



Sectoral and Cross-Sectoral Integration of Biodiversity in Democratic People's Republic of Korea

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1. Introduction

Korea DPR reported¹ on several integrating measures: the strategic direction of eco - environmental conservation of DPRK; relations between NBSAP and the sectoral plans of national economy; integrating biodiversity issues into relevant sectoral plans of national economy, including forest sector, agriculture sector, public health, fishery, efforts to raise public awareness of nature and ecological environment, and other sectors.

2. The Strategic Direction of Eco - environmental Conservation of DPRK

The general direction of nature and environment conservation of DPRK is to:

- 1) Promote the conservation of forest and eco-environment by implementing the activities for afforestation and water management and the development and rational use of water resources paying attention to the management of river and streams. .
- 2) Protect and manage soil resources and promote the use and development of land in perspective way.
- 3) Attach importance to biodiversity conservation and promote the conservation of biological resources and coastal management.
- 4) Prevent the environmental pollution and improve the eco-environment. Those are to keep off air pollution, plant trees in town, improve the livelihood in rural areas and management of natural monuments.

These policies requires the enthusiastic participation of stakeholders and their cooperation in the activities and planning for biodiversity conservation and its sustainable use and mitigation of climate change

3. Relations between NBSAP and the sectoral plans of national economy

|In pursuance of the Article 6.b for the conservation and sustainable use, the NBSAP of DPRK is closely related with the sectoral and cross-sectoral plans of forestry, fishery, traditional Koryo medicine manufacturing and agriculture which take main part in the use of bio-resources and is also integrated into the scientific research development plan, energy development plan and Master Plan for Land Development.

In the past decade, the implementation of the NBSAP has been promoted in close relation with the Master Plan for Land Development (MPLD). The general mobilization for land construction in both spring and autumn of every year from 1998, as an all people campaign, has played a significant role in land management and biodiversity conservation.

¹ Korea DPR (2011). 4th National Report of DPR Korea to the Convention on Biological Diversity, December 2011, 85 pp.

In the fields of forestry, fishery and Koryo medicine manufacturing, programs were prepared and are now undertaken to establish the systems and processes for the conservation and sustainable use of ecological environment, mainly focused on the creation of resources. Particularly, in fishery, there was a definite conversion from catching fishery into cultivating one with great emphasis on the conservation of coastal ecosystem.

In the scientific researches on biodiversity conservation, considerable successes have been achieved during the period of 2nd 5-Year Development Plan for Science & Technology (2003-2007), on the basis of which the 3rd 5-Year plan (2008-2012) is now under preparation putting a great effort on the research and technological development for the conservation and sustainable use of biodiversity.

At present, the action plan is under preparation in the field of education to improve the quality of education on biodiversity and environment.

Integrating biodiversity issues into relevant sectoral plans of national economy.

4. Forest sector

The forest ecosystem in DPRK takes very important position for land management and resource development, because over 80% of its territory is mountainous. Especially, considering the forest destruction due to recent economic difficulties of the country, it is urgent to intensify the actions in order to halt the deterioration of eco-environment, protect forestry biodiversity and raise the ecological service of forest. In this context, the government of DPRK has presented the policy for afforestation and greening the whole country and to improve the structure and ecological function of the forest. Nationwide campaign for implementing this policy has been strenuously promoted.

The Ministry of Land and Environment Protection (MoLEP) arranged the restoration of destroyed nurseries and the establishment of a new central nursery with an area of 100 ha in 2000, and also organized the construction of mother nurseries of 20-25 ha at municipal and county levels, which resulted in the increase of sapling production capacity in 2002 four times as much as that in 1994.

From 2002, annual reforestation of over 900,000,000 trees has been organized as a nationwide campaign. In addition, the production capacity of central nursery was increased as much as 400,000 of nursery tree in the period of 2006 - 2009.

The creation of firewood forests (total area of 800,000 ha) to solve the fire wood, which is the main cause of forest destruction and soil degradation, is gaining more and more impetus.

On the other hand, the government of DPRK has quadrupled the number of forest rangers in order to strengthen legal controls on the illegal tree-cutting and to improve the forest management.

In the field of forestry for lumber production, active reforestation has been promoted at deforested areas in compliance with the principle of cyclic felling, and the transformation of forests and

afforestation for erosion control have been energetically driven at the areas of low productivity and extraordinary soil erosion.

In particular, it is recommended to correct the tendency to concentrate felling at the areas with favorable cutting conditions, and actively apply the useful methods for lumber transportation.

In DPRK, on the principle of proper planting on the proper soil, they progress the afforestation works to guarantee the intensified use of forest land for the purpose of various and adequate use of land, and to assurance the maximum productivity of the forests, by the rational regulation of planting thickness of fast growing and high commercial valued trees. The afforested mixed forests, could prevent soil acidification and damage by harmful insects, increase soil fertility, productivity of the forests and enrich the forest's biodiversity.

Either in the mountains and plains, many forests of economic value such as metasequoia and walnut forests were afforested, so that those were contributed to national economy growth and improvement of people's life. By giving priority to survey and research work on the economic plants and on basis of those results, planting trees of economic value was encouraged on nationwide scale.

In the afforestation sector, the production system of nursery trees and seed selection were established, besides many scientific problems including earlier ripening of the pine nut tree, acclimation of bamboo, standardization of afforestation technologies including distribution of the kind of trees based on afforestation group and planting thickness were solved.

For the tree planting in forest, the method for rational thinning, forest innovation issues have been studied.

The pest controlling methods by bio- agricultural chemicals were developed and widely introduced in the forest protection sector.

In the forest utilization sectors, technological and scientific problems arising from the cultivation of edible and medicinal mushroom and various mushroom cultivation methods have developed.

There have been some efforts to introduce the advanced technical and scientific achievements by aerospace photographs, satellite images and computer technologies to the afforestation and forest management activities and increase the production of seedling by establishing the seed selection and breeding system and introducing the advanced technology. The forest management institutions have actively engaged in the activities for scientific conservation and plantation which result in the perfect production process systems from the seedling breeding to conservation and management.

The modernizations, reconstructions and expansions of production systems were accomplished in nurseries of Huichon, Tongchon and Songgan experimental station, therefore, the solid foundation for mass production of hybrid young trees was provided.

5. Agriculture sector

The area of farmland per capita in DPRK is 0.08ha and that for grain like rice and maize is nearly 0.06ha.

In this context, protection and sustainable use of farmland emerges as one of the most pressing issues for the increase of agricultural production. Being particularly abundant with sloping lands and surrounded by sea on two sides, it is very important for ensuring stable agricultural production to prevent soil erosion and create protective forests for flat field area.

In recent years, the activities which are vital for the sustainable development of agriculture and biodiversity conservation are greatly progressed. Measures for preventing soil erosion by decreasing gradients of lands for building terraced fields are now taken. Besides, the activities for plantation have been promoted with the aim of conservation of forest' biodiversity through the afforestations for erosion controls and the protection of foot of mountains with steep gradient and planting mixed forest with tall and short trees. In DPRK, great successes have achieved in the improvement of cold and humid lands, high acidity lands, and tidelands. All fields of North Phyongan, Kangwon, and South Hwanghae provinces were developed into standard ones not only to do farming easier, but also to prevent soil erosion and loss. The efforts have been made to prevent the soil erosion by making terraced field. Recently in DPRK, the activities for conservation and sustainable use of farmland, increase of soil fertility by introducing organic farming, developing cycling production system combined with agriculture and livestock, to increase efficiency of resource use, and to prevent the pollution. Furthermore, in DPRK with the cooperation of FAO, the experiences and best practices were achieved through implementation of the projects for applying the conservation agriculture. Recent years, many farms have attached the priority to the conservation of biodiversity and organic farming by producing and applying bio-chemicals and effective micro-organic compounds to the field. For this, the biological methods to control weeds by mud snail and microorganic herbicides, seed sterilization by bio-chemical, pest control by natural enemy have been widely introduced. Microorganic compounds including phosphorus bacteria compounds, effective microorganic compound are also developed and applied to increase the crop yield and soil improvement.

In some cooperative farms, agro- chemicals extracted from plant, tree and potato are widely used in seed sterilization. Effective microorganic compounds and bio-fertilizers are already applied across the country.

Many cooperative farms are widely using fermented organic fertilizer (fermented compost and hay) in vegetable cultivation and organic fertilizer in potato growing.

The examples showed that in DPRK, practical measures were actively taken for sustainable use and conservation of agricultural ecosystem, preventing soil acidification, and pollution of agriculture ecosystem by chemicals through active application of organic farming. And the agro- forestry management which guaranteed the sustainable use of agriculture and forest ecosystem was widely applied. The research project to apply the agro-forestry management in Pisan Farm, Anbyon County by Center for Biodiversity, State Academy of Sciences can be the good example.

The attention has been paid to the conservation of gene resources including crops and endemic livestock in agriculture.

All of these practical examples are the evidence to the effort for sustainable development and conservation of agricultural ecosystem in DPRK.

However, the activities to improve the land with low fertility into high one which provides sustainability of agricultural production and rich in biodiversity have to be continued together with improvement of slope land management, protect the natural habitat of natural enemies and pest control which promote the conservation of agricultural biodiversity and sustainable agricultural production and improvement of eco-environment.

6. Public health

Koryo medicine, the traditional medicine of Korea is a part of the medical science and closely related not only to the people's health and but also biodiversity in DPRK. The resource of Korean medical plant is rich with its endemic plants, phylogenic varieties and chemical components.

Therefore, medical plants serve as a concrete foundation for the treatment and prevention of all diseases and development of Koryo medicine from the time of ancient civilization. The Korean ancestors created traditional medicine on their own since the earliest time of history and the traditional Koryo medicine has become an excellent national cultural inheritance with the longest history and plenty of its content. From earlier time, the Korean ancestors applied acupuncture in medical treatment, and used various kinds of medical plants like wormwood, garlic, and ginseng for people's healthcare. 'Hyangyakjipsongbang' (encyclopedia of herb medicine, published in the 14th century) contains 649 species of traditional medicaments, and 'Tonguibogam' (handbook of traditional Korean medicine, 1599-1610) provides 1,400 types of prescriptions.

Decrease in forest resources in recent years has brought the changes in mountain ecosystem, which consequently made a great impact on the production of natural medicinal herbs. These conditions make it difficult to meet growing demands for Koryo medicines. The measures are taken to control the over-exploitation and conservation of medical plants resources. All the illegal exploitation of medical plants are strongly controlled and medical plant farms and production bases for plants and animals in medical use have been built in every parts of the country and the activities for investigation and protection of medical plant have been strengthened.

In DPR Korea, the pharmaceutical industry of Koryo medicine is a traditional one which comprises profound knowledge, abstruse expertise and mysterious recipes accumulated for a long time.

The cultivation and use of medicinal plants in DPR Korea is subject to the "Law on Medicinal Plant" (December 29, 2004) and its enforcement regulations. Under the control of the Management Bureau for Koryo Medicine Production (MBKMP), the Survey Team for Koryo Medicine Resources (PTKMR) undertakes the periodic nationwide investigations on Koryo medicine resources, inter alia of medicinal plants. By relying on these investigation data which are classified by region and species, Designing Office

for Koryo Medicine Resources (DOKMR) prepares plans relevant to Koryo medicine resources. The Korea Koryo Medicine Technology Center Technology is in charge of the development for and dissemination of Koryo medicines. By 2008, the total cultivation area of medical plants in DPRK is about 10 000ha and the numbers of cultivated medicinal plants are almost 80 species. Every city and county has the target to cultivate the medical plants in the area of 300ha and very active in its implementation. The cultivation of medical plant in mountain area has positive influence to the forest ecosystem and traditional Koryo medicine production reducing the pressure to forest ecosystem and providing the sustainable management of forest resources.

7. Fishery

The conservation and sustainable use of aquatic resources is very important for the development of national economy and improvement of people's living as well as the increasing of fishery production.

In DPRK with dense drainage network and surrounded by sea on two sides, the conservation and sustainable use of inland water, coastal and marine ecosystems is very important.

The changes in marine condition, decrease in aquatic resources due to over- use in coastal areas and particularly the reduction of pelagic fishery by recent economic difficulties have hampered the growth of fisheries output. The forest degradation greatly changed the environment of inland water ecosystems and the water pollution by organic wastes makes the aquatic ecosystem worse.

In this context, the Ministry of Fishery and the Department of Pisciculture concentrate on expanding inland water fish farming and on the development of coastal cultivation, inter alia of seaweed.

The Ministry of Fishery has adhered to the conversion of fishery from only catching fishery into cultivating one and achieved considerable successes therefrom.

Main fishery stations of the Korean West Sea and Korean East Sea are equipped with breeding facilities for the aquatic plants and animals of economic value, and much engaged in the creation, maintenance and management of coastal fishery.

The Institute of Aquaculture is engaged in the artificial collection of eggs of shellfishes like short neck clams and raising the littleneck clams and introduce their results into practices are on progressing and widely introducing. In Raksan, North Hamgyong Province, hundreds ha of sea cultivation bed has been built to breed scallops, sea cucumbers and fishes. Especially in Hongwon County, hundreds of thousands of trepang larvae are produced and released into the sea.

On the other hand, the fishing industry is developing in the direction of protecting and increasing the coastal non-migratory fishes by improving the fishing structure.

In the inland water areas, extensive construction and enlargement of fish farms, and scientification and modernization of their management are being energetically promoted, so as to meet the demands of the people for freshwater fishes.

In accordance with the national measures, the activities to develop the fish farming are activated in all people movement. In DPR Korea with limited area for cultivation, the main direction of fish farming development is to make best use of natural feeds and to expand the multidimensional fish breeding.

In compliance with the legal requirements of the “Law on Fishery” and the “Law on Fish Farming”, state control for the conservation of aquatic resources has further strengthened.

The Ministry of Land and Environment Protection is in charge of the management of 11 freshwater aquatic resource reserves and 15 coastal ones.

In DPRK, spawning ponds can be found in every water areas and every year hundreds of million of fry are incubating and stocking to the rivers and lakes. The government provides the financial support to the fish farms who stock the rivers with fishes and control them to implement the stocking plan.

In addition to this, the habitats for marine animals such as tries, trepangs, and ear shells are now providing in DPRK.

Every year, during general mobilization period for land management, people are encouraged to put stones and shells into the shallow seas to provide the habitat to seashells and the best example is Ongjin Bay. Accordingly in the coastal areas, fishing and purse nets are encouraged and the trawl fishery is prohibited.

In DPRK, April and July are designated as “Marine Resource Protection Month” and in this period, the government policy related with the conservation of marine resources are publicized to make the people aware of the value of marine resources and encourage them to participate in the conservation and propagation. And the knowledge on protected fish, its spawning season, prohibited fishing period, prohibited size of fish and the principles of marine resource protection are explained to the fishermen, local people and school students. And this period provides good opportunity for the conservation of marine resources through the activities to prepare spawning condition, control fishing and polluted sewage flow into natural water area.

8. Efforts to raise public awareness of nature and ecological environment

The universal 11-year compulsory education system of DPR Korea has introduced from kindergarten (1-year preschool education), primary school (4-years) and secondary school (6-years). The education on environment protection begins at the stage of kindergarten and continues through the stage of primary education (Nature Observation during the 1st and 2nd grades and Nature subject during the 3rd and 4th grades).

At secondary school, Biology and Geography subjects are providing the students with knowledge on the protection of animal and plant and environment. By 1992, the Ministry of Education incorporated subjects of strengthening biodiversity environment education into teaching programs and took adequate measures to implement these programs. Biodiversity and environment related education are aimed to educate basic knowledge of biodiversity conservation to develop environment education for

young people, on the other hand not only biodiversity related universities with the main subjects of biology, geography, fishery, forestry, public health and architecture but also other ones to begin the environment education. Accordingly important meanings were granted to the educational parts of biodiversity and environment and some measures were taken. The Department of Biology and Department of Geography of the Kim Il Sung University were renamed as Department of Life Science and Department of Global Environment, 4th National Report of DPR Korea to the Convention on Biological Diversity 53 respectively, at the early 2000's.

Agricultural universities and Fishery colleges at the provincial level, especially Hyesan Agro-Forestry College in Ryanggang Province and Pihyon Land Management College in North Phyongan Province, are attaching great importance to the education on the conservation and sustainable use of biodiversity. The public awareness activities on biodiversity and environment were enhanced. In every province (including municipality), there are school children's palaces that play the role as a center of extracurricular education for primary and secondary school students. Special attention is being paid to nature conservation in natural science education. "Homeland loving Teams" in every primary and secondary school, whose mission is to maintain the cultural and sanitary conditions of their villages, streets and towns, are conducting various activities for biodiversity conservation, especially during 'Birds Loving Month' in April and 'Tree Planting Month' in March and November.

In 1996, propaganda activity programs of nature and environment protection was prepared by Korean Nature Conservation Union.

Public education and awareness on biodiversity-related issues are actively conducted in the DPRK through TV, radio and other mass media, festivals, celebrations and other various occasions.

In DPRK, by means of mass media such as TV, broadcasting, newspapers, and journals, the basic knowledge about biodiversity and its importance for its conservation are widely addressed.

On the occasion of "Environment Day", "Earth Day" and "Day of Biodiversity", and "Tree Planting Month", "Bird-Loving Month", "Animal Protection Month", "Medical Plant cultivation Month", "Month for Preventing Forest Fire", the intensive propagation campaigns are conducted for biodiversity conservation.

Together with this, communication related to biodiversity conservation and nature protection is actively undertaken at natural parks, scenic spots, parks, zoos and botanical gardens and arboretums in close relation with extracurricular education at schools.

9. Other sectors

The reduction of green house gas (GHG) emission is critical to prevent negative impact on biodiversity by global warming.

The government has established the Designated National Authority for CDM to mitigate the negative impact of climate change, to participate the global environment issues and to coordinate the activities

for GHG emission reduction comprehensively. Therefore, it attaches priority to energy saving and promotes this activity.

The government has exerted its efforts to raise the public awareness on energy saving and encouraged their enthusiastic participation by taking the energy saving measures such as the use of no-load breaker, no stoppage condenser, ampere-hour meter and compact fluorescent lamp.

It also promotes the development and use of wind, geothermal and biomass while paying attention to the construction of the large-sized hydropower plants and medium and small sized hydropower plants. In order to reduce the air pollution and GHG emission, the government has established the system for granting the allowance for pollutant emission and the system for compensation of environment while taking the technical and engineering measures and enforcing the activities for supervision and control.

Since 2009, the government has planned to introduce the environment management systems to the factories in pilot level to establish the environmentally sound production system and since 2010, these systems have been popularized. In cities, the monitoring and controlling on the factories and enterprises with great amount of pollutant emission have been strengthened and such factories are encouraged to introduce the clean production process. In addition to this, the development and introduction of environmentally friendly coal burning technologies including coal briquette for heating and cooking at the city residential areas have been promoted while implementing the activities to provide the electricity for heating at the city areas.

The government attaches great attention to the development of alternative fuels and alternative energies, favorable for human health and eco-environment to meet the growing demands for energy and protect the environmental pollution.