also non-formal education conducted by institutions or organizations outside schools and informal education through the mass media. In any context, an academic and holistic approach can be utilized to promote critical and creative thinking skills and set a vision for the future.

Links between ESD and biosphere reserves have been emphasized in several documents. The MAB Strategy (2015-2025), which was approved by UNESCO in October 2015, incorporated ESD into its strategic objective 3(Facilitate biodiversity and

sustainability science, education for sustainable development and capacity building), making clear its importance. In the Lima Action Plan(2016-2025) adopted by the MAB-ICC in March 2016, Strategic Action Area A concerns “the World Network of Biosphere Reserves consisting of effectively functioning models for sustainable development”. Expected outcome A4 is “research, practical learning and training opportunities that support the management of BRs and sustainable development in BRs” and action A 4.2 proposes establishment of a global network on ESD in biosphere reserves, led by countries which are actively engaged in or are interested in educational activities for sustainable development in biosphere reserves.

In 2020, Dong-Ki Lee, exploring the relationship between global citizenship education and peace education, which both aim to contribute to the achievement of the Sustainable Development Goals, paid attention to the explanations about peace education given by Günther Gugel and Sam-Yeol Lee, prominent scholars on peace education in Germany and South Korea respectively. Gugel argues that peace education is not limited to understanding on peace, such as the cognitive ability and knowledge accumulation on the ideal state of peace, but pursues the cultivation of the ability to mediate and resolve conflict situations in a non-violent, rational and civilized way. In a nutshell, he argues the ability to mediate and resolve such conflicts is the ability to create and maintain peace. Peace education was re-defined by Sam-Yeol Lee in 1991 as “education to understand how to live as myself and with others” and at the same time as “learning how to deal with conflicts peacefully, although existing conflicting relationships cannot be removed”. Therefore, in peace education, a nonviolent approach to conflict situations and the importance of the culture of peace are

emphasized. The culture of peace, as Elise Boulding has pointed out, is “the entire set of relationships and institutions that enable a society to respond peacefully and creatively to differences and conflicts”, which includes identity, attitude, values, beliefs and actions to reinforce people’s ability to coexist with each other, not based on the power structure.

Biosphere reserves aim for coexistence of nature and humans and thus the promotion of a culture of peace in these areas is closely related to the reason for their existence. In other words, education to inspire a culture of peace (peace education) is in line with education for sustainable development, which seeks to connect environmental, social and economic aspects of development, with both forms of education seeking sustainability and equality among diverse stakeholders. Goal 16 of the SDGs is to “promote just, peaceful and inclusive societies for sustainable development, a judicial system accessible to all and inclusive institutions with effective accountability at all levels”. However, this is not just one goal among the 17 Goals, but an umbrella goal to encompass all other goals, because sustainable development itself pursues peace and ESD is destined to be peace education.

Education for peace and sustainable development in biosphere reserves can be linked at several levels. Before exploring these possibilities, it is necessary to look at how biosphere reserves can be understood. Lucie Sauvé, at the University of Quebec in Montreal, Canada, classified various dimensions in the relationship between humans and the environment in 2002 and suggested seven interpretations to understand the environment:

the environment as nature to be appreciated, respected and conserved; the environment as a resource to be managed and shared; the environment as a problem to be avoided or solved; the environment as a system to be understood for decision-making; the environment as the venue for life, to which we must adapt and which we should improve; the environment as a biosphere where we must all live together in the long term; and the environment as a community project that requires active participation.

Sauvé also noted that the relationship between environments is highly dependent on context and is culturally determined. In other words, it is expressed through interconnected and complementary dimensions. Environmental education that focuses on one dimension is incomplete and forms a narrow view of what it is to be in the world. In this context, ESD in biosphere reserves needs to be approached from various perspectives.

First, biosphere reserves can be linked to ESD as learning objectives and content. In other words, they can be used to foster relevant knowledge and understanding, such as a grasp on the ecological elements that make up the biosphere reserve, the relationship between them, the processes within ecosystems, the effect of human activities on natural processes in ecosystems and the interaction between biosphere reserves and development. Most of the core zones of a biosphere reserve are protected natural areas. Therefore, it is possible to use them to understand the components of the ecosystem, composition and characteristics of the ecosystem, biogeochemical cycles, biodiversity and cultural diversity (or bio-cultural diversity), economic aspects of bio-cultural diversity, various types of organisms, various types of ecosystems and ecosystem services. In addition, issues related to modern sustainable development can also be an important subject

for teaching and learning in biosphere reserves. The occurrence and consequences of environmental problems, pollution, erosion, desertification, deforestation, marine threats and pressures from urbanization and tourism are common issues found in biosphere reserves. These can be a trigger for conflicts between different regions or countries, between conservationists and those who are pro-development and between humans and nature. A lack of education and public awareness about responsibilities that humans must bear personally and collectively for the environment is also a root cause of environmental destruction. While most environmental problems are part of a global problem, in many cases, achievements in dealing with such issues come from local community participation. This is well reflected in the slogan “think globally, act locally”, which has been used in various campaigns, with positive results. In discussions on ecological citizenship, emphasis is also put on the fact that private sector practices can be connected with and influence, the public sector.

Second, biosphere reserves can also serve as learning environments and tools for ESD. They can serve as laboratories for sustainable development and educational environments and catalysts to facilitate and stimulate learning processes. Various questions relevant to sustainable development can be considered in biosphere reserves, such as what the relationship is between use of fertilizer, soil pollution, water pollution and the quality of agricultural products; how fossil fuels can be replaced by renewable fuels; how consumers can make smart and informed choices about what they buy, taking into consideration issues such as food mileage, water and energy use, animal abuse and working conditions; and how farmers, tour guides, managers, urban planners and citizens, can adapt to climate change. Such

questions are important in ESD and sustainable development. They are questions that are closely related to sustainability and equality in a particular region and to answer them, environmental, social, economic and cultural interactions must be examined in an in-depth way.

Education for sustainable development emphasizes the capacity to make our future sustainable. During the UN Decade of Education for Sustainable Development, competencies emphasized as important in the context of ESD included thinking about the future, critical and reflective thinking, understanding of complexity, systematic thinking and participation in democratic decision making. Negotiation and consensus-building skills, responses to risk and danger, respect for others, the ability to identify and behave in accordance with values, the ability to plan and to manage change, decision-making in uncertain situations, grasp of relationships and the ability to apply learning in various contexts were also identified as important (UNESCO, 2009). In 2017, UNESCO identified eight core competencies for sustainability: systems thinking competency, anticipatory competency, normative competency, strategic competency, collaboration competency, critical thinking competency, self-awareness competency and integrated problem-solving competency. It also proposed that these competencies should be included into the curriculums for ESD and global citizenship education (UNESCO 2017). These competencies can be learned and improved in the process of engaging with the various issues that can be examined in biosphere reserves, including the practical questions mentioned above. In biosphere reserves, local residents and visitors, in particular young people, can and should learn how everyone can help ensure that certain spaces are managed in a sustainable manner and that anyone

can contribute to the recognition, identification and resolution of conflicts between humans and nature.

Third, biosphere reserves can be explored as holistic systems, encompassing local residents as well as natural elements in the area, where residents can develop their sense of responsibility for nature protection and for improvement of the quality of life and prosperity of the community and where they can learn to adopt positive attitudes and modes of action.

Whatever the case, ESD in a biosphere reserve can be used to address essential issues that the local area faces, whether these issues concern poverty, human rights, citizenship, peace, democracy, social and economic development, health, gender equality, cultural diversity, protection of the environment and natural resources and sustainable patterns of consumption and production. ESD sheds light on the fact that such issues are interlinked with natural systems and socio-economic systems at the regional and global levels, enabling people to better understand the situation. In such cases, the following principles should be borne in mind:

- Emphasize the characteristics of the site.
- Demonstrate local problems and possible solutions and development methods.
- Empower local residents to engage in ESD projects and efforts to manage the site sustainably.
- Enable learners and visitors to contribute to the sustainable management of specific areas.
- Promote in learners and visitors a belief that they can make a difference towards sustainable development and a willingness to participate in similar projects.

- Promote a positive attitude toward the establishment and expansion of biosphere reserves and their sustainable management.

Examples of Education for Peace and Sustainable Development in Biosphere Reserves and Protected Areas

Coexistence of Nature and Humans: Dudhwa National Park and RCE Lucknow in India¹

The Dudhwa National Park is the fourth-largest national park in India and is located near the India-Nepal border. A protected area with rich biodiversity, it is the last shelter of wild flora and fauna that inhabit the banks of the Ganges below the foot of the Himalayas. Dudhwa Forest is home to an indigenous group known as the Tharu. In 1997, Dudhwa Forest was designated as a national park, but as time passed, the Tharu community grew and their demand for resources in the forest increased, exacerbating conflict between humans and wild animals. As this conflict grew, the park authorities also began to clash with the local community.

India's Centre for Environment Education(CEE) started education and conservation projects in several villages in Dudhwa National Park in 2005. The main purpose of these projects was to conserve biodiversity through participatory activities focused on improving the social and economic situation of the local community and sustainable consumption and management of available resources. The projects also aimed to develop a system for consultations among stakeholders. In order to carry out this

¹ The content on the Dudhwa National Park and RCE Lucknow in India is based on Preeti(2012) and was introduced as an example by Sun-Kyung Lee et al.(2013) ※ Source: Preeti, R. Kanauia(2012), Community-national park collaboration for ESD in relation with indigenous knowledge and biodiversity conservation, Proceedings of 2012 World Conservation Congress, Conservation Campus No. 0130, PP 50-53.

task, CEE formed the Sustainable Development Education Network with RCE Lucknow, a Regional Centre of Expertise for Sustainable Development recognized by United Nations University Institute for Advanced Studies(UNU-IAS). CEE initiated exchanges between stakeholders, including park managers and the Tharu community, via public relations activities, advisory meetings and discussions. Through these meetings and discussions, information was collected on the status of resources, existing systems and practices and issues and initiatives related to conservation. The basic assessment helped increase understanding of how deeply the residents were dependent on the park to secure their food, livestock feed and firewood. Based on the evaluation results, various planning meetings were held to strengthen the livelihoods of the indigenous community and a natural resource management activity plan was established to enhance the skills of indigenous people through capacity building, education and experiential exploration. Centering on RCE Lucknow, various educational programmes were developed and implemented, for example, on alternative agriculture, the use of alternative energy sources, handicraft skills and marketing for women, livestock breeding and livestock management and biodiversity education programmes for children.

Bio-Cultural Diversity, Coexistence of Tradition and Modernity: Swabian Alb Biosphere Reserve in Germany²

The Swabian Alb, in Baden-Wurttemberg Germany, is a low mountain area formed in the Jurassic period, with the city

² This case is excerpted from Hoffmann (2017), which was presented at the International Forum on Regional Regenerationheld at Rikkyo University in Japan and Muller et al. (2019)

of Stuttgart to the northwest and the Danube River basin to the southeast. The Swabian Alb Biosphere Reserve, designated in 2009, covers an area of 850 km² and has a population of about 150,000 people. Due to the large and sparsely inhabited grasslands in the area, the site was utilized as a military training camp following the development of new weapons at the end of the 19th century. The Munsingen camp was established in 1895 and continued to be used until its closure in 2005. As a result, the site has seen almost no recent development and nature coexists with historical and cultural landscapes from the 18th to 19th century. The biosphere reserve includes areas rich in a variety of flora and fauna as well as areas contaminated with ammunition. Biodiversity and cultural diversity are connected and integrated into a number of programmes. Lentils are cultivated as a local specialty and snails are raised for sale and used as food. Sheep-grazing is revitalizing the local wool industry, which makes products that combine traditional woolen fibers with modern new styles. Spelt wheat, a type of traditional German wheat, is grown and apples are harvested in orchards to produce apple juice. Trains run with both passenger and cargo compartments.

The linkage of biological and cultural diversity in the Swabian Alb Biosphere Reserve is based on various community partnerships and is further enhanced through education. This education covers conservation of nature, education for sustainable development, marketing and public relations and value-added marketing of local products(from agriculture, sheep farming, conservation, fruit trees, vineyards, etc.), forestry and hunting, tourism and cuisine, local development planning and transportation, environment and climate protection and historical and cultural sites. The various educational projects include sustainable forestry, education on the local stone and its historical and future impacts, annual meetings on education

for sustainable development, workshops on the future, educational holidays in biosphere reserves, nature experiences, nature for children, integration of biosphere reserves into local curriculums and building educational networks. These educational efforts in the Swabian Alb Biosphere Reserve build momentum for sustainable development by promoting economic growth, job creation and the development of new industries, strengthening ecotourism, helping to reverse economic decline and promoting conservation of nature.

Coexistence of Different Peoples in Transboundary Areas: the Mont Viso Transboundary Biosphere Reserve and the Vosges du Nord(France)/Pfälzerwald(Germany) Transboundary Biosphere Reserve

Transboundary biosphere reserves are collaborative projects to manage social and ecological systems across borders. As of 2020, 21 sites have been designated as transboundary biosphere reserves, mainly in Europe, Africa and South America, each composed of areas in 2-3 countries. Transboundary biosphere reserves are located where different countries share borders, so ecologically, the area comprises a single, shared system, but in many cases, social exchange is not active. As a result, a cooperative project is required to connect the areas that make up the transboundary biosphere reserve.

The Mont Viso Transboundary Biosphere Reserve in France, designated in 2014, is a glacial cirque between the Alps and the Mediterranean Sea, located on the border between France and Italy. The ecological characteristics of Mont Viso derive from a variety of ecosystems, ranging from dry, rocky mountains in the alpine regions, to an area where Swiss pine trees(*Pinus cembra*)

grow. Most areas are not densely populated and human activities mainly involve highland agriculture, forestry, handicrafts, etc. The tourism industry, medicinal herbs and aromatic plants are important economic resources. The Mont Viso Transboundary Biosphere Reserve offers an example of resident-led efforts to transition to clean energy sources. Ener'guil, a cooperative for common interests, is carrying out a project to invest in solar panels using subscription fees from local residents, businesses and public institutions, as well as local government subsidies. Solar panels are installed on the roofs of public and private buildings with the owners' approval and for a small fee. The electricity generated from these panels is sold to Électricité de France(EDF, a French electric utility company) at a price fixed for 20 years. Citizens can participate in this initiative in two ways, the first being to buy stock in the cooperative company. Each share is worth 50 euros and shareholders can buy as much as they want. Anyone who cannot or does not want to make a financial commitment can provide roof space to the cooperative. As of 2015, around 200 members, including managers who provided technical expertise and time to Ener'guil, had participated in the project, installing solar panels on 10 roofs as part of the initial project, with the support of the biosphere reserve. The renewable energy produced can meet the electricity needs of 40 households (excluding hot water and heating). This success story from the Mont Viso Transboundary Biosphere Reserve can be attributed both to the various ways in which the local community became involved and to the support of the biosphere reserve.³

³ The information on Mont Viso TBR and the Vosges du Nord/Pfälzerwald TBR is excerpted from Roth A. (coord.), (2017). #ProudToShare - Good Practices in French Biosphere Reserves. Tououse, MAB France and AFB.

The Vosges du Nord/Pfälzerwald Transboundary Biosphere Reserve was designated in 1998 and is located on the border between France and Germany. Three natural characteristics are common to the area: water, sandstone and forest. One important factor in breaking down the border between the two countries in this biosphere reserve is the regular agricultural market, which is held alternately in France and Germany. This is an opportunity to promote local agricultural products produced in traditional ways and to raise awareness about the community and the local heritage. Through the agricultural market, environmentally friendly agriculture and sustainable development are encouraged through integrated farming and local exchanges and trading are promoted, building a social consensus and creating jobs. The biosphere reserve organizes dialogue channels with local communities, provides technical support for the holding of agricultural markets and promotes events with the help of local agencies. At the end of the season, an annual assessment is conducted to coordinate and improve the organization of the market in future years. Major factors in the success of the transboundary agricultural market include **i)** the participation and support of farmers dedicated to environmental protection, **ii)** direct sales and promotion of local products since 1999, **iii)** complementary relationships between French and German farmers who do not offer identical products and **iv)** complementary relationships between French and German visitors, who do not have identical consumption habits.

Importance of Collaboration and Social Learning in Biosphere Reserves

Biosphere reserves are 'learning places for sustainable development'. They are sites for testing interdisciplinary approaches to understanding and managing changes and interactions between social and ecological systems, including conflict prevention and management of biodiversity.(UNESCO, 2020).

A UNESCO MAB Biosphere Reserve is an international protected area that conserves natural ecosystems and historical and cultural resources unique to the site so that humans can utilize them socially and economically. It also has the goal of coexistence between nature and humans. Education for sustainable development and education for peace in biosphere reserves can play a key role in developing this identity.

In a biosphere reserve, various elements(natural and artificial, technological, social, economic, historical, cultural, ethical and aesthetic elements) are mixed and diverse systems(park systems, tourism systems, ecological systems and community and residential systems) are intertwined. The relationships and interdependencies between them make the overall system complex. There are various stakeholders within each system and conflicts at various levels are inevitable. In order to achieve peace and sustainable development in biosphere reserves, it is necessary to determine objectives and processes that maximize the interests and attentions of various stakeholders.

Joint efforts between different organizations should be a very important process and purpose within biosphere reserves. These can be classified into networking, coordination, cooperation, collaboration, etc., depending on the relationship with the partner. Among them, 'collaboration', signifying the highest level of

joint effort, can be defined as a joint decision-making process between key stakeholders who manage issues with a fundamental understanding of the complexity in the problem-solving process in situations requiring multiple organizations to respond collectively. This is the form of collaboration required in biosphere reserves or other protected areas.

In considering education for peace and sustainable development in biosphere reserves, it is necessary to expand the scope of education to social learning that occurs in the process of such collaboration, going beyond the range we accept on a daily basis. Social learning takes place in the process of revealing and integrating different, sometimes contradictory, viewpoints, among individuals who share different knowledge and experiences and it can, simultaneously, be both a process and a consequence of effective cooperation. In addition, social learning occurs when people share and interact with different perspectives and experiences and build relationships with other people or organizations. Through this process, social learning provides an opportunity to evolve a simple individual or organizational group into a community or group with a common purpose.

In the case of ESD, education includes not only one-way education and training (an educator who provides information and a passive learner who receives it) but also two-way communication and a mediation function that enables information exchange and communication in two directions or in multiple directions. In other words, it is a premise for and encompasses, social learning that includes all of information, learning and communication, which are included in the many cases presented above. It is through this process that ESD makes it possible to develop the capacity to build sustainable development and a sustainable society. These diverse

learning processes become an important element in education for sustainable development. With this in mind, we must now work to mobilize all relevant stakeholders - practitioners, experts and managers and others from around the world - to make this educational process that can promote peace and sustainable development a reality in biosphere reserves globally.

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Editors MAB National Committee of the Republic of Korea, Korean National Commission for UNESCO
Authors Eun-Young Kim, Chul-In Yoo, Hag Young Heo, Suk-Kyung Shim, Sun-Kyung Lee
Address 8th Fl 22 Hyeoksin-ro, Wonju-si, Gangwon Province, Republic of Korea
E-mail mab@knps.or.kr
Homepage www.unescomab.or.kr
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