

THE BORROWED PLANET
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*We do not get the soil as a heritage from our ancestors,
We borrow it from our children
Antuan de SAINT-EXUPERY*

This brochure can be called “The dying planet” or “The passing away civilization”, or just “The desert”. All these names can reflect equally well the situation that is taking place in our home, which is called Planet Earth. Moreover, these words make us to recollect works of science fiction, where the authors describe other planets as dead deserts, over which there is nothing else except hot winds. For a long time neither grass, nor trees were growing on those planets and all inhabitants have left them centuries ago. On the surface of planet Earth soils, plants, birds and animals are dying every day, too. Every year continents lose 24 billion tons of the upper fertile layer of soil. Agricultural lands, forests and pastures are disappearing. Dry lands currently occupy more than third of the land’s surface. Every year more than 23 million hectares of soil turn into deserts.

FERTILE SOILS DISAPPEAR ALL OVER THE WORLD

Global evaluation of deterioration of soils conducted by the UN environmental protection program, showed that within last several decades 11% of the planet’s fertile soils had been affected by erosion, filled with chemicals to an extent, when all of the productive properties of the soils were lost. Three percent of the soils have degraded so that it will not be possible to restore them. For example, in Central America and Mexico more than 25% of the soils have been affected. In some cases fertility of the soils is supported by fertilizers, but the amounts of crops gathered from these soils are much smaller than the amounts gathered from healthy soils. In many developing countries the continued loss of productivity of the soils combined with the fast growth of populations leads to production of insufficient amounts of food and lack of organic fuel. To a certain extent, exhaustion of fertile soils has been compensated by intensive cultivation, development of the more productive types of plants and new products created with the help of biotechnology. But these kinds of technology are quite expensive and only well-developed countries can afford them.

For example, China has 153 million hectares of deserts, which comprises about 16% of the country’s territory. About 5% of this landmass are affected by the natural expansion of deserts. The speed of this process constantly increases, and it is estimated that currently expansion of deserts annually involves more than 200 thousand hectares. Two years ago this figure was 156 hectares per year. About 4 million hectares of crop lands and about 5 million hectares of pastures are affected by the expansion of deserts. It is estimated that direct economic losses from dust storms stand at the annual level of 800 million USD.

About 7 million hectares of irrigated lands are affected by accumulation of salt, mainly as a result of insufficient drainage or unsatisfactory supply of water.

Obviously, erosion of soils in China increases as time goes by. It is estimated that the total square of soil affected by erosion has increased from 129 million hectares in 1985 to 160 million hectares in 1991.

Erosion of soils has a very significant impact on agricultural production.

For example, from 1983 till 1989 natural changes have led to a 60% decrease in the amounts of gathered grain crops. About half of the decrease is a result of floods and droughts, however, erosion of soils and environmental problems are also associated with the more intensive agricultural production.

Specifically, in India exhaustion of soils and their changes have affected 85 million hectares of crop lands. Water and wind erosion, accumulation of salt, expansion of swamps and decreased productivity have a very significant impact on productivity of soils in this country.

WHEN THE INDIGO SEAS DRY UP

In 1930, Konstantin Paustovskii wrote an essay, which was called “Talks about fish”. Particularly, it very colorfully described the Aral Sea: “In the heat, sand, hot fogs lies this indigo sea, filled with fish and overgrowths of reed”.

So, about seventy years ago the sea was of indigo color and was filled with fish. Now everything is totally different. It happened so that the water of two rivers – Amudaria and Syrdaria – which for centuries supplied Aral Sea started to be used for watering the crops. Highly heat and water consuming plants were grown in the basins of these rivers – cotton, rice, vegetables, grapes. Soils here are fertile and generous. To water 6 million hectares of crop lands water is taken from Amudaria and Syrdaria. Every year rivers bring less and less water to Aral Sea. The Sea goes further and further away from its original shores leaving behind dry soil covered by white salt.

Until 1960 the Sea almost did not dry out. The sea began to dry out and die after the people started to take water for watering all of the large territories. Shallow bays were lost and the new islands appeared. Kok-Aral peninsula became an island. Traditional habitats of fish started to disappear and the fish discontinued their natural regeneration. Concentration of salt in the water has dramatically increased. This led to the decrease in the temperature level of freezing to –2 degrees and resulted in the freezing of under-the-ice water. In these circumstances it is very difficult for the fish to live through the winter.

Decreased water supply from Amudaria and Syrdaria caused drying out of bodies of water in the river deltas, where water animals lived among the reeds. Water animals also started to disappear.

However, this is not all of the problem. Currently the Sea is tens of kilometers away from its original shores. Winds blowing from the Sea catch the salt from the dried out bottom of the Sea and carry it to the fields. These salty winds can destroy cotton crops at the very beginning of their vegetation period. To remove salt from the soil, it is necessary to continuously water the soil for a long period of time. And this requires a lot of fresh water and significant funding.

This is a small introduction into a big topic identified in the heading. Death of the Aral Sea represents only one act of the drama taking place on the territory of Kazakhstan. Scientists, researchers, politicians have got accustomed to the language of figures and special terms. Let us try to view the problem through their eyes.

In Kazakhstan 180 million hectares (more than 60 percent of the territory) are turning into desert. The process of expansion of deserts, which causes soils to become exhausted and results in mutations and disappearance of plants (scientifically called “degradation”) is taking place all over the republic. The reason for all these events – unlimited human activities. Expansion of deserts is also stimulated by the particularities of local climate, soils, plants and water resources.

CAUSES...

First of all, scientists stress the importance of natural causes or, speaking scientifically, factors.

In Kazakhstan one of the main natural factors is represented by droughts. More often than anywhere else droughts occur on the territory from upper Uil river to Djezkazgan and from Zaisan lake to Ust-Kamenogorsk. In cases of droughts expansion of deserts in ecosystems reaches 15-20%. Nature can recover after droughts.

The process of degradation and expansion of deserts is stimulated by the influence of Caspian Sea. For Kazakhstan, significant part of which is situated in the zones of deserts and semi-deserts, natural factors stimulating expansion of deserts also include drying out of big lakes and even seas and short strong river floods.

However, more serious danger is represented by activities of the people, or, the so called, anthropogenetic influence. Here is a small example, which can show how the unforeseen activities of the people can harm the nature. Timber industry: cutting of trees and bushes for fuel is an industry that was developing in Kazakhstan for centuries. For example, even in 1950s a massive territory of industrially cut bushes existed in Urme valley located in the ancient delta of Syrdaria in Kyzylkum desert. Another territory of concentration of industrially cut bushes was in Koskuzak in the region of the terraces of the river Chu. This territory had even a special railroad track for shipment of the cut bushes. Cutting of bushes satisfied the needs of the local people. But the resources were used up by 1970s.

One of the other reasons for anthropogenetic expansion of deserts in Kazakhstan is represented by non-systemic, or rarely planned, gathering of semi-bushes as a food supply for cattle. The gathering is usually done so that the roots of the plants are destroyed. Only 5-10% of the plants recover after this method is used.

Another example. Since ancient times it was considered that grasslands located in the river valleys are the best pastures for domestic animals. Here peasants gathered the grass, which was later used to feed the animals through the winter. Currently the grass in river valleys disappears. Instead of it there are hard grasses, which can not be eaten by horses or cows. What are the reasons? The grass was cut without paying attention to the naturally optimal conditions.

It is well-known that the "virgin" lands, which in 1950-60s attracted people from all over USSR, suffer from wind erosion. But now water erosion is becoming a big problem in this region, even on plain crop lands. Erosion leads to a decrease in the fertile layer of the black lands and "chestnut" soils. In Kazakhstan erosion represents the main "channel" for the loss of productivity and crops.

...AND THE CONSEQUENCES OF EXPANSION OF DESERTS

Here we'll step aside from our main story and say a few words about the fact that many of the well-known and respected people of the country are seriously concerned about conditions of the nature. Some time ago "The national program of actions aimed at fighting the expansion of deserts" was developed. In the annotation to this program it is written that: "The National program of actions aimed at fighting the expansion of deserts covers a wide range of issues. It includes concise but in-depth characteristics of natural conditions of Kazakhstan. The main causes of expansion of deserts are analyzed... agricultural use of lands with the low level of

productivity, exclusion of the lands from agricultural turnover, monocultures, limited use of organic fertilizers, water and wind erosion, secondary accumulation of salt, intensive and non-systemic use of pastures and grasslands, destruction of forests, extreme regulation of the rivers' water supply, predatory exploitation of underground resources. Classification of the types of desert expansions is provided. Depending on the degree and characteristics of degradation, concrete measures are proposed for recovery of ecological systems (pastures and grasslands, forests and other places of natural massive concentration of plants), for recovery of fertility of crop lands, for recultivation of technologically destroyed lands in general and for preservation and balanced use of biological diversity. The annotation contains the list of actions, which can prevent further degradation of the natural sphere and can assist in the recovery of degraded elements of the environment of Kazakhstan. The national program of actions aimed at fighting the expansion of deserts must serve as the guiding state-wide document for concrete planning and stage-by-stage implementation of actions leading to execution of provisions listed in the UN convention on fighting expansion of deserts.

The National program of actions aimed at fighting the expansion of deserts was created by many leading scientists: biologists, meteorologists, hydrologists, doctors, geologists. The program scientifically carefully describes the processes of expansion of deserts. For example, in the third chapter of the program entitled "Factors of expansion of deserts" includes the following topics: "Expansion of deserts – degradation of lands", "Degradation of plants", "Wind erosion of soils (deflation)", "Water erosion", "Destruction of the upper fertile layer of soils", "Accumulation of salt on watered lands", "Accumulation of salt in cases of drying out of lakes and other bodies of water", "Chemical pollution of soils and underground waters", "Technological expansion of deserts", "Breaks in hydrological regimes".

This outstanding work contains also another chapter, entitled "Social and economic consequences of expansion of deserts". In other words, how dangerous this process is for the human beings themselves.

Continuation of our story uses this chapter as the background information; of course, our story has some sidetracks, which allow to distinguish free presentation of the materials from a scientific report.

So...

HOW MUCH DO SHALLOW RIVERS AND GRASSLESS PASTURES COST?

Consequences of the expansion of deserts mainly include decreased variety or complete disappearance of plants, wind and water erosion of soils, increased hardness of soils and expansion of swamps, expansion of zones covered by sand, and, in the end, decreased productivity of soils and fertility of plants.

Such environmental changes are taking place in the Southern and Southeastern regions of Kazakhstan inhabited by 5,4 million people (about a third of the country's population).

Since ancient times people in these regions grew cattle and this business satisfied them for decades. Large herds of sheep find pastures in this region, at the same time the region is known for the high degree of degradation of the pastures: 45 million hectares have been strongly damaged and 15 million hectares have suffered moderate damage.

The pastures are exhausted as a result of the very high concentration of cattle (the amount of sheep is much higher than the amount of plants, which can be used as a source of food supply for the sheep).

Construction of dams in the upper parts of the rivers, consumption of water for watering the crop lands have changed the hydro regimes in the valleys of such rivers as Syrdaria, Ili, Chu, Karatal and other rivers located in Semirechie basin.

The square of water-supplied pastures has decreased to 68% of the total square of pastures and this has led to a decrease in the numbers of cattle grown and strengthened the process of expansion of deserts.

The lack of water delays exploitation of the rich mineral resources, slows down development of the production forces, which need water almost as much as energy and fuel.

Decreased water supply leads also to the decrease in the square of watered lands, which in Kazakhstan are used to grow cotton, sugar cane, vegetables, fruits, rice. Almost all watered crop lands are to a larger or smaller extent affected by the expansion of deserts, secondary accumulation of salt, expansion of swamps, and, in the end, by the process of losing fertility of the lands. On some of these lands the fertility has reached the same level of fertility as on non-watered lands, which has a strong negative impact on the economy of the region.

The ecological crisis in Aral and Ili-Balhash zones, especially in the Ili river delta, has led to deterioration of living conditions of wild animals and their numbers has drastically fallen down. Fish resources of the regions have been strongly affected. More than three fourths of lakes in the Ili river delta have lost their productive capabilities. Out of 16 lake systems having the square of more than 100 thousand hectares, only 4 have been preserved till modern times; the rest have either dried out or turned into swamps. As a result, in Ili river basin and in the lake Balhash the amounts of fish caught every year have decreased by 50%; the annual losses are estimated to be at about 10 thousand tons.

In Aral and Ili-Balhash zones the expansion of deserts is caused by exhaustion of water resources, at the same time the expansion of deserts in the Caspian zone is a result of flooding caused by the increased level of Caspian Sea and by sand accumulations created by the winds blowing from the steppes. The level of Caspian Sea has risen by more than 2 meters since 1978; as a result, more than 357 thousand hectares of near-the-shore pastures have been flooded, and this has left 200 thousand heads of cattle without any source of food supply.

In the zone of steppes wind erosion has negative impact on the economy. During the period of intensive development of the "virgin" lands, which is approximately attributed to the years from 1956 till 1965, more than 25,4 million hectares were ploughed up, including 5 million hectares of sandy lands.

Development of "virgin" lands included ploughing up of the lands alongside river banks, on the slopes of ravines. The process was accompanied by cutting down forests and destroying places of massive concentration of various bushes. Melting waters carried large amounts of the fertile upper layer of soil, sulphur and potassium into ravines and lakes. Fertility of the soils was gradually lost. Deterioration of the physical conditions of soils led to a 15-20% decrease of productivity. Currently more than 5,6 million hectares of fertilized lands suffer from water erosion. As a side effect of construction of dams and electric power plants, river valley plains are turning into deserts, productivity of grass lands is constantly falling on hundreds of thousands hectares in Pavlodar and Semipalatinsk regions.

Development of plants and factories has a negative impact on agricultural lands located in the suburbs of large cities and around villages. Large plants and factories pollute the territories around the places of their location by side products. The same destructive role is played by the ore and coal mines, oil extraction spots and refineries. Significant losses are caused by activities of the military ranges. These installations destroyed about 10 million hectares of pastures and crop lands on the territory of Kazakhstan.

In accordance with the UN estimates the annual losses caused by expansion of deserts amount to 963,2 million USD.

20,5 million hectares of non-watered lands are affected by water and wind erosion, which leads to the loss of fertility of the affected lands. The income annually lost as a result of erosion adds up to 779 million USD

Almost all of the watered lands are affected by secondary accumulation of salt or by expansion of swamps. 250 USD are lost on each hectare on the total square of 1,5 million hectares, which in total adds up to 375 million USD.

Within 40 years of exploitation of the “virgin” lands in Kazakhstan more than 1,2 billion tons of the fertile upper layer of soil were lost as a result of water and wind erosion. Annual losses caused by this process add up to 2,5 billion USD.

Plants have reached a significant degree of degradation on 14,7 million hectares of pastures. The cost of recovery of these lands is 1 thousand USD per one hectare, which in total will amount to 14,7 billion USD.

The amount of funds, which needs to be allocated for preservation of the normal living conditions of people in Aral Sea region is 14 billion USD; another 11,5 billion USD are required to raise the level of the river Syrdaria and to increase the level of Aral Sea. Actions, which must be taken to protect the people from the raising level of Caspian Sea, cost 2,85 billion USD, and if the actions are not taken, the losses may add up to 29 billion USD.

Consequently, it is possible to suggest that the losses caused by expansion of deserts add up to tens of billions USD. A developing country, which got its independence only 5 years ago, and which is currently suffering from an economic crisis, does not have the required funds. At the same time, if urgent measures are not taken, in the upcoming decade expansion of deserts may become much faster and its economic consequences will be much more serious.

EXPANSION OF DESERTS AND UNEMPLOYMENT: THE MODERN REALITIES

The current situation in Kazakhstan is characterized by a crisis caused by the change of economic systems and by the unfavorable ecological situation. This has led to a significant decrease of the overall people's standards of living, and, especially, of standards of living in the ecologically disadvantageous regions.

The fact that Aral Sea is drying out has led to the decrease in the amount of fish caught from the Sea and this has resulted in closures of the factories depending on the supply of fish caught from the sea. Consequently people who were working on those factories are losing their jobs.

So, in 1995 in Kyzyl-Orda region more than 16 thousand people lost their jobs, 12 thousand of them – people living in rural areas. 11,3 thousand people were on forced vacations because of complete or partial closures of their factories. Every fifth family (more than 100 thousand people) has suffered from unemployment in the

region. Years ago in Aral sea region there were 13 thousand fishing artels, there was a shipyard in Aralsk and a fisher repair shop in the prot of Uch-Sai. When Aral Sea started to move back from its original shores, more than 10 thousand people found themselves at risk of unemployment, and this, considering that the average family in the region consists of 5 people, meant that about 50 thousand people were almost left without any income.

All this leads to the decrease in incomes of the people and to lower consumption of food products. Consumption of meat and animal fats is much lower than the established medical norms, consequently the largest part of the population living in the desert zone is suffering from vitamin and albumen starvation. For example, in 1995 in Kyzyl-Orda region per capita production of meat was 40 kg, milk - 85 kg, eggs – 29, while the medical norms are, respectively, 78, 352 and 220.

To find a better deal people are migrating from the region. A new type of migrants appears – ecological refugees. Hundreds of people annually leave the areas where deserts are expanding. So, in 1994 more than 298 thousand people moved out of the regions located in the desert zone. The level of migration is especially high from the regions of ecological disasters. 20080 people moved out of Kyzyl-Orda region in 1994. The largest portion of migrants from this region moves to Almaty and southern regions of Kazakhstan. In connection with that, in Almaty and southern regions of the Republic the situation with availability of work places and unemployment gets worse every year

The increase in the level of Caspian Sea has led to the fact that 17 towns and villages have been covered by water. Fertile lands serving as pastures and grasslands were covered by water and people were left without their work places and sources of income. In Atyrau region there is a collective farm – Algabaskii – which has been specilizing on growing bulls. The raising sea covered the lands of the collective farm by a thick layer of water and 2,5 thousand people lost their jobs. A 50% decrease in the number of sheep grown by the farm left more than one thousand families of farmers without any opportunities to find a new job.

Low standards of living, insufficient food supply, insufficient level of medical services, unusable water, salt and dust storms – results of the destroyed ecological balance and degrading living conditions – have led to the drastic fall in health conditions of people, shortened life expectancies, and limited birth rates, which is the first sign of extinction of the people from this region.

Worsening living conditions, death of the green “belts” around towns and cities, destroyed transportation links, lower levels of electric power consumption, lower demand for communication services, irregular supply of gas and fuel, all these factors have a very significant negative impact on living conditions.

Deteriorating ecological situation, resulting from expansion of deserts, finds a reflection in health conditions of the people. Disadvantageous ecological situation influences people both directly and indirectly. In this case the rates of illnesses and death rates serve as indicators of the processes, which are taking place in the surrounding environment.

Statistical data shows that regions affected by high degrees of expansion of deserts are in many ways different from other regions of Kazakhstan.

One of the reasons for the majority of illnesses – poor quality of drinking water. Exhausted water resources and limited water supply in the rivers have decreased the self-cleaning properties of the bodies of water. For example, near Kyzyl-Orda the concentration of mineral salts has increased by 2,7 times, sulphates – by 3,4 times, ammonium – by 20 times, nitrates – by 8,5 times; absorbed poisonous

chemicals were found in the water, the level of bacteriologic pollution has increased. From Uzbekistan the waters of Syrdaria carry industrial sewage of more than 50 plants and factories. The same situation is common for other rivers.

Lower fertility of soils, degradation of pastures have caused a drop in production of food. People stopped eating fish, consumption of meat and dairy products has been greatly reduced. However, to completely understand the reasons for degradation of health conditions of the people, we also need to take into consideration the facts of often salt and dust storms, lower level of health care services, lack of medicines, constantly reduced numbers of available work places, high numbers of children per family, especially among representatives of the indigenous population.

For example, in Atyrau, Mangistau, Kyzyl-Orda, Almaty and Taldy-Korgan regions people have various kinds of diseases more often than in other regions. In comparison with, let's say 1994, now more people suffer from diseases of digesting organs (298% more adults than in 1994), for children this figure is 412%; from gastric ulcers – 558%; from skin and under skin cells diseases – 229%, blood diseases – 264%; ferric deficit anemia – 310%. People living in the desert zone have significant malfunctions of the blood development process and immune system.

In Aral Sea region there is a natural center of fever, high probability of hepatitis. The highest level of blood circulation system diseases is found in the epicenter of the Aral crisis – Kyzyl-Orda region. High levels of these diseases can also be found in the Caspian Sea region, South Kazakhstan and Almaty regions.

Cancer-related diseases are also wide spread among people living in the zone of deserts.

Regions affected by the expansion of deserts are also well-known because of the high death rates, especially among children. In 1995 the death rate among children was (per 1000 newborn) 35 – in Mangistau region, 34 – in Djambul region, 31 – in Kyzyl-Orda region, 28 – in Atyrau region. Children are left behind their peers in terms of physical development, they suffer from psychiatric disorders, anemia, blood-related diseases.

SOUR WATER-MELONS

This is how we decided to entitle a small chapter, in which people living in the regions more or less affected by the expansion of deserts, are telling about how the degradation of the nature influences their lives.

Fischer Ivan Edmundovich, chairperson of the local Committee on land relations and land improvement (Shortandy village, Akmola region):

Wind and water erosion has led to degradation of the soils and to the decrease of fertility. While the “virgin” lands were developed, soil properties and geomorphologic particularities were not taken into account and standardized 2X2 km fields were cut. As a result of accumulation of snow, every spring melting waters move away the fertile upper layer of the soil. Total ploughing up near rivers and ravines also stimulates erosion. The region also suffers from problems related to the lack of fresh water. Collective farm named after Saken Seifullin has to drive in the necessary water resources. Soils were seriously damaged by the use of herbicides 2.4 “D”.

Shevchenko Alexei Alexeevich, the head of the local department of ecology and biological resources (Shortandy village):

“It is necessary to combine turnover plough and flat cut processing of the land. The latter one stimulates the development of various diseases of the plants and speeds up rotting of the roots. Turnover plough helps to effectively fight the diseases.”

Semenov Alexandr Matveevich, teacher (Shortandy village):

“I have two children, the younger child is 10 years old, the older one is 15. We live using products grown at our own farm: we have some crop land, cows, pigs and birds. In the region the process of expansion of deserts is reflected in the increased square of salted lands, destruction of plants in the forests and among the water sources.

Zachepilo Mikhail Mikhailovich, pensioner, participant of World War II (Shortandy village):

“Birch forests were destroyed when the “virgin” lands were ploughed up. Now the unique steppe lakes, which are not supplied with melting waters are drying out and covering with silt. Plants, which were growing on the shores of the lakes, were destroyed by cattle, water birds and their nesting places were also destroyed. Kopyrkol, Erkygyz, Shoshaly, Balyktykol, Dalakol, Esenbakty lakes have dried out.

Nurtazina K (Bakanas village, Almaty region):

“After swimming in Ili river many people suffer from ulcers appearing on their bodies. Allergic diseases are also very common.”

Ordabaev T (Bakanas village):

“Melons and water melons growing on the fields are not sweet. Inside water-melons there are multiple hard white spots, their taste is salty”.

**SO, THE EXPANSION OF DESERTS IS A TRAGEDY OF THE NATURE,
THE MAIN ACTORS OF THE TRAGEDY ARE HUMAN BEINGS AND
THEY ARE THE ONES WHO MUST HELP THE NATURE TO OVERCOME
THE DIFFICULT SITUATION.**

The “National programs of actions aimed at fighting the expansion of deserts” contains a chapter, which is called “The strategy of actions against the expansion of deserts”. This is a wide program of actions for a large number of people, including government officials and peasants, who know about the expansion from their everyday experiences. It also outlines the activities for lawyers, scientists, economists and financial specialists.

Here is a short paragraph dealing with forests, or, with the so officially called forest resources.

“The total square of forests growing in the Republic is 24,6 million hectares, out of which 10,5 million are represented by lands covered with forests. The share of desert forests is 63%, mountain forests – 21%, and the steppe and river valley forests account for 16%.

Intensive development of natural resources has speeded up the process of expansion of deserts, which is taking place in the forests. Non-systemic cutting of trees, plough of the lands covered by forests, forest fires have also significantly damaged the forests. Within last 30 years the square of forests only in Kyzyl-Orda region has decreased by more than 100 thousand hectares, the remaining parts of the forests are characterized by lower levels of growth and expansion. Irrational activities of the people have seriously damaged wild fruit forests, their square has been decreased by one third.

Genetic assessments and development of genetic databases of the unique types of trees are carried out to ensure stable preservation and rational

exploitation of the biological diversity. The plans also provide for expansion of the network of natural forest reserves, national parks, genetic reserves, which are typical for any local typological complex.

Significant damage to forests is caused by forest fires. During dry years they destroy up to several hundred and even thousand hectares of forests. That is why the plans provide for improvements of the forest protection services, construction of the new fire towers, 100% increase in the number of the forest security staff and complete equipment of the forest security service by modern communication devices, fire extinguishing equipment and vehicles.

Mainly selective and gradual cutting of the mountainous and river valley forests of the Irtysh region is recommended...”

The dots are put here to symbolize that the outlined actions do not limit the activities, which can be undertaken to preserve the environment.

The same can be said about preservation of water, soil, wild animals, pastures and grass lands and everything else, which surrounds people in their everyday lives, and which, in the end, represents the life itself.

By the way, in the autumn of 1998 scientists representing Kazakh scientific research institute of environmental and climatic monitoring visited the Aral Sea region. They are often visitors in the region and every time they go they bring back stories filled with new colors, which unfortunately, can hardly be called bright. This is understandable. The representatives of the scientific research institute witnessed the death of the Aral Sea. They saw how playing sea waves gradually turned into laying salt, which is carried away by winds for many kilometers. They saw ships, which were forever caught into sand traps. They saw abandoned villages of fishers. Understandably, such pictures put significant pressure on the hearts of the scientists.

But this year the scientists saw how the desert has changed. In those regions, where winds were building sand hills and where there were no animals and even no snakes or lizards, now there are plants. The reason for the change is quite simple, specialists of the forestry department from the city of Shuchinsk are doing what people must do: they are planting trees in the deserts.