# THE BIODIVERSITY FINANCIAL NEEDS ASSESSMENT IN KAZAKHSTAN

THE BIODIVERSITY FINANCIAL NEEDS

ASSESSMENT IN KAZAKHSTAN

UNDP partners with people at all levels of society to help build nations that can withstand crisis, and drive and sustain the kind of growth that improves the quality of life for everyone. On the ground in nearly 170 countries and territories, we offer global perspective and local insight to help empower lives and build resilient nations.

Empowered lives.
Resilient nations.

Publication «The biodiversity financial needs assessment in Kazakhstan» was prepared within the framework of the global Biodiversity Finance Initiative (BIOFIN) for decision makers people and stakeholders. The information presented in the publication reflects the need for financial resources for the conservation and sustainable use of biodiversity until 2030.

BIOFIN is a global partnership addressing the biodiversity finance challenge in a comprehensive manner. The Initiative provides an innovative methodology enabling countries to measure their current biodiversity expenditures, assess their financial needs in the medium term and identify the most suitable finance solutions to bridge their national biodiversity finance gaps.

CONTENT

LIST OF ABBREVIATIONS

ACBK	Association for Conservation of Biodiversity of Kazakhstan
BaU	Business as Usual
BIOFIN	Biodiversity Finance Initiative
CBD	Convention on Biological Diversity
CFW	Committee for Forestry and Wildlife
ENO	Scientific Background Report
FNA	Financial Needs Assessment
FFS	Forest Fire Stations
FW	Fire Watchtowers
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
IBA	Important Bird Areas
IUCN	International Union for Conservation of Nature
KTO	Kazakhstan Tourism Organization
KZT	Kazakhstani Tenge
MA RK	Ministry of Agriculture of the Republic of Kazakhstan
NBSAP	National Biodiversity Strategy and Action Plan
PA	Protected Area
PES	Payments for Ecosystem Services
RA	Regulatory Act
SFE	State Forestry Estate
SGP/GEF	GEF Small Grants Programme
SNCA	State Nature Conservation Area
SNNP	State National Nature Park
SNR	State Nature Reserve
TEO	Feasibility Study
UNDP	United Nations Development Programme

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

The development of a National Biodiversity Strategy and Action Plan (NBSAP) is the obligation of parties who have ratified the Convention on Biological Diversity (CBD), as well as a necessary step for the conservation and sustainable use of the country's biodiversity. However, the financial needs of the NBSAP implementation is not often evaluated and this limits a country's ability to achieve targets on biodiversity conservation. However, detailed financial cost information is very important for government bodies that approve financing. The Biodiversity Finance Initiative (BIOFIN) and the methodology elaborated as part of the project has a systemic and nuanced approach to estimate costs for the implementation of national goals as well as the estimation of the financing deficit between the expected base financing and the costs for the NBSAP implementation.

The Financial Needs Assessment (FNA)[1] is an assessment of the required expenses to achieve the national goals on biodiversity conservation in Kazakhstan and contains information on the expected cost of the implementation of the NBSAP and the expected financial gap. The first part of the FNA includes a description of targets and goals included in the NBSAP, a summary of the costs and a review of the timing for the implementation of actions. The second part of the FNA provides information on the one-time and recurring expenses, assessment of the "business as usual" financing scenario and calculation of the financial gap.

The budget for the NBSAP implementation for the 2016-2020 period is around 286 billion KZT (851 million USD)[2]. The first component of the NBSAP focuses on biodiversity conservation, which includes activities on the ecological network formation and protection of country's genetic resources, has a projected cost of 135 billion KZT (403 million USD). The second component of the NBSAP which focuses on sustainable use of Kazakhstan's biodiversity – including forests, wildlife, fish resources and agro-biodiversity – with the implementation period until 2020 requires 129 billion KZT (383 million USD); of which 80% is costs for conservation and rehabilitation of forest ecosystems. According to the NBSAP, the mechanisms for "implementation support" include information support and staffing, applied research, as well as improvement of economic tools for biodiversity conservation. The budget for the NBSAP "implementation support" mechanisms equals to 22 billion KZT (65.3 million USD).

In 2014, Kazakhstan adopted a state water resources management program, the purpose of which is to ensure water security in the country by improving water management. Implementation of the program provided through 2020 with a total budget of 3.3 trillion KZT, which will be specified during the formation of respective budgets for the planned period. In field of agriculture since 2013, the government adopted the state program "Agrobusiness-2020" which aimed to improve the competitiveness of subjects of agro-industrial complex in the country and development of the agricultural sector. The total budget of program until 2020 is 2.9 billion KZT. In this regard, within the framework of NBSAP, activities on water resources and agriculture have not been considered.

On average, the expected financing need for NBSAP implementation and achievement of specified goals (through 2020) will be around 57 billion KZT (170 million USD) per year. Comparing data with country's GDP (for 2015), the required annual amount of expenditures for biodiversity conservation equals to 0,2%.

---

[1] Previously called Workbook 2
[2] Exchange rate for June 2016 is 336 KZT to the USD

According to the conducted research the total financial gap for biodiversity conservation until 2020 amounts to 158 billion KZT or 55% of the current funding. The biggest deficit of funds is observed on combating with the main causes of biodiversity loss by including the topic of biodiversity in the activities of the government and society as well as upgrading the efficiency of implementation through public planning, knowledge management and capacity building.

One of the priority areas in making efforts on conservation and restoration of biodiversity and ecosystems of the country is raising awareness of decision-makers and society related to their values.

To eliminate the financial gap, it is necessary to develop a Biodiversity Finance Plan, based on which the experts will be able to identify the financing sources and mechanisms for the purpose of biodiversity conservation.

INTRODUCTION

The conservation of Kazakhstan's biodiversity is of global importance due to the vastness of its territory, its size exceeding the territory of the four neighboring Central Asian states. As well Kazakhstan contains a wide variety of natural conditions, ecosystems, biological species diversity, and various genetic resources valuable for agriculture and research.

The flora and fauna of Kazakhstan includes more than 14 thousand species, including more than 5,750 species of higher vascular plants, about 6,000 species of fungi and lichens, 178 species of mammals, 499 birds, 104 fish and more. Peculiar for central Eurasia, the country is represented by a full range of plant subzonal species from deserts, steppes and mountain zones. Two major migration routes – the Western-Siberian-African and Central Asian-Indian – lie on the vast territory of the country, along which millions of birds fly every year.

Approximately 10.7% (29.3 million ha) of the Kazakhstan territory is part of the state forest estate. Of the country's total area, actual forested land occupies 4.61%. Agroecosystems which include landscapes established and regulated by humans or otherwise suitable for agriculture systems cover about 222.1 million hectares.

In the last decade, the country's economy has been steadily rising but this has been accompanied by an increased load on ecosystems. Contamination of ecosystems, particularly in areas of industrial activity, increased pollution due to the expansion and intensification of agriculture, and mass recreation areas are affected by anthropogenic influences. Industrial pollution, rangeland degradation, depletion of plant resources, and desertification aggravated by climate change are also increasing. As a result of these negative impacts on biodiversity both the environment and human wellbeing suffer.

Conservation and sustainable use of biodiversity is one of the most important aspects of environmentally friendly and sustainable development of the country. In 1992, the Republic of Kazakhstan signed and, in 1994, ratified the UN Convention on Biological Diversity (CBD). The republic has also accepted the responsibilities on developing national objectives to support the targets on biodiversity conservation and sustainable use, as described in the Aichi Biodiversity Targets[3]. The 17th Aichi target invites each country to update its national strategic plans on biodiversity conservation.

In order to meet these international obligations Kazakhstan drafted the National Biodiversity Strategy and Action Plan (NBSAP) with support from the United Nations Development Programme (UNDP). In accordance with the state planning regulation, this document is called the Concept for biodiversity conservation and sustainable use in the Republic of Kazakhstan till 2030 (in CBD terms – the "National Biodiversity Strategy", hereinafter – the Concept). The draft Concept provides the specific measures for expansion and improved management of protected areas, systems of environmental education and population awareness, environmental tourism, and sustainable use and conservation of forests, wildlife and fish resources. Execution of the planned priority strategic objectives will significantly improve the biological diversity conservation as a basis of the sustainable social and economic development of the country. The Concept has been supplemented with a detailed Action Plan that together with the Concept, represents what the CBD would call the National Biodiversity Strategy and Action Plan (NBSAP). Both documents have been developed through a consultative process and have been peer reviewed via the NBSAP Forum.

---

[3] 20 targets for biodiversity conservation and sustainable development, accepted in Aichi, Japan

1. STRUCTURE OF THE CONCEPT AND METHODOLOGY OF THE REPORT

The Concept involves 10 key objectives and 32 urgent tasks. The structure of the Concept divides objectives into two sets of activities including (1) biodiversity conservation, and (2) sustainable use of biodiversity in the context of forestry, fishery, agriculture, hunting and tourism, as well as mechanisms for implementation.

The first section of the Concept is focused on biodiversity conservation, covering the sectors of protected areas (PAs) and tourism, which includes the tasks for forming a representative ecological network, conservation of rare and endangered species, development of monitoring system, development of approaches for eco-tourism in the country and international cooperation in conservation of biodiversity.

The second section of the Concept is focused on the sustainable use of biodiversity, including

issues in forestry, fisheries, wildlife and agro-biodiversity. The tasks in this area seek to ensure the conservation of forest ecosystems, increase in amount of forests, support sustainable forest management, implement measures on climate change in the forestry and agriculture, conservation, reproduction and wildlife management, conservation and sustainable development of fisheries resources, conservation of the ecosystem of the Caspian Sea, conservation and restoration of agro-biodiversity.

The Action Plan is developed for the Concept, which includes the specific measures for improving the management, conservation and use of biodiversity in Kazakhstan. This document was developed for three periods – 2016-2020, 2020-2025 and 2025-2030 – and is designed for receiving funding by the state authorities, the private sector and international organizations.

Table 1. The structure of Concept

Components	Conservation of biodiversity
	Sustainable use of biodiversity in Kazakhstan based on integration of biodiversity conservation and adaptation to climate change
Mechanisms	Conducting applied research by industries
	Capacity building
	Improvement of economic mechanisms for biodiversity conservation

This Financial Needs Assessment (FNA) is made according to the methodology described in the Biodiversity Finance Initiative (BIOFIN) Workbook (Version 8.0 dated 10 April 2014). The second section is devoted to the calculation of the cost for implementing each of biodiversity strategies within the revised NBSAP. The FNA allows planners to estimate the total cost of all activities and determine the financial gap.

The Financial Needs Assessment consists of two parts:

1. Cost of strategies, actions and expenses

2. Determination of the financing gap

The first part of the report identifies the costs of key strategies and actions presented in the updated Concept, including sustainable use, protection, restoration, access and benefit sharing, and implementation strategies, as well as projected expenses for each strategy. In the second part of this report, all the costs are summarized and the financial gap for biodiversity management purposes are determined and presented.

2. SUMMARY OF ALL STRATEGIES INCLUDED IN THE CONCEPT

Component 1. Conservation of biological diversity

Objective 1. Formation of a representative ecological network

Due to the increasing anthropogenic impacts on nature, biodiversity conservation requires formation of a representative ecological network where well protected cores (reserves, national parks, reservations) are interconnected by territories with less strict protection (protected areas, reserves, etc.), as well as elements of ecological networks – ecological corridors for animal's migration, Important Birds Areas (IBA), hunting and forestry.

The measures in this objective provide for the establishment of the legal framework for regulation of public relations in the sphere of the formation, conservation and sustainable use of the ecological network of the Republic of Kazakhstan.

As a result of the measure, amendment of the Environmental, Forest Codes, and the Law of the Republic of Kazakhstan "On Protected Areas" is expected.

The Action Plan also includes measures for assessment and review of the status of existing PAs without legal protection, i.e. reserves and protected areas, with the goal of increasing their legal status. Currently, there are 50 state nature reserves of republican significance and 5 republican state protected areas in the country. As a result of the measure, assessment of 50 PAs is planned with a consequent increase in the conservation status of 5 PAs.

Table 2. The protected areas system in Kazakhstan

Ecological Network Element (Protected Areas System)	Definition and legal status	Number	Total Area, thousand km²
Ecological Network Element (Protected Areas System)	PAs with differentiated types of regimes of protection, destined for conservation and restoration of sites of the state nature reserve fund and biological diversity in land parcels and water space.	50	61
National and regional parks	PAs in which not the natural complex is protected, but some of its part: plants, animals or their certain species, or certain historical and memorial, or geological features (without legal entity status).	14	25
Nature reserves	It is a particular type of PA envisaged by the law of the country. Nature reserves are legal entities and are established in the form of the state institution. According to the IUCN definition equates to the VI category – "Sustainable natural resource management site: operates mainly for the sustainable use of natural ecosystems.	5	23
Protected areas	PAs, where human activity is limited (or prohibited) in order to protect the environment. Visit of this territory by tourists or nature lovers is not allowed.	5	113
Fauna sanctuaries	The site of the area (waters) where its entire natural complex is kept in natural state, whereas hunting is prohibited. Aside from that, any human economic activities are prohibited within the area, whereas lands are withdrawn from any type of use in perpetuity. This type of PAs has a legal entity status.	10	16
Total		74	238

To include 6 IBA of international importance in the Republican biodiversity monitoring system and formation of management mechanisms of these areas requires a group of qualified experts to study the areas and create management mechanisms.

One of the components of the ecological network can be sustainably managed hunting concessions. The total area of allocated hunting concessions includes 234.6 million hectares (86% of the area of the country), of which 117.7 million hectares (50.2%) are assigned to hunting management groups. Sustainable hunting should be considered from the standpoint of maintaining sustainable use of wildlife resources and the habitats upon which they depend. In this regard, inclusion of hunting grounds in the ecological network will require a mandatory assessment of the effectiveness of their management for conservation objectives.

In Kazakhstan, there are 123 state forestry areas including 28.6 million hectares of state forest estate. In order to determine their status,

it is necessary to evaluate the effectiveness of management of state forest areas in accordance with the categories and best practices of IUCN protected areas. It may be expedient to classify forest areas with high biodiversity value indicators to category VI "Managed resource protected area," which main functions are: to maintain biological and landscape diversity, environmental parameters, controlled use of various types of natural resources, maintenance of the local economy, development of safe areas of environmental management, conduct research and environmental monitoring, development of recreation and environmental education.

To create a well-functioning ecological network, it is also necessary to strengthen and expand the protected cores through the creation of new and an expansion of existing nature parks, conservation areas and reserves. It is expected that the Action Plan will create and expand the number of PAs progressively until 2030.

Table 3. Scheme of PAs creation and development in Kazakhstan

Year	Description
2016	Creation of "Tarbagatai" SNNP (State National Nature Park)
2017	Creation of "Ile-Balkhash" SNR (State Nature Reserve)
2017	Extension of "Barsakelmes" SNCA (State Nature Conservation Area) and "Irgiz-Turgai" SNR
2018	Creation of "Aral" SNR
2019	Creation of "Bokeiorda" SNR
2019	Creation of "Tukti" SNNP
2020	Extension of "Kolsai kolderi" SNCA and "Alakol" SNCA
2021	Creation of "Irtysh river floodplain" SNR and "Zhaiyk river floodplain" SNR
2021	Creation of "Turkestan" SNNP
2022	Creation of "Kyzylkum" SNCA
2023	Creation of "Zhanadarya-Syr" SNR
2023	Creation of "Ulytau" SNNP

Creation of ecological corridors for wildlife migration routes is also an important measure for the formation and maintenance of the ecological network. By 2020, it is planned to create two ecological corridors in Kazakhstan. Work on the first ecological corridor is being carried out with support from the United Nation Development

Programme (UNDP) project and requires a Decision of the governorate of the Almaty region for designation of lands. The second corridor is planned to be created in 2020 between the State Nature Conservation Area (SNCA) "Barsakelmes" and SNCA "Ustyurt" for protection of habitats and migration routes of large ungulates.

Objective 2: Rare and endangered species conservation

Conservation of rare species of plants is carried out only in the PAs territories, special measures in other areas are generally not taken. As part of the Global Environment Facility (GEF)/UNDP project "Conservation of in-situ mountain agro-biodiversity in Kazakhstan" in 2006-2012 works were carried out to preserve Sievers apple and ordinary apricot in and outside of PAs.

It should be noted that the national list of rare and endangered plants and animals has not been updated since 2006 and will be updated.

The Law of the Republic of Kazakhstan "On protection, reproduction and sustainable use of the plant world" does not provide clear mechanisms to protect the state rights and interests in respect of these valuable natural objects. In this regard, there is need for further development and adoption of this Law. It is necessary to provide scientifically based conservation of rare and endangered plant species.

There is an urgent issue to develop action plans that will ensure safety of the populations of the most vulnerable species of fauna (e.g.: Caspian seal, snow leopard, gray lizard, Siberian salamander, argali (Altai, Kazakhstan, Karatau and Kyzylkum), houbara bustard and others) in the long-term perspective. It is necessary to define the status of the "Action Plan by species" as a type of regulatory document. In order to preserve the Caspian seal population, it is necessary to create a Caspian Sea PA-Marine Reserve.

Another important issue is the inclusion of rules on the environmental requirements in the Environmental Code on special construction, equipment on particularly dangerous sections of power lines, objects of transport infrastructure protection devices, transition infrastructure for the prevention of loss of life and ensuring migration of wild animals.

Objective 3: Genetic resources conservation, access to them and sharing of benefits

The Nagoya Protocol on Access and Benefit Sharing reinforces and supports the implementation of the Convention on Biological Diversity (CBD). One of the CBD objectives is the fair and equitable sharing of benefits derived from genetic resources. By the Nagoya protocol, many different commercial and non-commercial sectors associated with the use of genetic resources will become beneficiaries of improved management. The protocol also regulates issues of genetic resources in the cases when native and local communities have the appropriate right to their access. The parties should take measures to receive the preliminary consent of these communities and to share with them on an equal basis taking into account traditional community laws. Having established the clear rules associated with the genetic resources, the Nagoya protocol will help to strengthen the opportunities for benefits for all the participants.

Kazakhstan as one of the signatory parties to the Convention of Biological Diversity (CBD) should create a legal basis for the conservation and sustainable use of genetic resources and create a mechanism of fair and equitable access to them. As part of these commitments, the action plan provides for implementation of a number of activities, including:

* preparation and adoption of the Law "On genetic resources"
* adoption of measures for minimizing genetic erosion and increased control over the importation into the country of genetically modified organisms
* formation and development of breeding and genetic facilities network
* creation of a genetic bank for the main types of plants
* inventory and assessment of genetic diversity
* maintenance of professional personnel training in the field of genetic resources.

Objective 4. Development of a biodiversity monitoring system based on ecosystem approach

Monitoring is an important biodiversity management tool. Biodiversity monitoring is an essential tool for measuring the effectiveness of measures taken for biodiversity conseravtion, and identification of trends, both natural and man-made.

For the development of biodiversity monitoring system in Kazakhstan, it is required to create centers of forest and bioresource information, registration and monitoring of the inventory of wildlife and hunting.

In 2012-2014, a project on development and implementation of an information system for monitoring biodiversity in pilot PAs was implemented with the support of the Government of the Republic of Kazakhstan and the UNDP. In order to strengthen the efforts undertaken within this project, expansion and improvement of the information system for monitoring biodiversity and ecosystems of Kazakhstan is required. It is planned to develop a mechanism and create a tool kit to maintain a uniform system of environmental biodiversity monitoring, to obtain objective information on the status of species, communities and ecosystems, with a view to making management decisions and development of predictive assessment of their condition.

Measures to introduce a model of population monitoring, publication of techniques of wildlife monitoring, presenting the results of monitoring and inventories of the animal world, publication of guidelines on monitoring of rare, endemic and endangered animal and plant species are essential and subject to execution in the short term for development of the biodiversity environmental monitoring system.

Objective 5. Improvement of the system and management of PAs in accordance with the goals of biodiversity conservation

In world practice, there are examples of an optimal balance between the two activities, conservation and sustainable use of PA natural resources, such as the development of eco-tourism, production of souvenirs, etc. One of the mechanisms to establish mutually beneficial cooperation between local communities and the PA is the creation of public PA councils. They help to establish contacts and resolve disputes on the use of resources in the same area. By 2020, the task is set to create public councils for PAs in Kazakhstan that will create conditions for direct public participation in decision-making of important

issues in environmental management and nature protection.

In accordance with the Protected Areas Law, the environmental organizations carry out their activities in accordance with the PA Management Plan. There is a need to include PA Management Plans, which are medium-term planning document, in the system of state planning. Over the past 10 years, there has been an acute problem of elaboration and approval of standards of PA budget financing at the level of their real financial needs, taking into account their environmental potential, geographical and social features.

The natural esthetic potential of the country provides opportunities for development of ecotourism in PA territories, in view of the diversity and attractiveness of landscapes that are not touched by the processes of urbanization and intensive agricultural production. The greatest potential for the development of eco-tourism includes territories of state national nature parks, which one of the activities is the development of recreational and tourist activities.

The fourth Aichi global objective stated that by 2020 at the latest, governments, business circles and stakeholders at all levels have taken steps or implemented plans to achieve sustainable production and consumption and do not allow that the impacts of use of natural resources disturb ecological sustainability.

To achieve this objective, the Concept provides the following measures for implementation:

Develop a methodology of assessment of recreational resources based on existing information for the territories of Kazakhstan PAs located in similar natural and climatic conditions, and perform an assessment of the resource potential, primarily eco-tourism in national parks. When implementing the study, focus should be made on the assessment of PA biological diversity as to resources and objects of ecological tourism.

Assess the current state of PAs ecosystems, and hold research on identification of options for sustainable use of biodiversity as a basis of sustainable development of basic ecosystems in intensive impact of different types of tourism.

To ensure sustainable use of biodiversity, to determine for all PAs the allowable load on ecosystems in the conditions of intensive development of all types of tourism. According to the results of this research, develop for Kazakhstan a common system of measurable indicators and methodology for monitoring the impact of tourism on PAs ecosystems.

Determine for each PA measurable indicators of ecosystems changes that will capture the dynamics of biodiversity of the main types of flora and fauna under the influence of tourism and recreational loads. Offer the best methods of monitoring, which will provide reliable information to make prompt managerial decisions for sustainable use of biodiversity within the PA boundaries.

On the basis of scientific-research work, to correct the functional zoning of PAs that will maximally ensure conseravtion of endangered endemic species and valuable ecosystems in implementation of plans of intensive development of all tourism types, especially environmental taking into account regional master plans and republican state programs for tourism development (clusters).

On the basis of an updated functional zoning and prospects for development of tourist infrastructure, to develop a series of eco-tourism routes for each PA – development and implementation of "green routes." Development and construction of ecological paths in specially protected natural areas.

Carry out adjustment of state programs, concepts and master plans for tourism development in the regions and in Kazakhstan as a whole in connection with the planned and conducted activities on conseravtion and sustainable use of biodiversity in tourism.

Include representatives of the Tourism Committee, the Representatives of Kazakhstan Tourist Association (KTO) and Association for Conservation of Biodiversity of Kazakhstan (ACBK) and two independent experts on eco-tourism in the composition of the Scientific and Technical Council of Committee of Forestry and Wildlife (CFW) in discussions on the issues of creation,

expansion, change of areas and functional zoning of PAs and others.

Create a permanent training center for eco-tourism guides and advanced training of PAs staff in the field of tourism.

Raise the level of environmental education of the local population and the quality of their capacity when providing services for tourists. Ensuring of ecotourism development in PAs through development and implementation of "green" routes.

To date, United Nations Educational, Scientific and Cultural Organization (UNESCO) included five Kazakhstan PAs to the World Network of Biosphere Reserves. These are reserves Korgalzhyn, Alakol, Katon-Karagai, Akzhayik and Aksu Zhabagaly. Despite the fact that in Kazakhstan legislation absence of the definition "biosphere reserve".

Improvement of the legal framework for transboundary PAs and biosphere reserves, continued efforts to integrate state conservation areas in the World Heritage List, UNESCO and others is required for further successful harmonization with the objectives of biodiversity conservation and maintenance of sustainable economic use in PA territories.

Establishment and maintenance of cooperative efforts with international agencies and neighboring countries for implementation of joint action plans for protection of nature is an important point for biodiversity conseravtion. There is a need to permanently hold conferences and organize internships for exchange of experience and capacity building of employees of the country's PAs.

Thus, five national objectives covering the sectors of protected areas and eco-tourism will allow Kazakhstan to develop and maintain the previous efforts in the formation of the ecological network, conservation of rare species and genetic resources, development of monitoring system, improvement of the system and mechanisms of PAs management, management of eco-tourism and international cooperation in biodiversity conseravtion.

Component 2. Sustainable use of Kazakhstan's biodiversity based on integration of biodiversity conservation and adaptation to climate change

Objective 6. Ensuring conservation and sustainable use of forest ecosystems and forest resources

One of the topical issues in the forestry sector is ensuring protection of forests from fires and illegal logging in the State Forestry Estate (SFE) territory. Despite the efforts undertaken by the competent authorities in this respect, in 2014 the number of fires increased by 2.3%. The reasons for this are the weak staffing and poor material-technical base of the state forest protection.

To solve these problems, the Concept provides measures for elaboration of the general scheme of fire control with a corresponding strengthening of technical equipment: (1) by 2020, 10 new Forest Fire Stations (FFS) and 48 Fire Watchtowers (FW) will be created, (2) 7 early detection systems of forest fires, and two units of aerotechnics with equipment for extinguishing fires from the air. By 2030 it is planned to double the number of all of the above equipment. Development of the program of forest monitoring by remote zoning of land with sufficient provision of forest institutions with protection space images is also required.

For each settlement there is a need to develop forest improvement design document for green belt creation – sustainably managed areas around settlements. In order to establish a uniform approach in determining an agricultural technique for creating green spaces, their care and maintenance in good condition during their life, it is necessary to develop guidelines for creation of green zones of settlements, taking into account regional soil and climatic conditions, as well as the recommended range of trees and shrubs, eliminating invasive species.

Increase of reforestation and afforestation to increase amount of forests in the republic

Today, amount of forests coverage is 4.6% of the land area. In 2012, within the "Zhasyl Damu" reforestation and afforestation were carried out on an area of 67 thousand hectares.

To achieve the national target and maintain the efforts undertaken by the sectoral program

"Zhasyl Damu" being implemented in 2010-2014, implementation of the following measures is required.

It is necessary to conduct soil surveys for forest suitability of areas identified for creation of forest cultures, each year on the area of 50 thousand hectares to ensure reforestation. It is also necessary to provide silviculture with quality planting material in the required quantity. For this purpose, it is planned to restore forest nurseries in the area of 350 hectares and create private forest nurseries in the area of 500 hectares. Creation of industrial plantations of fast-growing species and protective plantations by entrepreneurs and individuals supported by state subsidies is also relevant.

The issue of construction of a single selection seed production center with advanced equipment for micropropagation of woody species and equipment for the storage of reserve seed became topical to ensure quality planting materials in the country.

Development of protective afforestation: protection of agricultural lands from wind and water erosion, drought and dry winds is carried out by formation of agro-forest landscapes through afforestation of ravines, gullies, watersheds, by creation of protective plantings on pasture and arable lands. It is also necessary to make an inventory of the existing system of shelterbelt plantings followed by transfer of these plots in the private forest reserve lands.

Improvement of the methods of forest inventory and its automation will considerably facilitate the task for foresters. Carrying out voluntary certification of forestry entities will also promote environmentally responsible and economically sustainable management of forest resources of the country.

Enhancement of forest management effectiveness

An important factor in increasing the efficiency of the economy is to provide current information on the status and dynamics of the forest resources, and implemented measures for decision-making.

Activities conducted under forest management provide information on the state of forest resources, forest management and reforestation, the closest task of which is to increase the volume of forest management in order to create Geographic Information System (GIS) and electronic database of forest estate, transition to a continuous forest management and introduction of information technologies in forestry.

The technical basis of the daily work of forest management are the materials of aerial or satellite survey, reflecting the most accurate picture of the state of forests and changes occurring in it. Constantly updated information on the status of forest resources will be posted on geoportal of Committee for Forestry and Wildlife Ministry of Agriculture of the Republic of Kazakhstan (CFW MA RK).

An important factor contributing to the effectiveness of forest management is to automate record keeping, implement GIS-technologies and other electronic media in forestry production at the level of forest area, which will require the provision of forest facilities with the latest technology, software and improvement of the level of education of forest workers, which requires the revival of the Institute of Advanced Training of Forest Industry Employees.

An important factor in government decision-making in respect of forest lands is their ecological value determined during state inventory of natural resources. Introduction of a unified automated system of state natural resource inventories will provide state bodies and public organizations with information on the cost of the SFE plots.

Adaptation to climate change in forestry sector

Climate change may have an impact on all forest landscapes. Indeed, the forecasted changes in climate variables will seriously affect the ability of forests for adaptation and conseravtion. It is assumed that as a result of rise in temperature, changes in water supply and forecasted increased carbon dioxide content, changes in the forests are possible, which will take place on two levels: the structural (physiology and metabolism of trees) and at the level of ecosystems functioning. These changes will influence the availability and quality of products and services provided base on forest resources.

To adapt to climate change in the forest sector it is necessary to carry out a number of applied researches with the development of monitoring systems of the impact of climate change, with subsequent provision of recommendations on the range of species and technology of forest plantations' creation for different climate zones. Moreover, it is necessary to elaborate and adopt the state forest policy focused on conservation of forest biodiversity in changing climate.

Objective 7. Ensuring protection, reproduction and rational use of wildlife resources

Monitoring of the number of land animals is conducted by HCs only for a number of hunted species. They currently provide species accounting data to the CFW and based on these materials the number of individuals of different species in the whole country and the trend for their change is used to determine the harvest limits of these species. It is worth noting that the quality of monitoring in different hunting grounds and regions is very uneven, ranging from real data, through expert estimates, to figures in general taken "by eye," and by analogy with the previous years. This is due to very different resources, availability of personnel in HC and their qualifications. Concerning rare ungulates, as opposed to hunted species, monitoring is carried out by the state organizations, involving professional zoologists and aerotechnics.

To ensure protection, reproduction and sustainable use of wildlife, it is necessary to take measures at the legislative level on:

- improving the regulatory framework for ensuring protection, reproduction and sustainable use of wildlife resources, as an important sector of "green development," by making appropriate changes and additions;

- recognition of hunting economy one of types of a national economy and land use with establishment of the corresponding category of lands;

- review of the structure of biological justification for limits on the removal of wildlife products and ensuring its connection with the inventory of animal life;

- improvement of the legal framework in the field of sustainable hunting management including: give the rights to HCs to determine harvest volume of wildlife harvest of species which are easily and quickly rehabilitated;
- initiate the payment of bonus (percentage) to the rangers from the fine paid by offender for damage made to the wildlife;
- development of performance-based evaluation on HC activities for protection, restoration and sustainable use of hunted species;
- development of procedure of reparation of loss during the seizure of HC's lands for state needs.

Keeping the state monitoring and tracking of the wildlife, as the monitoring and tracking of biodiversity trends is required to increase the efficiency to ensure the protection and sustainable use of wildlife.

An important issue in ensuring protection of wildlife is the increase of efficiency of technical equipment and protection services. Creation of the state center for resettlement of wild animals as part of CFW and developing improved technologies of captive breeding, reproduction and release into the nature of rare species is an urgent task.

Objective 8. Ensuring protection, reproduction and rational use of fisheries resources and the sustainable development of fisheries

Regulatory Acts (RAs) of the Republic of Kazakhstan in fisheries are aimed at creating conditions for sustainable use of these biological resources. At the same time, they are not sufficient for this purpose and need reforms aimed at improving the principles of conservation and sustainable use of biodiversity in accordance with the CBD. To date, there are no regulations on fishing effort in the waters.

Currently, a pattern of decreasing biodiversity in reservoirs is observed, which is associated with the increase in demand on the target species of biological resources. There is a general decline in number, a reduction of species diversity, and a substitution of valuable species in food and commercial respects to less attractive species.

At the same time, state regulation of the use of biological resources is conducted from the perspective of "traditional" approach not fully ensuring the principles of sustainable use of biological resources.

Achieving a reduction in the volume of exploited natural resources to environmentally safe limits improves the efficiency of resource use. This objective can be achieved by means of state regulation of the use of biological resources in water bodies by implementing the principles of sustainable fishery management. Besides, increasing awareness of the subjects of natural use for sustainable use of natural resources through education, development of corporate responsibility, improvement of educational programs of universities will promote achievement of this goal.

Protection of biodiversity and natural habitats of fish and other aquatic animals

One of the most important factors reducing biodiversity of aquatic animals after overexploitation is the degradation and fragmentation of their habitats. Irrational use, which does not take into account the needs of aquatic life, as well as water pollution also lead to degradation and fragmentation of habitats of aquatic animals.

The most vulnerable areas of habitat for fish and other aquatic animals in terms of biodiversity conservation are breeding grounds and migration routes. To solve these problems, it is necessary to create specialized PAs for protection of fish resources and other aquatic animals. It is also required to set a regime of fishing that bans fishing in breeding sites, on migration routes, and in important wintering areas.

Recovery of fish populations, and limiting activities which tend to reduce the population, migration routes and places of concentration (wintering holes and spawning) of fish and other aquatic animals

Unsustainable fishing is the main factor reducing the populations of exploited fish species. The selectivity of fishing, based on the individual, most commercially profitable species, which is carried out without sufficient regard for productive capacity of populations (i.e. "optimal yield") has led to changes in the structure of reserves. Over-

exploitation by fishing companies and growing competition from the lesser used "low-value" species leads to further depletion of species.

To reduce excessive impact on fish resources and ensure their sustainable use, it is necessary to improve fisheries management with the introduction of the principles of the Code for Responsible Fishery. Besides, for the recovery of fishing value of undermined stocks and conservation of biodiversity, it is necessary to introduce measures to restore populations of commercial fish species and other aquatic animals reducing the number in their natural habitat. Creation of artificial populations of the target species followed by reintroduction into their natural habitats will contribute to this objective.

To restore the natural fish populations, primarily – sturgeon, selection and genetic centers for artificial breeding and creation of cryobanks of reproductive products of rare and endangered species should be created.

Conservation of the Caspian Sea ecosystem

The risks for safety and proper functioning of the Caspian Sea ecosystem increased with the development of extractive industries in the Caspian Sea water area and an increase in the intensity of navigation. Currently, anthropogenic load associated with the extraction of hydrocarbons has increased. The consequence of the activities directly relates to the extraction of hydrocarbon raw material, possible contamination in emergency situations, increased disturbance and unsustainable fishing significantly increase the risks for the Caspian Sea ecosystem.

Determination of sea areas with varying stability and vulnerability will contribute to reducing the risk, which will allow evaluate the safe impact volumes at which risks of biodiversity loss will be minimized.

Improvement of fishery, introduction of monitoring system for biodiversity, organization of differentiated monitoring of the condition of populations of commercial fish species by environmental groups (sturgeon, semi-anadromous and marine fish), as well as monitoring of the status of the Caspian seal will also contribute to conservation of fish and other aquatic animals of the Caspian Sea.

Objective 9. Conservation and restoration of agro-biodiversity

In Kazakhstan, pasture lands account for 70% of the country's total area, 26% of which are degraded. Unsustainable use and degradation processes occurring in pastures and hayfields have a negative impact and make species of plants very vulnerable. Its main reasons should include the negative impact of human activities and changes in habitat conditions.

The main natural factor contributing to the desertification processes in Kazakhstan is the landlocked situation of the country, resulting in a continental and arid climate, scarcity and uneven distribution of water resources causing widespread sandy (up to 30 million hectares) and saline lands (127 million hectares). Conditions for the development of the land degradation processes are created in violation of seasonal characteristics of soil formation at the impact of drought. The prerequisite of desertification is also weak soil maturity and its dynamics. These natural features of Kazakhstan cause poor environment resistance to anthropogenic influences (upon the estimates about 75% of the country territory are subjected to increased risk of environmental destabilization).

Degradation of agricultural lands is affected by such factors as the failure to pasture, lack of knowledge and skills to use the new and improved methods of management and the lack of incentives for their use by farmers.

Restoring degraded pasture ecosystems and reducing their areas are one of the most important tasks for prevention of desertification, as well as providing space of living organisms suitable for habitat.

Conservation and restoration of agro-biodiversity on fallow lands withdrawn from agricultural use

A strategically important direction today and for the future is to engage in agricultural use of previously degraded lands from tillage. Currently, most of these lands are overgrown with badly eaten wormwood vegetation with poor food supply, not only for farm animals, but for wildlife as well. Furthermore, they are breeding grounds for pests and diseases.

Therefore, the most important task for the near future is the involvement of fallow lands in agricultural use and the development of effective technology of turning these lands into highly productive grasslands that will be a huge reserve for increasing production of feed for livestock development in the perspective in the republic.

Besides, cultivation of perennial grasses in crop rotation pursues its goal restoration – maintenance of soil fertility and structural condition, allowing to create in the soil optimum water, air, food and biological regimes and other conditions for normal functioning of ecosystems preventing desertification and improving phytosanitary condition from pests and diseases.

Production of environmentally friendly products based on the use of organic farming

Development of environmental farming in recent years is a topical issue in international markets. The pace of global growth in the environmentally friendly products grown on the clean area without additional use of fertilizers and pesticides is 20% annually. The capacity of the world market of bioproducts (organic) in recent years exceeded 66 billion USD.

The urgency of the considered problem is determined by the need to saturate the domestic market with environmentally friendly food products produced in Kazakhstan in accordance with the demand of population and possibility of entering foreign markets, and hence obtaining of additional source of foreign exchange earnings to the state treasury. All of this has a positive effect on economic growth and socio-political situation, health promotion of the population, improving life expectancy.

In Kazakhstan, about 50 polyphagous species and more than 100 types of specialized pests, more than 70 types of diseases and about 120 species of weeds harm crops and pastures. According to the UN FAO, annual world harvest losses of crops due to pests make about 35%, including 13.8% from pests, 9.2% from diseases and 12.0% from weeds. Plant protection from complex of hazardous organisms in Kazakhstan is currently carried out almost 100% by chemical pesticides (insecticides). The negative consequences from the use of pesticides are well known – pollution of environment, as well as agricultural residues by toxic chemicals, including heavy metals, nitrates and other harmful to human health elements.

An alternative to the use of pesticides is the introduction of integrated protection systems based on biological methods (Integrated Pest Management). With the use of natural biological approaches (entomopathogenic microorganisms useful entomophagous insects, various extracts from plants) in regulation of hazardous organisms (insect pests, diseases, weeds).

Adaptation measures on climate change in agriculture

Over the past twenty years on the territory of Kazakhstan in the summer period, an increase in aridity has been observed. There is a decline in the moisture content and increase in temperature. Due to climate warming, an increase of adverse weather conditions for grassland farming in the summer, and their decrease in winter is observed.

Measures taken to adapt to climate change in agriculture:

- Adjustment of agronomic and agrohydrological indicators of soil in the main grain areas. Identification of trends in their changes. Development of measures for restoration of soil fertility;
- Development of technology of crops cultivation to prevent soil degradation;
- Selection works on improvement of sustainability of agricultural crops to climate stresses and drought conditions (removal and introduction of drought- and heat-resistant varieties);
- Assessment of profitability of crop cultivation in areas with low soil-climatic potential. Determination of areas with profitable farming, separately by types and kinds of crops, to pay greater attention to the problems of expansion of sowing oilseeds;
- Diversification of crop production with the inclusion of high-yielding and adapted crops to stressful situations. Promotion of the use of controlled environments (greenhouses) for cultivation of certain crops;
- Agroclimatic zoning of crops given climate change;

- Adjustment of the structure of the use of arable land including crops that can actively absorb carbon dioxide from the atmosphere;
- Introduction of water saving technologies of cultivation of agricultural crops on the basis of modeling changes in rainfall distribution;
- Study of the nature of occurrence of drought phenomena and development of long-term methods of forecasting droughts. Elaboration of methods for combating drought and their consequences.

Objective 10. Stabilization and improvement of environmental quality and protection of soil

The technological backwardness of industry and agriculture, as well as extensive use of natural resources has led to a considerable degradation of soils of Kazakhstan. More than 50 thousand km2 in the Aral Sea basin and Balkhash contain decertified and saline territories. Fertility of floodplain soils of Irtysh is reduced in connection with regulated flow and long-term polymetallic production. The problem of soil degradation is particularly acute in the Northern Kazakhstan – the area of grain farming. Over a period of long-term plowing of virgin lands, humus content decreased by 5-20% and more. From among 4.3 billion tons of humus reserves of arable layer 0-25 cm was irretrievably lost due to mineralization of organic matter, removal with harvest, in water and wind erosion 1.2 billion ton or 28.3%. 17.8 million hectares are potentially exposed to deflation and 2.6 million hectares suffer from severe wind erosion in grain-growing areas of the north of the republic.

The intense environmental situation is observed in industrial areas due to pollution of environment by toxic waste. There are more than 4.3 million hectares of disturbed land, including 1.5 million hectares of man-made zones, 1.9 – degraded grassland, 0.6 – contaminated by petroleum products and 0.3 million hectares of land with radioactive contamination in the Caspian oil producing region. On the territory of the former Semipalatinsk nuclear test site, about 2 million hectares of agricultural land was subjected to radioactive contamination. In Kazakhstan, soil contamination is observed in all industrial regions. For example, in the man-made zone of Shymkent soil is contaminated by movable forms of lead and cadmium with a maximum concentration of the latter from 200 maximum permissible concentrations (MPC) up to 1500 MPC of lead. In general, in the areas of dry farming and irrigated areas, a significant part of the land is depleted, degraded, salinized or polluted by toxic wastes. More than half of the land in the country is prone to desertification with varying degrees of intensity.

Every year more than one million tons of pesticides are produced in the world. At present, the impact of pesticides on health population is equated by many scientists to the effects of radioactive substances on a human being. It is well established that in the use of pesticides along with a slight increase in yields, increase in the species composition of pests is observed and food quality and safety of products decrease, natural fertility is lost, etc.

Pesticides cause profound changes in the entire ecosystem acting on all living organisms, while a man uses them to destroy the very limited number of species of organisms. As a result, intoxication of a large number of other species (beneficial insects, birds) is observed until their extinction. Besides, a person tries to use significantly more pesticides than needed, and exacerbates the problem.

In order to stabilize the situation, development of an integrated program of rational use, conservation and restoration of disturbed soil fertility, measures to prevent further degradation of soil, fertility restoration of eroded, dehumidified and technogenic disturbed soil, pasture improvement, and other issues with the solution to the environmental problems and protection of soils is required.

Concept implementation mechanisms

Mechanisms for the Concept implementation include information and scientific support and human resources as well as economic mechanisms improvement.

It is critical to create the Interagency Information and Analytical Center (the Center) as an effective mechanism for ensuring information support for the Concept implementation. The Center should implement functions of the national-level of the clearing house mechanism, established under the Convention on Biological Diversity.

It is necessary to develop a special system that would collect and process the information available for strategic decision-making. An important aspect to build information-providing system for strategic decision-making is the analysis of modern tools of management in the context of obtaining information for formulation and implementation of the strategy.

One of the most effective mechanisms for biodiversity conservation is the development of information and scientific support, increase in the level of education of government officials and public in the field of conservation and sustainable use of biological resources, ensuring public participation in addressing issues in the field. Achievement of these criteria in the first place requires a full-scale information campaign, the aim of which is to report about conservation of ecosystems and sustainable use of biological resources available for everybody, without exception, from the ordinary individual to government officials.

The purpose of scientific support of this Concept is to develop a set of activities, introduce applied scientific research focused on biodiversity conservation and sustainable use. This task requires the development of methodological framework for biodiversity monitoring in response to global climate change and increasing anthropogenic impact; methods for determining the volume of carbon in soil and vegetation cover, including forest ecosystems in Kazakhstan, scientific framework of an ecosystem approach in the legislation and in formation of regulatory documents (including provision of licenses, certificates, environmental insurance and environmental audit).

Currently, the PAs system of Kazakhstan is experiencing an acute shortage of qualified personnel. Ineffective PA management system is mainly a result of absence of qualified personnel. For the advanced training, it is required to hold at least annual workshops for all staff. Personnel development requires development of occupation list, and educational standards in each field as well as development of proposals for tenders to encourage institutions to participate in personnel development tenders.

The need to integrate the economic valuation of ecosystem services into national policies for sustainable development of the country is determined by the fact that natural resources play an important role in the economy of Kazakhstan, but the benefits derived from them in the long run, are not taken into account in standard economic analyses. The conceptual framework for economic valuation of ecosystem services is based on the fact that people being part of ecosystems depend on the services the ecosystems provide, and the dynamic interaction between them affects human well-being.

Public policy should take into account the benefits provided by the ecosystem services. Economic valuation aims to include basic parameters of biodiversity and ecosystems to the country's economic system, establish legal framework for the formation of ecological-oriented national accounts to include the value of biodiversity and ecosystems in macroeconomic indicators (GDP, GNP) and international offsets system.

To conduct economic valuation of ecosystem services with further use of its results in decision-making process it is necessary to carry out works on identification and valuation of ecosystem services (ES). Implementation of Payment for ecosystem services (PES) schemes requires identification of the ES beneficiaries and providers.

PES are critical to overcome barriers in the management of biological resources, and make

it possible to incorporate environmental costs and benefits while making decisions especially in cases where the financial resources to address environmental and economic problems are limited. PES system will allow identifying real consumers and providers of ecosystem services and provide additional financial resources, creating incentives for investment and private sector involvement in conservation of biodiversity and ecosystems. Through this mechanism it will be possible to establish market for ecosystem services by shifting abstract ecosystem services into all relevant categories of "goods or products."

The process of implementation of the payment mechanism shall take into account availability of demand and supply for the service, economic value of ecosystem services, availability or establishment of favorable legal framework, institutional framework and implementation of monetary and non-monetary payments.

3. SUMMARY OF COSTS FOR ALL STRATEGIES

Calculations of the cost for activities included in the Action Plan for biodiversity conservation of Kazakhstan were conducted by an expert on budget planning in consultation with a wide range of experts and stakeholders. Firstly, to determine the cost of the activities a series of consultative meetings were held with national experts in the sectors. During the meetings the procedure for implementing activities, as well as expected actions for implementation were discussed in details. Further, the expert collected budget quotations from companies for services and/or materials required for activities implementation. As a result, the budget for concept implementation was calculated from a bottom-up approach. However, it should be noted that the budget is composed of prices for 2014-2015, and although future years were adjusted for inflation, they can deviate from the current market prices and no attempt was made to estimate future price changes.

The table below includes costs for national goals and Concept implementation mechanisms. Funding amounting to 242 310 282 thousand

KZT is required from 2016 through 2030 for biodiversity conservation, as well as ecological network creation and management, conservation of rare wildlife species, ecological monitoring system development, and implementation of activities within the frameworks of the Nagoya Protocol.

The amount of 266 262 508 thousand KZT is required to stimulate sustainable approach in the utilization of the country's biodiversity in forestry, wildlife, fisheries and agriculture sectors, 70% of this amount is required for the forest sector.

Additional financing is required for scientific research, qualified personnel, and implementation of new economic tools. According to estimates, the required amount equals to 26 229 527 thousand KZT.

It should also be mentioned that one-time activities to be implemented in 2025-2030 were not included, since it is impossible to estimate their real cost.

Table 4. Expenses for implementation of Concept for biodiversity conservation and sustainable use in Kazakhstan until 2030, thousand KZT

Strategy and Objectives	2016	2017	2018	2019	2020	2021-2030	Total
Conservation of biological diversity							**242 310 282**
Objective 1 Formation of representative ecological network	30 398 484	14 740 761	30 007 187	18 910 637	18 875 495	102 372 875	**215 305 440**
Objective 2 Rare and endangered species conservation	702 460	783 623	1 032 221	974 216	1 248 477	159 712	**4 900 709**
Objective 3 Genetic resources conservation, access to them and sharing of benefits	8 250	47 315	6 859	2 629	1 022 678	1 610 880	**2 698 612**

Strategy and Objectives	2016	2017	2018	2019	2020	2021-2030	Total
Objective 4 Development of the biodiversity monitoring system based on an ecosystem approach	20 000	1 084 620	98 925	98 925	1 261 157	2 680 178	**5 243 804**
Objective 5 Improvement of the system and management of PAs in accordance with the goals of biodiversity conservation	420 713	11 895 663	673 658	693 422	336 847	141 414	**14 161 717**
Sustainable use of biodiversity							**266 262 508**
Objective 6 Ensuring conservation and sustainable use of forest ecosystems and forest resources	17 193 947	19 639 062	22 430 244	22 168 51	22 660 36	80 360 597	**184 452 728**
Objective 7 Ensuring protection, reproduction and rational use of wildlife resources	1 217 288	1 430 588	1 271 071	1 211 326	1 238 238	6 072 075	**12 440 585**
Objective 8 Ensuring protection, reproduction and rational use of fishery resources and sustainable development of fisheries	1 484 221	1 644 297	7 090 863	3 097 073	2 813 654	46 953 576	**63 083 685**
Objective 9 Conservation and restoration of agro-biodiversity	189 662	301 245	322 026	328 413	350 670	4 241 080	**5 733 095**
Objective 10 Stabilization and improvement of environment quality and soil protection		78 626	185 386	139 325	149 077		**552 414**
Support Mechanisms							**14 418 631**
Improvement of economic mechanisms for biodiversity conservation	1 936 637	2 056 355	2 178 468	2 312 234	2 446 000		**10 929 694**
Informational and scientific mechanisms	13 200	121 941	96 824	40 995			**272 960**
Capacity building	174 042	235 857	252 367	428 155	458 126	4 271 493	**5 820 039**
Governmental control and implementation in field of forestry, PAs, fishery and hunting concessions	1 770 545	1 770 545	1 770 545	1 947 599	1 947 599		**9 206 834**
Total		55 529 449	55 830 499	67 416 643	52 353 461	248 863 878	534 802 316

According to the BIOFIN methodology, expenses included in FNA are divided into Aichi Targets and Convention of Biological Diversity (CBD) Strategic Goals. Below is the list of Strategic Goals according to CBD Strategic Plan.

*Strategic Goal A: M*ainstreaming – Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society;

Strategic Goal B: Sustainable Use – Reduce the direct impacts on biodiversity and promote sustainable use;

Strategic Goal C: Conservation – Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity;

Strategic Goal D: Ecosystem service maintenance – Enhance the benefits to all from biodiversity and ecosystem services;

Strategic Goal E: Implementation support – Enhance the implementation through participatory planning, knowledge management and capacity building.

The distribution of costs by the major strategy groups was attributed during the BIOFIN workshop, which took place in the third quarter of 2015 and brought together sector experts from government agencies and research institutes. During the workshop, the participants were divided into seven working groups according to the sectors: 1) forestry, 2) protected areas and tourism, 3) hunting and wildlife management, 4) fisheries, 5) water management, 6) agriculture, and 7) industry. The participants attributed actions into the Aichi targets and five strategic categories.

Figure 1.
Summary of the costs for implementation of Concept under the objectives of Aichi targets/strategy
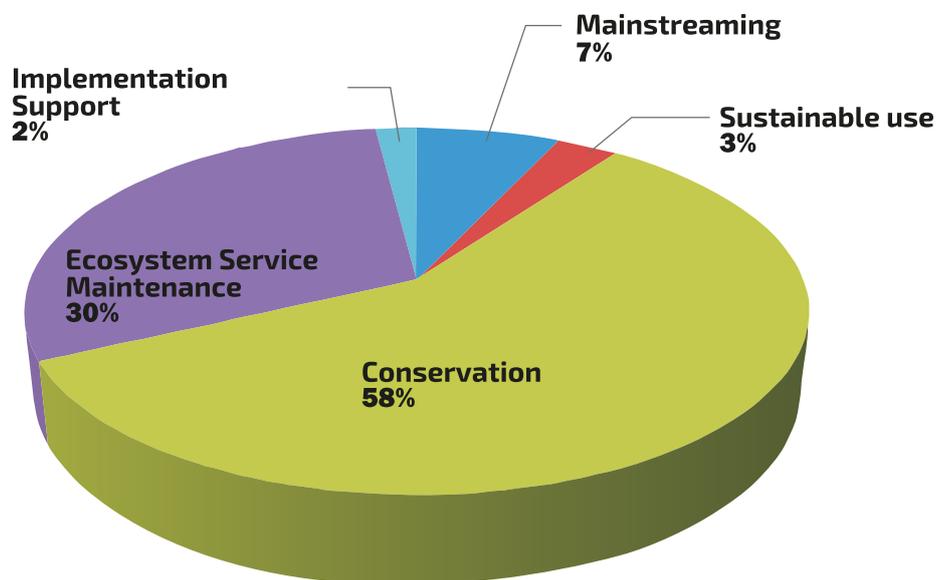
Strategic Goal A intended to eliminate the main causes of biodiversity loss through the introduction of biodiversity issues into government and society decision making. The main target or this strategy is to integrate ecosystem approach in all sectors of the country, reduce subsidies with harmful influence on biodiversity and include biodiversity values in the economic indicators of the country. The activities in this strategy include development of methodical recommendations, guidelines and information workshops. The budget of activities in the Strategic Goal A is 22 418 078 thousand KZT (7%).

Strategic Goal B has the objective to reduce direct impacts on biodiversity and stimulate sustainable use through the reduction of loss of all natural habitats, implementation of sustainable fisheries and reduction of biogenic substances extensively released. Under this Goal, the Action Plan envisages implementation of sustainable fisheries and aquaculture principles, implementation of forest certification system, as well as the development of an adaptive landscape system of farming. The budget of the strategy is 16 431 034 thousand KZT (3%).

Improvement of the biodiversity condition through ecosystems and species conservation as well as genetic diversity is the basis of the Strategic Goal C. The targets include creation and management of interconnected areas; and prevention from extinction of known endangered species. The Action Plan of the Concept envisages creation of new and extension of the existing PAs, as well as protection of the areas playing an important role for animal migration, which will create an optimal environmental network in Kazakhstan. In order to protect forestry ecosystems, general fire-protection scheme of SFE area within which forest fire stations and watchtowers will be constructed. The budget of activities under this goal until 2020 is 145 114 459 thousand KZT or 58% of the total budget of the Action plan.

The Strategic Goal D has the objective to increase the benefits from biodiversity and ecosystem services for all. The targets of this strategy include restoration, conservation and increase of ecosystems sustainability, providing necessary services, including the services associated with water, health care, activities and welfare. The restoration strategy is one of the most important

areas in biodiversity conservation, totally this strategy covers 30% of the cost of the Concept. The Action plan budget requires 93 664 701 thousand KZT from 2016 until 2020. In the forestry sector, restoration includes as plantation of new forestry crops on the lands excluded from the agricultural use or exposed to the fire, as development of forestry crops microclonal propagation methods. Restoration in fisheries and wildlife management is one of the key activities. Thus, within the Action Plan, it is scheduled to develop the work plans on restoration of the population of such animals as snow leopard, horse, Mongolian wild horse, tiger, desert monitor, argali, sturgeon etc. The relevant issue of studying saiga population diseases is also included in the restoration strategy. One of the targets in strategic goal D is the issue of access to the genetic resources and the fair and equitable sharing of benefits. The Nagoya Protocol on Access and Benefit Sharing is the regulatory document in this issue. The Republic of Kazakhstan having approved this protocol should prepare and adopt the Law "On genetic resources" and take measures on implementation of the regulating activities in the issues of access and benefit sharing.

The Strategic Goal E on improvement of implementation by planning, knowledge management and potential increase is focused on biodiversity knowledge exchange, its values and on trends and consequences of loss. Sharing experience with international agencies, integration of local population traditional knowledge and efficient information interaction of the fields enable Biodiversity Concept implementation. The budget envisages 2% (8 310 167 thousand KZT) of the total planned budget of the Action Plan.

4. SUMMARY OF TIMELINE OF COSTS

The Concept implementation is divided into three stages: (1) 2016-2020 – short-term, (2) 2021-2025 – mid-term, (3) 2025-2030 – long-term. The budget of expenses was calculated for short-term and medium-term measures, taking into account the annual inflation. The budget for the long-term measures was not calculated due to the complexity in determining the value of recurrent expenses over long periods.

Table 5. Distribution of expenditures on short and mid term

Objectives	Short-term	Mid-term
Capacity building	1 548 546 393	4 271 492 910
Improvement of economic mechanisms for biodiversity conservation	10 929 693 860	-
Ensuring protection, reproduction and rational use of wildlife resources	6 368 510 576	6 072 074 628
Informational and scientific mechanisms	272 959 922	-
Development of the biodiversity monitoring system based on an ecosystem approach	2 563 625 939	2 680 177 925
Improvement of the system and management of PA in accordance with the goals of biodiversity conservation	14 020 302 748	141 414 060
Genetic resources conservation, access to them and sharing of benefits	1 087 732 454	1 610 879 748
Rare and endangered species conservation	4 740 997 004	159 711 552
Formation of representative ecological network	112 932 565 305	102 372 874 952
Stabilization and improvement of environment quality and soil protection	552 414 127	-
Ensuring conservation and sustainable use of forest ecosystem and forest resources	104 092 131 068	80 360 596 620
Ensuring protection, reproduction and rational use of fishery resources and the sustainable development of fisheries	16 130 109 453	46 953 575 647
Conservation and restoration of agro-biodiversity	1 492 015 502	4 241 079 936
Governmental control and implementation in field of forestry, PAs, fishery, wildlife and hunting concessions	9 206 834 000	-
Total	**285 938 438 351**	**248 863 877 982**

The Concept consists of ten targets, which in their turn are divided by activities to the relevant field. Thus, the allocation of the costs by the Workplan implementation period is presented in Figure 2. According to the Table 5, 36.4% of total planned amount accounts for the target on conservation and sustainable use of forest ecosystems and resources. This target envisages activities on extension of forestry restoration area, enhancement of protection activities, forestry management efficiency, and taking actions to adapt to climate change in forestry as well.

About 20% of total financing amount accounts for the target on the establishment of representative ecological network in Kazakhstan. This target envisages the creation and extension of PAs, the creation of ecological corridors for animals, and inclusion of the key ornithological areas.

1-6% of the total budget of the short-term period of the Concept account for the goals related to the improvement of the PA management system and mechanisms, activities in the area of fishery and wildlife, conservation of rare species, implementation of new economic mechanisms and state control and implementation in the field of biodiversity.

Up to 1% of the total budget of the short-term period of the Concept accounts for activities related to the development of agrobiodiversity monitoring, conservation and restoration, improvement of environment and soils, conservation of genetic resources, staffing support and conduction of applied research.

For the mid-term period (2021-2025) the budget is 248 863 878 thousand KZT (740 666 304 USD). The same as for the short-term period over 30% of budget accounts for goals on formation of the ecological network, conservation and sustainable use of forest ecosystems. About 19% accounts for activities related to fishery. The mid-term period includes activities on development and implementation of unified system of monitoring of sturgeon populations in Kazakhstan. Up to 3% of the total budget of the mid-term period accounts for goals related to the development of biodiversity monitoring system by establishing the center of forest and bioresource information, the accounting center, monitoring and cadaster of wildlife; conservation and restoration of agrobiodiversity and others.

As part of the target related to creation of the representative ecological network in Kazakhstan, by 2020, four new PAs are planned to be created and three existing PAs are planned to be extended in Kazakhstan; additionally, five new PAs are planned to be created and two existing PAs are to be extended by 2030. According to the Figure 4,76% of planned funding is envisaged for the establishment of reserves, including revision of ENO and TEO. 13% of the allocated funding ring-fenced for the establishment of nature parks, 0,29% for the creation of reserves, 0,06% for the establishment of the ecological corridor between the Barsakelmes and Ustyurt reserves on protection of habitats and migration paths of wild ungulates. 8,54% of budget is planned for the expansion of existing PAs, as well as 1,01% accounts for other activities on the ecological network formation. The activities include:

- Inclusion of IBAs of international significance to the national biodiversity monitoring system and establishment of mechanisms to manage these areas;

- Conduction of assessment and inclusion of hunting concessions to the ecological network of the RK;

- Conduction of assessment and inclusion of hunting farms in the ecological network of the RK;

- Creation of the legal framework for the regulation of public relation in the sphere of establishment, protection and balanced use of ecological network of the RK;

- Development of the forestry institutions' assessment methodology;

- Conduction of assessment of forestry institutions according to IUCN system.

Figure 2. Activities for the target of Formation of ecological network

Creation of ecological corridors to ensure migration paths for wild animals
0,06%

The expansion of territories of existing PAs
8,54%

Other activities
1,01%

Creation of SNNP
13,49%

Creation of SNCA
0,29%

Creation of SNR
76,61%
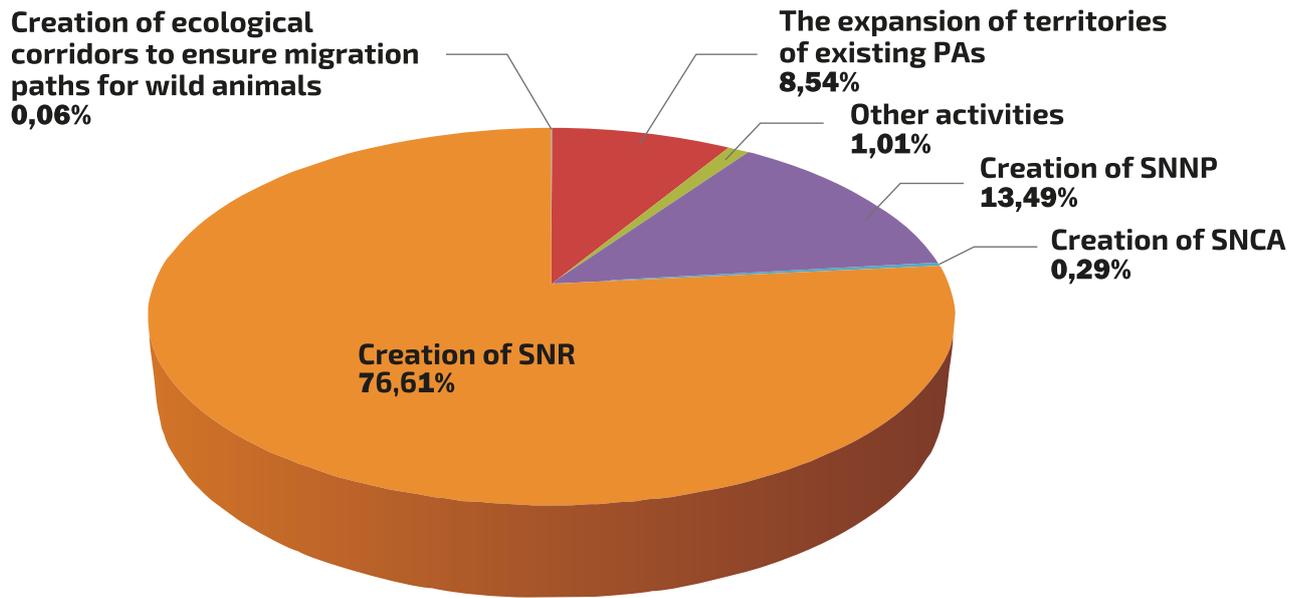
5. ONE-TIME AND RECURRING COSTS

"One-time costs" were defined as costs occurring only once, such as land acquisition for creating protected area or infrastructure such as buildings or roads.

"Recurring costs" are regular ongoing costs. Examples include the operational costs (staff, trips, meetings) and maintenance (replacement of equipment, software, transport repairs).

Component 1 – Biodiversity Conservation

The targets of first component of the Concept "Biodiversity conservation" include establishment of the environmental network, conservation of genetic resources, improvement of monitoring system, development of PAs management mechanisms. Budget of one-time costs until 2020 is 155 343 972 thousand KZT (USD 462 333 250) and recurring costs are 130 594 466 thousand KZT (USD 388 674 007).

Establishment of the representative ecological network

One-time expenses for the establishment of the representative ecological network include creation of ten new PAs with the status of legal entities on a total area of more than 3 million hectares, expansion of four existing PAs and creation of two ecological corridors for wildlife migration paths.

Creation and enhancement of natural areas requires the development of ENO (Scientific Background Report) and TEO (Feasibility Study). Following a discussion with the experts of the the Forestry and Wildlife Committee, it was found that most of the proposed natural areas to be gazetted have ENO and TEO. In some cases, the design or adjustment of existing studies is needed.

ENO elaboration requires a comprehensive series of studies including assessment of socio-economic conditions, environmental systems, risks, threats to protection of recommended boundaries, area, functional areas and the type of regime of protection and use.

Draft ENO for the establishment of PA is accompanied by cartographic and photographic material.

Given the need conserve the unique natural complexes, taking into account the interests of the local population and prospects of development of the region, the natural scientific justification defines the boundaries of PA and protection regime with a joint discussion with the Akimat of the region.

The development of draft TEO is carried out at the second stage of the complex of measures associated with the organization and expansion of PA. An integral part of the TEO is a land-use design of allocation of PA lands with the description of its boundaries and coordinates. This document determines the categories and areas of land sites belonged to the land owners and land users and removed in favor of protected areas without exception, as well as boundaries and the areas of the protected zone.

The TEO includes costs for creation of infrastructure and maintenance of the PA, implementation of activities for conservation, protection and restoration of assets of the state nature reserve estate. The legal gazetting of protected areas is prepared.

These projects are created based on the government order by organizations certified to provide such services.

One-time expenses include expenses for creating and updating the ENO and TEO, development of land management activities, and acquisition of satellite imagery on the area. All expenses were calculated based on the estimated areas proposed for creation of PA, however, practice shows that the acreage of actually reserved land can range. (Figure 3).

Recurring costs of this objective are focused on the maintenance of intended PAs, collection and accounting centers, tourist information centers.

Calculation of the costs for PA management was included according to available TEO (Section 9 – Costs on PA creation project). These costs were calculated according to the standards on natural areas management and increased due to inflation. For PAs with no TEO prepared, the funding was calculated on the example of the existing reserves upon the area of the lands. The recurring costs assumed funding for maintenance of "Tarbagatai" SNNP, "Bokeiorda" SNR, "Aral" SNR, "Ile-Balkhash" SNR, "Irgiz-Turgai" SNR, "Barsakelmes" SNA, "Altyn Yemel" SNNP, and "Tukti" SNNP (Figure 4).

Conservation of rare and endangered species

The activities within this issue are aimed at strengthening of the institutional and organizational basis for the conservation of rare species of animals and plants, as well as improving the productivity of hunting while maintaining the optimal structure of exploited populations of animal species and their habitats. The activities include:

- preparation of in-situ and ex-situ action plans,

- isolation of transmission lines in the areas of high priority to prevent birds from the harmful effects,

- construction of above-ground and underground wildlife crossings for ungulates,

- adjustment of the lists of rare and endangered plants and animals in accordance with the IUCN Red Book categories (International Union for Conservation of Nature and Natural Resources),

- publishing of printed versions and development of online versions of the Red Book of Kazakhstan.

One-time costs of these activities include costs for expert services related to the development of maps, schemes and TEO for designing migration passages, improving wildlife crossings, purchasing equipment to isolate power supply lines and constructing wildlife crossings. Since there is the lack of wildlife crossings construction experience in Kazakhstan and in CIS countries, the construction cost that was discussed with the competent experts is approximate (Figure 3).

There are no recurring costs in this target, as the implementation of the activities provides one-time funding and do not require ongoing operational costs.

Conservation of genetic resources, provision of access to them and their use on fair and equal basis

Preparation and approval of the Law of the Republic of Kazakhstan "On genetic resources" under the commitments of Nagoya Protocol is the main activity of the target on conservation of genetic resources, provision of access to them and their use on fair and equal basis. In addition, it is required to develop the "clearing house mechanism" within the protocol and define the authority in the field of flora and genetic resources. Besides, in order to achieve the target, it is necessary to establish and extend the network of selective genetic facilities and forestry genetic improvement centers. The costs for activities on establishment of national bank of plants genetic resources are not calculated in this budget.

One-time costs include costs for expert services related to development of the abovementioned activities as follows: creation of infrastructure and procurement of the required equipment for forest seed-production complex (Figure 3). Recurring costs are provided for the maintenance of this complex (Figure 4).

Figure 3. Distribution of one-time expenses on component of biodiversity conservation, thousand KZT

Formation
of representative
ecological network
48%

Development of a biodiversity
monitoring system based
on an ecosystem approach
2%

Improvement
of the system and
management of PAs
in accordance with
the goals of biodiversity
conservation
36%

Preservation of genetic
resources, provision
of access to them
and their use on fair
and equal basis
1%

Preservation of rare
and endangered species
13%
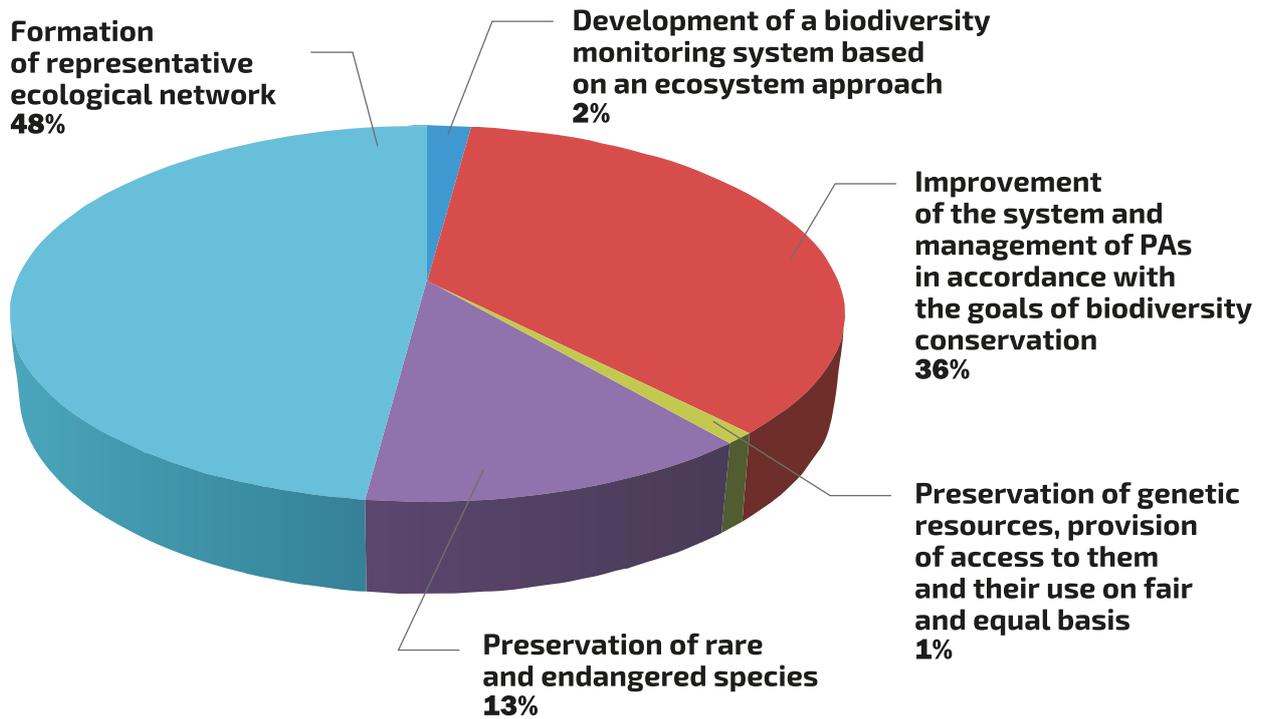
Figure 4. Distribution of recurring expenses on component of biodiversity conservation, thousand KZT

Development
of a biodiversity
monitoring system
based on an ecosystem
approach
2%

Improvement of the system
and management of PA
in accordance with the goals
of biodiversity conservation
3%

Genetic resources
conservation, access
to them and sharing
of benefits
1%

Formation
of representative
ecological network
94%
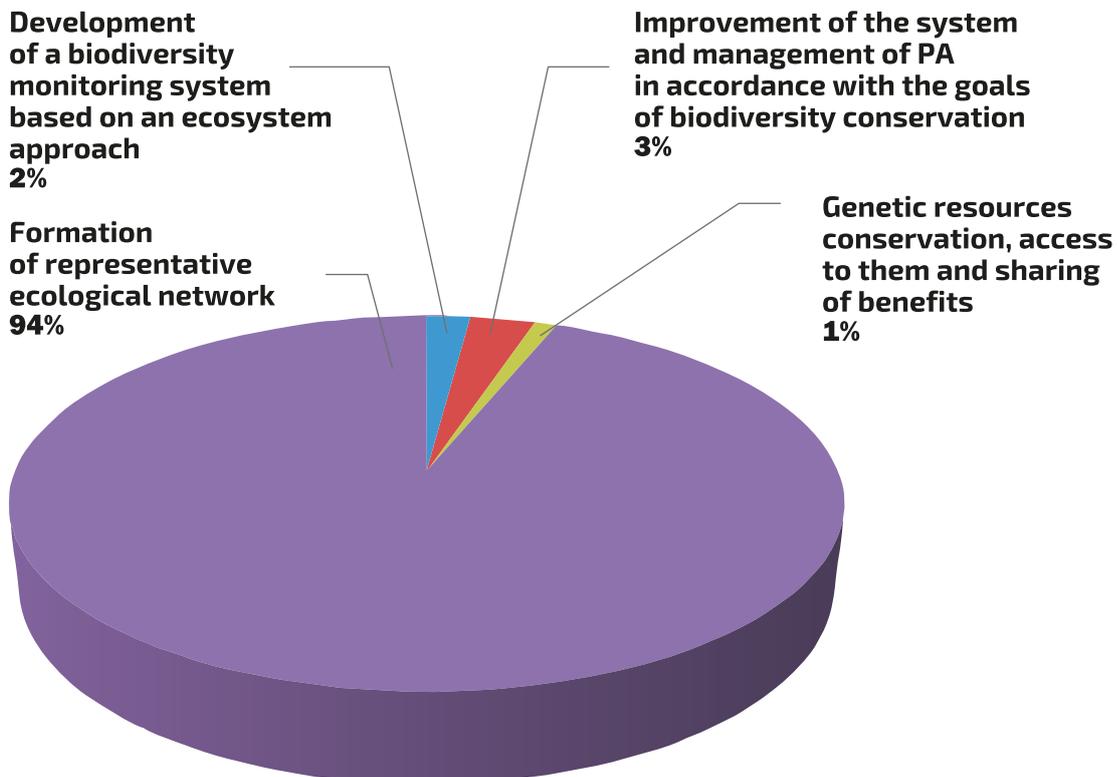
Development of biodiversity monitoring system based on an ecosystem approach

The objective implies the construction of the centers for collecting and accounting forest and bioresource information and monitoring the wildlife cadaster, developing mechanism and establishing institutional framework for a unified system of biodiversity monitoring in order to get the reliable information on the state of the species, ecosystem communities in making management decisions of the predictive estimate of their state. One-time costs cover TEO development costs, creation of biodiversity monitoring information system and payment for the services of specialists who will issue methodical recommendations on accounting. Recurring costs are provided for maintenance and operation of this system.

Improvement of the system and management of PAs in accordance with the goals of biodiversity conservation

Currently, development of ecotourism in Kazakhstan is the objective of high priority. In order to develop ecotourism in the country, it is necessary to develop regulations on recreational loads on PAs environmental system, attract the public to the issues of biodiversity conservation, define the available loads on ecosystems and develop tourist routes and provide infrastructure. For this purpose, the sectoral experts envisaged such activities as creation of Visitor centers in PAs, creation of green trails on the territory of SNNP, construction of guesthouses, establishment of the parks and other facilities to provide comfortable ecotourism for the population.

One-time costs may include costs for expert services, visits and trips, creation of infrastructure (roads, hotels etc.) Recurring costs are ring-fenced for maintenance of visit centers, study centers for training ecotourist guides, training and education center for PAs staff involved in tourism and recreation.

Table 6. One-time and recurring expenses on component of biodiversity conservation, thousand KZT

Objectives	One-time expenses	Recurring expenses	Total	%
Formation of representative ecological network	50 406 675	62 525 890	112 932 565	83,4
Rare and endangered species conservation	4 740 997	-	4 740 997	3,5
Genetic resources conservation, access to them and sharing of benefits	969 280	118 453	1 087 732	0,8
Development of biodiversity monitoring system based on an ecosystem approach	2 045 183	518 443	2 563 626	1,9
Improvement of the system and management of PAs in accordance with the goals of biodiversity conservation	12 723 015	1 297 287	14 020 303	10,3
Total	**70 885 150**	**64 460 073**	**135 345 223**	**100**

Component 2 – Sustainable Use

The second component of the Concept "Sustainable use of biodiversity of Kazakhstan, based on integration of biodiversity conservation and adaptation to climate change" includes objectives such as ensuring conservation and sustainable use of forest, wildlife and fisheries resources, and agro-biodiversity. The budget of one-time expenses until 2020 is 83 330 902 thousand KZT (USD 248 008 637) and recurring expenses - 45 304 279 thousand KZT (USD 134 834 163).

Ensuring the conservation and sustainable use of forest ecosystems and forest resources

The budget of all scheduled activities in forestry from 2016 until 2020 is 104 092 131 thousand KZT (USD 309 798 009), 70% of which is one-time costs. One-time costs include the development of a master forestry plan and schemes on fire-extinguishing management for environmental institutions. Development of plan and schemes requires to conduct survey work, where the main expenditure items are payroll and travel. To ensure the conservation of forest ecosystems, 30 forest fire stations and 72 fire watchtowers with relevant equipment will be built. It is also planned to purchase 2 aircrafts with equipment for extinguishing fires from the air and to equip the institutions with satellite imagery on a permanent basis.

Under the objective on increasing the volume of reforestation and afforestation, it is planned to hold activities on creation and restoration of private nurseries, plantations and green umbrellas in the territory of over 3,000 hectares with the support of state subsidies in order to increase forest coverage in the republic. By 2020, it is planned to strengthen state support for afforestation and expansion of the private forest estate. To date, the private forest reserves in Kazakhstan may include six types of plantations established at the expense of individuals and non-governmental entities on lands granted to private ownership or long-term forest management. Among them, two types of plantations – plantations of fast-growing trees and shrubs for industrial and energy purposes and private forest nurseries – receive state support (50 percent reimbursement) on their planting and cultivation (development).

The next activity provides for afforestation of burnt areas and establishment of forest plantations on lands exposed to the fires with total area, through 2020, of 200 thousand hectares, and through 2030 – an additional 300 thousand hectares. The cost of the activities per one year consists of the following aspects: (1) preparatory works prior to the soil treatment, (2) soil treatment, (3) cost of planting materials, (4) forestry crops and supplements and (5) maintenance of forest plantations.

It is planned that national breeding and seedling production center, with equipped laboratory for microclonal propagation breeding, will share activities between six departments:

- Department of forest seed production and reforestation
- Production department
- Central analytical laboratory
- Science department
- Department of planting
- Department of organizational and financial work

Equipping a laboratory with microclonal propagation equipment will ensure increase of productivity by 4-5 times, plants grown in this method are healthier and environmentally friendly.

Recurring costs in the forest sector include activities on the maintenance of created national breeding and seed production centers with staff of total number of more than 50 people.

Eight people on permanent basis are necessary to run one Forest Fire Station. Eight seasonal workers are required to run one Fire Watchtower in the fire-risk period (April – October). Expenses for maintenance of the system for early detection of forest fires annually amount to approximately 40 000 thousand KZT. The annual budget for maintenance of the above structures is 2 274 839 thousand KZT (Appendix 3)

Ensuring the protection, reproduction and sustainable use of wildlife resources

Expenses for wildlife resources management amount to 6 368 511 thousand KZT, including one-time 787 355 thousand KZT (USD 2 343 318) and recurring 5 581 156 thousand KZT (USD 16 610 583) expenses. This sector contains three objectives: (1) regulatory provision of protection, reproduction and sustainable use of wildlife resources, (2) provision of protection, reproduction and sustainable use of wildlife resources, (3) organization of sustainable hunting.

Expenses for activities on improvement of the legislative and regulatory framework to ensure protection, reproduction and sustainable use of wildlife as an important sector of "green development" in Kazakhstan include primarily non-recurring expenses. The main cost items are planned for salaries of experts on wildlife and expenses related to travel for approval of the Regulatory Acts.

The establishment of the center for movement of wild animals requires the staff of 9 people including seasonal workers, relevant technical equipment (vehicles, equipped containers for transportation of animals, radio stations, GPS-navigation, binoculars, video and photo cameras, uniforms, sleeping bags). The expenses also include costs related to acquisition of special all-terrain vehicles and sport motorcycles, which are necessary for catching wild animals.

Ensuring protection, reproduction and sustainable use of fishery resources and the sustainable development of fisheries

This objective includes following activities:

- Taking into account the problem of biodiversity conservation in regulatory documents of fisheries,
- Protecting biodiversity and natural habitats of fish and other aquatic animals,
- Restoring fish populations which are prone to population number reduction, migration routes and places of concentration (wintering holes and spawning) of fish and other aquatic animals,
- Conservation of the Caspian Sea ecosystem.

In order to achieve the established tasks, firstly, it is necessary to perform complex analysis of RAs in the field of fisheries, to develop fishing effort standards and to perform resource studies of key fisheries. In order to implement the target on restoration of fish populations, it is proposed to perform activities on development of biotechnology of breeding and restoration of rare fish populations during several years by the qualified staff. In order to conserve the Caspian Sea ecosystem, it is required to attract international specialists to develop a program for monitoring of the Caspian seal status and programs against

sturgeon fish poaching. Implementation of these activities is scheduled for at least three years. All activities mentioned above require one-time costs funding, including the experts work, procurement of equipment and rental of specialized transport. One-time cost in the fishing sector is 9 400 679 thousand KZT.

Creation of PAs designated for protection of fishing resources and other shellfish is the most significant task for today. For this activity, funding for ENO and TEO development for five PAs was provided. Funding of PAs creation was not included to the budget, as the amount required for creation of these environmental institutions will be calculated in the feasibility study, and it is difficult to calculate the amount of funding without data on the area and PA potential territory. In addition, it is important to create selective and genetic centers of sturgeon, cold water and warm water fish-farming. In this regard, TEO development was envisaged and funds allocated for creation of centers including purchasing of the equipment

Recurring expenses on the objectives in the sector of fishery resources are provided for maintenance of centers and annual monitoring of aquatic animals of the Caspian Sea at 6 729 431 thousand KZT.

Conservation and restoration of agro-biodiversity, stabilization and improvement of environmental quality and protection of soils

- conservation and restoration of agro-biodiversity in agriculture through reduction of the area of trampled and degraded pasture ecosystems,
- conservation and restoration of agro-biodiversity on fallow lands withdrawn from agricultural use,
- production of environmentally friendly products through organic farming,
- adaptation actions to climate change in agriculture,
- stabilization and improvement of environment and protection of soil.

For the tasks on agro-biodiversity conservation and restoration in the republic, it is necessary to perform a range of activities on making the inventory list of trampled and degraded

pastures, long-fallow lands and their reclamation by plowing and sowing. The total area of the stocking list of trampled and degraded pastures is 2,7 million hectares. and it is planned to reclaim 36 thousand hectares annually. In this regard, field works with utilization of GIS technologies and subsequent office studies with the release of maps and restoration schemes for the studied areas are required. Similar activities are required for studying long-fallow lands on the area of 8 million hectares. The above activities are considered as one-time investments with the budget of 324 724 thousand KZT.

Recurring costs may include reclamation of trampled and degraded pastures and creation of cultivated hay lands and pastures on the long-fallow lands. The implementation of these activities requires experts and multifunctional laborers, rental of relevant equipment, payment for fuels and lubricants and procurement of seeds. The recurring costs budget is 1 167 292 thousand KZT.

In order to stabilize and improve the quality of soil protection, it is supposed to determine the optimal doses of pesticides and fertilizers for utilization in arable lands of all subsoil users; the introduction of adaptive-landscape system of agriculture; development of RA and technologies determining the legal, economic and organizational basis for the production of environmentally friendly products. The recurring costs include the costs of the introduction of organic farming technologies on the area of 6,3 million hectares with the budget of 418 612 thousand KZT. The budget of one-time costs included expenses for experts, field trips and travels for the development of methodologies to determine the optimal dose of utilization of fertilizers and pesticides amounts to 133 802 thousand KZT.

Table 7. One-time and recurring expenses on component of sustainable use of biodiversity, thousand KZT

Objectives	One-time expenses	Recurring expenses	Total	%
Ensuring protection, reproduction and sustainable use of wildlife resources	787 355	5 581 156	6 368 511	4,9
Stabilization and improvement of environment quality and soil protection	133 802	418 612	552 414	0,4
Ensuring conservation and sustainable use of forest ecosystem and forest resources	72 684 343	31 407 789	104 092 131	80,9
Ensuring protection, reproduction and sustainable use of fishery resources and the sustainable development of fisheries	9 400 679	6 729 431	16 130 109	12,5
Conservation and restoration of agro-biodiversity	324 724	1 167 292	1 492 016	1,1
Total	83 330 902	45 304 279	128 635 181	100

Mechanisms for Concept implementation

Mechanisms for Concept implementation include the conduction of applied research in sectors, staffing support, improvement of economic mechanisms of biodiversity conservation, state control and implementation in the fields of forestry and fishery, PAs, wildlife and hunting.

Conduction of applied research in sectors, as mechanism for Concept implementation implies activities related to publication of scientific papers. Research is conducted to identify anthropogenic impact on biodiversity and its consequences. All expenses in this section are non-recurring, spent for field and office work. The required budget amounts to 272 960 thousand KZT.

Advanced training for staff of nature conservation and forest protection institutions implies the conduction of knowledge exchange workshops both at the national and international levels, besides it is planned to launch master's program in preparation of PA managers. Annual budget of required costs is 1 548 546 thousand KZT.

Improvement of economic mechanisms for biodiversity conservation includes:

- cancellation or replacement of subsidies, which are harmful to biodiversity, in order to minimize or avoid harmful impact,

- actions to identify the amount of natural capital in the economy of the country,

- legal framework of economic mechanisms for biodiversity conservation.

Activities for the first component mentioned above touch the issue of provision of subsidies for biodiversity friendly projects. This activity is indicated by subsidies with 20% increase contributing to biodiversity conservation. According to the expert's report on mobilization of financing for biodiversity through subsidies, the existing activities on provision of subsidies for forestry and fishery were increased and included in the budget. Costs for financing these activities are defined as recurring expenses.

Recurring expenses for the improvement of economic mechanisms are designed for identification and economic valuation of ecosystem services of environmental institutions. This work requires field work carried out by experts and laboratory processing of data.

The estimated budget of expenses for this mechanism is 854 960 thousand KZT and 10 074 734 thousand KZT for one-time and recurring expenses, respectively (Appendix 6).

6. EXPECTED FUTURE BASE FINANCING UNDER "THE BUSINESS AS USUAL SCENARIO"

The expected base financing under "the business as usual scenario" has been calculated for 2016-2020 in order to help define the financial gap. According to the BIOFIN methodology, future financing should include all financing resources aimed at biodiversity conservation analyzed in the Biodiversity Expenditure Review (BER). In this regard, we will consider the expected expenses envisaged by the republican and local budget, projects of international and other organizations implemented during the period of 2016-2020.

Republican budget

According to the Law of RK "On republican budget for 2016-2018" No. 426-V LRK dated November 30, 2015, it is planned to implement eight programs with direct and indirect influence on biodiversity conservation regulated by MA RK, Ministry of Energy (ME RK) and Department of Presidential Affairs of RK.

Budget planning in the country is done for the next three years, thus, the expected biodiversity funding for 2019-2020 has been calculated assuming that budgets will increase at an annual rate of inflation of 10% (Appendix 9).

The program "Management, conservation and development of forest resources and wildlife," has three sub-programs including,

- Ensuring the conservation of assets of natural reserve estate through maintenance of 26 PAs.

- Ensuring the conservation, reproduction and sustainable use of forest resources ensures maintenance of facilities for production and formation of forest seeds, air-delivered protection, forest management and other activities in the forest sector.

- Ensuring the conservation, reproduction and sustainable use of wildlife resources implies funding for conservation, registration and monitoring of rare and endangered animals, including the study of the status of the snow leopard.

Average annual predicted amount of biodiversity funding from RB according to the current program is 15 506 728 thousand KZT. However, comparing to the similar funding allocated to PA, forestry and wildlife which previous years was 7 967 097 thousand KZT the amount doubled.

The program "Improvement of the system of planning, monitoring, conservation and efficient use of natural resources" implemented in partnership with UNDP – for 2016 included funding in amount 51 360 thousand KZT for activities on development of the Concept of institutional framework for wildlife management, preparation of guidelines in terms of wildlife management and development of management plans for two project areas.

The funding of the amount of 745 738 thousand KZT is provided for the Program of DPA RK *"Management of forestry, conservation and development of forest resources and wildlife"* aimed at conservation and management of "Burabai" SNNP per each year The funding has increased if compared to the budget of 587 710 thousand KZT in 2014.

The program *"Creation of conditions for development of products, processing, sale of the crops production"* administered by MA of RK, is aimed at subsidizing the cost of services, works and goods in crops production. Section "Agriculture" of this work analyzed several areas of subsidies. Subsidies in crops production often has harmful influence for agro-biodiversity, and is rarely – positive for biodiversity. However, the state support of agriculture in Kazakhstan described in the last edition of "Agrobusiness – 2020" program aimed at the increase of agricultural production volumes by the use of water saving technologies as well as the application of scientifically rational methods of crop rotation that will facilitate both biodiversity conservation and agricultural production. As a result, by the program of support and creation of conditions in crop production, the positive influence share for the targets of

biodiversity conservation is estimated at 5% of the total amount of predicted funding.

Program "Efficient water resources management"

For 2014-2020, Kazakhstan approved the state program on water resources management. The program defines three objectives: guaranteed supply of water resources for the population, environment and economy fields by the implementation of activities on water conservation and increase of the available water resources; increase of the water resources management efficiency; conservation of water ecological systems. In addition, the program comprehensively considers the water supply issues taking into account the aims and objectives of the sustainable development and transition of the republic to the "green economy". The republican budget envisaged funding of 18 386 003 thousand KZT in 2016, 19 668 889 thousand KZT in 2017, 14 486 561 thousand KZT in 2018, the following years were calculated taking into account 10% inflation. The positive impact made by program on the biodiversity conservation is defined as 5%.

The program "Implementation of the Concept on transition to "green economy" and "Green Bridge" partnership program implemented jointly with ME RK and UNDP is aimed at the analysis and attraction of the best practices for providing assistance to the country in transition to the "green economy". The main objectives of the program include provision of support in developing institutional and legislative frameworks for the feasible promotion of solar energy; fishing industry development in terms of aquaculture and adoption of new technologies; development and institutionalization of "Green Bridge" Partnership program. RB allocated 161 995 thousand KZT in 2016, and 84 770 thousand KZT in 2017 to the Program for 2015-2017. The positive impact made by program on the biodiversity conservation is defined as 100%.

Two Environmental Conservation programs with positive impact on biodiversity are implemented during the period of 2016-2020. *Stabilization and improvement of the environment* program includes financing provided for the services on the implementation of the activities within the international agreements, conventions and protocols; services on the implementation of the objectives on informational awareness in the field of Environmental Conservation; construction and reconstruction of Environmental Conservation facilities. *Reduction of greenhouse gases emissions* program is aimed at providing services on the execution of the provisions of the UNDP framework convention on climate change and Kyoto protocol, and on the support of the use of the renewable energy sources in Astana and Almaty cities. The funding specified in table 4 is provided for these programs. The impact on the biodiversity conservation is defined as 50%.

The regional (local) budgets have been planned for three years and approved by the decisions of the relevant Maslikhats. Departments of Natural Resources and Environmental Management at the Akimats of each region envisage performance of activities on protection, conservation, reproduction of forests and forestry, and wildlife protection. Financing differs in each region. It depends on the volume of work done. The total amount of budget for five years is 35 976 342 thousand KZT, the funding for 2019-2020 envisages increase by 10% inflation.

Future basic financing also includes UNDP ongoing projects to be implemented until 2018, including BIOFIN, CB2, Increase of the sustainability of the protected areas in desert ecosystems through the promotion of biodiversity compatible livelihoods, Implementation of the Concept on transition to "green economy" and "Green Bridge" partnership program. The total budget of the projects is 526 850 thousand KZT. The positive impact made on the biodiversity conservation is defined as 100%.

The expected financing from all sources for 2016-2020 is 318 572 481 thousand KZT, of which 134 405 065 thousand KZT makes direct impact on biodiversity (Appendix 9). This indicator is not precise and can change during the next years. Due to decrease in prices on oil and metal observed all over the world late 2015, the Government of Kazakhstan decided to apply floating rate to national currency, that in its turn led to devaluation.

Table 8. The expected basic financing in "business as usual scenario" with direct impact to biodiversity, thousand KZT

Financing sources	2016	2017	2018	2019	2020	Total
Republican budget	18 972 355	19 121 032	18 690 152	20 559 167	20 559 167	97 901 873
Local budget	7 547 573	6 537 665	6 840 970	7 525 068	7 525 068	35 976 342
International and other organizations	241 649	219 530	65 671			526 850
TOTAL	26 761 577	25 878 227	25 596 792	28 084 234	28 084 234	134 405 065

Figure 5. The expected biodiversity financing under "Business as usual" scenario, thousand KZT
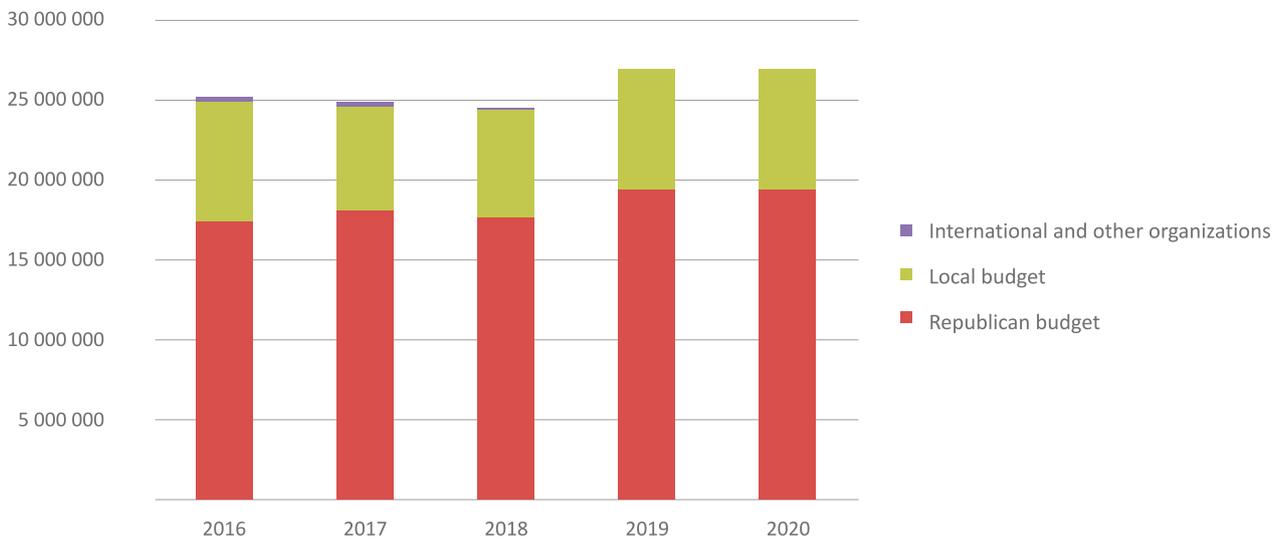
7. FINANCIAL GAP BY STRATEGY

The financial gap is calculated between the combined one-time and recurring expenses and the expected scenario of financing under the BaU of each of the main strategies. Based on the understanding of the total financial gap and expected annual financing, the developers can define the content of the plan for resources mobilization of the Biodiversity Finance Plan in order to reduce or eliminate finance gaps.

The estimated budget for the Concept implementation including one-time and recurring expenses until 2020 amounts to 285 938 438 thousand KZT. At the same time, 58% of all expenses is given for the Strategic Goal C aimed at improvement of biodiversity's condition through the protection of ecosystems, species and genetic diversity. 30% allocated for the goal for increasing benefits provided by biodiversity and ecosystem services for all people (Strategic Goal D), 7% is given for combat with the main causes of the biodiversity loss by including the theme of biodiversity in the government and society's activity (Strategic Goal A). 3% and 2% are provided for reduction of direct loads on biodiversity and stimulation of sustainable use (Strategic Goal B) and improvement of the performance effectiveness through community planning, knowledge management and capacity building (Strategic Goal E) (Appendix 7).

The budget of the expected future financing under business as usual scenario including the state and private expenses evaluated for 2016-2020 is 134 405 065 thousand KZT. The evaluation of the expected financing includes the expenses for environment and water resources protection. Since the Action Plan on the implementation of the Concept of Biodiversity does not include the sections on the environment and water resources protection, the expected expenses for these objectives are excluded.

The expected base future financing under business as usual scenario is 128 231 146 thousand KZT. Having distributed these indicators by the strategies of Aichi targets, we have received the following breakdown.

Table 9. Financial gap by strategies, thousand KZT

Strategies	Budget for Concept implementation	Expected future base financing under the BaU scenario	Financial gap	% Finance Gap
Mainstreaming	22 418 078	6 419 095	15 998 983	71%
Sustainable Use	16 431 034	5 181 144	11 249 890	68%
Conservation	145 114 459	53 517 827	91 596 632	63%
Restoration and Ecosystem Management	93 664 701	60 690 138	32 974 563	35%
Enhanced Implementation	8 310 167	2 422 942	5 887 225	71%
Total	**285 938 439**	**128 231 146**	**157 707 293**	**55%**

As is seen from the table above, the total financial gap for implementation of Concept of biodiversity conservation until 2020 amounts to 157 707 293 thousand KZT or 55%. The biggest deficit of funds is observed under strategic goals A and E, focused on combating with the main causes of biodiversity loss by including the topic of biodiversity in the activities of the government and society as well as upgrading the efficiency of implementation

through public planning, knowledge management and capacity building. Raising awareness of decision-makers and public in terms of biodiversity and ecosystems values plays a role of high priority in making efforts on conservation and restoration of biodiversity and ecosystems of the country.

To eliminate the financial gap, it is necessary to develop Biodiversity Finance Plan, based on which the experts will be able to identify the financing sources and mechanisms for the purpose of biodiversity conservation.

Table 10. Biodiversity financing scenarios and financial gap, thousand KZT

	2016	**2017**	**2018**	**2019**	**2020**
Expected financing under the BaU	25 174 364	24 780 593	24 506 457	26 884 866	26 884 866
Budget for implementation of Action Plan	55 529 449	55 830 499	67 416 643	52 353 461	54 808 386
Financial gap	55%	56%	64%	49%	51%

Figure 6. Biodiversity financing deficit
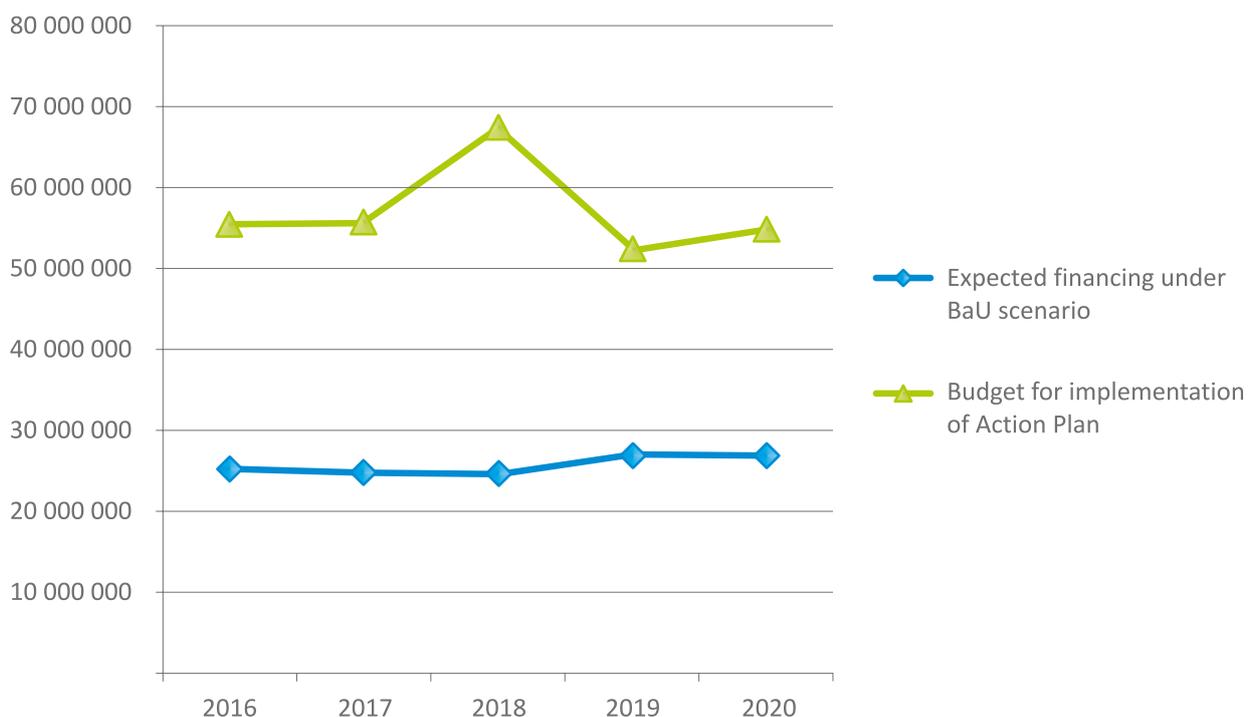
Two financing scenarios are presented schematically above. Concept implementation requires 57 billion KZT annually at average, as under "the business as usual" scenario the budget amounts to 25 billion. From the Table 10 we can see that the financial gap varies from 49% to 64%. Funding is distributed evenly by years; however, the highest deficit is observed in 2017-2018, since more expensive activities will be implemented in various sectors during this period.

CONCLUSION

The Financial Needs Assessment of implementation of Concept presents a holistic estimation of the total costs, both one-time and recurring ones. The estimated costs will form the basis for filling of financial gap. Moreover, in the Biodiversity Finance Plan we identify potential finance actors and mechanisms for each set of strategies and actions.

The Concept and its Action Plan includes activities related to forestry, wildlife and sustainable hunting concessions, expansion and formation of protected areas, fishery, agrobiodiversity and soil protection. As part of the Concept water resources are considered as a habitat of biodiversity and activities related to water resources are not included in the Action Plan. The section on agriculture was not included in these documents as well.

The total budget for the Concept implementation for 2016-2020 was 286 billion KZT (851 million USD) or roughly 57 billion KZT (170 million USD) per year. The implementation of Component 1: biodiversity conservation requires 135 billion KZT (403 million USD), including the objectives of forming the ecological network and conservation of genetic resources. Component 2: sustainable use of biodiversity resources of Kazakhstan, including resources of forest, wildlife, fisheries and agro-biodiversity with the implementation period 2016 until 2020 requires 129 billion KZT (383 million USD), of which the conservation and restoration of forest ecosystems accounts

for 70%. The Mechanism for Implementation including information and capacity building, applied research, and improvement of economic mechanisms for biodiversity conservation has budget of 22 billion KZT (65.3 million USD). The implementation of the Concept and achievement of the biodiversity management goals will require roughly 57 billion KZT (170 million USD) per year from 2016 through 2020. Comparing the data to annual GDP of Kazakhstan the annual expenditure for Concept implementation is 0.2% of the average annual government budget.

From the global perspective, the High Level Group of the CBD on the global assessment of resources for implementing the Strategic Plan for conservation and sustainable use of biodiversity, the required funding until 2020 amounted to 150-450 billion USD annually. By 2020, to implement the National Strategy for Kazakhstan annually it is required 170 million USD[4] or roughly 0.1% of the estimated total annual global biodiversity budget.

Adequate funding is a key condition for achieving the NBSAP objectives by 2020. For this purpose, it is necessary to mobilize the resources of the country, international donors, and the private sector and cover the financing needs for biodiversity conservation and sustainable management in Kazakhstan. Implementation of planned activities will enable all main actors to improve the environmental and socio-economic situation of the country.

---

[4] Exchange rate for June 2016 makes 336 KZT

APPENDICES

APPENDIX 1
Structure of Concept

Components	**Component 1: Conservation of biological diversity**	Objective 1	Formation of representative ecological network
		Objective 2	Rare and endangered species conservation
		Objective 3	Genetic resources conservation, access to them and sharing of benefits
		Objective 4	Development of a biodiversity monitoring system based on an ecosystem approach
		Objective 5	Improvement of a system and management of PAs in accordance with the goals of biodiversity conservation
	Component 2: Sustainable use of biodiversity	Objective 6	Ensuring conservation and sustainable use of forest ecosystems and forest resources
		Objective 7	Ensuring protection, reproduction and rational use of wildlife resources
		Objective 8	Ensuring protection, reproduction and rational use of fishery resources and sustainable development of fisheries
		Objective 9	Conservation and restoration of agro-biodiversity
		Objective 10	Stabilization and improvement of environment quality and soil protection
Mechanisms			Improvement of economic mechanisms for biodiversity conservation
			Informational and scientific mechanisms
			Capacity building
			Governmental control and implementation in field of forestry, fishery, PAs, wildlife and hunting concessions

APPENDIX 2
One-time expenses on component of biodiversity conservation, thousand KZT

Objective	2016	2017	2018	2019	2020	Total
Development of a biodiversity monitoring system based on an ecosystem approach	11 528	984 705			1 048 950	2 045 183
Improvement of a system and management of PAs in accordance with the goals of biodiversity conservation	188 823	11 498 580	473 682	391 989	169 941	12 723 015
Genetic resources conservation, access to them and sharing of benefits	8 250	47 315			913 714	969 280
Rare and endangered species conservation	702 460	783 623	1 032 221	974 216	1 248 477	4 740 997
Formation of representative ecological network	19 813 565	13 984 974	13 734 174	1 792 254	1 081 709	50 406 675
Total	**20 724 626**	**27 299 197**	**15 240 077**	**3 158 459**	**4 462 791**	**70 885 150**

Recurring expenses on component of biodiversity conservation, thousand KZT

Objective	2016	2017	2018	2019	2020	Total
Development of a biodiversity monitoring system based on an ecosystem approach	8 472	99 914	98 925	98 925	212 207	518 443
Improvement of a system and management of PAs in accordance with the goals of biodiversity conservation	231 890	397 083	199 976	301 433	166 906	1 297 287
Genetic resources conservation, access to them and sharing of benefits			6 859	2 629	108 964	118 453
Formation of representative ecological network	10 584 920	755 787	16 273 013	17 118 383	17 793 787	62 525 890
Total	**10 825 282**	**1 252 784**	**16 578 773**	**17 521 370**	**18 281 864**	**64 460 073**

One-time expenses on component of sustainable use of biodiversity, thousand KZT

Objective	2016	2017	2018	2019	2020	Total
Ensuring conservation and sustainable use of forest ecosystems and forest resources	11 820 231	13 792 635	16 258 874	15 276 891	15 535 712	72 684 343
Ensuring protection, reproduction and rational use of wildlife resources	219 561	417 593	150 201			787 355
Ensuring protection, reproduction and rational use of fishery resources and sustainable development of fisheries	788 107	948 183	6 052 046	1 056 112	556 230	9 400 679
Stabilization and improvement of environment quality and soil protection		78 626	55 176			133 802
Conservation and restoration of agro-biodiversity	62 104	67 068	71 456	60 304	63 792	324 724
Total	**12 890 003**	**15 304 105**	**22 587 753**	**16 393 307**	**16 155 734**	**83 330 902**

Recurring expenses on component of sustainable use of biodiversity, thousand KZT

Objective	2016	2017	2018	2019	2020	Total
Ensuring conservation and sustainable use of forest ecosystems and forest resources	5 373 717	5 846 428	6 171 370	6 891 620	7 124 654	31 407 789
Ensuring protection, reproduction and rational use of wildlife resources	997 727	1 012 995	1 120 870	1 211 326	1 238 238	5 581 156
Ensuring protection, reproduction and rational use of fishery resources and sustainable development of fisheries	696 114	696 114	1 038 817	2 040 962	2 257 424	6 729 431
Stabilization and improvement of environment quality and soil protection			130 210	139 325	149 077	418 612
Conservation and restoration of agro-biodiversity	127 557	234 177	250 570	268 110	286 877	1 167 292
Total	**7 195 115**	**7 789 715**	**8 711 837**	**10 551 341**	**11 056 271**	**45 304 279**

One-time and recurring expenses of Concept implementation mechanisms, thousand KZT

Mechanisms	2016	2017	2018	2019	2020	Total
Conducting scientific researches by sectors	13 200	121 941	96 824	40 995		272 960
Capacity building	174 042	235 857	252 367	428 155	458 126	1 548 546
Measures on accounting of natural capital in the country's economy	154 290	153 481	163 522	173 562	183 603	828 458
Phased cancellation or change of subsidies damaging biodiversity for the purpose of minimization or prevention of adverse effect	1 771 457	1 902 874	2 014 947	2 138 672	2 262 396	10 090 346
Legal framework for economic mechanisms of biodiversity conservation	10 890					10 890
Governmental control and implementation in field of forestry, fishery, PAs, wildlife and hunting concessions	1 770 545	1 770 545	1 770 545	1 947 599	1 947 599	9 206 833
Total	**3 894 424**	**4 184 698**	**4 298 204**	**4 728 983**	**4 851 725**	**31 164 867**

APPENDIX 7
Costs of Concept implementation according to the Aichi targets/strategies, thousand KZT

Strategy	2016	2017	2018	2019	2020	Total
Strategic Goal A	4 057 393	4 169 180	4 405 232	4 885 232	4 901 040	22 418 078
Strategic Goal B	1 883 210	2 374 734	6 559 373	2 312 716	3 301 000	16 431 034
Strategic Goal C	32 196 975	30 385 977	35 813 185	22 809 502	23 908 819	145 114 459
Strategic Goal D	16 477 612	17 602 248	18 666 796	20 271 100	20 646 946	93 664 701
Strategic Goal E	914 259	1 298 359	1 972 057	2 074 911	2 050 580	8 310 167
Total	**55 529 449**	**55 830 499**	**67 416 643**	**52 353 461**	**54 808 386**	**285 938 438**

APPENDIX 8
One-time and recurring expenses for Concept implementation, thousand KZT

Year	One-time	Recurirring	Total
2016	33 796 969	21 732 481	55 529 449
2017	42 890 376	12 940 123	55 830 499
2018	38 088 175	29 328 468	67 416 643
2019	19 766 323	32 587 137	52 353 461
2020	20 802 129	34 006 257	54 808 386
Total	**155 343 972**	**130 594 466**	**285 938 438**

APPENDIX 9
The expected basic financing in "business as usual scenario", thousand KZT

Financing sources	2016		2017		2018		2019		2020		Total	
	Expenses for BD	Expenses	Expenses for BD	Expenses	Expenses for BD	Expenses	Expenses for BD	Expenses	Expenses for BD	Expenses	Expenses for BD	Expenses
Republican budget	18 972 355	54 574 074	19 121 032	54 367 833	18 690 152	52 304 339	20 559 167	57 534 773	22 615 083	63 288 250	97 901 873	276 315 791
Management, conservation and development of forestry resources and wildlife	15 506 728	15 506 728	15 364 287	15 364 287	15 195 334	15 195 334	16 714 867	16 714 867	16 714 867	16 714 867	79 496 083	79 496 083
Efficient water resources management	919 300	18 386 003	983 444	19 668 889	974 328	19 486 561	1 071 761	21 435 217	1 071 761	21 435 217	5 020 594	100 411 887
Improvement of the system of planning, monitoring, conservation and efficient use of natural resources	51 360	51 360	-	-	-	-	-	-	-	-	51 360	51 360

Providing conditions for the development of production, processing, sale of crop production	919 321	18 386 426	1 827 463	18 274 631	1 665 105	16 651 054	1 831 616	18 316 159	1 831 616	18 316 159	8 075 121	89 944 430
Implementation of the Concept on transition to "green economy" and "Green Bridge" Partnership program	161 995	161 995	84 770	84 770	-	-	-	-	-	-	246 765	246 765
Stabilization and improvement of environmental quality	586 686	1 173 371	35 589	71 177	37 333	74 665	41 066	82 132	41 066	82 132	741 740	1 483 476
Reduction of greenhouse gas emissions	81 227	162 453	78 601	157 201	78 674	157 347	86 541	173 082	86 541	173 082	411 584	823 164
Protection, conservation, reproduction of forests and wildlife	745 738	745 738	746 878	746 878	739 378	739 378	813 316	813 316	813 316	813 316	3 858 626	3 858 626
Local budget	7 547 573	7 547 573	6 537 665	6 537 665	6 840 970	6 840 970	7 525 067	7 525 067	7 525 068	7 525 068	35 976 342	35 976 342
International and other organizations	241 648	241 648	219 531	219 531	65 671	65 671					526 850	526 850
Implementation of the Concept on transition to "green economy" and "Green Bridge" Partnership program	25 765	25 765	21 520	21 520							47 285	47 285
Building transformative policy and financing frameworks to increase investment in biodiversity management, BIOFIN	41 476	41 476	29 992	29 992							71 468	71 468
Economic evaluation mechanisms to improve decision making and management of the implementation of commitments under the global environmental agreements, CB2	53 382	53 382	52 808	52 808							106 190	106 190

Improvement of resilience of the protected areas system in desert ecosystems through promotion of biodiversity-compatible livelihoods in and around protected areas	121 025	121 025	115 211	115 211	65 671	65 671					301 907	301 907
TOTAL	26 761 576	62 363 295	25 878 228	61 125 029	25 596 793	59 210 980	28 084 234	65 059 839	30 140 151	70 813 318	136 460 981	318 572 461

APPENDIX 10
List of production costs use in the planning of budget for Concept implementation

Payroll

Position	Salaries (low resolution)	Salaries (average resolution)	Salaries (high resolution)	Measure-ment units
State bodies structure				
Director	150 346	238 593	326 839	KZT/month
Deputy Director	112 262	178 154	244 047	KZT/month
Head of Security Department	82 239	130 510	178 781	KZT/month
Specialist for Protection of Natural Complex	76 287	121 064	165 841	KZT/month
Forestry engineer	82 239	130 510	178 781	KZT/month
Hunt biologist	73 959	117 369	160 780	KZT/month
Telecommunication engineer	76 287	121 064	165 841	KZT/month
Head of science department	94 404	149 816	205 227	KZT/month
Senior scientist	92 334	146 529	200 725	KZT/month
Junior scientist	76 673	121 677	166 681	KZT/month
Ecology engineer	75 253	119 423	163 594	KZT/month
Recreation and tourism specialist	72 923	115 726	158 529	KZT/month
Head of accounting	106 568	169 119	231 670	KZT/month
Accountant	82 239	130 510	178 781	KZT/month
Economist	71 370	113 261	155 152	KZT/month
Administrative specialist	72 923	115 726	158 529	KZT/month
Mechanic engineer	60 760	96 423	132 086	KZT/month
Driver	57 436	91 148	124 860	KZT/month
Forester	79 911	126 815	173 720	KZT/month
Forest master	72 923	115 726	158 529	KZT/month
State inspector	63 347	100 529	137 711	KZT/month

Private sector structure				
Project manager	220 000	349 130	478 261	KZT/month
Specialist of GIS and databases	165 000	232 500	300 000	KZT/month
System analyst	165 000	232 500	300 000	KZT/month
International specialist	165 000	232 500	300 000	KZT/month
Specialist biologist	165 000	232 500	300 000	KZT/month
Tourism specialist	81 000	135 000	189 000	KZT/month
Ecotourism specialist	165 000	232 500	300 000	KZT/month
Ecology specialist	165 000	232 500	300 000	KZT/month
Forestry specialist	165 000	232 500	300 000	KZT/month
Agriculture specialist	165 000	232 500	300 000	KZT/month
SPNT specialist	165 000	232 500	300 000	KZT/month
Ecosystem specialist	165 000	232 500	300 000	KZT/month
Botany specialist	165 000	232 500	300 000	KZT/month
Ornithology specialist	165 000	232 500	300 000	KZT/month
Herpetology Specialist	165 000	232 500	300 000	KZT/month
Hunting specialist	165 000	232 500	300 000	KZT/month
Ichthyology specialist	165 000	232 500	300 000	KZT/month
Landscaping specialist	165 000	232 500	300 000	KZT/month
Zoology specialist	165 000	232 500	300 000	KZT/month
Soil specialist	165 000	232 500	300 000	KZT/month
Economist	165 000	232 500	300 000	KZT/month
Trainer	165 000	232 500	300 000	KZT/month
Interpreter	100 000	120 000	150 000	KZT/month
Handymen	100 000	120 000	140 000	KZT/month
Veterinarian	165 000	232 500	300 000	KZT/month

Travel expenses

Name	Cost, KZT/person, day (low resolution)	Cost, KZT/person, day (average resolution)	Cost, KZT/person, day (high resolution)
Transport costs (in both directions) in Kazakhstan	42 000	55 000	80 000
Transport costs (in both directions) in the CIS	200 000	300 000	450 000
Transport costs (in both directions) abroad	600 000	800 000	1 200 000
Per diem (in Kazakhstan)	63 840	96 432	120 000
Per diem (in the CIS)	120 000	150 000	200 000
Per diem (abroad)	250 000	350 000	500 000
Vehicle lease (inclusive of fuel and driver pay)	60 000	80 000	150 000

Costs associated with seminars and conferences

Name	Cost, KZT/person, day (low resolution)	Cost, KZT/person, day (average resolution)	Cost, KZT/person, day (high resolution)
Rental of premises	100 000	150 000	250 000
Lunch	3 000	4 000	5 000
Coffee break	1 800	2 700	3 500
Certificates printing	2 000	3 000	4 000

Equipment costs

Name	Cost, KZT/piece (low resolution)	Cost, KZT/piece (average resolution)	Cost, KZT/piece (high resolution)
Gps-navigator Garmin gpsmap 62	215 000	300 000	440 000
Trap camera, 12MP infrared, night vision for viewing wild animals	55 000	80 000	115 000
Binoculars, 5X digital camera + PC camera + digital video 4 in 1	19 800	30 000	54 000
Camera trap	210 000	300 000	540 000
Rental of nets for catching	90 000	200 000	320 000
Computer (system unit)	180 000	250 000	350 000
Monitor	90 000	130 000	250 000
Uninterruptible power supply	35 000	40 970	70 000
Printer	42 000	90 000	200 000
Mouse	3 000	6 000	10 000
Software ArcGIS	3 300 500	3 900 000	4 500 000
Software SQL Server	3 021 100	3 021 157	3 800 000

Cost of purchasing aerial and space imaging, according to the price list of JSC «Kazgeocosmos»

Name	Year	Cost 1 sq. km/KZT
Images quality 56 cm/pixel and above	2016	5 450
Images quality 56 cm/pixel and above	2017	6 000
Images quality 56 cm/pixel and above	2018	6 620