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Forestry Outlook Study for West and Central Asia
(FOWECA)

Thematic paper

Non Wood Forest Products in Central Asia and Caucasus

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ABSTRACT

This study was conducted by Programme of the Ecosystem Management of CAREC in cooperation with national CAREC branches in Georgia, Kyrgyzstan, Tajikistan, and Uzbekistan.

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1 INTRODUCTION

Non-wood forest production (NWFP) is the object of collateral use of all forests. It includes any sort of uses in forests and in the lands of forest fund which are not covered with a wood, excepting cutting of wood, turpentine and secondary wood stuffs. Secondary use of the forests is the mowing and grassing of cattle, accommodation of beehives and apiaries, collection of arboreal juices, preparation and the collecting of wild-growing fruits, nuts, mushrooms, berries (baccas), medicinal plants and technical raw material, hunting for valuable fur-bearing mammals and birds, fishery and production of different non-metallic minerals concerns to collateral use of a wood.

Forests of Caucasus and Central Asia keep the rich pantry of wild-growing fruits, berries, nuts. These valuable alimentary and medicinal raw materials are a source of vitamins, carbohydrates, proteins, organic acids, aromatic, mineral and other materials necessary for the human well-being. Caucasus is the one of the richest in the world regions which demonstrates the center of the species and races diversity of the wild-growing fruits. In the forests of Caucasus over 260 species of fruit plants from 37 genera occur. In river valleys and on the banks of the Caucasian rivers there are extensive cornel bushes and wild quince and alycha thrickets, the underwood here presents by the currant, raspberry, gooseberry and many other eatable plant species, the forest is formed by a chestnut, a hazel nut, a walnut, an apple, a pear, a merry (cherry-tree) and so forth.

Wild-growing fruit trees in Central Asia are considerably distributed, but on a species composition they concede to Caucasus. Here 212 species from genera are presented with non-uniform (uneven) diffusion on a geographic range. In a zone of the deserts the oleaster occurs in the river gallery forests (‘tugai”), in foothill and low mountains the almonds and pistachio trees grow, in mountain steppes the apples, an aglet, a walnut, pears, Cornelian cherries, bush cherries occur, etc. The richest with fruit species is the mountain forest steppe belt in which all feral (wild) species of fruit trees and bushes grow.

The forests of Caucasus and Central Asia are rich also with medicinal trees and grasses which local population, as well as food plants, from of old (long since) use for treatment of all kinds of illnesses. Hundreds species of medicinal plants in these regions are recorded (only in forests of Central Asia about 200 species).

In days of existence of the USSR the collecting and preparation of non wood forest production by the population were carried out free of charge, with the certain restrictions connected to the savings of a forest and with the collecting of production by forest enterprises in trade zones where preparation was carried out by forest enterprises themselves. The enterprises and the organizations leading a forestry, also conducted collecting free of charge. Volumes of preparations were established at realization of forest management. Concrete types of collateral (secondary) forest uses were regulated by special normative statements (regulations), for example, Plans of mowing and grazing of cattle in the forests of the USSR (regulation of 1988, №13, an item 61), etc.

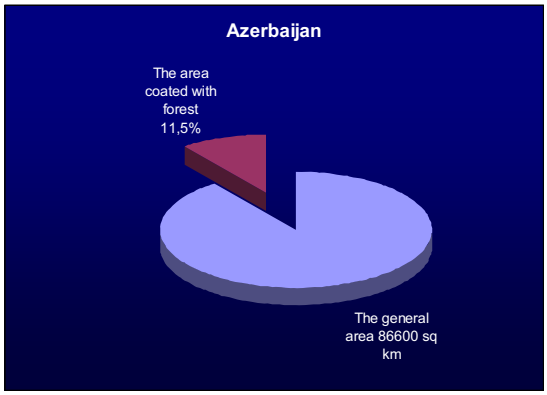
Secondary forest uses have the great importance for a forestry and process of reforestation (forest restoration). Almost each of kinds of preparation of non-wood forest production can render significant influence on growing and a state of the forest. The collecting and preparation of non-wood forests production can considerably increase productivity and

efficacy of forestry, material well-being of local population and even to influence on the economy of the state.

At the same time, the environment of the mountain and desert territories of the regions is very acquisitive to anthropogenic effects because of dryness and other features of a climate. The slightest infringements of ecosystems can have catastrophic consequences. Therefore interference of the human activity in ecosystems of mountain and desert forests including use by non-wood forests production, should be very cautious and should be adjusted by the states of the regions.

Establishment of independence of the states of Caucasus and Central Asia, process of transition to market economy have caused formation of new legal base of reforms, privatization of a state ownership, reforming both rural (agricultural) and forestry economies and formation of new type of agrarian attitudes, market infrastructures and so forth, that has caused also new orders of use by forests, their conservation and reproduction. Thus, the new ecological (environmental) threats linked to social and economic instability in conditions of educing market attitudes have appeared. The augmentation of poverty of the people, especially rural, has caused intensifying of the exploitation of natural (especially environmental) resources, including forests that can provoke the fast destruction of forest ecosystems. In these conditions regulation of legal base in the forest consumption and management of forestry with the purposes of its stable use and conservation of a biodiversity should become one of essential problems of new independent states. Stable use of non-wood forest products should promote enriching of an economic state of local population. Forests of countries of Caucasus and Central Asia play the important environmental and provisional role and consequently correct management of their resources should promote the decision of problems of poverty and sustainable development of countries of these regions.

2 FORESTS OF AZERBAIJAN AND A PROBLEM OF NON-WOOD FOREST PRODUCTS USE



In the economy of Azerbaijan, forestry plays a significant role. Forests occupy more than 11 % of all area of Republic (Figure 1.1). About 95 % of all forests compound mountain, covering slopes of the Big and Small Caucasus and isolated part of the located Talysh mountains. Forests of lowland cover about 5% of the general area covered with forests. Their value in economy of Republic in comparison with mountain forests is insignificant. The forests in Azerbaijan are predominary deciduous. Coniferous forests are presented only by pine forests (*Pinus kochiana*), engaging the insignificant areas. Except for pine forests, in some places groves from a yew (*Taxus bacata*), and in dry areas the juniper light forests (sparse trees) grow.

Mountain deciduous forests are very impure. They are presented by set of the many races differing also in the ecological attitude. In Republic 435 species of arbors and bushes grow, many of which give not only wood, but also a lot of to non-wood forest products playing the big role in a national economy of the state, and also in economy of personal facilities of the local human populations. The forests, meadows, semi deserts have the most important economic value in Republic. However, some other types of vegetation also contain many beneficial plants.

The area covered with a wood is distributed as follows on prevailing forest races (in % from all forests areas):

Table 1 Area covered with wood on prevailing forest races

Race	**%**	**Race**	**%**
Juniper	2,4	Linden	1,7
Pine	0,03	Elm	1,2
Beech east	32,0	Maple	0,2
Hornbeam Caucasian	22,5	Willow	0,2
Oak	31,5	Ash	0,01
Poplar	3,6	Other races	2,8
Alder	1,9		

Under beechen, hornbeam and oak forests 86% of all area of forests are covered, and the basic forest forming races are presented only by 12 races, but forests from other races though small on the area, have also the big value in formation of a diversification and the big economic value for local population are occupied. Hurdle rates of mountain forests on slopes of the Big and Small Caucasus are at height of 500-600 m, and in more wet areas of southern slopes of the Big Caucasus they alight below. In Lenkoran mountain forests begin at height of 50-100 m.

For forests of the inferior belt the richer underwood from various bushes - an aglet, a biwa, a wahoo, etc. is characteristic. At heights of 900-1000 m the oak and oak-hornbeam forests are constantly replaced by forests with predominance of an eastern beech which with a rising in mountains becomes more productive. In the average belt (1000-1700 м) the forests achieve the greatest capacity and completeness. These forests are most productive. They have the big performance (operational use) and water-security value. With the further rise in mountains crown density in forests is reduced. In forests over 1700 m the sward is well advanced, the role of underwood increases. At height of 1800-2100 m beech forests gradually disappear and pass in light oak-forests on southern slopes. High-mountainous oak-forests with an eastern oak are characteristic for east extremity of the Big Caucasus. On more wet places in the top forest belt the maple and elm forests educe. The uppermost edges of the forest are occupied with maculae birch croocked forest and decumbent junipers on a background of magnificent Alpine meadows.

2.1 The main forest formations of Azerbaijan on dominating races

Deciduous forests: beechen, hornbeam-beechen, oak from an chestnut-leaved, Georgian and eastern oak; ash-oak forests; oak-hornbeam; lignum vitae; oak-dzelkva; persimmon; maple with a velvety and Trautvetter's maple; alder forests; alder; chestnut; elm; nut; plane-tree; "tugai" – gallery river forests (willow, elm-poplar, elm, elm-oak); with a silk acacia; aspen; birch forests.

Coniferous forests: pine with Koch's pine.

Arid dry sparse forests: pistachio; pistachio-juniper; juniper; oak (with a Georgian Araks's oak).

Typological structure of forests in Republic is very rich and diverse. It is explained by richness of dendro (arbor) flora, diversity of soil and climatic conditions, in this connection separate types of a wood seldom occupy the significant areas.

Forests with predominance of an eastern beech are the most widespread. In a high-altitude direction they follow oak-forests (from *Quercus iberica*) and oak-hornbeam forests, since height of 900-1000 m and are lifted up to the top forest edge (1800-2000 м). These forests almost without underwood and sward in an average part of a belt, and are lower and higher than this strip the admixing of other races, first of all a hornbeam increases. From other species in these forests such trees as three kinds of maples grow, on gorges - a velvety maple (*Acer velutinum*), lindens (*Tilia caucasica, T. cardifolia*, etc.), elms (*Ulmus elliptica, U. scabra*) grow. In Lenkoran, the Caucasian persimmon, an alder, a buckthorn admixes to them. Underwood usually is absent. Over sward such species as woodruff, fescue, man's and female ferns, sanicle, etc. dominate.

Forests with predominance of an oak are distributed in all large forests of Azerbaijan, on lowland and on mountain slopes. The basic kinds of an oak are following: on lowland - a "long-legged" oak (*Quercus longipes*), in the inferior belt – a Georgian oak (*Q. iberica*), in the top belt - an eastern oak (*Q. macranthera*), in Lenkoran everywhere – a chestnut-leaved oak (*Q. castaneifolia*). Except for these, in forests 5 more species of an oak meet which are not forming the big formations. In the inferior belt oakerys (oak groves) are hardly infringed (damaged) by human activity. The trunks have the curled form and dry crowns. Underwood

from different kinds of bushes is rich and prickly. In high-mountainous oak-forests from an eastern oak underwood is advanced poorly, but there is a rich sward from more than 100 species of grasses, many of which have any value for the human population. Oak forests of lowland form of an oak near-"tugai" tape forests and, except for water-preservation role, have more value for reception of non-wood forest production, because include rich on a species composition a concomitant lignosa from pistachio, pears, mulberries, oleaster, and in underwood - an aglet, a granatum, barberries, biwa, buckthorn, etc.

Hornbeam forests stand in Azerbaijan on the second place after beechen forests and have important value in forestry. They are presented in all mountain forest areas of Azerbaijan and grow on slopes of all expositions, being lifted up to height of 1800-2000 m. Climatic and edaphic conditions of areas of its distribution are favour to growing of a hornbeam not only in various types of hornbeam forests, but also in other types of forests, especially in average mountain belt. Because of the big shade in these forests underwood and herbage are developed rather poorly.

Except for described broadleaved forests of Azerbaijan engaging in forest fund more than 80 % of the area, other types of forests including relict occupying small areas and not forming an independent belt are presented also. However, these forests frequently are highly productive, valuable in the economic attitude and giving quite good incomes to local human population. Among such forests it is possible to discharge the following:

- Lignum vitae forests with predominance of Persian parrotia or an iron tree (*Parrotia persica*) are distributed in Lenkoran on seaside plain, occupying more than 7 thousand ha. Among pure iron tree forests two radical types are distributed: iron tree wood with underwood from butcher's-broom and lifeless wood.

- The maple forests are engaging the small areas on the average and the top belts of mountains. In Azerbaijan 9 species of a maple occur, but only velvety and Trautvetter's maples (*Acer velutinum*, *A. trautvetterri*) form forest formations with their domination - the first on the average, and the second in a high-mountainous belt. Companions of a maple are an eastern beech, a heart-leaved alder, a mountain elm, a Caucasian persimmon, a walnut, a hornbeam and a Caucasian linden. Underwood is advanced poorly. The sward is magnificent advanced with predominance of ferns (6 species), nightshade, sedge, euphorbia, etc., and they have the big values for reception of non-wood forest production.

- Persimmon forests in Lenkoran large forest lands occupy about 10 thousand ha. Forests from a persimmon have been hardly cut down earlier. On the saved parts of such forests the velvety maple, a heart-leaved alder, a walnut, a hornbeam admixes. The sward is advanced well. Over it ferns, sedge, nightshade, some other grasses dominate. Plantations are harmed hardly by the shepherds using a shoots as forage for cattle.

- Elm forests form as inundated, and slope plantations from six species. In the inferior and average mountain belts the shaggy elm (*Ulmus scabra*) and elliptic elm (*U. elliptica*) meet on the bottoms and boards of mountain gorges. They are hardly damaged by cattle grazing.

- Nut forests occupy the small area, in some hundreds hectares, but because of the big value they have the great importance in life of the local human population. Except for pure plantations they participate as an admixing of the many other types of forests, increasing their value.

In Azerbaijan there are also forests from the races having valuable wood, but insignificant on the area, such as chestnut, forests from delkva (two species), from a silk acacia, “lapina”, alder, birch and aspen which in various vegetative belts occupy the small areas and meet by isolated maculae. Many parts of forests are hardly changed by cutting down and grazing of cattle and many of them are derivatives at the places of destroyed forests.

Tugai forests occupy now a little some tens thousand ha, on banks of the large rivers by narrow faltering tapes. The structure of saved tugai forests of Azerbaijan more or less homogenous in all parts. Dominating races in them are a white-leaved poplar (*Populus hibrida*), elms, an oak, a southern willow (*Salex australior*), a mulberry, an oleaster, a pear, etc.

Except for wood, the forests of Azerbaijan are rich by many other sources of valuable raw materials. In them on tens thousand hectares many kinds wild-growing fruits grow (a walnut, an apple, a pear, an alycha, a cornel, a biwa, a merry, a hazelnut, a Caucasian persimmon, a chestnut, a blackberry, etc.), afferent annually abundant yields which, however, are used completely insufficiently. Annual purchases the last years (Soviet time) of fruits and baccas compounded 3-5 thousand tons that does not exceed **5-10 % of general yield** of all wild-growing fruits of Republic.

The important part of additional use of forests is the hunting for fur-bearing animals and hunting-game birds. In Azerbaijan there are found such hunting-game animals as a wild boar, a lynx, a bear, a roe, a Caucasian deer; in high mountains there are occurred the Dagestan wild goat and a chamois; from the feathery game animal the pheasant and the partridges are found. On the basis of forests use there are presented the big opportunities for development of profitable beekeeping.

On a state of forests of Azerbaijan the big negative influence is rendered with grazing of cattle on wood glades and in the forests. The cattle eats and treads seed resumption of trees and bushes that results in reduction of quality and regeneration of forests, destroys a significant part of yield of trees which is important quantifying of incomes for local population. The big harm to resumption puts the feeding to cattle of ramal forages in the winter and summer seasons.

The forest resources of Azerbaijan compound now 1213.4 thousand ha, from them the area covered with forests occupies 989.3 thousand ha or nearly so 82 % from forest fund. Only 12 % of forest fund are occupied with non-wood lands, including haymakings, pastures, rocks, etc. Besides more than 130 thousand ha are under the forests and are not included in forest resources.

In the territory of forest fund now there are 14 state nature reserves with general area of 191.2 thousand ha and 19 state sanctuaries with area of 285.7 thousand ha, and also 6 national parks with area 116.2 thousand ha. The protected areas network covered 2,2 % of the territory of country and 15,8 % of the territory of forest fund. For years of independence 6 new nature reserves and 6 national parks were established. The network of nature reserves now covers the majority of forest types of Azerbaijan, as widely distributed (such as broadleaved the most saved forests), and relict and unique (such as with an Albicia, an Eldar’s pine, a yew, etc.).

The sanctuaries though under them the big areas also are allocated, completely not conserve the forests from effect of human pressure because the region of protection is not maintained.

Azerbaijan occupies rather small area - 8660 thousand ha, however, thanking enough high forest covering of territory - 11,5 % both to the big species diversity and high value of forest products they take a high place in a national economy and especially in well-being of local population. The population of Republic now compounds 8202.4 thousand persons. Thus, on one person it numbers 0.12 ha of forests. The most part of rural population lives at the irrigated zone at a some distance from forests, therefore on people, living in wood regions, numbers the bigger part of forest lands in several times. For 20 last years the quantity of the population in Republic has increased in 1.25 times and, accordingly, the pressure on the forests resources from the human beings has increased also. The pressure on the forests resources increased also due to reduction of a living standard, because the collecting and preparations of fruits have increased, and together with it grazing livestock number has increased on the forest pastures. Basically non-wood forest production is consumed by local population. Its sale is circumscribed for the lack of the big seller's market.

Till 2000 the forestry of Republic was in the management of central forest enterprise "Azerbles", which had 37 forest enterprises in a submission. In 2000 the Ministry for ecology and natural resources was established which has headed a forestry through Department of forest development. Now in Republic there are 33 forest enterprises and 5 regional forest-planting enterprises. They are mostly manager the planting of wood cultures (37 enterprises), collecting of seeds of the various tree, bushes and grasses species (22 enterprises), gathering of nuciferous (10 enterprises), collecting of medical plants (3 enterprises), collecting citrus (1), planting and growing the trees in the nurseries (7 enterprises).

The basic kinds of a direction of activity of forest enterprises, except for preservation of forests are the reafforestation and the collecting of non-wood forest production. Cultivation of nurseries and landing stuff for forestry is assigned on 7 forest-planting enterprises. By a direction of activity of forest enterprises, in Republic the great volume of the new forests (forests) should be conducted annually, however any real data in figures on this question were not presented, except for planting of nuciferous cultures races which Azerbaijan forest authorities pay the big attention. Wood cultures of these races on the area 150-200 ha are annually planted. The augmentation of volume of their planting in the long term perspective is planned, that will allow receive the high yield and will render significant influence on rise of a living standard of local population.

Forest enterprises of Azerbaijan according to plans effect collecting of non-wood forest products of different names, however, the expert collected the data only on collection of nuciferous races - a walnut, an almond, and also a chestnut and the summarized data on other products, as on food (alimentary) raw materials.

In table 2, 3 and 4 dynamics of the collecting of nuts and another product of these species for the last 15 years is presented. Probably, the forest enterprises gave the minimal figures of plans for the collecting of yields of NWFP in unfavorable years, because annual quantity of fruits collected by each enterprises present the identical quantity with some constant augmentation in last years.

Table 2 Data on walnut collection in forest enterprises - period 1990-2005

Forest enterprises	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Belekansky	2,01	2,02	2,02	2,02	2,02	2,02	2,02	2,02	2,02	2,02	2,02	2,02	2,02	2,02	2,06	3
Kazakhsky	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,13	0,13	0,13	0,13	0,13	0,13	0,18	0,2
Kahsky	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,7	1,7	1,7	1,7	1,7	1,8	2,2	3
Kubinsky	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,6	0,7	0,7	1
Kusarsky	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,3	0,3
Kabalinsky	1,5	1,5	1,5	1,5	1,5	1,5	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	3,5	2
Dashkesansky	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,05	0,05	0,05	0,05	0,1
Djalilabadsky																0,1
Zakatalsky	2,5	2,5	2,5	2,5	2,5	2,5	2,6	2,6	2,6	2,6	2,7	2,7	2,7	2,7	3,3	3
Ysmaiyllinsky	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1	1	1	1	1	3
Yalaminsky	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,9	0,9	0,9	0,9	0,9	1,2	1,2
Yardymlynsky															0,01	0,1
Leriksky	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,45	1
Lenkoransky	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Masallinsky																
Oguzsky	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,3	1,3	1,4	3
Tavuzsky	1	1	1	1	1	1,05	1,05	1,05	1,05	1,05	1,05	1,05	1,05	1,05	1,2	1,5
Shekinsky	4	4	4	4	4	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	5
Total	20,27	20,28	20,28	20,38	20,28	20,83	21,03	21,13	21,24	21,34	21,14	21,15	21,35	21,55	25,5	31,05

Source: Department of forest development of the Ministry for Ecology and Natural Resources

Table 3 Data on almond nuts collection in forest enterprises - period 1990-2005 (units of ton)

Forest enterprises	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Divichinsky	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,4	0,4	0,4	0,4	0,4	0,4
Tovuzsky	1	1	1	1	1	1	1	1,2	1,2	1,3	1,3	1,3	1,3	1,3	1	1,6
Hyrdalinsky	0,5	0,5	0,5	0,5	0,5	0,5	0,4	0,4	0,4	0,4	0,4	0,4	0,3	0,3	0,3	0,3
Shamahinsky	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,2
Absheronsky	0,5	0,5	0,5	0,5	0,5	0,6	0,6	0,6	0,6	0,7	0,7	0,7	0,7	0,7	0,84	0,3
Kurinsky													0,1	0,1	0,1	0,1
Total	2,6	2,6	2,6	2,6	2,6	2,7	2,6	2,8	2,8	3,0	2,9		2,9	2,9	2,84	2,9

Source: Department of forest development of the Ministry for Ecology and Natural Resources

Table 4 Data on edible chestnut collection in forest enterprises - period 1990-2005 (units of ton)

Forest enterprises	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Belekansky	1,2	1,2	1,2	1,2	1,2	1,2	1,3	1,3	1,3	1,3	1,4	1,4	1,4	1,4	1,42	2
Kahsky	1,5	1,5	1,5	1,5	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,7	1,7	1,8	2,5	1,5
Kubinsky	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,8	0,1
Kabalinsky	1,2	1,2	1,2	1,2	1,2	1,2	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,4	
Zakatalsky	2,4	2,4	2,4	2,4	2,4	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,8	3
Ysmaiyllinsky	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4	0,5	0,5
Oguzsky	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,6	1,6	1,6	1,6	1,6	1,6	1	1	2
Tavuzsky															0,176	
Total	8,1	8,1	8,1	8,1	8,2	8,4	8,6	8,8	8,8	8,8	9 ,0	9,1	9,1	8,6	10,746	12,1

Source: Department of forest development of the Ministry for Ecology and Natural Resources

The volumes of collection are basically small; on a walnut do not exceed 31 tons, to almonds - 3 tons and a chestnut - 12 tons. Plantations of a walnut occurring in 20 forest enterprises and an edible chestnut in 8 forest enterprises are most of all distributed.

All other yield of nuciferous is collected by population. The prices developed in the market (about 1 US dollar for one kg of a walnut and a chestnut, and 9 dollars for one kg of almonds) high enough and the collected crop should give to population the essential income. Wild fruits

and berrylike forest production is also gathered by the population, probably, mostly for own needs. The statistic on volume of preparations it is not conducted and for reception of such data, as well as in other states of the regions, special researches are necessary.

Forest enterprises collect the yield of fruit races not only in forests, but also in cultural gardens. The generalized data on dynamics of their collecting are presented in Table 5. From wild fruit races forest enterprises collect only sea-buckthorn berries, a dogrose and an aglet, the rest - only in gardens. Analysis shows, that volumes of harvesting low (on the average on one timber enterprise from 85 tons in 1992 up to 7 tons in 2005. For the last 10 years volumes of collections have decreased at 4-10 time, with 2823 tons up to 230 tons.

In the last years, with increase of deficiency of medical products of industrial manufacturing and growing prices on them, the increasing diffusion receives use of medicinal plants. In Azerbaijan the collecting of medicinal plants in forest fund is engaged from the beginning of 1970th. Now forest enterprises also are engaged in their collecting in rather small volumes. On a range of prepared grasses the statistics is not conducted. The generalized data for 15 years are presented in the table. Analysis of dynamics of their preparations shows, that the collecting of medicinal grasses in 2005 in comparison with 1990 has decreased in 3,85 times, with 13,1 tons up to 3,4 tons. It is explained, as well as reduction of the collecting of food production, absence of a seller's market and imports of production other countries. Realization of non-wood forest products is not conducted almost. However, if to take into account rich capacity of forests of Azerbaijan in non-wood forest production, on the market it is possible to remove a wide range of medicinal grasses and all diversification of fruit production.

Table 5 Data on medicinal and food plants collection for the period 1990-2005 (units of ton)

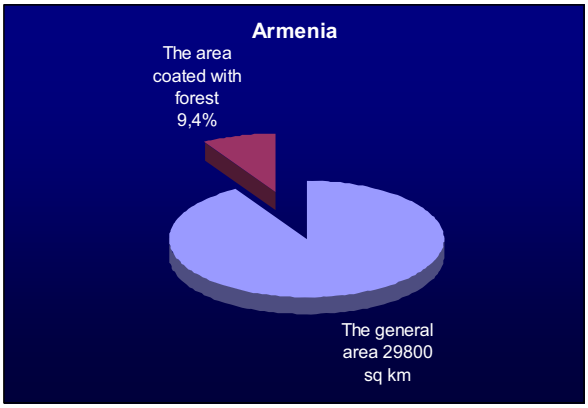
Years	Medicinal raw material	Food raw material	All
1990	13,1	325,4	338,5
1991	13.3	220	233,3
1992	5.7	2823.7	2829,4
1993	9.0	1087,6	1096,6
1994	1.3	1227,7	1229,0
1995	4.5	318,8	323,3
1996	1,6	471,51	473,11
1997	3,7	229,7	233,4
1998	5,3	123,5	128,8
1999	3,2	237,4	240,6
2000	4Д	133,6	137,7
2001	3,8	215,6	219.4
2002	3.4	189,7	193,1
2003	3,5	205,5	209,0
2004	3,3	230,3	233,6
2005	3,4	233,3	236,7

In Azerbaijan the public sector (non-state organizations, private sector) is engaged in import and export of non-wood forest production and it dictates also procurement prices. The population now collects non-wood forest production basically for own needs that cannot considerably improve a material prosperity. In the forests the forest enterprises prepare hay for own needs for their workers. Volumes of preparations are unknown. The population conducts everywhere the grazing of cattle which quantity in the last years in connection with poverty has sharply increased. Grazing of cattle puts the big harm to forests, resulting in gradual degradation.

There are no data on capturing and a shooting of hunting-game animals with which the forests of Republic are rich. Special researches are necessary for the collecting of data.

Forests of Azerbaijan are under the control of the state. The management of forests is carried out on the establishment of the Wood Code and the Law on Environmental control. In the Azerbaijan Republic use of forest resources is affected on a basis of legislatively reasonable agreements. Transfer of large forests is on hire basis carried out in three directions - a recreation, short-term landing of agricultural plants and the long-term lease with a condition of planting of forests saplings on 20 % of territory and maintenance behind them up to a complete covering with forest zone. In the Azerbaijan Republic the National program of regeneration and augmentation of a wood integument is authorized.

3 FORESTS OF ARMENIA AND A PROBLEM OF NON-WOOD FOREST PRODUCTS USE



Under the physical geographical demarcation of Armenia are selected the Northern Armenia, included in the basin of Kura river, and Southern Armenia, included in basin of Araks river. In the geomorphologic attitude it represents highland with high mountain ridges, reaching in various directions and hardly influencing on a climate and vegetation. In connection with complex orography the climate and vegetation of country are very diverse. They also are in close dependence on vertical zoning. On a climate the Northern Armenia concerns to moderately cold range with precipitation of 500-750 mm. It is the woodiest part of country with domination of beech forests. Forest covered area here compounds about 29 %.

Southern Armenia can be divided into two districts, sharply differing in on a climate and vegetation - Central with a continental and dry climate with high summer temperatures and Zanzegur which boreal part is treeless, and southern possesses the big spaces with oak and oak-hornbeam woods. General percentage of the forest lands of Zanzegur is about 20 %.

For Northern Armenia the beech forests engaging average and top belts within of heights of 1000-2200 m on northern slopes of ranges are characteristic. Southern slopes here are occupied with oak and mixed oak woods. In the beechen formations there are plantations of a yew (*Taxus baccata*). The eastern beech usually forms pure stands of trees. Much less often it forms woods together with a hornbeam (*Carpinus caucasica*), even less often with elm (*Ulmus elliptica*). Other races compound only individual admixing - a linden (*Tilia cordata*), a platan-liked maple (*Acer platanoides*), an aspen (*Populus tremula*), a Caucasian pear (*Pyrus caucasica*), a merry (*Cerasus avium*), and even more rare a common rowan-tree (*Sorbus aucupraria*), an ursine nut (*Corylus colurna*), a maple (*Acer campestre*), etc. The second layer and underwood usually are absent, occasionally it is possible to meet only a yew, a Caucasian honeysuckle (*Lonicera caucasica*), a Viburnum (*Viburnum lantana*), a currant (*Ribes alpinum*), dogroses (several species), a spurge (*Daphne mezereum*), a black elder (*Sambucus nigra*), a raspberry (*Rubus bouschii*).

In Northern Armenia all inferior mountain belt - 500-1100 m basically is occupied with an oak formation. Up to 1300 m an Iberian oak (*Quercus iberica*) grows, and higher - an eastern oak. Oak woods form both pure forests on poor soils, and mixed forests on more fertile soils. Here are usual an ash dace, a platan-liked maple, a field maple, a Caucasian pear, a hornbeam, lindens - Caucasian and heart-leaved, and also underwood with a rich species composition. In the inferior mountain belt (500-900 м) complex two-storied stands of trees with the first layer from a Georgian oak and second of a hornbeam are usual. Below on foothills the gramineous steppes are located. On southern slopes here there are significant areas of the dry light sparse forests.

Deciduous light sparse forests are not lifted above 1000 m. The most typical races here - a pistachio (*Pistacia mutica*), a skeleton-tree (*Celtis caucasica*), an ash (*Fraxinus oxicarpa*), a Georgian maple (*Acer iberica*), a Cotinus coggygria, a Rhus coriaria, a granatum (*Punica granatum*), a cotoneaster (*Cotoneaster multiflora*).

Coniferous light sparse forests are formed by treelike junipers (*Juniperus foetidissima, J. polycarpos, J. oblonga*). On southern slopes the mountain steppe is advanced on places of the destroyed oak woods. Anthropogenic activity has resulted also in appearance of bushes from a keep - arbor (*Paliuris spina-christi*), Pallas's buchthorn, Georgian honeysuckles, cotoneater, some species of dogroses, etc. In Northern Armenia the belt of the Alpine croocked forest (1900-2200 м) is well-marked with an integument of alpestrine high mountains. The most usual forest forming races in alpestrine croocked forest: an eastern oak, a high-mountainous maple, a mountain ash, a birch, a beech. Separate bunches under arboreal flat and on the open lawns bushes of Viburnum, Bibershtein's currant, gooseberry (*Grossularia reclinata*), Caucasian honeysuckles; bird cherries (*Padus racemosa*) grow. Places impervious thrickets are formed with a raspberry, bushes a spurge (*Daphne mezerium*) and a dogrose (*Rosa avenetica, R. spinosissima*) are usual, etc.

Forest vegetation of Zanzegur sharply differs from woods of Northern Armenia by dominance of oak and oak-hornbeam stands of trees. Beech forests here are not presented. Zanzegur is a unique area in Armenia, where an Arax oak (*Quercua araxina*) grows, forming woods in the inferior mountain belt. In its underwood a Colutia cilicica is usual including bushes of skumpia, privet, laxative buckthorn, Georgian honeysuckles. At-sight destroyed oak woods the bush assemblages educe. Here the dry light coniferous (juniper) and deciduous forests meet.

In all Armenia there are some remains of the tugai (river gallery) forests with dominance of poplars (*Popolus sosnowskyi, P. hybrida*), willows (*Salix alba, S. australior, S. triandra,* etc.), field elm (*Ulmus foliaceae*) and mulberries (*Morus alba*), intertwist with lianas – (*Periploca graeca*), eastern clematis (*Clematis orientalis*) and grapes (*Vitis silvestris*), place to place with rich underwood from a blackberry and a dogrose. At the top edge of a wood in Zanzegur the vegetation in most cases is the same, as well as in Northern Armenia. In the Central Armenia the forests are not presented, but in belts of steppe-meadows and the Alpine meadows at height of 2200-3000 m and above the small-sized bushes and under shrubs grow such as a stunted juniper (*Juniperus depressa*), a blueberry (*Vaccinium uliginosum*), a bilberry (*Vaccinium myrtillus*), a crowberry (*Empetrum hermafroditum*), a dogrose, etc. Because of the big diversification of the forest conditions due to a mountain relief the listed woods form different types, the basic of which following:

In beech forests the most widespread are the bunch of the types growing on abrupt boreal slopes with good resumption and with weak sward; bunch of woodruff is the most widespread and productive with a store of 400-500 m3/ha. In sward prevails the woodruff (*Asperula odorata*), and at low half-notes the rich grasses educe - the most productive type of a wood with a store up to 600-800 m3 /ha. Rich grasses here are advanced at small half-notes of a wood. At average half-notes reforestation is good, and at low is worsened because of hardly educing integument from an elder herbaceous and blackberries; alpestrine bunches grows in the top of forest belt above 1700 m. The sward here is well advanced. It is consisted from wide grasses and ferns, basically female (*Athurium filix-femina*).

In oak woods and their derivatives 3 species of an oak grow: Arax, Georgian and eastern: the first in southeast of Zanzegur, the second - across all Armenia at heights of 500-1850 m, sometimes forming mixed forests with a hornbeam, and the third kind forms woods in a belt above 1350-1450 m up to the top edge of a forest. On the area the oak in Armenia occupies the first place - over 41 % from all covered with woods areas, but a store on 1 ha is only 63 m3, because during centuries-old human activity the wood on the significant area are hardly exhausted by repeated cutting down and consist from young growth arbors. Only on remote places fields of a tall-trunked wood were saved. Continuous oak-woods from a Georgian oak including a hornbeam occupy the inferior mountain belt in Northern Armenia. Into structure of these woods enters rich dendroflora (tree and bush composition), especially bushes. From tree species there are presented an ash, field, beautiful, Georgian maples, a Caucasian pear, an eastern apple, elms (*Ulmus foliacea, U. suberosa*), a merry, a walnut, a Caucasian linden, an ursine nut, etc. Bushes are presented by wider range: a biwa (*Mesmilus germanica*), aglets – 3 species, numerous species of a dogrose, an alycha, a skumpia, a laxative buckthorn, wahoo (euonymus) - - 3 species, a Staphilea hinata, a cornel (Cornus mas), a honeysuckle - 3 species, a Viburnum, a hazelnut, a cotoneaster, etc. From lianas here grows a honeysuckle (Lonicera caprifolium), a clematis (Clematis vitalba), a dace ivy and a grapes.

The driest localities are occupied by sedgy types of oak-woods – sedge-hornbeam oak-groves with sedge-cereal-various grasses sward and sedgy hawthorn oak-groves including 5 species of aglet and alychas and the sward similar of previous. Southern slopes with richer soils are occupied by coach-grass hornbeam oak-groves most widespread in Northern Armenia, including and ash, a hornbeam and a shrubage from cornel, an eunomius, a dogrose, etc. and coach-grass cornel-hawthorn oak-groves where in the second layer the aglet and cornel grow instead of a hornbeam.

On northern slopes the types of the forest with various grasses educe – motley grass hornbeam oak-groves, motley grasses cornel, motley grasses hazelnut oak-groves, oak-groves from Arax oak including in sward of tens kinds of the grasses, many of which are used for the different human purposes, and also oak-groves from an eastern oak, the most widespread in Armenia. On the average and top mountain belts the dry steppe oak-groves with predominance over sward of separate kinds of cereals - fescue oak-groves, sedgy, cereal-motley grasses and cereal oak-groves including in structure of field and platan-liked maples, Caucasian and Syrian pears are distributed. In the middle mountain belt on flat northern slopes the high-duty oak woods including a hornbeam, woodruff hornbeam oak-groves including up to 25 % of a Caucasian pear which at cutting down of woods was usually abandoned for yield of fruits, motley-grasses oak-groves including euonymus, biwa, alychas, dogroses, educed honeysuckles, etc., and motley grasses oak-groves with ferns and admix of hornbeam and elm. And in the upper mountain belt the low productive motley-grasses oak-groves are presented – motley-grasses oak-groves of the top forest belt with motley sward of a rich species composition and concomitant races - a hornbeam, an ash, a maple, three species of a pear, in underwood – a Viburnum, a honeysuckle, an Armenian currant; alpestrine high-mountainous oak-groves with an ash and a hornbeam, with rich sward in height 60-80 sm.

Pine forests in Armenia are presented on the small areas, basically in the western part of Northern Armenia as the pure pine forests of two types - a dry pine forest with weak sward and pine forest – with green grasses on northern slopes with abundant sward of meadow type, with dominance of cereals and legumes.

Subalpine mesohylies forests include subalpine light forest and subalpine croocked forest where in underwood participate the Bibershtein's and eastern currants, a gooseberry, a Viburnum, a honeysuckle, a bird cherry, a raspberry, a spurge, etc., and the sward has a projective covering up to 100%. Many species of plants here have value for the human.

The driest slopes are occupied with the coniferous light forests engaging rather small areas - about 6,5 thousand ha, from 900 up to 2300 m. Their structure includes treelike junipers *Juniperus foectidissima, J.polycarpos*. In view of value the juniper wood was strenuously cut down by the population, therefore a wood hardly rarefied. Because of dryness the shrubage is advanced poorly. An east barberries (*Berberis orientalis*), a Georgian honeysuckle, a cotoneaster (*Cotoneaster racemiflora*), an Arax cherry (*Cerasus araxina*) meet. Sward basically is from cereals.

The area of Armenia is 29800 thousand ha of which the general area of forest fund compounds about 4040 thousand ha, and covered with a wood - about 300 thousand ha. Percentage of forest lands in Republic compounds with 9,4 %. A general store of wood is 25 million m3, from which volume of ripe wood is 19 million m3. Taking into account, that non wood forest products are collected not only in forest, and on all area of forest fund which makes 13,5 % from the area of Republic, it is possible to see, that it is quite part of production available in the state. Value of this production for the population having access to NWFP is huge.

The population of Armenia totals 3212 thousand persons. For the last 20 years it has decreased for 105 thousand persons or on 3,3 %. In Republic the rural population is much less, than urban - only 35 % from an aggregate number, but, taking into account average high density - 108 individuals/km², it is possible to consider, that an anthropogenic pressure on forests is high enough. It is counted 0,09 ha of forests on one person in Armenia, that also assumes a high degree of use of non wood forest products.

In Armenia, as well as in all Transcaucasia, a rich species composition of arboreal and bush vegetation is presented: more than 200 species among which a lot of beneficial to the human and widely used in food and for other purposes - a plenty fruits - a pear, an apple, a merry, a mountain ash; from bushes - an alycha, a bird cherry, a biwa, aglets, a cornel, a currant, a raspberry, a blackberry, Barberries, a cherry, a blueberry, a granatum, etc.; from nuciferous these are - a walnut, a hazelnut, a ursine nut; from technical plants – a tannic sumac, an oak, a linden, etc.; from herbaceous plants a plenty of kinds of medicinal grasses, both in wood flora, and in high-mountainous – sub-alpine and Alpine.

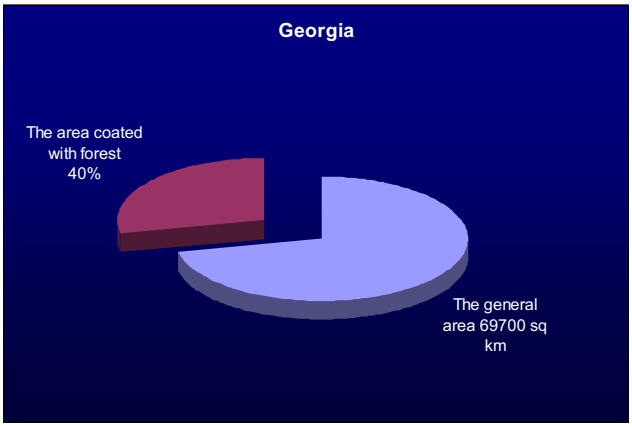
At the cutting of forests for use of woods the population specially left the food plants for preparation of non wood forest production that confirms its significance for local communities. A biodiversity of forests of Armenia is conserved by 3 strict nature reserves: Dilizhansky, Khosrov and Shikahogon, with general area less than 100 thousand ha and 12 special sanctuaries. In forests of Armenia there are found the roe, the wild boar, the stone marten, the Armenian fox, the brown Caucasian bear, the wood cat, and the Caucasian lynx. There are also many various species rodents and birds. Red and spotted deer were acclimatized. However, the current status and numbers of fauna now is not known.

In Armenia till 1990 38 forest enterprises were engaged in forestry, except for preparation of a wood, they conducted the recreation works, collecting of non-wood forest products - hay, wild-growing fruits - cornel, blackberries, etc., and also raw material - dogrose, sea-buckthorn

berries were engaged in a forestry, etc. The beekeeping has been well advanced. The information on a modern state of forestry is absent. Probably, statistics on this question it is not conducted. Unconditionally, in Republic the same as and in all other states of region, with falling economy and reduction of a living standard dependence of local rural population on non-wood forest products has amplified - the cattle grazing has increased, preparation of fire wood has increased, the collecting of fruits, especially nuciferous races has increased. The state of forests has accordingly worsened and productivity of food plants and herbages has fallen.

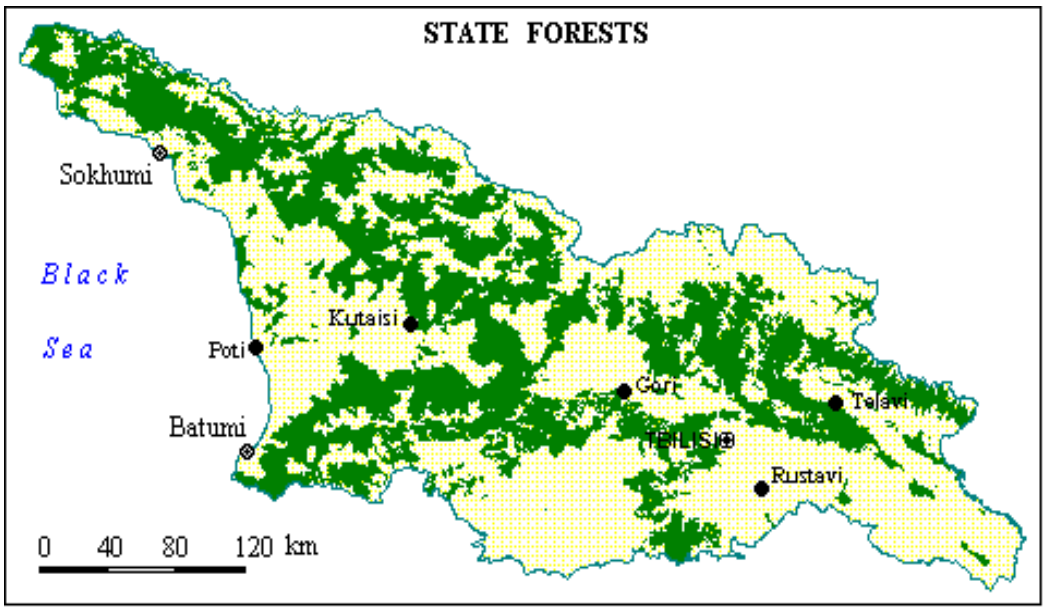
For definition of species of the plants used by the population as alimentary, medicinal, etc., realization of the special researches including inquest of the population in key points, the collecting of statistic departmental data in all forest areas of Republic, determination of market prices of separate types of wood production and so forth is necessary.

4 FORESTS OF GEORGIA AND A PROBLEM OF NON-WOOD FOREST PRODUCTS USE



On percentage of forests lands, structure, stores and biodiversity of forests the territory of Georgia is on one of advanced places in Eurasia. Forests covered about 40 % of the area of country (Fig. 3.1.). 80 % from them concern to broadleaved 20 % - to coniferous woods. Forests are the basic national value. They play a main role in conservation of environment; they are sources of existence of rural population and an inseparable part of cultural traditions. Forests of Georgia take a significant place in national economy of country. They have also huge international value since are a geographic range of distribution of a unique biological and landscape diversity and play the important role in formation of a water regime of region.

Figure 1 Map of forests in Georgia



Mountains of Caucasus are characterized by the big diversity of forest conditions - an exposition, a steepness of slopes, height of localities, etc. In conditions of mountains 90 % of forests of Republic grow. Due to complex topographical position and difficulty of moving the 500 thousand ha of forests are actually inaccessible, and were saved in a primeval state. Climatic and edaphic conditions of Georgia are ideal for development of forests. However, in XX century cutting down of forests has advanced rates of their growth and has defined threat to this unique natural resource. It is more than half of forests were damaged by intensive industrial throw in 1930-1950 which has destroyed more than 500 thousand ha of highly productive forests. Later actions on protection and regeneration of forests have been

conducted. It is necessary to note, that after disintegration of the USSR, in 1990th the forests of Georgia have appeared again under threat. In connection with a continued economic crisis the management of forests that has resulted in augmentation of illegal throw of a wood practically was stopped. Assistance to this process has rendered also by continuing energetic crisis.

4.1 The description of types of forests in Georgia and their tendencies

The area of forest resources of Georgia compounds 3005.3 thousand ha, the area covered with a wood - 2767,2 thousand ha of them, other area presents the rarefied forests, bushes, glades, etc. These forests are divided on economy according to the below-mentioned Table 6.

Table 6 Various types of forests of Georgia

Types	The area, thousand hectare	%
Coniferous forests	454,8	16,4
Hard-grained wood forests	1950,2	70,5
Soft-grained wood forests	298,5	10,8
Other wood types	12,1	0,4
Bushes	51,7	1,9

Source: Institute of mountain sylviculture

The forest vegetation of Georgia is very rich on structure of species. Here 153 species of trees, 202 species of bushes, 29 species of shrubs and 11 species of lianas are presented. Among them Many are the valuable on quality of wood, such as an eastern fur-tree and a Caucasian silver fir, giving the tuned wood, a beech, a chestnut, an ash, a majestic maple, a walnut, a box, a yew widely used in woodworked industry. Many among them are the wild-growing fruit races giving valuable fruits for food such as a pear, an apple, a cornel, an alycha, a persimmon, a chestnut, etc. The main tree species determining economy in forests of Georgia are considered as a beech, a fur-tree, a pine, an oak, a chestnut, a hornbeam, a birch, they frame the basic forests.

Forests of Georgia are located on slopes of the Main Caucasus ridge and its spurs, and also occupy the slopes of Small Caucasus ridges. 7,3 % of forests occupy the areas up to height of 500 m above a sea level, 19,5% - from 500 up to 1000 m, 35,5 % - from 1000 up to 1500 m and 37,7 % - from 1000 up to 1500 m. Allocation of forests on slopes of ridges are subject to general rule, in dependence on height of locality. Lowlands of the western part of Georgia on the humidified places are occupied with an alder (*Alnus barbata*). A *Pterocaria fraxinifolia*, an Imereti oak, a chestnut, a beech, a hornbeam, etc. admix to it, at smaller humidification an Imereti oak, with an admixing of a hornbeam, a *Zelkowa carpinifolia*, etc. grow. Tugai forests along the rivers are consisted of a willow, a poplar, an oak, etc.

The inferior mountain belt up to 500 m in the western Georgia is presented by mixed subtropical forests with a chestnut, Imereti, Gartvice's and Georgian oaks, a beech, a hornbeam, and also relict races - a *Zelkowa*, a Caucasian persimmon, a box, a yew, a fig, a strawberry tree. In underwood the Pontiac rhododendron, a cherry-laurel, an ilex, etc. are distributed.

In eastern Georgia this belt is occupied with forests from a Georgian oak and dry light sparse forest from a pistachio, a skeleton-tree, a Georgian maple, etc. In a belt from 500 up to 1000 m, the slopes of the Big Caucasus are covered with forests from a chestnut (*Castanea sativa*) with an admixing of a beautiful maple, a Gartvice's oak. In eastern part this belt is offered by forests from a Georgian oak with an admixing of an ash, a hornbeam, a field maple, etc. In the middle mountain zone from 1000 up to 1500 m across all Georgia beech forests grow. The upper mountain zone, up to 2000-2200 m in the western part is presented by silver fir-spruce forests from a Caucasian silver fir, an eastern fur-tree with an admixing of a beech, a linden, a mountain elm. In eastern part in this belt silver fir and fir forests are distributed. Frequently here are presented pure pine or pine-spruce forests. In a sub-alpine belt there is a light sparse forest and croocked forest from a high-mountainous maple, a mountain ash, Litvinov's birch, alternating with sub-alpine meadows and a tangle of a Caucasian rhododendron. The top Alpine border of a wood passes at height from 2050 up to 2550 m. For subtropical forests of foothills of the western part of Georgia the oaks (*Q. iberica, Q. imeretina, Q. hartwissiana*), a *Zelkowa*, a chestnut, a persimmon (*Diospyros lotus*), a hornbeam (*Carpinus causcasica*), a beech (*Fagus orientalis*), a linden (*Tilia caucasica*), maples (*Acer campestre, A. lactum*), a Pizhunda pine (*Pinus pithyusa*), a fig (*Ficus carica*), in insignificant quantity a box (*Buxus colchica*), a noble laurels (*Laurus nobilis*), a strawberry tree (*Arbutus andrachne*) are characteristic. Some lianas are also typical such as: ivy (*Hedera colchica*), a Periploca graeca, a Smilax excelsa, a grape (*Vitis silvestris*), several species of bushes – rhododendrons, an ilex (*Ilex colchica*), a cherry-laurel (*Laurocerasus officinalis*), etc. The herbage is presented poorly. At the place of the majority of subtropical forests at present the new agricultural subtropical cultures - tea, oranges, grapes and gardens from a pear, apples, peaches, a cherry, a persimmon are planted.

Dry light sparse forest in foothills of the ridges borders below with a semi desert, above - with a belt of oak forests. Vegetation here is dissimilar. On flat places and gentle slopes a pistachio (*Pistacia mutica*), a willow-leaved pear (*Pyrus salicifolia*), a skeleton-tree (*Celtis caucasica*), a granatum (*Punica ranatum*), a Pallas's buckthorn, a keep - arbor, a cotinus (*Cotinus coggygria*), a barberries (*Berberis vulgaris*) grow. On slopes junipers (*Juniperus polycarpos, J. foetidissima*) grow. The sward, basically from cereals is hardly developed.

In lower mountain belt, except for chestnut forests, the oak forests engaging about 200 thousand ha are strongly developed also. In the past in these forests intensive throws have passed. The Georgian oak occupies in east Georgia heights from 500 up to 1600 m. Oak forests, occurring on slopes of different expositions, are characterized by the big diversity of types of a wood. The bunch of complex oak-forests which structure includes also an dace ash, field and beautiful maples, a silver pea, a Caucasian linden, a black elm, a hornbeam, from bushes - an aglet, a biwa, a cornel, an euonymus is distributed. Other rather extensive bunch of oak-forests types with sward - sedgy and motley grasses. In the Western Georgia the special place is occupied by bunch of oak-forests types with Colchic underwood from an azalea (a Pontiac rhododendron), a cherry-laurel and an ilex. On the big areas in oak-forests of Georgia selective throws which have resulted in change of an oak by a hornbeam, by maples, and other shady resistant races were conducted. Forests from an eastern oak (*Quercus macranthera*) create own belt in east part of Georgia, being lifted, as a rule, up to the Alpine border of a wood on height up to 2200-2400 m. This drought-resistant race grows at 400 mm of annual precipitations. In more wet places to it the ash, a Hyrcan maple (*Acer hyrcanicum*), a hornbeam, a Caucasian pear admix. In underwood - a honeysuckle (*Lonicera caucasica*), a Viburnum (*Viburnum lantana*) and meadow-sweat (*Spiraea crenata*) are presented. The

sward consists basically the cereals of meadow-steppe type. The basic types of oak-forests of this kind - sedgy, cereal-motley grasses and motley grasses.

Chestnut forests are distributed both in western and in eastern parts of Georgia. Their areas are about 50 thousand ha. Prevailing race in these forests is a chestnut (*Castanea sativa*) to which in western Georgia the Gartvice's oak, a beech, a beautiful maple admix as well as a hornbeam, an eastern pear, etc. In underwood there are presented a cherry-laurel, a rhododendron, an ilex, a Caucasian bilberry. The basic forest types formed by a chestnut in the Western Georgia are the Colchicum chestnut forest almost without underwood, with a weak herbage; chestnut forest of cherry-laurel with an admixing of a hornbeam, a linden, a beech and underwood from cherry-laurel; chestnut forest of azalea with an admixing of a hornbeam, an oak and underwood from a blackberry; chestnut forest of cereals with underwood from an azalea and hazelnut and sward from mountain fescue, female ferns and other plants.

Hornbeam forests have rather large massifs in an oak, chestnut and beech forests belt from 500 up to 1500 m. basically these forests are secondary, arisen as a result of change oak or beech forests. General their area is about 120 thousand ha. On wet soils hornbeam forests with a box and an ivy meet. In localities of average humidification there is a bunch of hornbeam forests types with bushes – an azalea, a cornel, etc. For dry localities hornbeam forests with fescues are characteristic.

Beech forests from a beech east (*Fagus orientalis*), occupying more than half of area of forests of Georgia present about 1 million ha. They are absent only in the areas with a continental climate. These forests in the Western Georgia are lowered up to a sea level and lifted up to the top of vegetation, accepting here the form of a bush. In East Georgia it is distributed from 600 m up to the Alpine belt, but optimum zone its distribution from 900 up to 1600 m where stands of trees of high productivity are growth. The beech differs intensive growth and consequently depresses growth of other races, especially not enough shadow-resistant. More often others the hornbeam grows with it and such trees as a linden, field, beautiful and heart-leaved maples, and elm can be found. From undergrowth races an elder (*Sambucus nigra, S. racemosa*), a honeysuckle (*Lonicera xylosteum*), a Viburnum (*Viburnum opulus*), an azalea, an ilex, a Caucasian bilberry are characteristic.

The most widespread types of a wood: a beech forest with underwood from cherry-laurel with an admixing of a hornbeam, a linden, underwood from an azalea, an ilex, bilberries and sward from woodruff, female ferns and blackberries; a beech forest with an integument from woodruff with a hornbeam, a beautiful maple and a linden, without underwood and with infrequent sward; a beech forest with an integument from fescue with a hornbeam and a field maple, sward from fescue.

The fir forests, consisting of eastern fur-trees (*Picea orientalis*) and Caucasian silver firs (*Abies nordmanniana*) occupy more than 300 thousand ha. They grow in the western parts of the Big and Small Caucasus. These forests are belonged to zone of mountain belt from 1500 up to 2100 m. In Eastern Georgia where the climate is more droughts, the quantity of a silver fir in forests sharply decreases also stands of trees become abies-fur or only fur-tree. An admixing from the tree species in these forests can include an eastern beech, a maple, a sycamore, an aspen, birchs (*Betula litwinowii, B. pubescens*), a mountain elm, a yew, a pear. Underwood races basically are presented at coniferous forests of Western Georgia. It is evergreen underwood from cherry-laurel, rhododendron and ilex, expanding in impervious

thrickets. The sward consists from mountain fescue, woodruff, sanicle, and Robert's geranium, and oxalis, male and female ferns. Ivies (*Hedera colchica, H. helix*) are very much frequent there. Productivity of forests high - from 1500 m3 /ha in the Western Georgia up to 700 m3 /ha in Eastern Georgia. Wood of fur-trees is more valuable because its quality is higher, than wood of a fir and a hamular pine. The Caucasian pine is characterized by the most extensive geographic range. The general area of pine forests more than 70 thousand ha. The pine creates the massifs with the domination in places with a continental climate. It is distributed from 250 m in the Western Georgia and 600 m in East up to the Alpine border of a wood. Forests on flat and an average steepness slopes are high-duty, on abrupt slopes - are low-productive. The pine forest with an integument from sanicle is most of all distributed. It is dated for gentle slopes. The fur-tree, an aspen and a birch and underwood from a honeysuckle admix to a Caucasian pine. Sward is from sanicle, fescue, etc. Pine forest with motley grasses is dated for northern slopes. Sward is from cereals. Pine forest with an integument from ofescues is advanced on abrupt slopes. It is with an admixing of a birch, an aspen, a mountain ash. Dry pine forest is presented on dry slopes of a southern exposition, with an admixing of a birch. Infrequent sward is formed by fowl-grass and sedge. On northern slopes the pine forest with an integument from a bilberry with a herbage from *Linnea borealis* and *Pirola media* is distributed, and also pine forest with an integument from a foxberry with admix of bilberries, and handbell (*Campanula rapunculoides*).

Sub-alpine forests occupy slopes from 1900 up to 2500 m. They are presented by light sparse and croocked forests. In light sparse forests basically there is a birch, a high-mountainous maple (*Acer trautvetteri*), an eastern oak, a Caucasian pine, an eastern fur-tree, a Caucasian silver fir, an eastern beech. In croocked forest there is presented a birch with an admixing of a mountain ash and a beech. Light forests from a birch, a high-mountainous maple, a mountain ash (*Sorbus boisseri*), willows (*Salex caprea*), and a juniper (*Juniperus depressa*) are most typical, etc. Light forests from a Caucasian pine, an eastern beech, an eastern fur-tree, and a Caucasian fir with underwood from a rhododendron, a currant (*Ribes alpium, R. biebersteinii*), honeysuckles, Viburnums are frequent here.

The area of state forest resources of Georgia compounds 3005.3 thousand ha, including the lands covered with a wood – 2772.4 thousand ha, that presents more than 90 % from the area of forest fund. Percentage of forest lands of the state is about 40 %. Other categories of lands present less than 10 % of the area. The general store of forest wood is high and also makes 453.2 million m3. In forests there is an intensive growth of wood because of favourable conditions; it consists annually on 4.6-4.8 million m3. Mountain forests occupy 98 % of the area of forests, and flat - only 2 %. The biodiversity of forests of Georgia is preserved by strict nature reserves with general area of 15.9 thousand ha and 2 national parks on the area of 120.3 thousand ha (

Table 7).

Table 7 Biodiversity of Georgian forests

The name	Location	Year of the establishmen	The area in ha
Nature reserves, all			**150963**
including:			
Algetsky	Tetrickaro	1965	6822
	Manglisi		
Ahmetsky	Ahmeta	1935	16297
Adjametsky	Bagdady	1957	4848
	Warcihe		
Picunda-Miusersky	Gagra	1966	3645
Vashlovansky	Dedoplisckaro	1935	8480
Kintrishsky	Kobulety	1959	13983
Lagodehsky	Lagodehi	1912	17932
Liahvsky	Gory	1977	6388
Mariamdjvarsky	Sagaderdjo	1939	1040
	Ninocminda		
Rica	Gudauta	1957	16289
Saguramoysky	Mcheta	1946	5359
	Saguramo		
Satalpinsky	Chaltubo	1959	354
Psou-Gumistsky	Suhumi	1976	40819
Kazbeksky	Kazbekih	1976	8707
National parks, total:			**120313**
Including:			
Borjom-Hargaulsky	Borjomi	1999	76000
Kolhidsky	Poty	1998	44313

Source: Department of statistics

All protected areas have been established before independence of Georgia, in the Soviet time. National parks were established in 1998 and 1999. Nature reserves compound 2.2 % from all area of the state and 5 % from forest fund. The territory of the nature reserves is insignificant, but they guard the basic diversity of forests of Georgia - beech, pistachio forests, and forests of Colchicum type, oak, mixed broadleaved, relict and coniferous forests, etc. with unique landscapes. Georgia is the small state occupying the area in 7000 thousand ha with the population in 4993 thousand persons and an anthropogenic pressure on forests was not too changed. The quantity of forests on one person compounds 0, 55 ha, that presents the big size. According to the Wood code of Georgia accepted in 1999, the state, a patriarchy of Georgia, and also physical or private juridical persons can be the proprietor of forest fund of Georgia. However, now all forests remain in the property of the state because the normative statements on the basis of which division of the forest lands can be effected are not developed yet.

The decision of questions of forestry in Georgia basically is the responsibility of the Ministry for Nature Protection and Natural Resources. In its submission went a department of state forestry, a department of state protected areas and hunting facilities. The Ministry for nature protection and natural resources has the high degree of responsibility for environmental control and sustainable use of resources. It conducts the state control over use of resources,

establishes the quota, certifies the license right and gives it away. The Tax code of Georgia establishes also the tax to the use of fauna. A procedure of pricing same - 10 % of a market value. The market value is established by the Ministry for development of economy. However, now all hunting is suspended. The Forestry department (the Ministry for nature protection and natural resources) in the submission has 31 regional adjoining forestry enterprises. Their basic responsibility consists in scheduled cutting of a wood, and also in realization of actions on regeneration, innovation and protection of forests.

The destiny of 54.1 thousand ha woods (1.8 % of forest resources) which are in a submission of Institute of Mountain Sylviculture of Georgia is not solved, in connection with process of reorganization of Academy. The picture is not clear, also, with «former collective-farm woods» (520.0 thousand ha) which should be transmitted to the Forestry Department, however only the part is transmitted. Now management of these forests is carried out by aboriginal government bodies and the Ministry of Justice. The certain connection with wood sector have the Ministry of Justice; the Treasury; the Ministry for development of economy; the Ministry for preservation of monuments, cultures and sports; the Ministry for labour, public health services and a community service; the Ministry of Internal Affairs; local administrations and communities. Dependence of the population from the forests is rather high. It uses the cutting of a wood that uses as fire wood and for trade, and also as constructing materials and food stuffs. NGO-s, representing interests of the people, participate in decision-making processes, in research works, in public awareness campaigns, in monitoring, etc.

It is necessary to note, that after 1990th years, forests of Georgia have appeared under threat. In connection with existing budget crisis, management of forests was practically suspended that has resulted in augmentation of illegal throw of a wood. The energy crisis has assisted process. In

Table 8 the data of forest resources of Georgia on Autonomous Republics and regions on 2004, and in Table 9 - on type of trees in 2000 year are shown.

Table 8 Data of forest resources of Georgia on Autonomous Republics and regions, in thousand ha

Region	The area of forest lands	Area covered with a wood	% Coverings a wood
Georgia, all	**3005,3**	**2772,4**	**39,9**
Including:			
Abkhazian AR	507,1	475,1	55,1
Adjarskaya AR	193,6	187,0	65,1
Regions:			
Mingrelia - top Svanetya	308,1	284,2	38,2
Gurya	101,8	96,6	47,5
Imeretia	354,0	341,8	51,8
Racha-Lechhumy and inferior Svanetya	275,8	259,4	53,3
Shida Kartli	253,2	225,6	38,9
Mcheta-Mtianety	277,1	256,5	37,8
Kahetya	384,9	339,9	30,0
Kwemo Kartli	166,7	145,2	21,7
Samckhe-Djavahety	183,4	161,1	25,0

Source: Forest department

Table 9 Data of forest resources of Georgia on type of trees in 2000 year

Type	The area, ha	%
Forests of Georgia, all	2767197	100
Including:		
Softwood forests	454755	16,4
Firmly arboreal foliaceous forests	1950195	70,5
Softly arboreal, foliaceous forests	298506	10,8
Other arboreal types	12064	0,4
Bushes, bushes	51677	1,9

Source: Institute of mountain sylviculture

4.2 Special natural protected areas of Georgia

The special value in conservation of woods is played with special natural protected areas of Georgia. According to the law “Wood Code” of Georgia, on functional values of forests is divided on the following categories:

- Strict protected areas (150,963 thousand ha) (

Table 7);

- National parks (120,313 thousand ha) (

Table 7);

- Nature monuments. The general area is not determined;
- Natural sanctuaries. The general area is not determined;

- Protected natural landscapes. The general area is not determined;
- Woods of a green strip. The general area of 265,7 thousand ha;
- Resort forests. The general area of 890,6 thousand ha;
- Soil-protective water-regulating forests. The general area of 1658,1 thousand ha.

Now due to energy crisis intensive cutting down of forests is effected. On the official data annually from 1.2 million m3 of the cut down wood 1 million m3 is cut down for fire wood, 70 % of them are compounded with illegal throw. Other quantity of the cut down wood goes as industrial wood. On the informal data (expert evaluation), only for fire wood 2 million m3 of a wood is annually cut down. Export of wood compounds only 114.0 thousand m3. Calculations show, that deforestation with such intensity will result in complete exhaustion of existing forest resources within 150-170 years (the Project of development of forestry in Georgia). For regeneration of forests the planting of forest cultures and assistance to natural restoration is constantly carried out. However, analysis of dynamics of regeneration of forests shows that for the last 15 years the volume of these works has decreased at 40-50 times (Table 10).

Table 10 Dynamics of regeneration of forests, ha

Kind of actions	1990	1995	2000	2001	2002	2003
Planting of forest cultures	5071	1002	258	151	106	103
Natural restoration	23700	12910	900	554	346	558

Source: Department on statistics

Forest fires have become more frequent also. For the last 12 years their number has increased from 1 case annually up to 36 and the area of fires – from 14 ha up to 607 ha. It is caused heavy economic, financial and social situation in country.

4.3 Use of Non-Wood Forest Products

Under the existing legislation, use of non wood forest products, concern: wild growing fruits, nuts, baccas (berries), dead wood integument, moss, collecting of medicinal plants, hay, forage of cattle, hunting, fishery, beekeeping, also soil-protective, water-regulating, sanitary-and-hygienic, resort, recreational both other social - protective and environmental functions.
To the list it is possible to add raw material for perfumery products, paints, essential oils, utensils, baskets, brooms, and also vitamin-rich plants, etc. By pharmacologists it is not determined yet, how many kinds of plants are used in national and scientific medicine. More than 110 kinds of forests plants of Georgia are used only for medical - medicinal needs. In veterinary fruits, seeds and bark and other production more than 60 species of trees and bushes are used. They represent food for people and animals, enrich a human diet and are a valuable stuff for selection. In forests of Georgia there are presented: natural rod of a grapes, a granatum, a wild pear, a cherry, an apple, a fig both other fruit and berries which are ancestors of many races of cultural fruit of Georgia and other countries. For a long time the plenty peoples of Georgia is engaged in the collecting of fruits, seeds, an arboreal bark, leaves, roots, and other arboreal plants that used by them for different needs. For example, for a food it is widely used fruits of a chestnut (*Castanea sativa Mill*), a beech (*Fagus L*), feral pears (*Pirus caucasica*), and pomes (*Malus orentalis*), Cornelian cherries (*Cornus mas*), Berberis (*Berberis*), biwa (*Myspilus germanica L.*), sea-buckthorn berries (*Hippophae*), a wild alycha

(*Prunus divaricata L.*), etc. In forests blackberries also are distributed (*Rubus caesus L.*), which used for jam and compotes which differ high nutrient qualities, meet 30 species of a dogrose (*Rosa sp.*) which are used for treatment. From currant (Ribes) sweet drinks, jam, jelly, etc. are produced. Fruits of Viburnum (*Viburnum*) from ancient pores are used as a dietary medical means. For a food the population also widely uses a blackthorn (*Prunus spinosa L.*), a granatum (*Punica granatum L.*), an aglet (*Crataegus*), a persimmon (*Diospuros*), the oleaster (*Elaeagnus*.) and other berries. Also fruits of Ziziphus (*Ziziphus jujuba*), yew (*Taxus*), buckthorn (*Rhamnus pallasii F.*), acorns of oak (*Quercus*.), a buckwheat of a beech (*Fagus*) and other plants are magnificent food stuffs of animals. Besides from dried acorns the coffee substitute is produced, and sometimes also mill, add in flour and bake bread. In a ration of the population, the important place is borrowed with nuciferous fruits: a walnut (*Juglans regia L.*), hazel (*Corylus avellana*), pecan (*Carya pecan*), almonds (*Amigdalus communis L.*), etc. Forest lands of Georgia where nuts grow occupy up to 1300 ha. In Georgia the hazelnut (6 kinds) is in the big popularity, it can be found almost everywhere.

Among grasses in Georgia as a food stuff or nutrient additives are used: a nettle (*Urtica*), an asparagus (*Asparagus*), Solomon's seal (*Polygonatum*), onions (*Allium schoenoprasum L.*), mallow (*Malva silvestris L.*), purslane (*Portulaca*), dock (*Rumex acetosa L.*). Also fragrant plants: savory (*Satureia laxiflora L.*), mint (*Mentha longifolia L.*), a coriander (*Coriandrum sativum L.*) and other plants. Among NWFP, one of the first places is occupied by mushrooms. In Georgia 100 species of eating mushrooms are found, from which the people uses only 30 species. Forests of Georgia are rich by such plants for effecting honey, as, a linden (more than 4000 ha), an acacia (10800 ha), a chestnut (105300 ha), maples (9000 ha), an oleaster (320 ha), the rhododendron, a blackthorn, a cherry bird's, sea-buckthorn berries, etc. Series of the widespread forest plants contain dyeing materials, as for example: a white willow (*Salix alba L.*), an alder (*Alnus*) and a walnut (*Juglans regia L.*) contain dye for wool, sumac (*Rhus coriaria L.*) and skumpia (*Cotinus coggygria Scop.*) for black dye, and buckthorn (*Rhamnus*) for yellow. Chestnut (*Castanea Sativa Mill.*), birch (*Betula*), Pterocarya, Ash (*Fraxinus*), aglet (*Crataegus kurtostyla Fing.*), sea-buckthorn berries (*Hippophae*) contain also dyeing materials. For manufacturing baskets and brooms population use branches and leaves of plants: willow (*Salix*), hazel (*Corylus avellana*), Viburnum (*Viburnum lantana L.*), yellow rhododendron (*Rhododendron flavum*), cornel (*Cornus mas L.*), *Philadelphus caucasicus, spirea (Spiraea L.*), ligustrum (*Ligustrum vulgare L.*), honeysuckle (*Lonicera*) etc.

Due to lack of nutrient base in kettle production, for cattle grazing and preparation of hay, the fields existing in large forest massives are frequently used though they are accompanied with negative factors. The feeding of cattle (except for goats), is allowed in all forests except for recreational forests and special protected areas. For the prevention of harm for the forests, forestry manages and local administrative bodies jointly determine time and norms of cattle grazing. The big value has, also planning of hay collection. Forests represent also fine base for development of beekeeping, hunting, a recreation, tourism and other.

At past, the people of Georgia used NWFP for the different purposes. These products were free for the personal use. In the Soviet time the state bought from forest enterprises wild fruits and berries in the fixed prices. For example, 1 ton of cornel cost 300 roubles, 1 ton of a dogrose - 650 rbl, 1 ton of a chestnut -350 rbl, etc. Collecting of NWFP now is conducted for personal needs free of charge. And for commercial objectives the tax is established by the Tax

Code of Georgia in the dimension of 10 % of a market value. But the market value officially is not established yet.

In Georgia the materials of inventory and plans of management do not include the quantitative data about NWFP. It means that the information on collection and quantity of NWFP is poor and not regular. Population uses NWFP basically for existence, instead of for sale. So, the information on a market value practically does not exist. Collecting of many NWFP officially is not registered, though it is impossible to deny, that use of NWFP is widely distributed and takes the important place in the national economy, especially in the rural areas.

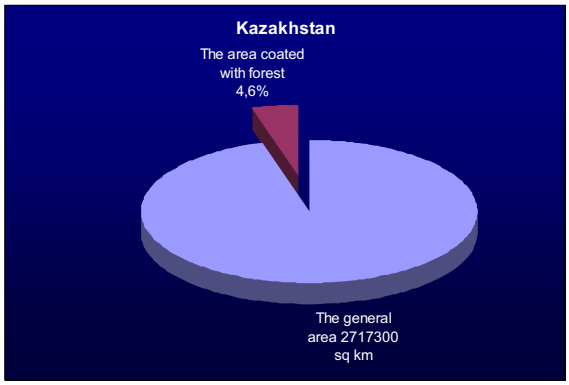
According to the data of the World Bank survey, cost of NWFP use is estimated in 8.35 million USD, that is distributed as follows: mushrooms – 1.5 million, nuts - 0.58 millions USD, berries and fruits – 2.0 million USD, medical plants – 0.08 million USD. It is necessary to note, that 0.44 million USD is the income from collecting and export of seeds of a fir trees and 3.75 million USD is an annual income from effecting of forage. But the source of calculation of such data is unknown.

The Tax code of Georgia establishes also the tax for the use of fauna. A procedure of pricing is the same - 10 % of a market value. The market value is established by the Ministry for Development of Economy. But now all hunting is suspended. In the past, the actions connected to hunting and management of the hunting economy, in Georgia have been organized not bad. There were organized the special territories where hunting was allowed. Management plans were developed. The data on production were accessible. The maintenance for these lands was carried out by the State Department on Forestry and the Union of Hunters where have been incorporated about 80000 persons. After independence on the different causes this network has completely collapsed. The population without the special permission uses the forest hunting lands for feeding of cattle.

As a conclusion, it is possible to say, that unfortunately, the questions of use of Non-Wood Forest Products, in Georgia are insufficiently organized for the present. Collecting and trade of NWFP at a state level are not settled in this connection the official data about NWFP practically are absent. In such conditions, the unique, real opportunity of reception of the information about NWFP is an inquest of that population which uses these products. To regret, realization of such works within the framework of this project is impossible.

The projects having a component on NWFP are following: ongoing project on the developments of forest sector in Georgia supported by World Bank, with credit in 15.34 million USD for 2002-2009. Within the framework of this project it is stipulated the planting of a walnut and almonds approximately on 1153 ha, a granatum - on 184 ha, an apricot and wild apples. It is planned also on the areas with planted trees of acacia, oak and elm, to produce the high-quality honey. In the same territories the reception of hay will be possible also.

5 FORESTS OF KAZAKHSTAN AND A PROBLEM OF NON-WOOD FOREST PRODUCTS USE



Kazakhstan occupies almost 3 million км2, the area of forest resources compounds 262 thousand км2, and covered with woods area - 124 thousand км2. General percentage of forest lands in Republic taking into account saxaul forests and the fixed areas makes only 4,6 %, and without them - 1,2 %. The wood area is distributed very non-uniformly. So, without consideration of small forests on banks of water sources and valleys of low mountains, it is possible to call the Western and Central Kazakhstan treeless. The greatest wood area (about 70 %, mostly saxaul forests), is concentrated in the south of Republic. In the north, in steppe zone, it covers 14 %, in the east - about 13 % from all area of state forest fund.

Tree and bush flora of Kazakhstan is diverse enough. It includes 67 species of trees, 261 species of bushes and 5 species of lianas. The majority of these species are beneficial for the people not only as a source of wood, but also as Non-wood forest products used in all kinds of economic activities and for food of local population. Tree species occupy more than 85% of all areas covered with woods, from which 20% fall coniferous, about 12% on deciduous races and more than 50 % on sandy races - a saxaul and Richter's saltwort ("cherkez").

The basic forest races in Kazakhstan from coniferous are a dace pine (*Pinus silvestris*), a Siberian fur-tree (*Picea obovata*) and Shrenk's fur-tree (*Picea schrenkiana*), a Siberian silver fir (*Abies sibirica*), a Siberian larch (*Larix sibirica*), a Siberian pine or cedar (*Pinus sibirica*); from deciduous – drooping, nappy and Kirghiz birches (*Betula pumila, B. pubescens, B. kirghisorum*), an aspen (*Populus tremula*), black and other poplars (*P. nigra, P. laurifolia, P. diversifolia*), a black and white saxauls (*Haloxilon aphyllum, H. persicum*). Except for listed species, there are presented the wild fruit trees, having economic value - an apricot (*Armeniaca vulgaris*) – 2.5 thousand ha, almonds (*Amigdalus communis*) – 0.2 thousand ha, a Sievers's apple (*Malus sieversii*) – 12.3 thousand ha and aglets (*Crataegus spp.*) – 1.8 thousand ha.

Table 11 Basic forest forming races, their store and age structure

Kinds wood forming plants	In total on Republic Kazakhstan				
	Area		Store		Middle age
	ths ha	%%	Mln. m3	%	
Pine (*Pinus silvestris*)	831,8	8,98	97,45	25,94	65
Fur-tree (*Picea obovata, P. schrenkiana*)	185	2,00	33,47	8,91	111
Silver Fir (*Abies sibirica*)	400,1	4,32	58,64	15,61	105
Larch (*Larix sibirica*)	176,3	1,90	29,80	7,93	149
Cedar (*Pinus sibirica*)	44,7	0,48	9,01	2,39	172
Junipers treelike (*Juniperus spp*.)	12,9	0,14	0,22	0,06	104
Birch (*Betula verrucosa, B. pubescens*, etc.)	921,6	9,95	85,05	22,64	45
Aspen (*Populus tremula*)	322,3	3,48	30,09	8,01	41
Alder (*Alnus glutinosa*)	2,2	0,02	0,25	0,06	44
Poplar (*Populus spp*.)	79,2	0,86	9,20	2,45	39
Treelike Willows (*Salix spp*.)	47,4	0,51	4,38	1,16	32
Oak (*Quercus robur*)	2,6	0,03	0,32	0,08	51
Ashes (*Fraxinus spp*.)	6,4	0,07	0,36	0,09	31
Maples (species of g. *Acer*)	9,3	0,10	0,26	0,06	26
Elm, etc. (*Ulmus spp*.)	82	0,89	2,19	0,58	26
Saxaul white (*Haloxylon persicum*)	2007,6	21,68	4,85	1,29	21
Saxaul black (*Haloxylon aphyllum*)	4129,3	44,59	10,29	2,74	19

Pine forests grow on slopes of elevations Kazakh hill-side, and tape pine forests on banks of Irtysh river. Lower stores of pine forests are composed by bushy lichens or, in more wet conditions, by many steppes, meadow-steppe species of herbaceous plants. The basic type of pine forests of Kazakhstan can be reduced to the following: in mountain pine forests of Kazakh hill-side - fresh stone-rocky with low productivity; dry stone-lichen with average productivity; a fresh grass-cowberry birch and wet grass-mossy filical birch with high productivity; a wet sedgy-reed birch forests, dry cereal-stone-berry and very dry stone-grass of a low yield class and fresh grass-berries birch forests of a high yield class. The present range of a pine in Kazakhstan can be related to a category of breaking-up areas, as result of human economic activities in the past, under overgrazing of cattle. Fine conditions for cattle breeding and agriculture, the forests abounding with hunting-game species, since the ancient times the pine forests attracted the human attention. And now, in spite of high pressure and decline, the pine forests are rich with non-wood forest products - berries, mushrooms, medicinal plants.

Larch forests grow on slopes of Southern Altai and Saur ranges. Forest belt here covers only slopes of ranges basically of boreal expositions. The inferior border of a wood is at height 1000-1400, and top - at height of 2200-2350 m. In Saur the larch forms only pure stands, and in Southern Altai both pure and mixed with a cedar, a fir, a spruce and deciduous races. In the inferior belt there is a significant admixing of a birch, less often than an aspen. The spruce and a fir are admixed to a larch from heights of 1300-1500 m. The cedar forms in larch forests sub-belt of high-mountainous forests from height of 1850 m.

The basic types of larch of Kazakhstan are divided:

- Dry – cereal-motley without underwood and spirea with an underwood from a spiraea. A grass is covering well, basically from cereals, sedge, a drupe.

- Fresh larch forests – high grasses without underwood, but with good grasses; currant with underwood from a currant; silver-fir-motley-grasses with a rarefied grass stand.

- Wet larch forests – silver fir-moss without underwood and cedar-moss with underwood from a honeysuckle and Siberian mountain ashes. A soil covering from a bilberry, a sedge, etc.

- Sub-alpine larch forests are located in a belt above 2000 m on cavicorn boreal slopes. Plantings pure or with an admixing of a cedar. An underwood infrequent, a soil - covering rich from a bilberry, a geranium, crowfoots, etc. In Saur the underwood is developed better with dogroses, cotoneaster, spiraea, a honeysuckle.

- Dark coniferous forests occupy mountains of southeast Kazakhstan (Altai, Dzungarian Ala Tau) and Northern Tien Shan. The basic forest forming races are a Siberian fir and Shrenk's spruce. The fir has major importance in Ore Altai in middle mountain belt, and in Dzungarian Ala Tau - only on northern slopes. On Altai in fir forests the magnificent forbs reaching height of 2-4 m are developed. Filical silver-fir forests on flat and sloping slopes have major importance.

- Dark coniferous forests in Northern Tian-Shan are formed by Shrenk's spruce on boreal macro-slopes of ranges. They do not form the big masses, and have rarefied and mosaic distribution. It is linked to a centuries-old regular grazing of cattle and a burning of a grass stand. Increase of the inferior border of forest belt and decrease of top border is connected to same cause also, that descended as well in the Caucasian forests. In the typological attitude the spruce forests subdivide into groups mixed, moss, grassy, lichen, juniper and black elm. ` The basic areas are occupied by the moss spruce forests which are not having an underwood and with a weak grass stand.

The cedar though occupies about 45 thousand ha, grows stray patches among a Siberian larch. Near the top border of forest belt it is presented by light sparse forests with round-leaved birch. Nevertheless, for local population cedar forests have huge alimentary value.

The Turkestan juniper (*Juniperus turkestanica*) together with a Cossack juniper occupies more than 75 thousand ha. It grows in Dzungarian Ala Tau and the Sowing. Тянь-Shang in a belt from 1800 up to 3300 m on southern slopes, but meets on other slopes also. It has the form of a creeping tree. The community of junipers includes, as a rule, a rich grass stand grassy and cereal-motley grasses type.

- Birch forests are located in Irtysh region and in the south of the Western-Siberian lowland. The birch of two types occurs by large forest areas of forest-steppe birch forests. In lower circle of plantings typically wood kinds of grasses grow, from bushes of the European black currant and the Siberian hawthorn which are frequent. In birch forests it is possible to discharge the following types of a wood: dry birch forests on a water-separate plateau, fresh and wet birch forests with a nappy birch. There is observed the tendency in moving of a birch on the south; however human activity – throw, fires and ploughing of grounds prevent this.

The forest vegetation in Western Kazakhstan is presented by groups of river gallery (inundated) and sandy formations with the general area more than 80 thousand ha. Mixed forests represent the oak groves with a birch, an aspen, less often a smooth elm and poplars. At them there is a rich underwood from a tartar honeysuckle, a laxative buckthorn, a spindle - tree warty, willows, a cinnamon dog rose, a cotoneaster, an apple tree, a viburnum, a blood-red hawthorn, steppe cherries, a black currant, a sloe, a broom, a dye woadwaxen, a pea trees and a filbert. Sandy formations also consist predominary of a birch and an aspen, or bushes - willows of 6 kinds, a broom, a juniper cossack, a buckthorn fragile, a dwarf almond, a spiraea, a bird cherry, a hawthorn Altay, an elaeagnus angustifoliate, a tamarisk of 2 species, etc.

Deciduous forests of Zailiysky Ala Tau are generated by an aspen, an apple tree, a hawthorn and partly an apricot. They are located basically for northern slopes of a ridge. The apple tree, a hawthorn and an apricot are lifted not above 1500 m, and above changed with the aspen forests passing in spruce forests. In limens of the area deciduous forests are presented by only isolated groves, ingrained in shrubs, mountain meadows and large grasses steppe. In underwood of plantings there is a dog rose, a spirea, a honeysuckle, a barberry, a currant, a spindle - tree and a European bird-cherry. Herbage is with an average covering, but rich in the specific attitude. On southern slopes the forests of apricot are formed, the apricot participates as an admixing in apple-aglet plantings, being lifted only up to 1500 m. Similar forests are present also on northern slope of Dzungarian Ala Tau, but the apple tree there does not form pure plantings.

Arid forests of Kazakhstan occupy the biggest areas in state forest fund. The general area of all deserts of Republic abandons approximately 140 million ha. The area occupied only with sandy tree species, compounds about 6150 million ra, and even at low productivity they play a huge role in economy of the state. Among trees and bushes in deserts saxauls, tamarisk, calligonum, winterfat, sandy acacia are most distributed. In the flood-lands of the big rivers - Syr-Darya, Chu, Ili, Karatal, etc. due to affinity of underground waters and seasonal floods of the rivers the vegetation is rich and original. It forms here tugai (gallery river) forests - a willow, an oleaster, a poplar family, etc. Tugai do not form continuous masses along the rivers, and grow a narrow faltering strip, alternating with meadow and cane vegetation.

Arid forests of various areas of Kazakhstan differ on a species composition and are divided into 8 vegetative areas. On a complex of ecological factors and their modes the following types of saxaul forests are discharged:

- saxaul forests of sandy ridges are divided on sedgy calligonum and white saxaul; white-saxaul with sedge and wormwood, mixed (black and white) saxauls with sedge and wormwood;

- saxaul forests of sandy hills and sandy ridges are divided on white saxauls with various grasses, mixed sedge and wormwood on an alluvion; black saxaul with white wormwood, saltwort and wormwood, cereals and other grasses, etc. All these types of saxaul forests have the big pasturable value. The last two types have the big diffusion in the northern forest enterprises. Both types of a wood are resistant enough also to human influence which do not result in change of races.

- flat ancient alluvium adjournments of old river beds compound the black saxaul forests with various desert shrubs and grasses. Pasturable value of them is great.

Riparian forests of Central Asia have the big economic value from the ecological point of view. Simultaneously they serve as a place of winter, and sometimes, especially recently, and a year-round grazing of cattle. Forest forming races are some kinds of willows (*Salix spp.*), an oleaster (*Elaeagnus oxycarpa, E. iliensis*), three species of poplar (*Populus diversifolia, P. pruinosa, P. litwinowiana*), sometimes an ash (*Fraxinus sogdiana*), bushes - tamarisk (*Tamarix laxa, T. hispida*), a barberry (*Berberis iliensis*), an atraphaxis (*Atrafaxis canescens*), a sea buckthorn (*Hippophae rhamnoides*), from lianas - a clematis (*Clematis orientalis*). From herbaceous plants a small reed, a dogbane, a reed - mace, a reed, a licorice, a dewberry, a sophora, an inula, etc. which have magnificent development everywhere grow.

Owing to an unsystematic grazing of cattle and often fires, and also regulating drainage of the rivers, the riparian forests of Central Asia now are hardly destroyed. The area of forest fund of Kazakhstan biggest of all countries of region and compounds 26200 thousand ha. The area covered with a wood - 12400 thousand ha, that presents 4,6 % from the area of all territory of country and 47,3 % from the area of forest fund. More than half of forest fund are treeless and compound not wood lands. But these lands also are object of not wood forest production, serving as haymaking, pastures, places of a growth grassy medicinal, food and ornamental plants and so forth. The forests are distributed extremely non-uniformly within all area (Table 12).

Table 12 Forest covered lands and store of wood on administrative ranges (01.07.2003)*

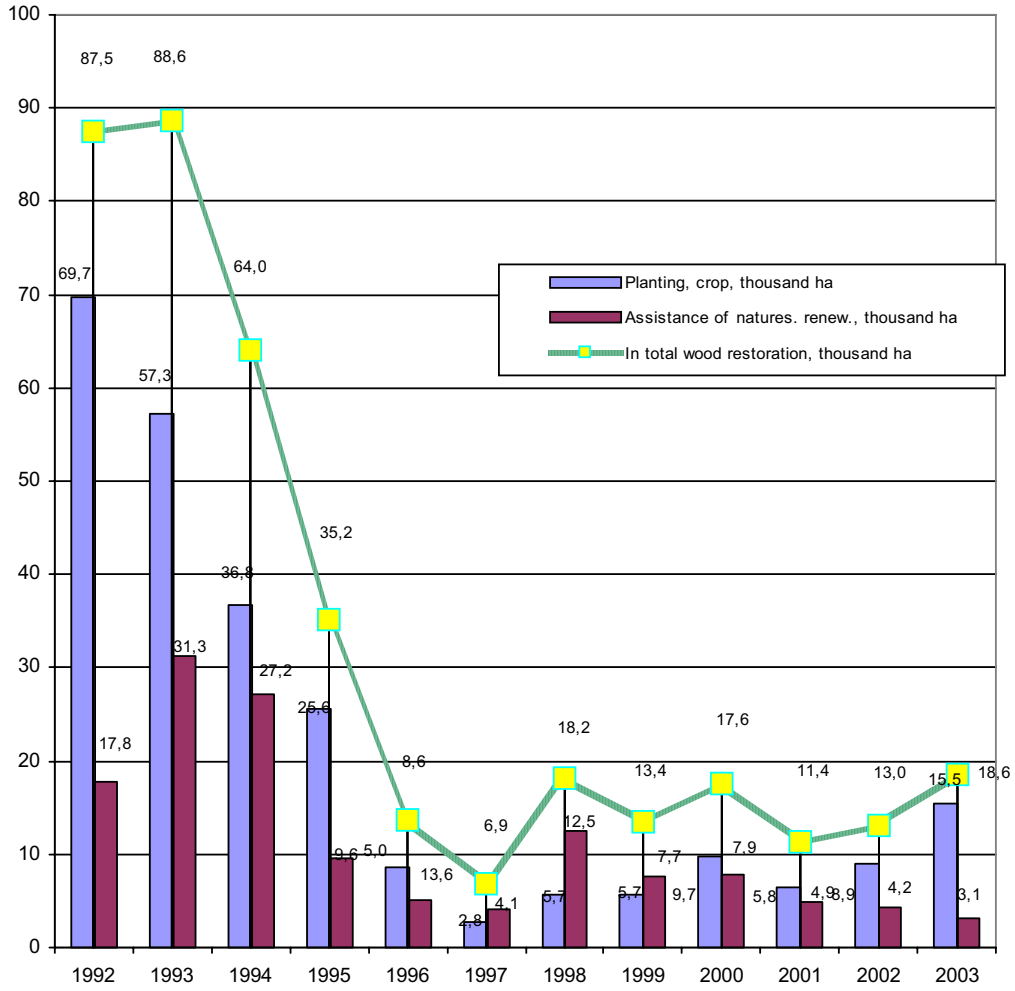
Administrative regions	Covered with a forest lands, one thousand	General store of wood on a root, one million m^3	Percentage %
Akmola	379,2	42,9	2,6
Aktybinsk	47,7	1,0	0,2
Almaty	1835,8	38,5	8,2
Atyrau	16,4	0,4	ОД
East Kazakhstan	1766,1	167,3	6,2
Zjambyl	2305,6	3,6	16,0
Western - Kazakhstan	101,0	8,01	0,7
Karaganda	103,9	4,5	0,2
Kostanay	227,8	18,5	1,2
Kyzylorda	3069,8	5,9	13,6
Mangustau	112,8	0,04	0,7
Pavlodar	312,4	26,8	2,5
North - Kazakhstan	539,5	55,1	5,5
Southern - Kazakhstan	1609,8	3,1	13,7
Republic of Kazakhstan	**12427,8**	**375,6**	**4,6**

* The data of the state count of forest resources of 2003 are used.

Percentage of forest lands separate administrative ranges changes from 0,1 % (Atyrau) up to 16 % (Jambyl). The most woody are desert areas at the expense of thickets of arid woody plants (Southern - Kazakhstan, Kyzyl-Orda, Jambyl regions) where the store of wood is very small and also productivity of forests is the lowest. They are used by the population basically as pastures. In the Soviet time in Kazakhstan the big attention was paid to reforestation and quantities of works on creation and restoration of forests were high enough. For the last 15 years these works were reduced because the level of economy has decreased in 5-7 times and

stabilized at this level. The program “Forests of Kazakhstan” supposes increase of volumes of reforestation in 2004-2006.

Figure 2 Dynamics of reproduction of forests in terrain of forest resources in 1992 - 2003 years



In Kazakhstan the wide network of special protected areas for conservation of a biodiversity of forest resources was established in which there are 16 state nature reserves and special reservation zones on the area of 5238 thousand ha and 10 state national parks with the general area of 1911 thousand ha was established. The special protected areas compound 20 % from the area of forest fund. On this area of forests the non-wood forest production for the population is inaccessible. Protected areas conserve the forests practically all landscape zones of Republic (Table 13). The large part of protected areas was created for years of independence.

Kazakhstan is also the biggest state in the region on the area which is 211730 thousand ha. The population of Kazakhstan now counts 15172.1 thousand persons. For the last 20 years the population has decreased almost for 670 thousand individuals. Disposition of the population

on territory of Republic is non-uniformly. The greatest its density is in southern regions, not in an arid zone, but in foothills, in a zone of an irrigated farming.

The mountain forests engaging 16% of all forests are located near southern and southeast borders where population density is higher, than in a steppe zone, and an anthropogenic pressure on forests, mountain and plain are high. All forests on lands of state forest fund (except for land-reclamation plantings for agricultural purpose, are a state property and are guarded by a service of state forest control. The dominating part of state forest fund (86,9 %) in 2003 year was moved to management of regional administrations, 12,1 % of the general area of forests is in management of Committee for Forestry and Hunting of a Ministry of Agriculture of Republic Kazakhstan.

All forests of Kazakhstan, which not included in special protected areas system, except for forests of a mountain zone, are protected by 161 official body on preservation forests and fauna (by forest enterprises). The general number of these enterprises across Kazakhstan is not cleared by the expert. Into functions of these forest enterprises enters not only preservation of forests, but also augmentation of forest areas at the expense creation of the artificial foresting.

Using of forests and foresting in forest fund including collection of non-wood forest products, is carried out by other enterprises which are taking place in management structure of regional administrations, and statistics about volumes of NWFP collecting is not presented. For receiving of information on this question realization of special researches by experts is necessary.

Forests of Kazakhstan, except for arid forests, are rich with wood production used by local population. The distribution of forests in different natural zones - from wood up to arid, defines also wide assortment of non-wood forest production both alimentary, medicinal, and technical, etc. which is widely used by local population for the needs and for generation of an additional income. But the collecting of this production is not under control, and volumes of preparations are unknown. In sands the uncontrollable grazing of cattle, a hay - mowing, negatively influencing on a condition and restoration of forests is effected by excess of norms of a grazing and other uses by a wood. At the same time, the assortment of collected medicinal grasses is much less, than them is present in a wood flora of Kazakhstan and expansion of assortment could give the population an additional income.

In Kazakhstan, as against other countries of region, industrial stores of some beneficial most widespread types of plants (

Table 14) are determined. The data only on 23 species of plants is indicated, whereas them in a forest flora not less than 100 species. From the list of the plants permitted for the collecting the rare and vanishing species should be excluded. The special monitoring of non-wood forest products collecting and their stores in a nature should be organized. In Kazakhstan there types and quantity of the collected NWFP are unknown. The scales of collecting of NWFP and their prices should be assessed in the additional survey – because huge area of the country and no available information in one place. Because of it is impossible to calculate now the incomes received by local population from forest resources.

The basic problems of development of the industry using biological resources

The development of domestic industry with using of non-wood forest products is going slowly and not-effective. The low investments into processing branches connected to their low profitability and a high competition of the cheap goods in a home market slow down growth of manufacture of many goods in Republic. It is connected also with declining of wood processing industry and slow growth of manufacture of pharmaceutical production alongside with deficiency of raw material. There are no manufactures on deep processing of vegetative medicinal raw material. The level of complex use of non-wood forests raw material is insufficiently high. Although in the domestic market the level of their use is very high, without debts and special assessment.

The basic legislative acts in Kazakhstan regulating the environmental questions

The basic acts regulating the area of landscape and biological diversity in Kazakhstan are the Land code of Republic Kazakhstan (2003), the Law "On environmental control" (1997), the Law "On environmental examination" (1997), the Law "On special protected areas", the Law "On protection, rehabilitation and use of fauna" (2004) and Forest Code (2003).

The land code includes the division 4 "protection of lands, lands reclamation, state control, monitoring and land reestr" which is the most related to conservation of biological and landscape diversity. **The wood code** was accepted in July 2003 and it regulates of forest legal relations for ensuring of protection and reproduction of forests and forestation, rational and balanced use of ecological and resource potential of forests; conservations of a biological diversity, objects of natural protected areas, consolidation of legality in this sphere. Article 3 of the Code establishes the base principles of the forest legislation of Republic Kazakhstan:

- sustainable development of forests;
- conservation of a biological diversity of forests and special protected areas;
- multi-purpose use of forests;
- rational, continuous, sustainable using of wood and non-wood forest resources;
- state regulation and control in the area of forest use and preservation, reproduction of woods and forestation;
- compensation of the damage caused by infringement of the forest legislation;
- payment for the using of wood resources;
- participation of the population and public communities in preservation and protection of forest resources.

The law "On environmental control" is the basic law in range of the nature protection legislation. As one of principles of environmental control in it ensuring conservation of a

biological diversity is declared. The given law forbids the economic and other activity invoking destruction of natural ecosystems, genetic diversity, flora and fauna, etc.

The law "On protection, rehabilitation and use of fauna" defines responsibilities of state organizations and main demands on preservation of fauna and, on use of objects of fauna, regulates questions of conducting hunting and fishery, etc. The given law contains also the general provisions concerning regulation of animal numbers, financing and realization of economic incentives on preservation, reproduction and sustainable use of fauna. This law selects in a separate category of fauna threatened and hunting-game species and provide the measures for the conservation of species included in the national Red data book.

Normative legal acts of the Government regulate the following questions:

- rules of hunting, fishery;
- rules of conducting a hunting and a rule of conducting a fishery;
- the compensation of the harm caused by infringement of the legislation in the area of fauna use;
- the list of animal species infrequent and finding under threat of petering;
- a pay for using of fauna etc.;

Table 13 Special protected areas of Kazakhstan Republic guarding forest ecosystems, across landscape zones

Forest-steppe

Type	No:	Accommodation	Landscape subzone	Area, ha	Preserved forest type
Republican value					
State national parks	**2**	**Akmola and North – Kazakhstan regions**	**Forest-steppe**	**184646**	**Forest-steppe assemblages**
The natural monuments	**16**	**North – Kazakhstan region**	**Forest-steppe**	**178,8**	**Softwood forests (pine forests), ecosystems, mountain - large forests**
Sanctuaries	**2**	**North – Kazakhstan region**	**Forest-steppe**	**186500**	**Birch - aspen xyliums**
The general area:				**371324,8 ***	

Steppes

Type	No:	Accommodation	Landscape subzone	Area, ha	Preserved forest type
Republican value					
State reserves	**1**	**Kostanay region**	**Dry steppes, pine pine forests, wetlands**	**191 381**	**Relict pine pine forest**
The state national park	**2**	**Karagandy region and Pavlodar regions**	**Droughty steppes and lowhills forests**	**141011**	**Mountain - large forests in steppe. Azonal patches of pine birch forests.**
State reservations	**2**	**East Kazakhstan and Pavlodar regions**	**Dry and arid steppes**	**936793**	**Unique tape pine pine forests of Irtysh region**
State sanctuaries	**4**	**East Kazakhstan and the Western - Kazakhstan regions.**	**Arid and droughty steppes**	**61388**	**Decidious park forests (apple, bird cherry, viburnum, etc.)**
The general area:				**1330573***	
Local value					
State national parks	**1**	**Karagandy and Kostanay regions**	**Droughty steppes and forests**	**7 500**	**Relict forests from an alder black**
The natural monuments	**19**	**Karagandy region**	**Droughty steppes and forests**	**68,2**	**Unique arbors, refugiums of the boreal floras, complexes of infrequent kinds of flora, relict files**
State sanctuaries	**3**	**Western - Kazakhstan region**	**Droughty steppes and lowlands forests**	**3992,3**	**Plant communitys of an ouk, hazelnut, an alder black, complexes of infrequent kinds of flora**
The general area:				**11560,5**	
Total				**1342133,5 ***	

Deserts

Type	No:	Accommodation	Landscape subzone	Area, ha	Preserved forest type
Republican value					
State nature reserve	**3**	Almaty, East - Kazakhstan, Mangistau regions	Northern, middle and southern deserts	**252615**	Gallery river forests, bushes assemblages, saxaul forests
State national parks	**3**	Almaty region	Mountain plains, foothills and desert hollows	**259317**	Saxaul forests, ashen forests, Charyn canyon
State botanic garden	**2**	Almaty region. Акгау	Foothill and middle deserts	**104**	More than 1900 species and varieties arboreal and bush races
State reservation	**3**	Almaty, Zhambyl, Southern - Kazakhstan, Mangistau region		**4392500**	Forests of foothills and plains, saxaul, river gallery forests, desert assemblages
State sanctuaries	**9**	Karagandy, Kyzylordy, Almaty, East Kazakhstan region	Deserts and intermountain hollows	**1109148**	Juniper, aglet, river gallery forests, white saxaul, relict thickets of sea-buckthorn berries.
The general area:				**6013684***	
Local value					
State sanctuary	**1**	Western - Kazakhstan region	Northern deserts	**16 405**	Unique pine and poplar stands, precinctive herbaceous plants
The state reserved zone	**1**	**Southern - Kazakhstan region**	Desert and and foothills	**600**	Saxaul forests and associations of plains and foothills
The general area:				**17005**	
Total				**6030689***	

Mountains

Type	No:	Accommodation	Landscape subzone	Area, ha	Preserved forest type
Republican value					
State nature reserves	**5**	Almaty, East Kazakhstan, Southern - Kazakhstan, region Zhambylskaja.	Mountains	**322872**	**Mountain forests**
National parks	**2**	Almaty, East Kazakhstan region.	Mountains	**807923**	**Mountain forests**
The state nature sanctuary	**2**	Almaty and the East Kazakhstan region.	Mountains	**1037**	**Relict fields темнохвойной boreal taiga and a fir Siberian**
State sanctuaries	**13**	East Kazakhstan, Southern - Kazakhstan, Zhambyl region	Mountains	**1745070**	**Mountain forests and their associations (a pistachio, apples, etc.)**
The general area:				**2876902***	
Local value					
State national park	**1**	Almaty	Mountains	**563,44**	Mountain forests
State nature sanctuary	**15**	Southern - Kazakhstan region	Mountains,	**8894**	Mountain forests, infrequent kinds of arbors and bushes, feral vineyards
State reservations	**3**	Southern - Kazakhstan region	Mountains	**78000**	Infrequent and petering kinds arboreal and bush races
The general area:				87457,44	
Total				**964359,44***	

* The areas of the state nature sanctuaries which are taking place in the area are not included in the national parks

Table 14 Industrial stores of some beneficial species of plants in Kazakhstan

№	Species of a plant	Area of occurrence	Air-dry mass, tons
1	Dogrose (a complex of Rosa species)	Western Tarbagatai	8,3
		Ketmen	12,47
		Dzungarian Ala Tau	67 (fresh fruits)
		Zailisky Ala Tau	8
		Kirghiz Ala Tau	4
		Karzhantau	4
		Western Tien Shan	7,15
2	Origanum dace (*Origanum vulgare*)	Western Tarbagatai	1,04
		Zailisky Ala Tau	2,6
		Ketmen	27,9
		Dzungarian Ala Tau	40,7
		Kungei Ala Tau	0,5
		Kirghiz Ala Tau	5,2
		All KZ	>70
3	Burnet dace (*Sanguisorba officinalis*)	Western Tarbagatai	3,4
		Kalbin ridge	1,8
		Eastern Kazakhstan Region	2,6
		Irthysh region	9,6
4	Sage-brush (*Artemisia sieversiana*)	Katon-Karagai district of Eastern Kazakhstan Region	33,3
		Kungei Ala Tau	4,7
	Sage-brush an estragon (*Artemisia dracunculus*)	Kungei Ala Tau	1,8
5	Willow (a complex of Salix sp.)	All KZ	300 ths.
6	Elecampane (*Inula helenium*)	Zailisky Ala Tau	17
		Dzungarian Ala Tau	12,5
		Eastern Kazakhstan Region	21,4
7	Aglets (*Crategus sp*.)	Zailisky Ala Tau	49
		Eastern Kazakhstan Region	30
		Ketmen	27(fresh fruits)
		Zailisky Ala Tau	49,1
		Dzungarian Ala Tau	420,7 (fresh fruits)
		Karzhantau	2,4
8	*Rhaponticum carthamoides*	Altai	34
9	Sea-buckthorn berries (*Hippophae rhamnoides*)	Eastern Kazakhstan Region	21-32
		Dzungarian Ala Tau	48 (fresh fruits)
		Altai	30
10	Greater celandine (*Chelidonium majalis*)	Ketmen	1,85

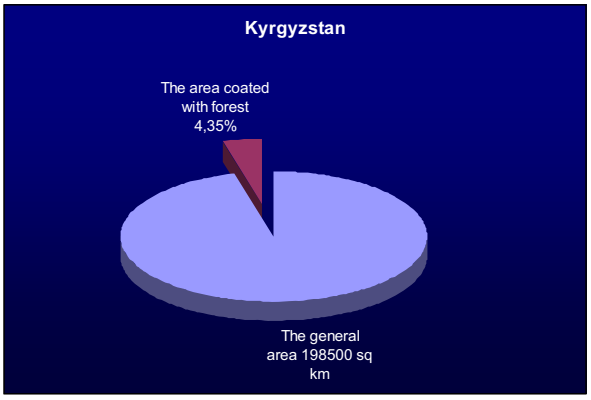
№	Species of a plant	Area of occurrence	Air-dry mass, tons
11	Nettle gonochoristic (*Urtica dioica*)	Kirghiz Ala Tau	4
		Zailisky Ala Tau	1,77
		Irtysh river region	4,7
		Dzungarian Ala Tau	3,94
12	Valeriana doubtful (*Valeriana dubia*)	Zailisky Ala Tau	13
		Ketmen	0,24
		Kirghiz Ala Tau	0,1
13	*Veratrum lobelianum*	Terskei Ala Tau	150,2
		Kungei Ala Tau	32,9
14	Peony abnormal (*Paeonia anomala*)	Eastern Kazakhstan Region	4,4
15	Berberis (Berberis heteropoda)	Ketmen	42,8 (fresh fruits)
		Dzungarian Ala Tau	68,6 (fresh fruits)
16	Apple (Malus sp.)	Ketmen	19 (fresh fruits)
		Zailiysky Ala Tau	377 (fresh fruits)
		Dzungarian Ala Tau	100(fresh fruits)
17		Karzhantau	45 (fresh fruits)
18	Apricot (Armeniaca vulgaris)	Ketmen	0,53
19	Thyme (*Thymus marchallianus*)	Dzungarian Ala Tau	128,5
20	*Delphinium dictyocarpum*	Karzhantau	0,47
21	Horsetail wintering (*Equisetum hiemale*)	Karzhantau	0,05
22	Blue dandelion (*Cichorium intybus*)	Karzhantau	0,15
23	Almonds (*Amygdalus spinosissima)*	Chimkent and Jambul regions	225

Table 15 Dynamics of number and extraction of the hunting species of animals

Species	2001		2002		2003	
	Number	**Extraction**	**Number**	**Extraction**	**Number**	**Extraction**
Brown bear (*Ursus arctos*)	1200	20	1100	23	1334	19
Maral (*Cervus elaphus sibiricus*)	6749	154	4912	153	6589	103
Roe deer (*Capreolus pygargus*)	43561	882	39524	1115	49650	1108
Wild goat (*Capra sibirica*)	14335	227	13691	256	15732	139
Wild boar (Sus scrofa)	15692	148	11111	260	14400	187
Musk rat (Ondatra zibethicus)	341400	14893	296602	5308	393386	11795
Marmot badger (Marmota caudata, M. baibacina)	2019600	14035	2159787	5030	1614377	20077
Sable (Martes zibellina)	3500	139	3550	205	3957	2234
The fox (Vulpes vulpes)	-	1392	-	288	183092	2032
Corsac (Vulpes corsac)	-	230	-	1	113272	358
Badger (Meles meles)	-	3	-	22	25774	70
Hare (Lepus tolai, L. timidus)	-	27203	-	17353	1349092	37965
Siberian weasel (Mustela sibirica)	-	42	-	69	105933	98
Polecat (Mustela eversmanni)	-	-	-	22	196391	74
Fiber (Sciurus vulgaris)	-	154	-	422	63928	627
Glutton (Gulo gulo)	-	-	-	-	-	2
Pheasant (Phasanius colchicus)	204023	2658	137657	2542	189328	7912
The wood grouse (Tetrao urogallus)	5590	-	6718	-	9072	2
The goose (Anser spp.)	-	14925	-	31461	-	39583
Duck (Anas spp.)	-	123501	-	240783	-	351369
Red grouse (Lyrurus tetrix)	-	419	-	1532	-	4744
Coot (Fulica atra)	-	6706	-	13515	-	28864
Partridge (Lagopus lagopus, L .mutus, Perdix perdix, P.daurica)	-	330	-	5274	-	5080
Quail (Coturnix coturnix)	-	145	-	510	-	356
Mountain patridge (Alectoris kakelik)	-	576	-	1692	-	4661
Wood – cock (Limicolae)	-	27	-	143	-	612
The pigeon (Columba spp.)	-	562	-	1877	-	4694
Turtledove (Streptopelia spp.)	-	121	-	32	-	-
Cormorant (Phalacrocorax carbo)	-	4	-	-	-	-

The Government of Republic accepted also the program of “the Wood of Kazakhstan”, providing realization of significant volumes of forest restoration and forest conservation works for 2004-2006. The stage of realization included the project of GEF/UNDP and Committee of Forest management of Kazakhstan Republic “Conservation of Forests and augmentation of Forest Percentage”.

6 FORESTS OF KYRGYZSTAN AND A PROBLEM OF NON-WOOD FOREST PRODUCTS USE



Kyrgyzstan is a mountain country where mountains compound more than 95 % of the general area, therefore practically all forests concern to mountains. The general area of state forest fund of Kyrgyzstan is 3321.5 thousand ha, but from them covered with a wood only 864.9 thousand ha or 25% of the area of forest fund. More than 28 % of the area of state forest fund is occupied by stony slopes and slide rocks, 35 % - by haymaking and pastures. In the territory of Kyrgyzstan two areas can be selected: Northern with mountain dark coniferous forests and Southern with mountain broad-leaved forests and xerothytic light forests.

In the north on slopes of Kungey-Ala Tau, Terskey-Ala Tau, Kirghiz, Talass ridges and in basins of Kemina and Naryn the main forest forming race is the Shrenk's or Tien-Shan spruce (*Picea schrenkiana*). In the south, on slopes of Chatkal ridge the forests are mixed, formed by a spruce, a Semenov's silver fir (*Abies semenovii*), a Persian walnut (*Juglans regia*), a Sievers's apple tree (*Malus sieversii*) and other deciduous species. In the Fergana range, the broad-leaved forests consist of a Persian walnut, an apple tree and a Turkestani maple (*Acer turkestanica*). To the south, on Alai and Turkestani ranges the forest belt formed by 3 kinds of a treelike juniper (*Juniperus sp.*).

More than halves from the general area of forests the coniferous forests from fur-trees, firs and junipers occupy. Broad-leaved forests compound only 20% of all forests, but the species composition of them is rich. Basically they consist of a Persian walnut, a Turkestani maple, an apple tree, a pistachio nut (*Pistacea vera*), birches (*Betula sp.*), willows (*Salix sp.*), poplars (*Populus sp.*), pears (*Pyrus sp.*), a hackberry (*Celtis caucasica*), an almond (*Amygdalus communis*), an ash (*Fraxinus sogdiana*), etc. The bush communities occupy much more areas - about 30 % from all forests. Their species composition also is rich and includes species, many of which, as well as tree species, are beneficial to the people. They include a hawthorn of two kinds (*Crataegus turkestanica, C. pontica*), Tien Shan and steppe cherries (*Cerasus tianschanica*), a honeysuckle of 4 kinds (*Lonicera sp.*), a cotoneaster (*Cotoneaster spp.*), a black elm (*Caragana*), a sea buckthorn (*Hyppophae rhamnoides*), a spirea (*Spirea sp.*), a dog rose (*Rosa sp.*), a mountain ash (*Sorbus sp.*), a treelike willow (*Salix*), etc.

Spruce forests are formed by a Tien-Shan spruce and form in mountains a belt of spruce forests which can be divided on 3 sub-zones: the inferior forests located from the inferior border up to 2200 m where it is concentrated about 5 % of all spruce forests; average - from height 2200 up to 2500 m. In this sub-zone the forests are presented much more than in other places. The area of them compounds about 30 % from all spruce forests; top - from height 2500 up to the top border of spruce forests. These forests compound almost 60 % from all area of spruce forests. In inferior sub-zone spruce forests occupy the northern slopes of ridges, in the middle - western and eastern, and high-mountainous spruce forests occupy even southwest slopes. On conditions of humidifying on which depends not only productivity of

spruce forests, but also structure and vigor of concomitant vegetation, the spruce forests can be divided on: dry where fur-trees accompany, with cereal, cereal-motley grasses steppes; fresh – meadow-steppe spruce forests; wet - spruce forests with high herbage cereals-forb meadows, large grasses wood meadows; very wet - spruce forests with high herbage meadows from umbellate and meadows on downturn; crude - spruce forests with inundation meadows; wet - spruce forests on bogs with hydrophilous meadows. All types of spruce forests are pastures, used during millenia by human.

Fir forests from Semenov's fir occupy the extremely insignificant areas, only 3.3 thousand ha and they practically have no economic value, because this species is included in the Red data book and is under preservation. In fir forests 2 types are selected only: fir forests with dead cover on very abrupt slopes and a fir forest with motley-grasses-mossy on less abrupt.

Juniper forests in Kyrgyzstan occupy the significant areas (more than 170 thousand ha). They are located basically on Chatkal, Alai and Turkestani ridges where independent forest belt form. In Northern Kyrgyzstan these forests are only less than 3% from all juniper woods. High-standing plantings are formed basically by a Central Asian juniper (*Juniperus seravschanica*), globe-shared (*J. semiglobosa*) and Turkestani (*J. turkestanica*). Elfin wood in high mountains are formed most widely by a Central Asian Turkestani juniper, but there are also junipers cossack (*J. sabina*) and Siberian (*J. sibirica*). The Central Asian Zeravshan juniper is most thermophilic, engaging the inferior part of juniper belts and not insinuating to the north of Talas range. A Turkestani juniper is the most cold-resistant species. It forms the top border of a wood, being lifted up to 4000 m. The Zeravshan juniper grows at heights of 1900-2700 m, globe-shared - from 2000 up to 3000 m and Turkestani - from 2100 up to 3300 m. All diversity of juniper woods can be divided into 4 groups.

Juniper wood with couch-grass are formed by rarefied Zeravshan juniper on northern and western slopes up to 2300 m, the underwood is expressed well and presented by a dog rose, a spirea, a Tien-Shan cherry, an ephedra and a small-leaved honeysuckle. Grassy vegetation is presented by couch-grass and wormwood.

Juniper wood with fescue, basically from globe-shared juniper is located up to 2800 m. The underwood consists of honeysuckles, dogroses, cotoneasters and a barberry. A soil - covering on glades from a sheep's fescue, under crowns with meadow-steppe vegetation.

Juniper wood with fowl-grass are distributed on slopes of all expositions at height up to 3200 m, consist from Turkestani juniper. The underwood is expressed poorly - from Meyer's currant (Ribes meyierii), a honeysuckle, and a barberry. The soil covering consists of meadow with an admixing motley grasses.

Rocky juniper woods meet in all belts on stony slopes, slides and rocks. The underwood and a soil - covering here are presented poor.

Walnut wood from a Persian walnut occupy not so significant areas, about 40 thousand ha, but in Southern Kyrgyzstan they have colossal economic value. They grow on slopes of Fergana, Chatkal and Usun-Ahmad ranges in a belt of 800-2300 m, but the basic (it is more than 99 %) plantings are concentrated within the limits of 1000-2000 m. Forests are distributed on all expositions, but about 60 % on northern. Such compact masses of a walnut wood are unique in the world. For local population they have huge value as give the most valuable fruit production and wood. The areas of a walnut forests in first half of last century

decreased almost by half because of unsystematic throw of trees, a grazing of cattle and a mass fruit picking. Now the areas occupied by a walnut, were stabilized. The general possible crop of a walnut on all area of forests has been determined by a forest management in 1960 years in 6960 tons. The actual harvesting of walnut forest enterprises never exceeded 1800 tons. It is necessary to take into account, that a significant part of a crop, not getting in the count, used by local population, but the statistics on this question is absent. On size of a crop the big influence is rendered with weather conditions. It is determined, that the good harvest happens on the average only once in 6 years. The walnut in Kyrgyzstan grows not only pure stands, but also in mixture with other races - an apple tree, a maple, a poplar, other species, with a good underwood from a honeysuckle, a barberry, a dog rose, alychas, a buckthorn, etc. and a potent rich grass stand on glades – cereal-motley grasses or meadow-motley grasses in dependence on conditions of humidifying.

Some types of a walnut forests are selected: a walnut groves on gentle slopes; the same, but abrupt slopes; and the same on very abrupt slopes; and with additional earth humidifying; walnut groves in the river gallery forests; walnut groves with fir on shallow soils; the same, on potent soils; walnut with poplar in hillsides; and the same in water-sheds and in river-beds; walnut with maple and apple and rarefied walnut forest. First two types are more productive, and they also occupy more than 90 % of the area of all walnut groves. Normal restoration of a walnut forest is prevented by human activity. Vegetative conditions in areas of its growth are favourable for good restoration of forests.

Pistachio forests of Kyrgyzstan also occupy not so big areas (less than 20 thousand ha), but, as well as a walnut, they have the high value and great importance for local population. All of them are formed by a pistachio nut (*Pistacia vera*). Now it is basically medium-age plantings. All pistachio-forests are largely destroyed by people and the most natural types were not remained. Pistachio forests occur on Fergana and Chatkal ranges in a belt of 900-1100 m, presented by two types: pistachio arid light forests and bushes - from 700 up to 900 m and pistachio steppe light forests, of ephemeral steppes and meadows - from 900 up to 1100 m. Because of a constant overgrazing by cattle the grassy vegetation here though has a rich species composition, hardly damaged and except for pastures cannot serve as anything.

Apple forests are distributed on the same ranges, as a Persian walnut on the area more than 13 thousand ha and also are of great importance for the population because of fruit production. They are formed by an apple tree as it is now considered, one species – Sievers's apple tree (*Malus sieversii*). The natural conditions for this apple tree in Kyrgyzstan are favourable, and it is disseminated well without human influence. The apple tree is accompanied, as a rule, with bushes, basically, the same kinds, as in walnut forests as giving valuable production, than value of these forests is even more increased. Apple crops are received good not annually, and once in 2-3 years because of weather conditions. On an evaluation of a forest management, they could yield a harvest of apples in 2960 tons; actually the harvest in forest enterprises did not exceed 1200 tons, and other part used by local population.

Maple family of a wood in Kyrgyzstan occupy the area more than 25 thousand ha. Among deciduous races they take first place. The maple here is presented by two species – Turkestani and Semenov's maples (*Acer turkestanica, A. semenovii*). Forests are formed by the first kind, and Semenov's maple is included, as a rule, into structure of other plantings. The basic areas of a maple forests are concentrated in Southern Kyrgyzstan in a belt of mountains from 1100 up to 2700 m on slopes of all expositions, but it is more than them on northern slopes. A maple wood now hardly rarefied as a result of cutting down and unsystematic grazing of

cattle. Their big part is the rests of the plantings of walnut with maple destroyed before. Main maple woods grow on watersheds of small ranges and in sub-alpine skirt of walnut-fruit forests. These forests are divided on 4 types, but all of them with a rich underwood from meadow-sweet (3 species), dog rose (3 species), plums (alychas) (2 species), a Persian honeysuckle, are sometimes added by Meyer's currant. Maple forests are admixed by places with an apple tree and aglets – Korolkovi's and Turkestani.

Poplar forests of Republic are presented by narrow tugai plantings along the rivers. In gallery river forests of Chu river a diversifolious poplar (*Popolus diversifolia*) occurs, on inflow of Naryn in a lower reaches - a grey poplar (*P. pruinosa*), on valleys of the Fergana range in a lower reaches – a white poplar (P. alba), in the south, on valleys of the rivers of all ranges there is distributed an Uzbekistan poplar (*P. usbekistanica*), and in the Central Tien-Shan on the rivers - a Tien-Shan poplar (*P. tianschanica*). Due to easy access to these forests for use they were exposed to throw and grazing of cattle for many years, and in many cases are completely destroyed. Saved poplar forests are basically from young growth.

Birch forests the same as also a poplar, in Kyrgyzstan do not form the big masses, and are frequently located by narrow strips along the mountain rivers. Sometimes the birch meets as an admixing in spruce and walnut forests. In Kyrgyzstan 6 species of a birch grow: Turkestani (*Betula turkestanica*), curve (*B. procurva*), tien-shan (*B. tianschanica*), Alai (*B. alaica*), Korzhinsky's (*B. korshinsryi*) and Sapozhnikoc's (*B. saposhnikovii*). The basic forest forming species are first two kinds. In a birch plantings prevail ripe and close to ripe standling timbers, and it is not enough young plants.

Bushes occupy, alongside with high-standing plantings, the big area, about 200 thousand ha. Bushes locate the areas with less favourable conditions, than trees, or are derivatives after destruction of walnut forests. Shrubs are a source of reception of fruits (a barberry, a dog rose, a sherry - plum, etc. on slopes, a sea buckthorn, a currant, and a dewberry - in bottom lands of the rivers). They serve for preparation of fire wood, medicinal raw material, a small-sized building materials, etc.

Kyrgyzstan is predominary mountain Republic. Mountains in it occupy 94 % of the area, plains - 6 %. It is located within Tien-Shan and Pamir mountain countries. All territory of Republic lays above 500 m, and more than halves of it is at height from 1000 up to 3000 m. practically, all state forest fund is located in mountain territories. The general area of forest fund of Kyrgyzstan is 3279.3 thousand ha. The area covered with a wood compounds 836 thousand ha of them or 25.5 % from all area of forest fund. There are many lands, not covered with a wood and suitable to a forestation – 265.4 thousand ha. From non-forest lands the significant areas is occupied by haymaking – 14.7 thousand ha, and pastures for a distant pasturing of cattle - 1130 thousand ha. There is also 5.4 thousand ha the gardens which produce also non wood forest products. A general store of wood in plantings is 28.84 million m3.

The general area of Kyrgyzstan compounds 19990 thousand ha. The percentage of the forest land in comparison with other states of region rather high – 4.2 %. The population is 5065 thousand individuals. For the last 20 years the population has increased for 28 %. The rural population compounds 65%. Average population density is 25.7 individuals/км2. The basic quantity of rural population lives in a zone of an irrigation farming, but the significant part

lives also in the forest zone, in immediate proximity from forest areas, especially in a zone of walnut forests. Less part of population lives at a zone of coniferous forests. 29 thousand persons work in a forestry of Republic. The part of the forest lands on one inhabitant is 0,17 ha.

All forest enterprises of countries (

Table 16) are included into system of the State forest service which is division of State Environmental Agency and a forestry unit under Government of Republic. In a management system of Administration of the President two basic hunting economies (former sanctuaries) and one National park are presented. All forest enterprises, hunting economies, nature reserves and natural parks have services of state wood preservation or rangers regular guarding. In the attitude of management and control of preservation of flora and fauna, and also an environment (conservation of a biodiversity, prevention of pollution of the rivers and an atmosphere and other measures) control functions circumscribed to small regional inspections, and on places the actual control is absent.

Table 16 Users of forest lands, their submission and functions. Information about owners of State forest resources of country

№	Owner	Range and basic types of forests	Area (thousand ha)	
			general	including covered with a forest
1	2	3	4	5
Forest enterprises of State forest service				
Chu region				
1	Jaiyl forest enterprises	Gallery river forests of Susamyr and forest plantings	16,5	5,7
2	Frunze forest enterprises	Plantings of Chu valley and spruce forests	7,8	1,6
3	Chu forest enterprises	Spruce zone	25,5	7,6
Talas region				
4	Bakay-Aty forest enterprises	Spruce zone	33,3	10,0
5	Kara-Bury forest enterprises	Spruce zone	24,0	5,8
6	Manas forest enterprises	Spruce zone	20,3	1,7
7	Talas forest enterprises	Spruce and gallery river forests on Talas river	38,0	7,0
Naryn range				
8	Ak-Taly forest enterprises	Spruce and gallery river forests on the river Naryn	96,2	23,4
9	At-Bashy forest enterprises	Spruce zone	89,6	15,5
10	Jumgal forest enterprises	Spruce zone	97,9	22,8
11	Kochkor forest enterprises	Spruce and gallery river forests on the river Chu	5,2	2,'3'
12	Naryn forest enterprises	Spruce zone	142,4	34,2

Issyk-Kyl range				
13	Jety – Oguz forest enterprises	Spruce zone	91,5	28,5
14	Issyk-Kyl forest enterprises	Spruce zone	53,3	15,9
15	Karakol forest enterprises	Spruce zone	101,8	21,1,,
16	Rybachinsk forest enterprises	Forest cultures, coastal and flood-land thrickets on the river Chu	8,9	0,7
17	Ton forest enterprises	Spruce zone	13,7	6,8
18	Tiyp forest enterprises	Spruce zone	78,0	19,6
Osh range				
19	Kara-Kuljyn forest enterprises	Spruce zone	91,1	6,2
20	forest enterprises “Alayku”	Spruce zone	41,5	17,6
21	Osh forest enterprises	Spruce zone	44,3	9,3
22	Nookat forest enterprises	Juniper zone	67,9	26,5
23	Uzgen forest enterprises	Walnut - a fruit zone	48,8	18,6
24	Alay forestry	Juniper zone	130,2	21,9
25	Aravan forestry	Spruce - mixed forests	29,4	4,1
26	Chon-Alay forestry	Spruce – mixed zone	43,4	9,9
Batken range				
27	Batken forest enterprises	Juniper zone	162,4	40,4
28	Arkyn forest enterprises	Juniper zone	49,4	6,8
29	Laiylyak forest enterprises	Juniper zone	135,2	42,2
30	Uch-Korgon forest	Juniper zone	140,9	38,3
Jalal-Abad range				
31	Avletym forest enterprises	Walnut - fruit zone	87,2	32,4 .
32	Aksyi forest enterprises	Walnut - fruit zone	62,6	29,8'
33	Ala - Bukin forest enterprises	Mixe}, juniper – walnut- fruit zone	45,4	26,5,
34	Arkyt forest enterprises	Walnut - fruit zone	52,2	17,7
35	Arstanbal-Atyn forest enterprises	Walnut - fruit zone	16,3	7,8
36	Kabyn forest enterprises	Walnut - fruit zone	7,9	4,9

Jalal-Abad range cont.ed				
37	Achyn forest enterprises	Walnut - fruit zone	14,5	7,3
38	Kara - Almyn forest enterprises	Walnut - fruit zone	31,0	13,3
39	Kochkor-Aty forest enterprises	Walnut - fruit zone (pistachio)	80,2	28,3
40	Kyzyl - Ungur forest enterprises	Walnut - fruit zone	57,9	23,6
41	Ortok forest enterprises	Walnut - fruit zone	17,6	10,3
42	Toskol- Aty forest enterprises	Walnut - fruit zone (pistachio)	80,2	28,3
43	Toguz-Torouz forest enterprises	Spruce zone and gallery river forest of Naryn river.	63,0	9,4
44	Toktogul forest enterprises	Spruce zone	126,2	30,8,,
45	Chatkal forest enterprises	Mixed juniper and gallery river forests on the river Chatkal	44,6	21,3
46	Jay - Terek a forestry	Spruce zone	8,3	3,2
47	Karakul a forestry	Spruce zone	19,0	5,6
48	Kok – Alman a forestry	Walnut - fruit zone	3,9	1,6
49	Urumbash a forestry	Spruce zone	10,6	3,6
Total : 42 forest enterprises and 7 forestry			**2737,9**	**783,4**
Nurseries				
50	Kara-Darya a forest nursery	Jalal-Abad region	0,05	-
Total: 1 nursery			0,05	-
Forest and hunting economies of the State forest service				
51	Issyk-Aty forest and huntings	Chu region	8,4	2 2,3
52	Ak-Suy hunting sanctuary	Chu region	7,6	-
Users of the Administrative office of the President				
53	Hunting “Kyrgool”	Chu region	1,1	0,016
54	The hunting plot “Liman”	Issyk-Kyl region	0,251	0,251
Total: 1 State complex sanctuary, 3 State hunting economies			**17,4**	**2,6**

Forests in the State national natural parks				
Users of the State forest service				
55	“Besh-Tash”	Talas region the Spruce complex	32,4	4,9
56	“Karakol”	Issyk-Kyl region the Spruce complex	38,1	5,1
57	“Kara-Shoro”	Osh region the Walnut - fruit zone	14,3	1,5
58	“Kyrgyz-Ata”	Osh region Juniper forest	11,2	2,3
59	“Saymaluu-Tash”	Jalal-Abad region Spruce forests	32,0	1,0
60	“Salkyn-Tor”	Naryn region Spruce forests	10,4	2Д
61	“Chon-Kemin”	Chu region Spruce forests	123,6	12,8
Users of the Administrative office of the President				
62	“Ala-Archa”	Chu range Spruce-Juniper zone	2,3	1,0
Total: 9 State national natural parks			**264,4**	**30,6**
Forests of State reserves				
Users of the State forest service				
63	Besh-Aral	Jalal-Abad region Mixed арчевые and bottomland forests	86,7	3,5
64	Issyk Kul	Issyk Kul region Lake Issyk Kul and paludous coastal угодья	19,1	0,9
65	Karatal-Japyryk	Naryn region Lake the Son - Kul and spruce forests	21,0	1,0
66	Naryn	Naryn region Spruce forests	37,0	4,9
67	Sarychat-Ertash	Issyk Kul region Mountains bogs	72,1	-
68	Sary-Chelek	Jalal-Abad region Walnut -fruit forests of a Chatkal range	23,8	9,1
Total: 6 nature reserves in 2003			**259,7**	**19,4**

After 2003 years 2 more nature reserves were formed at the expense of forest and state lands				
69	Kulunaty	Osh region Spruce zone of the south from grounds forest enterprises "Alayku"	24,5	7,2
70	Padyshatyn	Jalal-Abad region	30,6	13,6
		Walnut fruit forests of a Chatkal range from lands of Avletimsk and Ala-Bukinsk forest enterprises		
Total: 2 nature reserves were established in addition			**55,1**	**20,8**
Besides, since1998 there is the special structure including in structure reservations, natural parks, sanctuaries and a zone special preservation with core area.				
71	Biosphere "Issyk Kul" territory	Issyk Kul region	Protected territory 4,4 million ha	

This situation developed for a long time. Primary all services (forests, fauna (hunting), preservation of waters and atmosphere) have been gathered in the Ministry of Environment (1992-1996), then Departments of forestry and hunting has been formed as the Agency on Forestry, and biodiversity and protected areas have remained in the Ministry of Environment. Then protected areas were moved to in Agency on Forestry, and control of a biodiversity and environment - to the Ministry for ecology and extreme situations (MEES). Then since the end of 2005 in the MEES the State Agency on Environment and Forestry was selected. The agency includes the State forest service as independent division. Thus, in country the new approaches in use of natural resources which demand revision of the legislation in this area (the property right, a setting, tax deductions, distribution of the profit, participants of process and so forth) only start to be formed.

The system of special protected areas of Kyrghyzstan is rather complex, has the history of development and includes:

1. Eight nature reserves in the system of State forest service, including 1 biosphere, 1 wetland (Ramsar site having an important value for the protection of water-birds) and 6 nature reserves which serve as standards of the various mountain ecosystems with general area 314.8 thousand ha (Table 15).
2. Seven natural parks of the system of State forest service with general area 262.1 thousand ha (Table 15) and 1 National natural park of the system of Administration of the President with area 3.6 thousand ha. So, 8 natural parks with general areas 265.7 thousand ha.
3. Two complex sanctuaries – 10.1 thousand ha.
4. Ten forest sanctuaries on the territory of forest enterprises – 22.6 thousand ha.
5. Twenty-three Botanical reserves disseminated on the all diversity of mountain ecosystems 6.2 thousand ha.
6. Fourteen Zoological (hunting) reserves 286.1 thousand ha.

7. Biosphere territory “Issyk-Kul” with general area 4359.8 thousand ha.
   a) the core area (zone with strict regime of protection) makes 169.8 thousand ha, but it includes the territory of the Issyk-Kul and Sarychat-Ertash nature reserves and Karakol natural park (total 129.3 thousand ha) and adjacent areas of high mountain zones with area 40.1 thousand ha.
   b) the buffer zone with the limiting regime of the use is presented by 33501.5 thousand ha.

In total in Republic 66 territories with a special regime of protection with area of 945.6 ha or 4,75 % of terrain of country. Actually now only in the special protected areas, all landscapes and biodiversity is really preserved.

Non wood forest products

Products of a vegetable origin:

Among non wood forests production in Kyrghyzstan the nuts are the most valuable product, thus forest enterprises and the population actively collect them, including for selling in the markets from the following wood plantations - *Juglans regia, Pistasia vera, Amygdalus communis* and *A. bucharica.*

The walnut: the area of pure walnut forests make 40.5 thousand ha. From one tree it is possible to collect in separate years up to 250 kg of nuts, but it is not observed practically, because usually the yield is subject by early-spring frosts. In the bumper-crop years the forest enterprises of the walnut zones in the sum collected 1.5 thousand – 1.8 thousand tons of walnuts. In the middle of 1980th the volumes of storage began to fall, because local residents left walnuts at themselves for the purposes of selling in the markets more and more. Now forest enterprises hardly collect from 1.5 up to 3 tons of walnuts on seeds for forest restoration. Besides, the forest enterprises now carry out collection of commodity walnuts, involving local residents and paying for work on 10 som (25 cents) for 1 kg of the handed walnut. However, the total volume of collecting in bumper-crop years makes 380-400 tons of a low-grade walnut, because the population leaves nuts of high quality for own needs and sell them in the markets at the price of 35-45 soms (about 1 US dollar) for kg. The part of forest enterprises hands over the walnut forests harvesting sites for the rent with payment at the rate of 30 % of the collected crop. In lean years which happen frequently, the forest enterprises sometimes do not carry out plans on collection of seeds of a walnut for crop in nurseries. Since 2001 attempts to raise interests of forest enterprises are accepted and to create system of stimulus for increase in collecting of walnut, including the organization of export of kernels of nuts, preparations of walnut jam, but all these projects while remain ineffectual.

Nuts of a pistachio in the past (1970-90th) gathered in volume up to 150 tons bumper-crop years, but now all yield is taken away by the local population (Kochkor-Atynsky forest enterprise collects in one year no more than 2-3 tons of a pistachio). In the market in Kochkor-Ata and Mili-Sai the local inhabitants have sold about 30 tons of pistachio in one year under the price up to 100 soms (2.5 US dollars) for 1 kg. The area of pistachio thrickets is 36.6 thousand ha.

Nuts of almonds gather basically on seeds (Achinsky and Kochkor-Ata forest enterprises). It is necessary to note that this almond is bitter. The sweet almonds are gathered by local residents already for a long time, because the state control over a zone of foothills is not present.

Fruits of fruit trees are suitable to gathering and fruits of *Malus Sieversii, M. niedzwetzkyana, Pyrus communis, P. korshinskyi, Prunus sogdiana, Sorbus tianschanica, S. turkestanica, Crataegus pontica* have high quality. The territory covered with a wood from these species makes: an apricot - 1,5 thousand ha, a pear - 0,1 thousand ha, a mountain ash - 1,7 thousand ha, an apple-tree - 18,0 thousand ha, a treelike hawthorn - 1,9 thousand ha. Preparation of this production especial as dried fruits can make more than 10 thousand tons one year, and per 1960-80th it was prepared by forest enterprises of nut-fruit zones annually up to 1,5-2 thousand tons of dried fruits of apples and a cherry plum which were taken out to Siberia. But by 1980-90th development of gardening and a crop of cultural apples, pears, plums, apricot, including as dried fruits have superseded from the market production of wild fruits. The competition became especially rigid by 2000th. So in 2001 in Arstanbal-Aty forest enterprise it has been started up on forage to cattle of 1 thousand tons of dried fruits, and local population sold the dried fruits for 1 kg on 1 som (50 kg for 1 dollar). Now transport charges manage more expensively, than cost of dried fruits of wild fruit trees in the markets of Fergana. Since 2005th under the project of manufacture of peptine the Chinese businessmen have developed the processing capacities in three forest enterprises. Efficiency of the project is not known yet. Available processing small enterprises (in 2 forest enterprises of the south of Kyrghyzstan) are overloaded with garden production, and wine shops do not accept wild fruit and basically release substitute fault.

Berries of bushes are produced by *Berberis, Cerasus, Rubus Caesius, R idaeus, Elaeagnus, Hippophae Rosa, Ribes*. The local population in plenties, including for realization (selling), collects a raspberry (Toktogul and Avletimsky forest enterprises), a blackberry in Chui valley, sea-buckthorn berries on coast of lake Issyk Kul and the river Chu, a currant on Susamyr river, a barberry on all south and in Issyk-Kul hollow, a dogrose in some forests enterprises of the south and in Issyk-Kul lake region. Berries from Kyrgyzstan (dry and fresh) are often sold on the markets of Kazakhstan and Uzbekistan (Tashkent), but this is private business which is not regulated anywhere.

Mushrooms constantly gather in fir forests of Issyk-Kul lake region, Chon Kemin (milk mashroom - *Russula delika*), in Toktogul hollow and on Susamyr (steppe agaric - *Pleurotus eryngii*), and also on all landings in foothills (*Agaricus compestris, Lepista saevia*). However, the economic estimation and their contribution to development of local economy were never made.

Hay: the General area of haymaking in the State forest fund – 14.8 thousand ha with average productivity about 2 tons of dry hay for 1 ha. Except for it, hay usually is mowing clear in the glades nearest to settlements and even edges. First of all, the forest enterprises prepare hay for horses and other cattle, then all workers of forest enterprise; including wardens' protection service prepares hay for the internal needs. And if there is free haymaking after that, inhabitants of villages inside forest enterprises for payment prepare hay. Usually the prices for rent of a haymaking make 40-50 soms (about 1 US dollar) for 1 ha (200 soms for 3-4 tons), but in some forest enterprises for the inhabitants mowing free-of-charge and it is made by way of fire-prevention actions. For the inhabitants living outside of large forests, problems of forage for cattle sometimes get par quantity value: the price, reaches 8 thousand soms (about

200 US dollars) for 2-3 tons of hay. In a zone of juniper forests many arable lands have sowed lucerne.

Raw materials for the medical and perfumery purposes: Repeatedly in the forestry enterprises there were made the attempts of herbs collection (roots of elecampane, *Rodiola sp*., licorice, grass of St. John' wort, greater celandine, coltsfoot, immortelle, etc.). But now the markets are filled with many herbs, including imported from China or from Altai. Industrial production (through crop and cultivation) some especially valuable plants (for example, ginseng) can be perspective.

Raw material for dyes: Traditional national technologies in perfection master local vegetative raw material for manufacture of dyes for felt, fabric and leather. But by the end of XX century the market represents high-quality dyes, and in art crafts application the newest dyes more and more find.

Raw material for construction and utensils: The Big values represent the wood knobs of walnut wood and wood of some races for manufacture of utensils, musical instruments, and fine fakes. Wood of juniper, frame pistachio, an apricot, a pear, and roots of a juniper is especially appreciated. Since 2000 in walnut-fruit forests the larceny of wood knobs of walnut has developed, and forest enterprises cannot stop this process till now.

Ornamental plants: Nurseries of forest enterprises grow the fir-trees, pine and other trees and bushes for gardening. In the research-and-production firm "Alshtyn-Jaiik" renting 20 ha in Kaaba forest enterprise, it is growed the saplings of the fruiters and a walnut for realization in Fergana valley. Profitability of nurseries low, and taxes to the lands and payment of rent quite often result in losses.

Allocated substances: In walnut-fruit forests the prospect pitch from trunks of a pistachio and almonds, also gallic formations on leaves of a pistachio and pitch of Ferula are represented.

Others vegetative product: Unique value for local residents is represented with fire wood, which local residents prepare in a forest in many forest enterprises for a payment at a rate of 50-100 soms (1-2,5 USD) for 1 cube m.

Products of an animal origin:

Alive animals: In the past Kyrghyzstan delivered a significant quantity of alive animals on export: for the purposes of acclimatization - a semirechensky pheasant, annually about 3 thousand individuals (1970-1985) were imported to Hungary, Bulgaria and Czechoslovakia; a wild boar till 50-60 heads (1965-1975) to Moscow suburbs and for moving in the northern regions of Republic. Now all pheasants occurring in Issyk-Kul region, Talas, Toktogul hollow, on the south of Kyrghyzstan, and also in separate areas of Chujskaya area are descendants of the pheasants settled in the seventieth years from Tokmak state nursery of pheasants. Wild boars of the north of Kyrghyzstan are descendants of the wild boars delivered from Sary-Chelek nature reserve. Through system of Zookombinat some other animals were caught annually for the export: the Snow Leopards (3-4 animals annually), mountain ibexes (up to 10 individuals) and singing birds – chaffinchs, bramblings, twites, redpolls, rosy-finches, etc. in total up to 5 thousand individuals (1960-1980) acted. Now with amplification

of wildlife management catching and export of wild animals is stopped. In forest lands the wild boars and singing birds were caught only.

Fur-skins raw materials: In the past the Republic through system of organization which called "Sojuzpushnina" delivered annually from 30 up to 70 thousand skins of marmots (red and grey), 10-25 thousand skins of muskrats, 2-3 thousand skins of foxes. Since 1995 after liquidation of the state monopoly on furs the storage of furs began to fall sharply and now under special quotas (paid) the separate hunters (field men) extract in general about 500 skins of marmots which any more do not find a commodity market. A plenty of furs (marmot, muskrat, mink, marten, fox) is extracted by traps of local residents and realized in the illegal market. Storage (bag) of furs in the country is conducted in the territories which are not included in system of forest enterprises. For forest territories, the prospect can represent only a marten, squirrel and fox which number very low, and prospects of development of this branch are absent.

Trophies and commercial hunting (the hunting rounds): Territory of forest enterprises has no perspective, because potential species having high trophy value (a mountain goat - ibex, a Marko Polo argali) inhabit outside of wood territories. In Republic it is created about 150 private hunting facilities (only in Naryn region 80 facilities are created). The trophy potential only on a mountain goat makes about 1% from total number (about 250-300 individuals). But the most part of this trophy object is inaccessible (there are no roads, and delivery of the hunter costs more expensively to the profit). Therefore at annual sale by the state about 100 licenses, in available private enterprises the foreign hunters cannot extract the promised trophies. The same picture is observed with the rams of Marko Polo argali for which through international committee CITES it is allocated annually no more than 30 licenses. Absence in facilities of promised trophies results in the international scandals, bankruptcy of many facilities which at support of local authorities turn in the poaching procuring offices providing with meat of wild animals necessary people. The international rounds on auctions of Kyrghyzstan cost: on an ibex – 3.5 thousand US dollars, on a ram of Marko Polo argali - 12 thousand US dollars. But in Republic the State (state hunting authorities and State Agency on the nature protection and forestry) sell the licenses on an ibex for 1.5 thousand US dollars, on the ram of Marko Polo argali for 5 thousand US dollars. Then the regional authorities (administrations) for rent of the lands where hunting is going raises officially a payment from each hunting for an ibex of 0.5 thousand US dollars and on the ram - 2-3 thousand US dollars. Then the customs at export of trophies makes gathering. Besides that, since 2005 local residents, blocking roads, gather additional payments from foreign tourists. Thus, since 2005 foreign hunting tourism starts to disappear quickly.

Honey and production of beekeeping always took in forestry enterprises the important place in the commercial activity bringing the additional income. On apiaries, two persons usually contain at least 50 families of bees. In forest enterprises of the walnut and fruit zones, Talas and Toktogul regions there are till 20-25 apiaries on the average for forest enterprise, it is a little bit less in Issyk-Kul hollow, it is even less in Naryn and Batken regions. The plan of honey for an apiary in all forest enterprises is determined in 5 kg for a season. In some forest enterprises the order of compensation of shortage of honey is accepted by money, but usually the plan is not carried out and also incomes of beekeeping are insignificant. Forest enterprises honey pay on debts against Social Fund and Tax inspections for debts for the leased arable lands. Beekeepers exchange wax on wax-paper (frames). In the past in forest enterprises of Osh and Zhalal-Abad regions the commercial storage of the royal jelly was realized, now it is stopped. Repeatedly (the German project and the Japanese project) were made attempts to

organize export of honey to Europe, South Korea or Japan, but propensity in forest enterprises to underhand (fraud) was undermined with all undertakings. The price of honey in the local markets is 70-90 soms (1,5 - 2,5 US dollars) and basically is defined in cost of transport charges, thus there is the fraud in the selling of honey, when sellers frequently mix substitutes.

Meat of wild animals: In the forest lands only two species of animals' perspective for hunting and for preparation of meat occur. These are a roe deer and a wild boar. Number of roe in the forests is only 3-4 thousand individuals, and for wild boar it is 2-3 thousand. These two species suffer from persecution by wolves and poaching and for preparation of meat production are not perspective.

Raw material for medicine: In China bile of a bear and pants (horns with buckskin) a maral is appreciated, but number of these two species is very low and they are included in the Red Book of the country.

The raw material for dyes in the country is absent.

The area hunting lands in the country is 15 million ha, thus 14 million ha are covered by inter economic hunting planning (management) (1970-1973). The unproductive territory in 5 million ha is presented by glaciers, snow caps and rocks at absolute heights more than 4.5 thousand m. The protected areas system closed for hunting, as zones of reproduction and protection, occupies 950 thousand ha. In structure of hunting lands, 11,3 million ha are presented by grass-steppe lands located from 600 m up to 4500 m. above sea level, wetland areas present 0.8 million ha. In a zone of forest enterprises only 3.6 million ha (24 %) are located, from them forest and bushes hunting lands make only 1.2 million ha (8 %). Hunting societies (Kyrgyz-hunting-fishermen union) are fixed 4.5 million ha of lands, behind the state structures (Administration of the President, state forest service, state hunting economy) are fixed 0.4 million of ha. Private and joint-stock structures (firms of touristic hunting) rent 2.5 million ha (basically on the lands of a state property). Free hunting lands (which have no high values and to anybody unnecessary because of low efficiency or inaccessibility) cover 6 million ha. All fixed or rented lands are made out in the form of secondary land tenure, i.e. with payment of rent not without the right of use the lands, that considerably harms to development of the hunting resources consumption (use) and results in conflicts to the basic tenants – farmers, cattle breeders, shepherds and others.

Resources of the hunting animals: Number of game as a whole in the country is estimated:

1) A marmot, chuckar from 500 up to 1000 thousands individuals;
2) A hare, a see-see partridge, martens in the sum (an ermine, polecat, weasel) - from 100 up to 500 thousand individuals;
3) An ibex, in the sum waterfowls and other natatorial game - from 50 up to 100 thousand individuals;
4) A fox, a badger, a muskrat - from 30 up to 50 thousand individuals;
5) A squirrel, a pheasant - from 20 up to 30 thousand individuals;
6) A porcupine - from 15 up to 20 thousand individuals;
7) A mountain sheep (argali) - from 10 up to 15 thousand individuals;
8) A roe, a wild boar - from 6 up to 10 thousand individuals;
9) A marten, the wolf - from 3 up to 6 thousand individuals;
10) A lynx - from 1 up to 3 thousand individuals;
11) A snow leopard, a bear, a maral - from 500 up to 1000 individuals.

Staff and experts: During period of reforming and transition to market economic mutual relations the hunting sector as branch of economy, by present time has completely lost the potential for the several reasons:

a) The structure of members of hunting societies, i.e. hunters and field men in the country was reduced by the following rates: 1970 – 80th - 25-30 thousand members of hunters and fishermen, 1994 - 16 thousand, 1997 - 12 thousand, 2000 – 9.5 thousand, 2003 – 6.8 thousand, by present time (2005) in the country remained about 5 thousand members of societies, thus of hunters actively occupied with hunting - less than 3 thousand -all they are the inhabitants of cities Bishkek, Tokmak, Kara-Bolta.

b) In structures of public services (State hunting service, in nature reserves, in state sanctuaries, state forest economies) and in structures of private and public hunting economies the experts are not presented. Only 6 qualified experts remained in the country (all in the system of "Kyrgyz-ohotrybolovsojuz").

c) Because of loss of experts there was a loss of technology and hunting management at the state level: the control over places is absent completely, the accounts of game are fictitious, and the management of the consumption (mode of using) also is absent. The role of the state is limited only to gathering of money for decisions and search of system of taxes from consumers, including various taxes, fees, payment for rent, for the right of hunting, for the weapon and so forth.

Now the basic objects of hunting are the following: a mountain goat (ibex), a roe, a wild boar, a fox, a badger, a porcupine, a hare, a marmot, a muskrat, from birds: a chuckar, a snow cock, a pheasant, a quail. All citizens who have achieved 18 years age, having the right on the weapon and being have members of the hunting society have the right on hunting. Hunting for almost all species of animals is paid under licences, special cards for hunting and permits. In one year each hunter pays: the hunting duty, the tax to the right of hunting, the sanction to the right to have the weapon, the sanction to each kind of game, special hunting card (for birds), the seasonal either single permit or a membership dues to a society which are composed from payment of the maintenance of structure of purchase of forages for top dressing, transport charges of hunting society, construction and the maintenance of offices, cordons and other devices, and also payment of rent for hunting lands in regional bodies of land region. All this makes about 400-700 soms in one year depending on object of hunting. If to take into account expenses for an ammunition, transport expenses of the hunter, accompanying expenses for clothes and equipment hunting on the average manages in 1.0 – 2.0 thousand soms in one year on one hunter (50 USD). That is why the quantity of hunters was reduced from 30 thousand in 70-80 years up to 3-4.5 thousand in 2005, and the quantity of poachers has increased, not only due to left hunters from payment, but also is simple due to the inhabitants living near hunting manages (enterprises) since the control over places is not present. Poaching became norm and scope of this process is actually unknown. This phenomenon is especial is distributed in forest enterprises and high mountain uplands near shepherds parking. The most significant damage is rendered to a livestock of an ibex, an argali, a roe, a wild boar which extract for the sake of meat, and also a marmot, a muskrat, a mink, a marten who extract for sale of skins. The taken into account parameters of extraction of game already for a long time cause alarm (Table 17).

Table 17 Parameters of extraction of game in Kyrghyzstan (average in one year)

Years	Ungulates in the sum Thousand individuals	Predators (a fox, a wolf) Thousand individuals	Rodents (a marmot, a muskrat) Thousand skins
70-80 Years	3-4	3-4	45-50
1994	0,5	0,3	13,7
1997	0,3	2,3	-
2000	0,7	(acceptance skins) is allowed	10,6

In 2004 on Republic it is procured, more truly, it is given licenses on 202 roes (got 0.7-0.8 thousand earlier) and 38 wild boars (got 1.2 – 1.5 heads, including 100-150 heads for delivery of meat in a trading network earlier). Now the question of increase of cost of sanctions and toughening of retaliatory measures (increase of penal sanctions) is considered. All these measures under absence of the control over places will result in the even greater abandoning of legality in hunting and the further development of poaching. Potential of development of the hunting economy and necessary measures for correction of a situation very different in dependence on specificity of sectors of branch.

Sports hunting economy and activity of hunting societies.

The potential of development of the activity of sport hunting economy is still kept, since still there are available the hunting societies, but it is necessary to carry out measures on sharp decrease various having overcome and reduction of the dimensions of total payments the average dimension of incomes of inhabitants. Especially it is necessary to strengthen legal maintenance of rent of the lands by societies and regular regime of the staff rangers' preservation. But nevertheless, in conditions of ecological recession, when one trip to the hunting lands costs more expensively the average monthly salary of the ranger in hunting enterprise, to expect efficacy from preservation, management and functioning of this branch it is not necessary. Increase profitability of the public hunting economies can be secured by development of commercial hunting tourism only, but the entered new payment for licenses 30 % of a total cost of round in which estimate increase of the rate was not provided also that results in absence of profitability of these services are equal.

The state hunting facilities and their efficacy.

These facilities are financed due to the budget, therefore efficacy of their activity ambiguous. Frequently increase of cost of various collecting is connected to charges on these facilities and for maintenance of their efficacy.

Fur craft.

Last decade interest to furs has sharply fallen. The fur of the squirrel, marmot and muskrat already costs very much low and frequently extraction of them became not profitable. Still favourable there is a craft of the marten and the fox, but state frames are going to raise cost of licenses. For increase of profitability of all fur craft it is necessary to develop the small commercial enterprises in ranges of fine fur high quality products.

Commercial foreign hunting.

Trophies of the country are appreciated only two kinds: the argali and a mountain goat (ibex). The potential of the country on extractions of these trophies is rather high. So, in the country the horns nominated as the world champions have been procured: an argali with 162 sm and a mountain goat 157 sm. But various requisitions of state frames, including corruption, in ranges, and also all intensified the tendency of local communities by any routes to gather earning firms and tourists do these services risky and unprofitable. Recently a plenty of the hunting facilities (joint-stock and private) appeared which owners are relatives of officials in regional administrations, but at change of authority in regions varies and redistributed possession of these hunting economies. Many facilities have no incomes actually and foreigners, but extraction of hunting game animals, including females and offsprings descends the year round for storage of meat. All this made the problems of deep crisis of management in the hunting economy.

Development of nurseries and realization of animals.

In the past the country delivered about 3 thousand pheasants and about 100 wild boars annually for acclimatization in other countries. In Republic the State nursery of pheasants and Nursery of falconry (financed by the Ministry of Agriculture of the USSR) reacted. Works on semi-captive breeding of deers, fallow deers, bisons (in Sary-Chelek nature reserve), a maral (in Naryn nature reserve) were conducted. For export through system of Zoological organizations ("Zookombinats") there were paid up to 5 thousand singing passerins, 100-200 individuals of squirrels, 50 individuals of swans, 5 snow leopards on the average were paid annually. By 1990th years all capturing have stopped. Deers and bisons were shot on meat. Nurseries for the lack of financing have stopped the existence. The equipment and technologies are lost, and experts have emigrated. Now with the big work with assistance of the Moscow zoological garden and the Kazakh hunters have been caught 12 Marko Polo argali and 12 ibexes for nurseries of rescue of infrequent kinds of the critical countries (the International program of rescue of species of Nepal, Afghanistan, Tadjikistan, Uzbekistan, Kyrghyzstan and Mongolia). But sending is stopped; animals are confiscated and transferred to Karakol zoo to a menagerie where they will soon be lost.

Wood programs and projects on management of forest lands

Successful international projects are the central Asian project on the conservation of a biodiversity of Western Tien-Shan, the Kyrgyz-Swiss program of a support of a wood the Les-Ik, the project of the German society of technical cooperation (GTZ), French-Kyrgyz project on management of forests in Batkent region, the Kyrgyz-Finnish project on resources of pastures and forests, the Program of small grants of UNDP, etc.

Rather fast after UNEP (1992) there was appeared a general comprehension of inevitability of transition from consumer use of forest resources to ecosystem approach in forests control focused on search of balance between interests of the people and conservation of forests as the vital ecosystems of the Planet. Necessity of revision of principles of interaction of economic systems with an environment, introduction of ecosystem mechanisms, i.e. sustainable management of forests and maintenance of availability of the most requiring in resource base, has become obvious in the Kirghiz Republic at preparation for the World Summit on Sustainable Development (Johannesburg, 2002). The forest sector of Kyrghyzstan should develop of the new theory of the management which are adequately taking into account both -

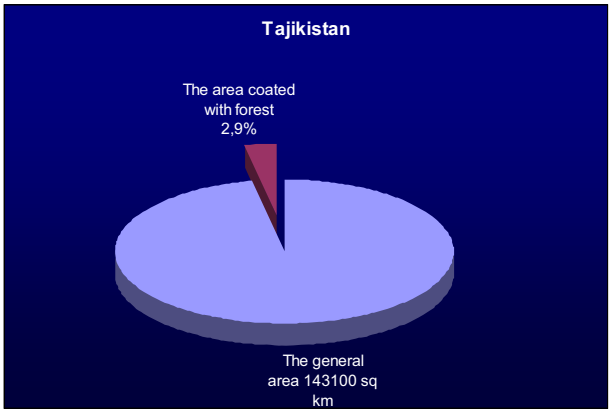
ecological and social aspects and the growing role of forest sector in sustainable development, conservation of a biodiversity and to fight against poverty. To 2003 the main substantive provisions of a forest policy have been determined, and the Concept of management by forest sector (2004) was produced. In a basis of the Concept the institutional and structural reform, legal reform and development of information and educational system on principles of an openness and availability lay. Modern system of forest management where economic functions and functions of the government are incorporated will be reformed by division of control-regulating and economic functions so that:

- Functions of management, including the control and regulation, structures of a state forest service executed;
- Functions of economic use, including use by all resources in forest lands, a private sector, with a support on community economy execute with introduction of market attitudes, norms and criteria of business.

Models of institutional organization of forest management, reproduction and sustainable use are developed with allowance for environment characteristics of forests and presented by 4 types of nut-fruit, coniferous-spruce, juniper and gallery-river forests:

- In nut-fruit forests the institutional organization of management, restoration of a wood, protection and forest utilization will educe on model of community management of a forestry in which the private sector will be engaged in collection and processing of wood and non wood forest products;
- In coniferous-spruce forests in dependence on vigour of a source of raw materials (a store of a mature wood) and an opportunity of organization of large-scale manufactures, the contract (concessionary) organization of works on a forest use with development of small and average business on wood-processing and to complex use of wood resources is planned;
- In juniper and gallery-river forests within the framework of a private sector development only collateral use by resources and forest management measures will receive. The control and regulation of use by forest lands will be saved behind the State forest service.

7 FORESTS OF TAJIKISTAN AND A PROBLEM OF NON-WOOD FOREST PRODUCTS USE



Tajikistan differs, as well as all mountain countries, by large diversity of an environment that explained by complex relief of country. The Republic is crossed by the highest ranges of Tien Shan and Pamir. It defines the sharp exhibiting a vertical zonality of a plant cover. On an environment conditions Tajikistan is subdivided into five large regions: Southern, Central and Northern Tajikistan, Western and Eastern Pamir. In Southern Tajikistan with rather low ridges at low heights, lower than 600 m, the vegetation is presented by ephemeras and low herbage e semi-savannas composed. It was generated at the place of destroyed earlier pistachio forests from *Pistacia vera*. Now pistachio forests grow by separate isolated masses on slopes of mountains at height of 600-800 m. They are replaced, at height of 2000 m by mixed pistachio-juniper, and then juniper forests from *Juniperus seravschanica*. In valleys of the rivers were saved a stain of riparian forests of Central Asia from an oleaster (*Elaeagnus angustifolia*) and poplars (*Populus pruinosa*). On sands in a lower reaches of the rivers Vakhshs and Kafirnigan white saxaul from *Haloxilon persicum* and saltwort from *Salsola richteri* forests are distributed.

In the Central Tajikistan where enter Southern Gissar, Karategin, Washhshsk, Darvaz and Peter the Great ranges with abrupt and rocky slopes and more wet climate are distributed mesophilic broad-leaved forests, or a black forests, from a Persian walnut (*Juglans regia*), a Turkestani maple (*Acer turkestanica*), apple trees (*Malus sieversii*), etc. They are presented by small separated plots at height from 1000 up to 2200 m on boreal slopes or in valleys of the rivers and differ a rich standling timber. In Pamir-Alai forests from more drought-resistant races - a Bukhara almond (*Amygdalus bucharica*), a hackberry (*Celtis caucasica*), a Regel's maple (*Acer regelii*) and other, characteristic for a scrub forest grow. Above 2000 m high-mountainous sub alpine meadows, changing on 2500 m by motley-grasses steppes are distributed, also included in forest fund of Republic.

Northern Tajikistan with high crops Zerawshan, Turkestani and Kuramin differs by drier climate. The tree vegetation here begins about 1700 m above sea level by bushes from *Spiraea hipericifolia, Amygdalus spinosissima,* and various species of *Ephedra*. From height of 1800 m it is selected two belts of juniper forests: inferior from *Juniperus seravschanica*, top - from *J. semiglobosa* and *J. turkestanica*. Small birch forests from several species (*Betula sp*.) grow near the water. On Western Pamir with high (up to 6000 m) ranges and dry climate the tree vegetation is infrequent and located mostly in valleys of the rivers. In mountains the Persian walnut, an apple tree and a sherry - plum (*Prunus divaricata)* grow, the Central Asian globe-shaped juniper, some species of birches (*Betula sp*.), than willows (*Salix sp*.) and Pamir poplar grow higher. On Eastern Pamir with heights up to 6900 m with the extremely severe conditions, a currant (*Ribes villasum*), a barberry (*Berberis kaschgarica*), a sea buckthorn (*Hippophae rhamnoides*), a honeysuckle (*Lonicera spp*.), a cotoneaster (*Cotoneaster uniflora*), etc. lift in the highest valleys of the rivers.

Broad-leaved forests (black forest) are distributed at height of 1000-2200 m. They are composed by humid and heat-loving tree species - a Persian walnut, a Turkestani maple, a Sievers's apple, an eastern plane tree. Under human influence during centuries and till now there is a reduction of these forests. Forests are formed by tall, up to 18-20 m, trees. Here though there are many bushes, but they do not form thickets. In herbage the mesophilic high grasses prevail, serving as good pastures. At the inferior border they are enriched by xerophit breeds – a Bukhara almond, a hackberry, a Pontiac hawthorn (*Crataegus pontica*), etc.

Maple forests from a Turkestani maple are most distributed in broad-leaved forests, occupying more than 30 thousand ha. These are rich plantings in height up to 15 m. Together with a maple in the first storey frequently there is a Persian walnut. The second storey develops by apple tree, sometimes a Persian mountain ash (*Sorbus persica*). Bushes in thick forests are diverse in the specific attitude *Rosa corymbifera, Lonicera nummulariifolia, Exochorda albertii*, etc. Grass stand is rich and high from bishop's-weed, touch-me-not, and yellow balsams. At throw maple forests change by shrubs. At the top border they are replaced by juniper, at inferior - by a xerothytic rarefied forest.

Walnut forests occupy in broad-leaved forests the second place. Now their areas compound about 9 thousand ha, although only 40 years back their area counted about 20 thousand ha. They meet fragmentary, small masses on the area in a belt from 1300 up to 2000 m. Here the walnut forms the first storey, frequently together with an ash (Fraxinus sogdiana) or with a poplar (Populus alba); the maple and an apple tree form a second storey. Underwoods consists a sherry - plum, a Turkestani hawthorn and form other high bushes, characteristic for maple forests. A grass stand is rich and high from meadow-wood kinds.

Apple forests have no a wide circulation. They appear after throw of a walnut or a maple composing an upper storey. On structure of a standling timber and herbage they are close to original forests.

Plane-tree forests from *Platanus orientalis* in Pamir-Alai were saved only fragmentary by narrow strips in the river valleys, not occurring on slopes, at height of 1000-1300 m. These forests have the dead covering from dry leaves.

Ashen forests from *Fraxinus sogdiana* occupy small plots at heights of 1000-1650 m also along the rivers on Gissar and Peter the Great ridges. Other races grow badly together with it. The grass stand is combined only from shade tolerant plants - a mint, a horsetail, etc.

Persimmon forests from *Diospyros lotus*, as well as an ash, have no the large distribution. On Karategen and Darvaz ranges they are settled along the rivers at heights of 1200-1300 m. Usually under their cover the Persian walnut, a sherry - plum, a cherry (*Prunus mahaleb*), a Turkestani hawthorn grow. On Darvaz range together with persimmon the fig (*Ficus carica*), an eastern plane tree grow. From lianas there is a grape (*Vitis vinifera*).

Juniper forests occupy in Pamir-Alai more than 120 thousand ha of mountain slopes. They are composed basically by three kinds of the juniper forming two well-marked belts. The inferior belt at heights of 1800-2200 m is defined by forest forming value of juniper - *Juniperus seravschanica*. The top belt from 2200 m and up to the top limits - from *Juniperus semiglobosa* and *J. turkestanica.* The inferior belt passes on slopes of ranges of the Central and Northern Tajikistan. In Southern Tajikistan they are located only by fragments on watersheds of low ranges. On the top border they adjoin with upper juniper belt. In dry

conditions it is pure forests, into more wet in their structure enter a Turkestani maple or a poplar. In a second storey of such forests there is Sievers's apple tree and a Bukhara pear (*Pyrus bucharica*). The underwoods consist of a honeysuckle, a dog rose (*Rosa kokanica*) and *Cotoneaster subacuta*. Herbage is high and rich from cereals and motley grasses. Juniper forests with a Tajik poplar (*Populus tadshikistanica*) are located on terraces of the mountain rivers. The structure of bushes here includes also a barberry. Herbage is formed by a St. John's worth, an origanum, a yarrow, etc. The most widespread types of juniper forests in Pamir – Alai is with couch-grasses. It is located almost on all ranges of Northern, Central and Southern Tajikistan. These are pure juniper forests with an underwood from a honeysuckle, a dog rose and a cotoneaster. In upper juniper belt at its inferior border the globe-shaped juniper is distributed, at the top border domination passes to a Turkestani juniper. The first grow at height of 1800-2800 m, not forming continuous masses and are familiar for more wet places. They are frequently mixed with a Turkestani juniper, or on more wet places with a birch and a Turkestani mountain ash. In an underwood the Meyer currant, an oblong barberry, kinds of a honeysuckle are usual. The Turkestani juniper is most widely distributed on Turkestan, Darvaz and Peter the Great ridges at height of 2400-3200 m. High-standing and rich they are only on northern slopes. It always pure juniper forests. In them it is not enough bushes. Herbage is by mesophilous character, not having good nutritional value for cattle, against of other types of juniper forests.

Light, very rarefied forests concern **to a xerothytic thin forest** from thermophilic races of a pistachio nut (*Pistacia vera*), a Bukhara almond (*Amygdalus bucharica*), maples (*Acer pubescens A. regelii*), etc. The Basic areas from them are occupied by pistachio forests, and much less - amygdaloids - about 5 thousand ha. Pistachio forests are located at height from 500 up to 1200 m on ranges of Southern Tajikistan. These are very rarefied forests with many low trunks (up to 5-6 м) trees. Occasionally their structure includes an almond and redbud (*Cercis griffithii*). Bushes from an almond (*Amygdalus spinosissima*) and a bean - caper (*Lygophyllum gontscharovii*) are small. The grass stands consist of ephemers and annual grasses, or various kinds of a sage-brush. Pistachio forests are of great importance for local population because of the valuable fruits giving to families in rural areas a significant part of the income.

Amygdaloids from a Bukhara almond in the Central Tadjikistan are wide distributed at height of 900-1700 m on southern slopes of ranges which boreal slopes are occupied with broad-leaved forests. They are rarefied, seldom clean. Usually their structure includes a hackberry, a Regel's maple, and a Pontiac hawthorn, less often a pistachio nut. On Darvaz range to them the pomegranate (*Punica granatum*), a sweet almond (*Amygdalus vavilovii*), a katsura tree, etc. are admixed. In herbage umbellate and high cereals prevail.

Small-leaved forests in Tajikistan include forests from moisture-loving and cold-resistant races of birches, poplars, willows. The areas under them are insignificant. About 6 thousand ha are occupied with a poplar, less than 6 thousand ha a willow and about 2 thousand ha - a birch. They are usual for high mountains of Northern and Central Tajikistan on Darvaz, Peter the Great and boreal slopes of Gissar ranges. Birch forests form small groves or narrow strips of 8 species of a birch along the rivers, at lakes. In a second storey in them the mountain ashes, various kinds of a willow, a sea buckthorn are presented, from bushes – an Yanchevsky's currant, an angustifoliate honeysuckle grow. In herbage only moisture-loving grasses, a sedge grows.

Poplar forests from *Populus tadshikistanica* occur at height of 1900-2200 m. In mixed plantings their structure includes a Turkestan maple, an apple tree, a Zeravshan juniper, and at the top border a birch. At an underwood there is a barberry, a honeysuckle, a currant, etc. The herbage is with cereals and motley grasses. Poplar forests from *Populus pamirica* there are small groves at height of 3850 m, forming croocked forest. In an underwood here there is a Pamir honeysuckle, a willow and a sea buckthorn. For the population in these areas the forests are the source of fire wood, hay, fruits and sea-buckthorn berries.

Tugai, gallery forests were saved only in a lower reaches of Vakhsh, Kyzylsu and on Syr-Darya rivers, at heights of 300-400 m. The large part of lands occupied in the past by tugai, is run in under agricultural lands. Tugai forests are composed from an oleaster (*Elaeagnus angustifolia*), poplar (*Populus pruinosa*) and a tamarisk (*Tamarix pallasii*). The structure and composition of riparian forests of Central Asia entirely depends on a groundwater table which level frequently varies. At their high level forests from an oleaster educe, at low it is changed by poplar. Forests from an oleaster are most widely distributed in a lower reaches of Vakhsh and Kafirnigan rivers. These forests are rich, with height up to 13 m. In herbage there are presented high cereals *Erianthus ravennae, Phragmites communis*, and also a naked licorice (*Glycyrrhisa glabra*). Poplar forests usually replace an oleaster at falling a groundwater table. They are or in a mix to an oleaster, or clean. Plantings are always light. In an underwood from bushes there is only a tamarisk. The herbage same, as in oleaster tugai, but *Imperata cylindrica* is added. Trees intertwisted with lianas *Cynanchum acutum*.

Sandy forests in Tadjikistan are presented poor. They are occurring by small masses in three localities - in a lower reaches of the rivers Vakhshs and Kafirnigan and in a valley of Syr-Darya. The white saxaul is the most widely distributed. They are rarefied and also presented by mixed plantings from *Salsola richteri* and *Calligonum griseum*, *C. prczevalskii.* The herbage is presented poor. For local population these forests can serve only as a source of fire wood.

Twenty years back the forest enterprises annually prepared on the average 450 tons of ephedra going for preparation of medical products, 35 tons of sea-buckthorn berries, near 40 tons a dog rose, 10 tons of *Ungernia*, 170 tons of a Persian walnut, 200 tons of pistachio nuts, 150 tons of pomegranates, 5 tons of a barberry, 500 tons of a rhubarb, 1 tons of *Bunium sp* (spicery).

The fauna of Tajikistan is diverse. In riparian forests of Central Asia live a Bukhara deer it (reacclimatized), the jungle cat, a jackal, a wild boar, a hare, a fox, a striped hyena, and other mammals; and birds - a pheasant, a quail, etc. The stone marten, a brown bear, a weasel, an ermine, a lynx, a wolf, a snow leopard, a Siberian mountain goat, etc. occur in mountain forests. The birds are presented by see-see partridge, a chukar, a wood pigeon, etc. Many of them are trade and hunting-game animals, but information on hunting and use of these animals and volumes of production are absent.

The area of state forest resources of Tajikistan compounds 1800 thousand ha, except for them are present 50 thousand ha of the forest area, belonging to farms. The area covered with a wood now compounds 410 thousand ha of 740 thousand ha of forest fund. From non-forest lands of forest fund haymaking occupies with 4.7 thousand ha and pastures for a distant pasturing of cattle - 840 thousand ha (the Source - Agency of Forestry of Tajikistan). The general store of wood in forests of Tajikistan estimates in 5.3 million m3, but it annually decreases on 0, 036 million m3.

Intensifying of exploitation of natural vegetative and animal resources has caused negative changes in their condition, ecosystems become to degrade, and some species of animals and plants become to extinct (disappear). It has caused of establishment of special protected areas network in the most valuable types of ecosystems. In Tajikistan 4 nature reserves, 13 sanctuaries and 2 national parks (Table 18) have been organized.

Table 18 Special protected areas in Tajikistan

Name	**Year of foundation**	**Area (thousand ha)**	**Name**	**Year of foundation**	**Area (thousand ha)**
Strict nature reserves:			Sanctuaries:		
Tiger Gorge	1938	49.8	Muzkul	1975	68.0
Romit	1959	16.1	Sangvor	1969	51.0
Dasstijum	1983	16.0	Kamarov	1959	9.0
Zorkul	2002	16.5	Childukhtaron	1972	12.6
National parks:			Karatau	1959	14.2
Tajikistan National park	2001	2,600.0	Iskanderkul	1976	28.5
Shirkent National park	1993	30.0	Saivota	1959	4.1
Sarikhosor National park	2003	3.8	Zeravshan	1977	5.0
			Kusavlisay	1979	20.0
			Aktash	1984	15.0
			Nurek	1984	30.0
			Dashtijum	1984	30.0
The general area 3 062.8					

After reception of the status of independence of the state in Tajikistan one nature reserve – Zorkul for preservation of water animals and bank vegetation, and 3 national parks have been organized. All sanctuaries have been organized in the Soviet time. The general area of protected areas is 98.4 thousand ha, that compounds 5.5 % from area of state forest fund. They conserve one plain-tugai, one juniper phyto-cenosis and one - deciduous forests. Sanctuaries are established practically in all landscape zones together with national parks, but they now don't execute their functions. In the long term perspective the Government of Republic supposes to transfer of the some sanctuaries in the higher status of strict nature reserves.

The Republic Tajikistan occupies rather small area in 14310 thousand ha from which 93 % presented by mountains, including high-mountainous Pamir almost unplanted. The population of Tajikistan is 6400 thousand persons. For the last 20 years it has increased by 1900 thousand persons, or nearly so in 1,5 times. Accordingly, the pressures from anthropogenic

activity for natural ecosystems also have increased, including forests, because the rural population compounds 65 % from general number.

All forests of Tajikistan are state and belong to public sector. The guarantor of conservation, restoration and rational use of forests is the State Committee of Environmental Control and Forestry (SCECF). The large part of forests is in management of this Committee, except for 50 thousand ha of forests managed by farms. However the control over their condition is assigned to a state forestry. The general area of forests in Tajikistan for years of independence, since 1990 has increased only for 2 thousand ha (Table 19), but quality of forests worsened due to strong anthropogenic pressure. For the lack of fuel on fire wood the tree vegetation is cut down and completeness of woods is reduced. Not normalized grazing of cattle destroys the natural restoration of forests, and total collecting of harvests of fruits and nuts also influence at this situation. For the last years the number of forest enterprises has increased from 27 up to 35, which in the long term should improve management of forests.

The main part of the population of Republic lives at an irrigated lands and has no access to forests. Forests are sparse by small masses almost on all mountain ranges and the settlements of people are located almost near to each of these masses which use non-wood forest production and render constant influence on a forest. Thus, practically all forests are subject to strong anthropogenic influence. Conditions of Republic are enough dry and forests have small stores of a biomass, trees do not give the big crops (harvests), the collecting of non-wood production is so limited and local population mostly uses it for own purposes.

Forest utilization is effected on a contractual basis with representatives of forestry: the population collects non-wood forest production, a part from which they hand over to the state, and they can sell other part at own discretion. Such production is presented by a Persian walnut, a pistachio nut, and different kinds of fruits - apples, pears, sherry - plum, dog roses, drug plants, etc. For an insignificant pay the grazing of cattle is effected. Volumes of collecting of non-wood forest products in Tajikistan are presented in Table 20. In the table there is no information on preparations of separate kinds of non-wood forest production, and is given only on some groups of their application. Preparation of hay is carried out since wood haymaking rather in low volumes and in the last years they have decreased to 4.5-2.8 thousand tons, because of deterioration of vegetative conditions. Hay basically is collected for needs of forestry and workers of forest enterprises; other population has no access to it enough. During independence time, the preparation of medicinal plants decreased, from 480 up to 7 tons because the relationship with a pharmaceutical industry of other states was destroyed and practically stopped. Local population collects the medicinal grasses for own needs, but the statistics on this question is absent. For the last years the quantity of the collecting of ornamental (decorative) plants more, than twice has increased, that can influence hardly on the conditions of populations of separate kinds of the plants best-selling in the market. The fruit picking in forests in the last years is saved at one level, with fluctuations because of weather conditions. Preparation of fruits is rationed by nobody that influences natural resumption of woods.

Manufacture of honey was considerably reduced for the last 15 years. The last 10 years it practically was not going, though opportunities of natural phytocenosises allow to increase its quantity in tens times. The population does not have not enough means that content of apiaries. Very important problem which is linked to stores and reproduction of wood resources is the poverty of the population. It forces villagers, and sometimes and urban inhabitants intensively use the forests of Tajikistan, that hardly influences their conditions. An

intensive not rationed grazing of cattle (forest areas and other grounds of forest resources are used both summer and winter pastures), preparation of fire wood, and a harvest of nuciferous races, and also medicinal grasses, etc. results in an attrition of forest resources. All of them are accessible to rural population of mountains and there are now under threat of extinction.

The policy on forest management is defined by the state and Government of Republic Tajikistan and has found the reflectance in the Constitution of Republic Tajikistan, in Laws "On nature protection", "On bowels", "On use of fauna", "On special protected areas", in Wood codes and decrees of government of republic. Development of forestry is closely interconnected to other branches of a national economy. The main policy of Government and the state is directed on conservation and restoration of mountain forests, as one of main components of conservation of natural resources of republic and a main component of conservation of soils from erosion. Despite of a heavy economic situation, the Government of Tajikistan present the finance on restoration of forests of various purposes. Besides with the purpose of more rational use of forest lands the State present and strengthens behind forest enterprises the lands from state fund with the purpose of expansion of forest areas. Development of forestry is closely related with the economic and social programs developed by the State.

One of the major acts is the law of Republic Tadjikistan «About nature protection» (accepted in 1993). The present law in a complex with organizational, legal, economic and educational measures is called to promote formation and strengthening of the ecological law and order of protection of environmental natural medium in interests of the present and the future generation and to maintenance of ecological safety in terrain of Republic Tadjikistan. The basic purpose of the considered law is:

- Maintenance of a specific diversification and conservation of conditions of reproduction of historically generated kinds of a flora and a fauna;
- Preservation natural communities, conservations of balance of nature, development of ecological monitoring.

Parliament of Republic Tadjikistan in 1993 is accepted by decree on Forest Code of Republic Tadjikistan which basic purpose is conservation of forest resources of Republic, and also preservation and rational use of lands, waters, fauna and flora which is taking place in the territory of forest fund. The regulation "About forest wardens economies of a production association of Republic Tadjikistan" which basic purpose is regulation of works of forest wardens of economies, management of the state control over preservation of a forest and its resources, and also regulation of hunting, the tax medicinal and foodstuffs is accepted also. In 1994 the law "About preservation and use of fauna" and in 1996 - the law "About special protected areas" has been accepted. Besides with the purpose of protection and rational use of forest resources by the decision of Government norms and the dimensions of fines for infringement of the legislation on a forest are determined.

Now the main political document for sector of a forestry of Tadjikistan is the *Document of Strategy of Reduction of Poverty (DSRP)* and *the State ecological program on 1998-2008*, approved by Government of Tadjikistan accordingly in 1997 and 2002. Documents recognize that the sector wood economies will be one of priority directions of socio economic development of country, and confirm the obligation of government on an all-around development of a national Policy of forestry. Documents state the program of action during

the term of 2002 - 2008, and establish principles which will promote development of a national policy in all ranges, including forestry.

In these documents it is indicated, that the Government starts realization of these documents which are directed on maintenance of rational use of natural resources of Tadjikistan, maintenances of an optimum condition of lands, forests, pastures, water resources, conservation of biological diversity, preservation of rare and vanishing species of flora and fauna. Research of levels of pollution of ecological system is now started, and the special commission watches infringements of laws on nature protection. A means secreted from a public finance with the purposes of environmental control, do not cover even realization of is minimum necessary nature protection measures, and alternative sources for their realization now are not present. Cooperation to international organizations in sphere of environmental control is on a low level. The legislative and regulating base on environmental control requires revision and unification.

Other important document where the problem of forestry is mentioned, conservations of forests and expansions of their areas – "Program of development of agriculture up to 2015". According to this document, the Government will promote development of plantations of trees with the purposes of maintenance of local population with building timbers and fire wood. Besides questions of conservation of woods and their protection against cuttings down have found the reflectance in to the "National action programme on struggle against a desertification" and "Strategy of actions on conservation of a biodiversity", authorized by Government of country. Preservation of forests now is considered as very important matter. Taking into account the problem of mountain forests conservation, the Government of Tajikistan in 2004 has made the decision on affiliation of the Ministry for nature protection and Association on forestry production of Republic of Tajikistan, and on their base the State committee of Environmental Protection and Forestry of Republic Tajikistan was established. In which frame an Agency of Forestry has been organized. All forests of Tadjikistan are in the state property. The State Committee is the guarantor of their conservation, regeneration, widening and rational use. Mostly forests are belonged in conducting of Agency and the small part of them is in collective farms. However the control and rational use of these forests is assigned on State Committee. Besides frame of forestry enterprises, the State Committee includes 4 nature reserves, 2 national parks, 13 sanctuaries.

Widening of exploitation of natural resources was the cause of that separate natural complexes and their elements began to be exposed to basic changes, and some valuable species of animals and plants have disappeared. It has caused of building of the special protected areas assigned for conservation of unique and petering landscapes. This problem in Tajikistan attract the big attention: in republic there are 4 nature reserves, 13 sanctuaries and 2 national parks.

Nature reserve "Tiger gorge" is located in a southwest part of republic, and this is the only single in the world nature reserve of desert – tugai type in the zone of dry subtropics of the Central Asian type. On southern slopes of Hissar range, the mountain reservation "Romit" is located. Other mountain reservation "Dashty-Djum" is located in a southeast part of the country, on strong partitioned slopes of mountain Khazratishokh ridge, in the zone of small-leaved forests. It is unique reservation in the CIS where the population of Markhor and unique pistachio light forests is kept. Tadjik and Sherkent state national parks have been established for preservation of the unique and aesthetic attitude of a mountain landscape, at simultaneous adjustable recreational use, and carry out the major cultural and educational functions for

broad masses of the local populations. However, it is necessary to note, that these National parks till now do not carry out their functions and remain “paper parks”.

In a submission the Agency on forestry of State Committee of NP there are 13 sanctuaries which carry out various functions and cover almost all natural-landscape zones of republic. Zeravshan ornithological sanctuary was organized on the north of republics in the low-lands of Zeravshan river. Karatau sanctuary was organized in the zone of pistachio light forest. Dashtydjum sanctuary was established for conservation of whole population of Markhor goat. Dashty-Maidan, Kamarou, Sangvor sanctuaries were created in the zone of mountain broad-leaved forests and nut and fruit forest gardens; Iskanderkul, Kusavlisay and Saivotinsky sanctuaries were established in the juniper forests, Zorkul and Muzkol sanctuaries - on Pamir.

The nature monuments taken under the state preservation are presented by various unique objects of the nature, occupying insignificant areas. At present in total in republic the given status is appropriated to 162 objects, such as natural tracts “Archa Mairon”, Kuli Varsaut, Childukhtaron, to forest gardens in the flood-lands of Sardai-Miena river, “tugai”vegetation in the flood-lands of Obisurkh and Vanch rivers, salt dome of Khodja Mumin and Khodja Sartiz, rock Chirak-Tash, “Burning mines”, etc.

As it was above marked, the special protected areas not always in a state in full to carry out the problems put before them, in this connection Tajikistan should develop and submit the “Concept on the development of a network of nature protection areas of Republic Tadikistan”, providing widening and strengthening of preservation of unique objects of the nature, in particular, transition of the some sanctuaries in the status of strict nature reserves.

Mentioned above actions will promote the further conservation of the unique mountain nature and conservation of a gene pool of mountain forests and faunas. For this purpose it would be reasonable to have the uniform network of protected areas and their incorporation in the general system of ecological monitoring is supposed.

Table 19 Information on the forest lands

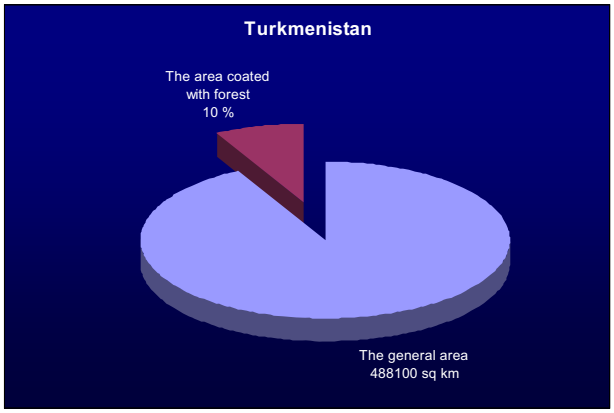
		1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Territory of the forest lands	Thousand hectare	408	408	408	408	408	408	408	408	410	410	410	410	410	410	410
Quantity of forest enterprises	Pieces	27	27	27	27	27	27	27	28	30	30	32	34	35	35	35
Special protected areas	Thousand hectare	380	380	380	380	380	380	380	380	380	380	380	380	380	2980	2980

Table 20 Information on Non-Wood Forest Products in Tadjikistan

Plants / raw material	**units**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
1. Food (Grains)	Tons	254	291	320	267	301	310	320	326	338	349	290	293	438	252	302
2. Fodder	Tons	5950	6550	7453	5483	4376	3963	3276	3186	3095	2750	2765	4450	3235	2947	2863
3. Raw materials for medicine and aromatic products	Tons	450	470	480	126	86	28	32	30	30	33	25	8	15	7	7
4. Raw materials for colorants and dyes																
5. Raw materials for utensils, handicrafts and construction																
6. Ornamental plants	thousand pieces	746	834	926	763	657	837	920	1173	1213	1686	2200	749	1203	1451	1620
7. Exudates																
8. Other plant products *	Tons	1057	1187	1049	985	452	396	332	300	311	361	417	1290	1027	722	1044
Animals																
9. Living animals	Pieces	5345	5787	5144	4963	5078	5476	5696	6085	6238	6439	6781	5603	6347	6611	6674
10. Hides, skins and trophies																
11. Honey	Tons	46	39	26	17	7	4	3.5	3	2.5	2.8	1.4	1.3	4.1	3.1	3
12. Bush meet																
13. Raw materials for medicine																
14. Raw materials for colorants																

* Other plant products are – nuts and fruits, dried fruits, seeds, pits, melons and gourds, rhubarb, onions and others.

8 FORESTS OF TURKMENISTAN AND A PROBLEM OF NON-WOOD FOREST PRODUCTS USE



Turkmenistan occupies extensive territory in 488.1 thousand км2 in a western part of Turan lowland. It is located in a zone of an arid climate with annual quantity of a rainfall on plain 120 mm / year, and in mountains - no more than 320 mm. 85 % of territory are presented by arid landscapes. Here it is possible to select the following types of forests: mountain slopes, flat tugai, forests of an arid zone. In Turkmenistan 127 species of trees and bushes grow. The forest area in desert compounds more than 91 million ha, in mountains - 0,5 million ha and tugai - 0,05 million ha. The area covered with a wood compounds 4.1 million ha, of them in mountains - 0,1 million ha, deserts - 3,7 million ha.

Not wood area of forest fund is presented by arable lands, haymaking, gullies, abrupt slopes, etc. Per capita it is necessary 3.8 ha of forests. Percentage of forest lands in Turkmenistan compounds more than 10 %. It speaks that, that forests of arid sandy races are ranked as the area covered with a wood. 40 years back forest enterprises of Turkmenistan it was prepared by 60-65 thousand m3 of a wood from which almost 40 thousand m3 in saxaul and saltwort forests, 14 thousand m3 in tamarix, the rest - in mountains and tugai (gallery river) forests.

Mountain forests are located in mountains of Kopet Daghs, Big and Small Balkhany, Kugitang. Mountains have hardly divided relief and in this connection very impure vegetative conditions. Main purpose of mountain forests consist not in reception from them wood or non-wood forest products, but in improvement of ecology of mountain territories. For all forests of Turkmenistan mountains, the dispersion, small percent of forest covered areas and rarefied places are characteristic. Mountain forests are located on the area of five forest enterprises. They have rather small structure of races. The basic forest forming races are the Central Asian juniper (*Juniperus turkomanica*), engaging about 24 thousand ha. The second place on the area (about 12 thousand ha) the pistachio forests occupy (*Pistacia vera*). Other races are very insignificant on the area: an almond (*Amygdalus communis*) about 1 thousand ha, a maple (*Acer turkomanica*) about 6 thousand ha, elm (*Ulmus spp.*) – 0.3 thousand ha, willows (*Salix spp.*) - 0, 2 thousand ha, a Jerusalem thorn – 3.5 thousand ha, except for them a Persian walnut (*Juglans regia*), an ash (*Fraxinus sogdiana*), an elaeagnus (*Elaeagnus angustifolia, E. orientalis*), etc. The area covered with a wood is presented not by continuous masses, but separate groves from standling timbers. The greatest economic interests represent the juniper and pistashio.

Juniper forest is distributed in mountains of Kopet Daghs, Big and Small Balkhan and Kugitang. The basic juniper forests are in Kopetdag and Harrygaly forest enterprises. Juniper forests are clean, or with an admixing of a maple and bushes: a dog rose, a honeysuckle, a barberry, a buckthorn, etc. In some places juniper forests are exterminated completely. Forests on remote plots of mountains were better saved. The Central Asian juniper grows of 1100-

2500 m, though it can grow and from height of 500 m in a belt. The height of 1500-1800 m is optimum. The general circuit of types of a juniper forest looks as follows:

Juniper forest with motley grasses occupies the foothills of northern slopes, the bottom of gorges. In undergrowth the maple is presented, in an underwood a barberry, a dog rose, a honeysuckle is usual. It is the most productive types of juniper forests.

Juniper forest with cereals and motley grasses is formed on cavicorn, mild slopes. Sometimes there are plots with domination of a maple. In an underwood there is a dog rose, a sherry - plum (*Prunus divaricata*), a honeysuckle, a cotoneaster, a barberry, an ephedra, a bladder fern. In herbage there are cereals, a sedge, and ephemers with a projective covering up to 90 %. The couch-grass communities are used for haymaking and vernal - autumn pastures.

Juniper forest with fescue-wormwood occupies a belt of mountains at heights of 1000-1800 m. With height passes in juniper with cereals and motley grasses. To a sheep's fescue dominating in a cover the sage-brush, a feather grass, xerothytic forbs are admixed. On southern slopes in this belt the almond, a cherry, a tannic sumac is widely distributed. The areas are intensively used as a pasture.

Rocky uniper forest is distributed on abrupt slopes, rocks and so forth. In an underwood an almond, a cotoneaster, seldom fig trees (*Ficus carica*) grow. In a cover mosses, lichens, and rare cereals are presented. This type of juniper forests is less productive.

Pistachio forests are distributed basically in Badhyz and in part on northern, eastern and western slopes of Kopet Dagh. A pistachio nut widely used for fixation of hillsides and an afforestation of banks of water reservoirs. Pistachio forests at correct exploitation can give a national economy of hundred tons of a valuable alimentary nut. Pistachio forets are located on the altitudes of 600-1000 m in the territories of Kushka and Naryngaly forest enterprises, but sometimes they lift up to 1500 m and even higher. A large part of pistachio forest is rarefied. They can be divided on pistachio forests of northern slopes, plain-hilly pistachio forests, gorge and abrupt southern slopes pistachio forests. Pistachio forests of northern slopes and the plains are most productive and also give the most valuable fruit production. The underwood in pistachio forests practically is absent, sometimes there is an ephedra. The herbage of average density consists of cereals. The pistachio gives the nuts not annually, basically after one year. The crop from one tree sharply changes from 0,5 on southern slopes up to 21 kg in plain-hilly pistachio forests.

Maple forests from a Turkmen maple (Acer turkomanica) are located in territories of two forest enterprises – Harrygaly and Kopetdagh. In the first their area compounds 5 thousand ha, in the second - about 1 thousand ha. Maple forests, basically, are located in a zone of cereal-motley grasses juniper forests. Sometimes they form plantings in the valleys of flooded lands of the mountain rivers. The maple usually does not form pure plantings, and grows in a mix with other races: an apple tree, a sherry - plum, a hawthorn, an almond, a pear, an ephedra, a barberry, a hackberry, etc. Stunted plantings prevail.

Below strips of maple forests in Western Kopet Dagh in the inferior belt of mountains, lower than 800-1000 m in mountain - valley forests in a bassin of Sumbar river a walnut, a plane tree, an elm, an ash and many other species of wild fruit trees, same kinds, as in maple forests grow here. The special value for the population here represents, except for fruit, a Persian walnut.

In high foothills of basin of Sumbar river the keep-arbor and the Anatolian blackberries grow basically, creating impervious thrickets are over. Here frequently there is a hackberry, a pomegranate, a fig, a common buckthorn, cotoneasters, etc. The most valuable kinds of this belt a pomegranate (*Punica granatum*) and a fig (*Ficus carica*), numbering hundreds forms of a valuable material for selection of cultural races.

Tugai (river gallery) vegetation in Turkmenistan is located by a narrow faltering strip along flooded lands of the rivers of Amu Darya, Atrek, Murghab and Tedzhen. Tugai as a unique source of wood in desert constantly were affected by throw and a rich grass stand - to a mass grazing of cattle, therefore they have been completely destroyed by places, and saved remains concern to derivative types. Tree species - a poplar and a willow - were destroyed and the first turn, and now bush tugai presented by tamarisk family dominate above poplars.

Tugai forests are formed mostly by few kinds of trees and bushes. Main forest forming race is the "tugai" poplar - a diversifolious poplar (*Populus diverdeifolia*). Occasionally three more kinds of poplars occur. There is a big-seeds poplar (*P. macrocarpa*). To poplars the oleaster (*Elaeagnus turkomanica*) is frequently admixed. From bushes on the first place the tamarisks stand (*Tamarix ramosissima, T. laxa, T. hispida* and three more kinds less widespread). From willows there are the Salix blakii, S. wilhelmsiana, S. sogdiana, and in flood-lands of Amudarya river an Amudarya willow (*S. oxica*) and a willow spicular (*S. acmophylla*) are more often. From shrubs here *Halimodendron halodendron* and a box - thorn (*Lycium ruthenicum L. turkomanicum*) are usual. The composition of herbage is presented by 70 species, the majority from which is good forage for cattle. The general area of tugai is more than 50 thousand ha, from them is a little more than half are covered with a wood. In the last years main forest forming race is a tamarix (more than 60 % of all area of tugai forests), then goes poplar (less than 30% of the area) and on the third place an oleaster (about 9 %). Tamarix has no the big economic value. By local population it is used on fire wood, on facing of wells, for manufacturing of weirs (water fances). Tugai is divided on the following types: typical poplar forests; paludous or herbage-meadow forests; dry arid poplar forests; halophite poplar forests; psammophite (sandy) poplar forests; halophite forests with tamarix; willow forests and oleaster forests. From all types for the local population first two types forming good pastures and haymaking are most valuable.

Forests of an arid zone (sandy-arid forests) execute, basically, a soil-protective role, and besides are a source of reception of fire wood, and also serve as pastures of cattle for local population. The black saxaul is especially valuable as fuel. It and other tree - shrubs in some places are a unique source of fire wood. The general area of forest resources of arid forests compounds 9,14 million ha, of them covered with a wood - 3,7 million ha. The structure of races of arid forests of Turkmenistan is very poor. Prevailing breed here is a saxaul white (*Haloxylon persicum*), then black (*H. aphyllum*). Both kinds occupy about 93 % of all area covered with a wood. Other races have smaller distribution: *Calligonum spp*. - about 3 %, *Salsola richteri* - about 1,5 %.

Saxaul forests are distributed on alluvial plains. The ancient delta of Amu Darya, Zaynzguz and Low Karakum, sandy masses Uch-Tagan, Chilmamed kum and series other here are entered, Communities only a black saxaul occur also on plains of Ustyurt. In an upper storey one and in mixed saxaul forests - two kinds of a saxaul dominate. Together with a saxaul in an upper storey frequently saltwort - *Salsola richteri* - occurs also, and in a lower storey many kinds of Calligonums, *Aellenia subaphylla*), an ephedra (*Ephedra strobilacea*) occur.

The grassy storey is formed with stunted subshrubs: sage-brushes, saltworts, milk vetches, bindweeds, grasses - ephemers and ephemeroids: sedge, sandy oats, the big number of ephemers from cereals family, a thistle family, a cruciferae family. They represent good pastures for a small-sized horned livestock.

White saxaul forests grow basically on slopes and cavicorn tops of sandy dunes, hummocky and range-hilly sands. The white saxaul forests are most typical with sedge (Carex physoides) cover. The white saxaul forests types the stony and moss are also typical. The last two types are very poor by pastures.

Black saxaul forests in Turkmenistan are distributed in much smaller territories, than white, but they have the great importance for the local population as an unique source of fire wood. It can grow from deep sands up to heavy clay ('takyr") and salted soils. Black saxaul forests are divided on the following types: typical, widespread on less-hilly plains in limits of old river beds. Salsola richteri and fodder subshrubs accompany a saxaul usually; tugai black saxaul forests are located on upper terraces of the ancient rivers of Amu Darya, Uzboy, etc. Here in a community composition the tamarix participates as an edificatory plant. They form good pastures; stony and semi-savanna black saxaul forests are distributed a little; moss black saxaul forests are distributed on Uzboy and in the Central Kara Kum desert and they occurring in places of a temporary over moistening. Participation the herbaceous plants covering soils on 50-70 % is typical. They form good pastures.

***Salsola richteri* forests** and in part *S. paletzkiana* are widely distributed on the significant areas, about 100 thousand ha, on sands Southwest Turkmenistan in Low and Southeast Kara Kum. Grow on slopes of ridges or hilly sandy plains where sands are poorly fixed. On the big areas of sands *Salsola richteri* occur as characteristic components of white saxaul and Calligonum forests. The upper storey is composed from *Salsola richteri*, saxaul, Calligonum. Below - a storey of large subshrubs from an ephedra, milk vetches, and Turkmen box – thorns is presented. The herbage consists of sedge sandy, some ephemers, etc. In a valley of Amu Darya river *Salsola richteri* occurs with tamarix. All *Salsola richteri* forests are good pastures.

Calligonum communities of polymorphic stem *Calligonum*. In limits of Turkmenistan more than 50 species of them occur. Calligonums compose communities of psammophite-shrub vegetation. Calligonums seldom form pure thrickets, and more often they are entered as components in white saxaul and *Salsola richteri* forests, etc. Continuous big masses of Calligonums occur seldom. The prevailing cover is composed usually by several species (8-10) of Calligonum, and large species (*C. arborescens, C. caput-medusae*) can be combined with medium-sized (*C. densum, C. abatum*) and stunted (*C. setosum, C. microcarpum*), etc. Calligonums occupy in Turkmenistan the area more than 200 thousand ha. Calligonum presents the good natural fire wood. Wood of some species is used also on facing of wells in desert. Because of cutting the thrickets of large Calligonums are considerably exhausted.

The general area of forest resources of Turkmenistan for 1991 compounded 9943.5 thousand ha, from them the area covered with a wood occupied 4126.8 thousand ha, or 41.6 % from all area of forest fund. There are significant land reserves for creating of new forests – because uncovered with wood the forests area even more, than covered with a wood – 4176.2 thousand ha. Reafforestation on these lands is a huge potential for use of non-wood forests products, basically, as pastures. In State the forest found presents also 640 thousand ha pastures on not forest territory, the small area on not forest territory and the small area under

hay lands - 1,5 thousand ha. General store of plantings is very low – 13.7 million m3. On the average the store of wood compounds 3.3 m3 /ha. Basically it is wood of sandy races, suitable only on fire wood.

The special protected areas compounded 789.2 thousand ha, including the special state strict nature reserves of general territory. In total 7 nature reserve were organized with the purpose of conservation and studying of natural complexes of Republic. From this number 2 nature reserves are arid, one is located in tugai area, one presents the pistachio forests communities, one guards a mountain juniper forests and one - mountain broad-leaved forests. There were presented also 6 sanctuaries with the general area of 665.7 thousand ha. Management of forestry was carried out by the forestry enterprises - 19 forest enterprises and 4 forest meliorative stations. In the system of forestry the Turkmen hunting society also functioned. The special state strict nature reserves:

- Amu Darya reserve (1982): the area is 49.5 thousand ha. It includes an ecosystem of "tugai" forests in flood-land of the Amu Darya river. There are 1040 species of plants, 48 species of mammals, 203 species of birds. It is important area for migratory and wintering birds.
- Badkhyz reserve (1941): the area 87.7 thousand ha. It covers a pistachio ecosystem, habitats of kulanes, goitered gazelle, Persian leopard, hyena, etc., 75 species of endemic plants.
- Kaplankyr reserve (1979): the area 282.8 thousand ha. It includes the desert-forest ecosystem, 918 species of higher plants were described, among them 55 endemics.
- Kopetdag reserve (1976): the area 49.8 thousand ha. It includes the juniper and mountain forest ecosystems. There are defined 960 species of higher plants.
- Kugitang reserve (1986): the area 27.1 thousand ha. It covers the mountain forest ecosystem with specific flora and a fauna. There are described about 1000 species of higher plants from them 40 endemics.
- Repetek international biosphere reserve (1928): the area 34.6 thousand ha. It includes the desert forest ecosystems basically from saxaul.
- Sunt-Khozardag reserve (1978): the area 26.5 thousand ha. It includes the mountain – forest ecosystems, the most advanced species are juniper and maple.
- Khazar reserve (1932) the area of 231.2 thousand ha, the marine area is 192.0 thousand ha.

The general area covered with a wood in the system of protected areas exceeds 100 thousand hectares. The most valuable softwood forests, nut and fruits, rare species of trees and bushes, included in the Red data book of Turkmenistan are guarded in reserved lands. Therefore the general area, territorial resource of the protected areas of Turkmenistan for maintenance of genetical pool of forests and stability of forest ecosystems (8 special protected areas and 14 sanctuaries) compound 1916 thousand ha.

According to the special survey (1988-89) the general area of State forest fund of Turkmenistan compounds 9.9 million ha, that there correspond approximately 20,3 % of the general area of the country. The area covered with a wood 4.127 million ha or 41 % from general area of State forest fund or 8,8 % of the area of the country. Forests of Turkmenistan carry out basically protective functions and consequently are referred to I category. From the general area of forest fund 6.58 million ha are transferred to animal husbandry for long-term using.

The area covered with a wood on a category of protection is allocated on the following categories:

- Water-protection zones (on banks of the rivers) – 26.2 thousand ha;
- Soil-protective zones – 3081.6 thousand ha;
- Sanitary-and-hygienic and recreational – 3.8 thousand ha;
- Special protected areas - 789.2 thousand ha;
- Others – 226.0 thousand ha.

In Turkmenistan three basic types of forests are selected: mountain, desert and river gallery (or "tugai") forests. Allocation of forests for types is presented in Table 21.

Table 21 Allocation of forests on the types in Turkmenistan (1998)

Type	General area of land, thousand hectare	Area covered with a wood, thousand hectare	Basic forest forming races	Store of wood, million m ³
Mountain	524,0	146,2		3,9
			Juniper Maple Elm Pistachio Hold - arbor Skeleton -tree	1,5 0,203 0,148 1,44, 0,66 Little
Desert	9360,2	3957,9		9,53
			Saxaul white Saxaul black Richter's Saltwort Tamarix Calligonum	7,5 1,8 0,05 >0,05 0,13
"Tugai"	38,3	26,2		0,27
			Euphrates Poplar Grey-leaved Poplar Oleaster Tamarix Willow	
Total	9922,5	4126,8		13,7

The population of Turkmenistan compounds 6298,8 thousand persons. For the last 20 years the population has increased almost in 2 times that has considerably strengthened anthropogenic influence on forest territories. The number of rural population compounds 53% from general number. Basically rural population is engaged in animal husbandry, grazing the cattle in the territories of state forest fund with the most productive pastures. Arid forest territories are used only as pastures, and forests for preparation of fire wood. Efficiency of pastures with each year is reduced because of an excessive overgrazing of cattle.

Riparian forests of Central Asia, except for pastures, are used and for preparation in insignificant quantity of hay - from 7 up to 8 thousand t. Hay is used for needs of forestry. Local residents prepare it to themselves in addition. Volumes of preparation are not fixed. Some figures of collecting of hay in forest enterprises are presented in Table 22.

Other kinds of use of non wood forest products in Turkmenistan have small volumes in connection with dryness of conditions. In a small quantity the Persian walnut, an almond and

a pistachio nut, on 20-25 tons annually by forest enterprises, the rest - the population collects and uses. Medicinal grasses were prepared annually on 2 tons though the source of raw materials on lands of forest fund is much higher. The population uses medicinal grasses only for own needs.

The base for augmentation of the collecting of fruit and nut production in mountain forests is insignificant. Plantings of a walnut is only 100 ha, including a natural origin - 50 ha, the nutting in them never exceeded 10 t. The basic plantings of a pistachio nut are located in Kushka forest enterprise. For the last 20 years the picking of a pistachio nut did not exceed 30 tos though the opportunity of collecting is in several times more. The pistachio nut gives rather small income in a family budget of local population, basically, for workers of forest enterprises. On hillsides in very small quantities there are presented alychas, a barberry, a dog rose, a hawthorn along river beds, but a crop at them not annual and in circumscribed quantity are over. The wild fig and pomegranate growing in area of Garrygaly, the population almost does not collect, because they are their basic crops in an irrigation zone. The dewberry and bitter almond are collected by local population in a small quantity for own needs and trade.

Thus, the basic kind of collateral use of forests in Turkmenistan is use of pastures. All other uses of NWFP in life of the population of republic play an insignificant role.

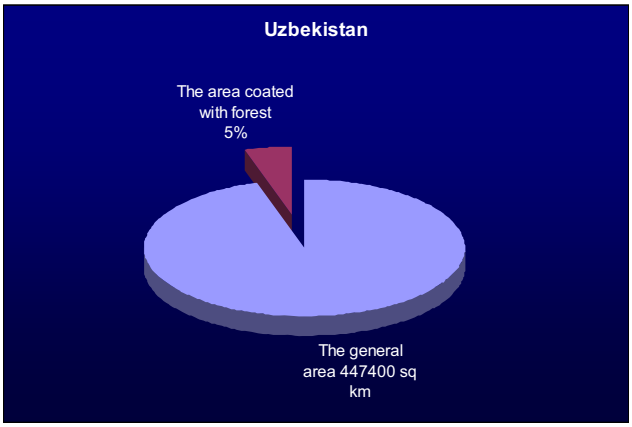
The basic directions and problems of a nature protection policy of Turkmenistan are determined in "The National Action Plan for Nature Protection". This program document concretizes and covers all aspects of an environmental policy of the country for the nearest years. In this important document development of forestry is considered as an environmental priority and actions are planned for their decisions. The forestry of Turkmenistan requires the organization of carrying out of the forest husbandry works. It would be necessary to introduce the modern technologies with introduction of GIS systems. In 2005 under the initiative of FAO wood department the report on an assessment of wood resources was prepared. In 2005 the review of forestry is prepared within the framework of FOWECA project. At the same time, there were developed the programs on regeneration of juniper, and also on establishment of the forest-gardens of a pistachio till 2010.

Table 22 Non Wood Forest Products and their use in Turkmenistan

Plants / raw material	**units**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
1. Food (Grains)	Tons	254	291	320	267	301	310	320	326	338	349	290	293	438	252	302
2. Fodder	Tons	5950	6550	7453	5483	4376	3963	3276	3186	3095	2750	2765	4450	3235	2947	2863
3. Raw materials for medicine and aromatic products	Tons	450	470	480	126	86	28	32	30	30	33	25	8	15	7	7
4. Raw materials for colorants and dyes																
5. Raw materials for utensils, handicrafts and construction																
6. Ornamental plants	thousand pieces	746	834	926	763	657	837	920	1173	1213	1686	2200	749	1203	1451	1620
7. Exudates																
8. Other plant products *	Tons	1057	1187	1049	985	452	396	332	300	311	361	417	1290	1027	722	1044
Animals																
9. Living animals	Pieces	5345	5787	5144	4963	5078	5476	5696	6085	6238	6439	6781	5603	6347	6611	6674
10. Hides, skins and trophies																
11. Honey	Tons	46	39	26	17	7	4	3.5	3	2.5	2.8	1.4	1.3	4.1	3.1	3
12. Bush meet																
13. Raw materials for medicine																
14. Raw materials for colorants																

* Other plant products are – nuts and fruits, dried fruits, seeds, pits, melons and gourds, rhubarb, onions and others.

9 FORESTS OF UZBEKISTAN AND A PROBLEM OF NON-WOOD FOREST PRODUCTS USE



The area of Uzbekistan compounds 448.8 thousand km²; it occupies the central part of Central Asia that defines also features of an environment of Republic. The big, northwest part of Uzbekistan is located on Turan lowland, its significant part is occupied with Kyzyl Kum desert. In eastern and southern parts there are foothills and spurs of a mountain Tien Shan and Pamir-Alay between which intermountain plains - Fergana Zeravshan, Syr-Darya, etc. are located. Plains occupy 78.7 % of the area of Republic, mountains – 21.3 %. Almost all ranges, except for Fergana, western spurs of a Gissar and Babatag mountains, have the latitudinal diffusion. The general area of state forest fund of Uzbekistan compounds 5.04 million ha. The area covered with a wood – 2.24 million ha, percentage of forests of which - 5 %. In forests of Uzbekistan about 200 kinds of trees and bushes grow.

Mountain forests

The area of forest resources of mountain territories compounds 1.24 million ha, the area covered with a wood - 268 thousand ha. Percentage of forest lands in mountain territories of Uzbekistan is very low and compounds 2.8 %. The basic part of mountain forests is located in the Uzbek part of Western Tien Shan (Ugam, Pskem, Chatkal and Kuramin ridges) and in southwest spurs of Gissar mountains. Mountain forests present the variegation and rarefied spots is peculiar. Here it is not enough close plantings. At rather small area, these forests are very diverse on composition. Nuciferous and fruit races are widely distributed in them, in particular, representing significant value for a national economy. But the greatest distribution only some tree species and bushes received. The others occur by admixing to the basic composition and small cultures. On the area of mountains covered with a wood the coniferous forests presented by three species of a treelike juniper prevail. They occupy 190 thousand ha. Deciduous forests occupy about 60 thousand ha territory.

At the big diversification of deciduous breeds and bushes, their basic part is presented by rather small area. Pistachio forests are widely distributed on more than 28 thousand ha. Considerably the smaller area - about 18 thousand ha are presented by amygdaloids from three kinds, the wood from a maple (4.4 thousand ha), the Persian walnut (3.3 thousand ha) and apple trees (2.5 thousand ha). The areas of other tree species do not exceed 2 thousand ha. Character and disposition of mountain forests of Uzbekistan define features of an environment and a complex history of development forest vegetation. The variegation of conditions of habitats hardly complicates character and structure of mountain forests and their disposition.

Juniper forests have the biggest distribution and consist of three species – Zeravshan juniper (*Juniperus seravschanica*), globe-shaped (*J. semiglobosa*) and Turkestan (*J. turkestanica*). On

a significant part of mountains the juniper forests form well defined forest belt and serve as a characteristic element of mountain landscapes. In inferior sub-belt the Zeravshan juniper starting grows since heights of 1100 m and up to 2000-2100 m where the globe-shaped juniper begins to appear, by degrees changed the first. From height of 2400-2500 m the Turkestan juniper starts to dominate and 3000 m this kind by elf wood and is higher remains only stunted trees.

The Zeravshan juniper is most distributed from all species and occupies about 65 % of all area juniper forests. It is distributed on all ranges of Uzbekistan, exceeding 2000 m. These Juniper forests are sometimes pure, but more often with an admixing of maples (*Acer semenovii, A. turkestanicum*), aglets (*Crataegus turkestanica, C. pontica*) and the various bushes forming a well-marked underwood with a honeysuckle (*Lonicera sp*.), a barberry (Berberis oblonga), dogroses (*Rosa sp.*), bladder fern (*Colutea sp*.), etc. Plantings, as a rule, are with low and average completeness. Most productive juniper forests are located on Kuramin, Turkestan and Gissar ranges. Herbage between trees on northern slopes is rich, multispecific, from cereals and motley grasses.

The globe-shaped juniper occurs in the same places, as Zerabshan, but it is more presented on slopes of Turkestan and Gissar ranges. It usually grows on slopes of northern expositions in the places with better moisture. It reaches the best development at height of 2500-2600 m. The second storey is well-marked, the underwood and herbage are similar with Zeravshan juniper forests.

The Turkestan juniper within Uzbekistan is distributed only on northern slope of a western part of the Turkestan range, forming the best in republic juniper massif with area more than 30 thousand ha. Completeness of plantings is average; by places it achieves also high completeness. The best juniper forests in Hissar mountains are concentrated in basin of Machaydarya river where they form continuous close plantings on slopes of all expositions.

Selected types of juniper forests in Uzbekistan are steppe, semi-savanna, mountain-xerothytic and meadow. Semi-savanna occupies the inferior part of forest belt; steppe is located on gentle slopes of high mountains, accumbent to an alpestrine belt. Mountain-xerothytic juniper forests are rarefied and located on slopes of southern expositions. Meadow junipers are rarefied also and located on slopes of northern expositions. Meadow junipers are developed in places with increased humidifying. At foothills of northern slopes they form thick forests.

In Western Tien Shan the juniper forests is accompanied with a Persian mountain ash (*Sorbus persica*), Sievers's apple tree, less often Turkestan eglet, even less often Semenov's maple, a Tien Shan mountain ash, a pistachio nut. In Pamir-Alay the role of a honeysuckle strengthens, there is a barberry, a Turkestan maple, a Bukhara almond (*Amygdalus bucharica*), a Bukhara pear (*Pyrus bucharica*), etc.

Deciduous forests occupy in mountains of Uzbekistan considerably smaller area. Their most significant masses are concentrated in Western Tien Shan, on southern spurs of Hissar mountains and in Babatag. On structure mountain deciduous forests are composed by xerothytic and mesophit groups. Among the first are most distributed the pistachio forests and amygdaloids. Road-leaved mesophit forests are formed by a Persian walnut, Sievers's apple tree, Semenov's maple, two kinds of a hawthorn - Turkestan and Pontiac, sherry - plums (*Prunus divaricata, Prunus mahaleb*), a hackberry (*Celtis caucasica*), many kinds of bushes

among which have alimentary and medicinal value for people such as dogroses, barberries, a laxative buckthorn (Rhamnus catartica), cotoneasters (Cotoneaster sp.).

Pistashio forests are sparse on all ranges of Uzbekistan where they do not form independent plantings, and occur by individual standling timbers or small groups – rests of pistachio forests. The largest massifs of a pistachio (about 25 thousand ha) are located on slopes of Babatag range. The pistachio on slopes of dry mountains and in foothills at heights from 600 up to 1800 m grows. In the inferior part of a belt it has more often bush form, is higher - bole. The best standling timbers place on sloping boreal slopes. Pistachio forests, as a rule, are rarefied. Average completeness of Babatag pistaship groves is 0,4. With a pistachio the hackberry, Regel's maple (*Acer regelii*), Bukhara pear, Bukhara (*Amygdalus bucharica*) and prickly (*A. spinosissima*) almonds, Persian honeysuckle (*Lonicera persica*), buckthorn (*Rahmnus sp*.), bladder fern (*Colutea sp.*) and by places an ash (*Fraxinus raibocarpa*) grow. Pistachio forests of semidesert and steppe differ. In Babatag at height of 800-1100 m a basis of the first in herbage is compounded with sedge and ephemers with predominance of barleys. Pistachio steppe located, at heights of 1100-1400 m and higher, is composed by communities of a sage-brush including cereals and motley-grasses, forming good pastures.

Wet-growing pistachio forests have the great value. The pistachio gallipot goes on manufacturing of valuable paints and varnish, leaves cecidiums contain 32% of tannids. Nuts of pistachio have the high nutrient quality. Annual productivity of Babatag pistachio forests in fruitful years made up to 200 tons of nuts. Crops are once in 2-3 years. In the last years due to high level of cattle overgrazing in pistachio forests, the trees have considerably reduced yield and collection of nuts from all massifs does not exceed 10 tons.

Amygdaloids are located also in the inferior mountain belt. Bukhara, dace and prickly almonds have the greatest economic value. The Bukhara almond is widely distributed in mountains of Uzbekistan at heights of 800-1600 m. In the top belt with it Regel's, Turkestan maples, an ash, two species of aglets, a Zeravshan juniper grow. In inferior belt it accompanies by pistachio. In an underwood there is a red cherry, a barberry, a pea tree, a bladder fern, etc. The Almond dace (*Amygdalus communis*) grows by small groups in Western Tien-Shan where form the same communities, as a Bukhara almond, but with other bushes – Semenov's maple, aglets, dogroses, cotoneasters, a barberry, etc. Both kinds of an almond are widely used for a fruit picking which are used in perfumery manufacture. Prickly almond is the xerophite. It is a low bush, grows on dry foothills of southern slopes in community with a red cherry, an atraphaxis, an ephedra, a pea tree. It is used by the population for a fencing of plots from cattle.

Walnut forests in republic are located only in three areas isolated from each other at height of 900-1800 m - in Western Tien-Shan, on southern spurs of Hissar mountains and in Nuratau range. They are located for well humidified slopes of northern expositions and valleys of the rivers. Walnut forests here do not represent the big massives. It is small groves among bushes or other more xerophilous vegetation more often. They are divided on enough plenty types because of a diversification of conditions of a locality: an apple walnut forest; a plam – ravine and plam – riverin walnut; a motley grasses walnuts, etc. In a second storey of all phylums in this or that admixing there are fruit races – a Sievers's apple tree, a Sogd sherry - plum, Turkestan and Pontiac hawthorns, a cherry, Semenov's maple, etc. The herbage, as a rule, is multispecific, rich, with high density with the big store of dry mass. Despite of the small areas, walnut groves have the great value for the population. Near all large massives of these

forests there are big settlements, life in which in many respects depends on these nuciferous forests, as a source of fire wood, hay, and a feed.

Apple forests occur almost in all mountain areas of Uzbekistan, being part of other forests, even conifers, by admixings. As forest forming race the apple tree grows on the small area on the same ranges where the Persian walnut grows also, in a belt from 1000 up to 2500 m. These forests are basically mixed. Their structure includes the same races, as walnut forests.

In the same areas the aglets are widely distributed also. The Turkestan hawthorn is part of a walnut and apple forests, and also the shrubs formed as derivative types after destroyed walnut forests. The Pontiac hawthorn forms rarefied plantings on southern slopes, as more xerophilous race. This kind is valuable food race both for the local human population, and for forests animals. Except for listed, the significant areas on all slopes in forest fund are occupied with bushes, many of which are used by local people as thrickets of dogroses (up to 15 species), Barberries of three species, a honeysuckle of 4 species, cotoneasters, a spiraea, a bean - caper, a sea buckthorn, etc.

Plain-arid forests occupy the basic part of the area of forest fund of republic (3630 thousand ha). The largest massives of these forests are located in Kyzyl Kum desert, in part in Kara Kum, in sands of the Central Fergana. It is covered with a wood of 1900 thousand ha. Plain-arid forests are the most widespread type of vegetation in Uzbekistan. Basically it is xerophilous bushes or small sapling. Usually they are very much rarefied. Here 110 species of tree and bushes are totalled. The basic forest forming races of deserts - a black and white saxauls (*Haloxylon aphyllum, H. persicum*), different species of *Calligonum sp*., tamarix (*Tamarix sp*.), *Salsola richteri*. Saxaul forests occupy 601.2 thousand ha the area covered with a wood that makes 87 % of arid forests of republic.

The black saxaul has the greatest economic value, as high-calorific fuel and as a soil-protective plant. Highly-productive plantings are located on clay and grey soils along the rivers and dry channels of the ancient rivers. There are black saxaul forests with sedge, aristida, saltworts, algal. All types, except for the latter, are the good pastures.

The white saxaul have no industrial value. It grows on the deep fresh fixed sands with a hummocky relief. Usually they are hardly rarefied. Among white saxaul forests the sedge (*Carex physoides*) formations are most distributed. There are also *Aristida pennata*, feather grass (*Stipa sp*.), wormwood, and ephemers and moss formations. Due to bad development of herbage the pascual value of white saxauls is low.

Saltwort forests occupy about 40 thousand ha of the area covered with a wood. Forest forming races are two species of saltworts: Richter (*Salsola richteri*) and Paletsky (*S. paletzkiana*). Saltwort forests are basically with middle completeness, with rather well developed herbage.

Calligonum formations occupy about 20 thousand ha. The basic part of them is located on south of republic, on hilly sands of Kattakum and Kyzyl Kum. Thrickets of Calligonum form by numerous species.

Thrickets of tamarix (*Tamarix sp*.) cover very big area in Uzbekistan. But the basic part of them is located in riparian forests of Central Asia. Less than one third of them (more than 30 thousand ha) are located in sandy-arid territories. They occupy here the lowered or equal plots

with hardly salted soils. They occur frequently in channels of the old rivers. Rarefied thrickets dominate. Pascual value of them is insignificant.

Riparian forests of Central Asia occupy in Uzbekistan about 200 thousand ha forest fund. Forest covered area has decreased in several times and now compounds about 25 thousand ha due to strong anthropogenic influence for the last decades. There are selected mountain and flat tugais. Mountain tugai is located in valleys of the numerous mountain rivers, islands and the bottoms of gullies. They are occurring also on the lowered places close ground waters and on cones of mudflow. The largest massifs of riparian forests of Central Asia are concentrated on coasts of a flat part of the rivers, in particular in delta of Amu Darya, on banks of Syr-Darya and Zeravshan rivers. In a mountain part the wood tugai dominates, consisting of high trees and bushes. The basic forest forming races here are poplars (*Populus usbekistanica, P. nigra, P. alba,* etc.), willows (*Salix australior, S. olgae,* etc.), an ash (*Fraxinus sogdiana*), and a birch (*Betula tianschanica. B. procurva*), a tamarisk (*Tamarix arcenthoides*), etc. The poplar forms both pure and mixed stands with a willow, a birch, a tamarix, an ash, Semenov's maple, a sherry - plum, etc. Now these tugais are hardly destroyed by cutting down and unlimited grazing of cattle, especially in lower mountain parts of tugai because of easy availability and deficiency of fire wood. In the inferior part of valleys and on banks of a flat part of the rivers the flat typical tugai is developed. In less wet localities tugai is saved only in ancient valleys of the rivers collecting a surface runoff. Forest forming races in flat tugai are a poplar (*Populus diversifolia*), an elaeagnus angustifoliate (*Elaeagnus angustifolia*), willows (*Salix sp.*), about 30 kinds of tamarix (*Tamarix sp.*). Mixed forests are formed of these races in conditions of a favourable water relationship on meadow-tugai soils. In them the underwood and herbage well grow. They serve as good pastures. Thrickets of tamarix in riparian forests of Central Asia of Uzbekistan occupy the greatest area - 70 %. They are widely distributed in bottom lands of the modern rivers, on border tugai with desert, in channels of the strivelled rivers, etc. They form heavy beds. Now flat tugai are hardly destroyed by human activity. A stubbing tugai for clearing the areas under rice, cutting down of trees, regulating a drainage of the rivers of Amu Darya and Syr-Darya have resulted in decline of a large part of riparian forests of Central Asia and decrease of quality of the rest. Their restoration for the lack of high waters descends extremely poorly.

Infrequent animals live in forests of Uzbekistan - a Bukhara deer, a brown bear with white claws, a Turkestani lynx, a Siberian ibex, a Tajik marchor, mountain sheep – argali and urials, a snow leopard, many species of a hunting - trade fauna (wild boars, badgers, foxes, martens, mountain patridges, pheasants, etc.).

The general area state forest found Uzbekistan compounds 5,04 million ha, the area covered with a wood 2.24 million ha (44.4 % from the area state forest found). Mountain forests compound on areas State forest found 1. 23 million ha, and covered with a wood – 0.286 million ha (21.8 % from the area of mountain forest resources). Sandy forests occupy on area State forest found 3.63 million ha, and covered with a wood – 1.9 million ha (52.3 % from the area of sandy forest resources). Riparian forests of Central Asia on area of state forest fund occupy 60 thousand ha, from them covered with a wood - 46 thousand ha (76.7 % from the area tugai forest resources). The general store of wood of forests compounds 12 million m3. Management of a forestry is directed on conservation ecological profit forests and building of optimum conditions for activity of other branches of a national economy. The major task is the augmentation of the area of forests. The enterprises of forestry on the establishment of wood raw material till 1990 affected the consumer goods (wum items, children's furniture,

and household goods). Shops of consumer goods in 1982 year were in 48 forest enterprises of Republic. Now these shops work poorly or are liquidated.

The area of Uzbekistan, including aquatory, compounds 44884400 ha. The population now presents more than 26.4 million people. For the last 20 years the population has increased on 8 million person, or nearly so in 1,5 times, and for the last 50 years - almost in 3,8 times. On the average on one inhabitant is belonged 0,01ha covered with woods area, not including artificial plantings. Rural population is the basic collector and the consumer of non wood forest products - compounds 63 %, but distribution of people the extremely non-uniform. The basic part lives in a valley on irrigated lands and has no access to wood resources. Mountain forests are located mostly near to frontiers, and arid - in a waterless or shallow zone, so that the population using services of a wood, in the state it is a little.

The problem of unstable use of the biological resources, first of all natural ecosystems, is one of the vital issues of development of the country. Attitudes in this sphere are adjusted by a package of acts: Laws «On nature protection » (1992), «On preservation and use of fauna» (1997), «On preservation and use of flora» (1997), «On forests» (1999), «On special protected areas» (2004). Meanwhile, the basic modern legal act, directly operating with the subject of unstable consumption of biological resources or the consumption negatively influencing a biodiversity, is the Decision of Cabinet of Ministers N 508 from 28.10.2004 «On intensifying of the control over rational use of biological resources, import and export them by Republic Uzbekistan» and the positions resulted in Appendices to it directed: 1. «Regulations on the order of use of objects of flora, import and their export of Republic Uzbekistan». 2. «Regulations on the order of using, import and export of objects of fauna of Republic Uzbekistan and conducting hunting - fishing economy». 3. «Regulations on distribution of the means received as payments for using by objects of fauna and flora, the penal sums and the sums collected from infringers of the nature protection legislation for put damage». This Decision is a basis for further harmonization of legislation with the international multilateral nature protection contracts, in particular, in range of international trade by species of animals and the plants included in Appendices I and II of the CITES. Reduction of unstable consumption of biological resources is served with activity of the state inspection organizations: State biological control, Republican water inspection, Main Forestry Department (Management of nature reserves, national natural parks and hunting economy). To an avoidance of unstable use of biological resources in the country promote: Development of system of the state and departmental control over bio resources, intensifying administrative and the criminal liability for illegal use of bio resources and environmental contamination, community participation and education, improvement of system of distribution of energy carriers, maintenance of the free market of realization of services of ecosystems with aboriginal communities, perfection of practice of traditional use of the biodiversity, the differentiated taxation, microcrediting and so forth. For realization of control measures and decrease of unstable use of biological resources in the country, according to the legislation, are used the following legal and economic tools: licensing; sanctions and interfacing procedures (quotas, export-import certification and so forth), Together with other economic mechanisms of maintenance of nature protection in Uzbekistan: payments for excess of specifications of releases or shunts of pollutants in an environment and disposition of waste products; payments for normative and above permitted standard environmental contamination, for using natural resources; the ecological tax; penalties and sanctions, including, for illegal extraction of biological objects and system of payments for irrational using natural resources, the preferential taxation. Same serve performance of works on struggle against a desertification, switching forest improving works. To resistant control of a

forestry serve: the Decision of the Cabinet of Ministers “On measures, on development industrial poplar planting and creation of plantations of other fast-growing tree species” (1994), “On measures on augmentation of manufacture of licorice in Republic Uzbekistan” (1995.), “On the statement of some statutory acts on protection of forests of republic” (1999). Appendices: 1. Fire prevention rules in forests. 2. Rules of wood-cutting of a care of a forest. 3. Rules of a hay - mowing and a grazing of cattle in forests, the decision of Kabinet of Ministers “On the statement of Regulations about the order of definition of a category of protection of forests” (2000). Forest enterprises of republic submit to Main Department on Forestry at the Ministry of Agriculture and Water Resources RU (Table 23).

Activity on direct use of the services, given by ecosystems, is subject to a regulation and licensing according to the legislation. Any activity in this respect, connected with direct reception of the commercial profit is taxed. In the certain cases linked to development of local communities (especially living in brittle mountain and arid biomes), it is applied systems of the preferential taxation, microcrediting, the credit unions and other stimulating activity. Fundamental laws at aboriginal use of services of ecosystems belong to the local organizations of a civil society and are adjusted, according to the legislation, self-government institutions and their supreme organizational - legal structure submitted by citizens. The main thing from effective ways of conservation of a natural environment, flora and fauna is the organization of special protected areas. According to recommendations of the WCMC of UNEP/IUCN the terrain protected zones necessary for maintenance of a biodiversity and support vital ecological processes, the area should compound about 10 % of all territory of the country. In new Law of RU “On the special protected areas” (2004) the national system of special protected areas categories, based on the international system of IUCN categories (1994), is applied. The modern system of territories to which legislatively the status of protected areas have been done (Table 24) now is presented in Uzbekistan by 9 state nature reserves (the general area of 2082.69 km² or 0,46 % of the area of the country), 2 natural parks (accordingly, 5987 km² or 1,33 %), 5 state monuments of the nature (33.805 km² or 0,008 %), 14 sanctuaries and 1 natural nursery with threatened animal species (13682.155 km² or 3,05 %), and also special water-security zones of the rivers and zones of formation superficial and underground waters (4240.352 km² or 0,94 %), thus the general area of protected areas system compounds 26026 km² (5,80 % of the area of the country). For last decade the protected areas in Uzbekistan has increased by 4826.842 km² (1,07 % of area of the country). Now the system of protected areas in the country covers 3,22 % plains (arid landscapes) (11377.495 km²) and 11,32 % of mountain areas (10826.394 km²), and also 3568.589 km² wetlands ecosystems, including river terraces. The some protected areas of Uzbekistan have global value in conservation of the world natural heritage. Now this system requires reforming, expansion and perfection of management according to national legal and international requirements. These purposes are served with modern projects of GEF, UNDP, WB, TACIS, WWF, and the Governments of Uzbekistan.

Table 23 Presence of the forest enterprises in Republic Uzbekistan 1.12.2005 - (according to decree of the Cabinet of Ministers from 10.08.2005 for № 191)

№	The name Administrative Terrains	Number of timber enterprises	The basic measures spent for timber enterprises
1. Forest enterprises of system of the Main administrative forestry department of			
1.	R.Karakalpakstan	12	Sand consolidation works. Crop and planting of a wood on sands. Collecting of seeds of sandy species
2.	The Andizhan region.	1	Planting of wood cultures
3.	Bukhara region.	8	Forest enterprises of Bukhara region are engaged in crop and planting of wood cultures on sands, collecting of seeds of sandy cultures
4.	Dzhizak region.	4	Crop and planting of a wood in mountains, collecting of nuciferous, conifers, fruit seeds
5.	Kashkadariya region.	11	Crop and planting of a wood in mountains, collecting of nuciferous, conifers, fruit seeds
6.	Navoi Region	7	Crop and planting of wood cultures on sands, collecting of seeds of sandy cultures
7.	Namangan region.	2	Breeds
8.	Samarkand region.	7	Collecting of nuciferous and other seeds, planting of a wood
9.	Syr-Darya region.	1	Collecting of nuciferous and other seeds, planting of a wood
10.	Surkhan-Darya обл	5	Planting of a wood
11.	Tashkent region.	2	Collecting of nuciferous, planting of wood cultures, crop of seeds
12.	Fergana region.	2	Pistachio nuts in mountains
13.	Khorezm region.	1	Planting of wood cultures, collecting of nuciferous, etc. various seeds
2. Nature reserves			
14.	Nature reserves of the Ministry on Agriculture and Water management	7	Preservation flat, river valley, mountain forests and their biodiversity
3. Hunting manages			
15	Hunting economies	5	Management and organization of hunting on lands of the state forest lands
4. The specialized forest enterprises on cultivation of medicinal grasses			
16	Specialized forest enterprises	7	Cultivation and collection of medicinal grasses, the collection of food plants
5. National parks			
17	Zaamin national park	1	Recreation, sustainable management

Table 24 Modern system of special protected areas of Uzbekistan

The name (year of establishment, controls)	The location		The area Km ²	Category IUCN
	Administrative	Geographical		
State nature reserves (9)				
Chatkal biosphere (1947)	The Tashkent region	Chatkal ridge	357,24	Ia
Zaamin (1928, 1937, 1959)	The Dzhizak region	Turkestani ridge	268,48	Ia
"Bdai-Tugai" (1971)	Karakalpakstan	An Amu Darya valley	64,62	Ia
Kyzylkum (1971)	Bukhara region	An Amu Darya valley	103,11	Ia
Zaravshan (1975)	The Samarkand region	A Zeravshan valley	23,53	Ia
Nuratau (1975)	The Dzhizak region	Nuratau ridge	177,52	Ia
Kitab (1979)	The Kashkadarinskai region	Zaravshan ridge	39,38	Ia
Hissar (1983)	The Kashkadarinskai region	Hissar ridge	809,86	Ia
Surkhan (1986)	The Surkhan-Darya region	Kugitang ridge	238,95	Ia
Natural parks (2)				
Zaamin popular (1976)	The Dzhizak region	Turkestan ridge	241,1	II
Ugam-Chatkal national (1990)	The Tashkent region	Western Tien Shan ridges	5745,9	II
The state nature monuments (5)				
"Vardanzi" (1975, 1983)	Bukhara region	The central Kyzyl Kum	3	III
"Yazyavan" (1994)	The Fergana region	Fergana valley	18,42	III
Minbulak (1991)	The Namangan region	Fergana valley	10	III
Chust (1990)	The Namangan region	Foothills Chatkalsky ridge	0,96	III
« Central Fergana » (1995)	The Fergana region	Fergana valley	1,425	III
Sanctuaries (restoration of separate natural objects and complexes)				
Sanctuaries (14)				
"Gurlen" (1978)	The Khorezm region	A bottom land p. Amu Darya	5,87	IV
Arnasai (1983)	The Dzhizak region	The central Kyzyl Kum	663	IV
"Dengizkul" (1973,1990)	Bukhara region	Austral Kyzyl Kum	500	IV
"Saigachi" (1991)	Karakalpakstan	A plateau Ustyurt	10 000	IV
"Sudochie" (1991)	Karakalpakstan	Delta of the Amu Darya river	500	IV
"Karakir" (1992)	Bukhara region	Southernl Kyzyl Kum	300	IV
"Nurabad" (1992)	The Samarkand region	Southernl Kyzyl Kum	290	IV
Karnabchul (1992)	The Samarkand region	Southernl Kyzyl Kum	400	IV
Kushrabad (1992, ГКОП)	The Samarkand region	Aktau hills	163	IV
"Актау" (1997)	Region Navoijskaja	Aktau hills	154	IV
"Sarmych" (1997)	Region Navoijskaja	Aktau hills	50	IV
Mubarek (1997)	The Kashkadarinskai region	Southernl Kyzyl Kum	264,69	IV
"Sechankul" (1998)	The Kashkadarinskai region	Southern Kyzyl Kum	70,375	IV
Houbara Bustard (1998)	Region Navoijskaja	Southern Kyzyl Kum	250	IV
Natural captive breeding centers (1)				
Ecocenter of "Goitered or Persian gazelle" (1976)	Bukhara region	Southwest Kyzyl Kum	71,22	IV

In management Tashkent regional hokimiat are Ugam-Chaktal national park, Burchmullin forest enterprise, Ahangaran forest enterprise, Akchin hunting. The basic direction of activity of forest enterprises is preservation of existing forests and forestation. In a mountain zone the priority is given cultivation nuciferous cultures - to a Persian walnut, a pistachio nut and an almond with the purpose of augmentation of fruit production. Cultures and plantations from these breeds on the area 600-800 ha are annually created. In sands the saxaul black is cultivated basically. Works on creation of new forms of nuciferous plantings which in the last years are mortgaged in plantations are carried out. All this is directed on reception of more nuciferous production which basically is used on building of new wood cultures in mountain and foothill zones. Walnut and almond are sowed in nurseries from races which used on sale. The part of production is used as foodstuff. Fruits of a pistachio nut at once are sowed on cultural forest the area and plantations are formed. Now annual cultivation seedlings of a walnut compounds about 700 thousand pieces and understock seedlings of an almond sweet more than 300 thousand pieces. Forestry Department has developed the program of development of forestry on 2006-2010, according to which in this season should be mortgaged nuciferous cultures on the area of 4.5 thousand ha.

Table 25 Non-wood forest products in Uzbekistan (statistical data 1990-2005)

Data on collecting of seeds on forest enterprises of the Department of the Forestry																
The Ministry of Agriculture and Water management of RUz for the term 1990-2005																
															(units of thousand ton)	
NWFP/Years	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Almonds	13,5	11,01	8,51	6,73	4,92	8,36	5,53	5,72	8,85	7,93	7,13	8,33	4,92	5,44	4,49	0,76
Pistachio	3,7	6,42	4,6	5,8	0,5	5,28	5,03	6,05	4,4	1,75	1,55	0,86	2,75	1,59	2,28	0,16
Walnut	15,7	16,14	10,4	7,3	4,87	4,17	9,74	8,18	11,24	3,3	4,75	4,36	4,6	4,66	3,47	1,77
In total																
															(units of thousand ton)	
Drug plants	427,1	312	341	291	156	87	196	207	339	287	346	247,7	235,6	289	288,9	270
Food plants	325,4	220	294	297	14	321	304	289	10,5	50,3	95	82,3	67,6	38,8	38,8	41
In total	752,5	532	635	588	170	408	500	496	349,5	337,3	441	330	303,2	327,8	327,7	311

Table 26 List of the medicinal and food plants collected in forest enterprises of Republic Uzbekistan

№	The Russian name	The Latin name	Collected parts	Procurement price Sum	Wholesale price	The note
1	Dog rose	Rosa canina	Fruits	1200	1500	Cultural
2	St. John's wort	Hipericum	Above-ground part	500	700	Wild
3	Dace origanum	Origanum vulgare	Above-ground part	500	700	Wild
4	Elecampane	Jnulae grandis	Roots and rhizome	400	600	Wild
5	Redhaw Hawthorn	Crataegus turkistanika	Fruits	500	700	Wild
6	Harmala	Peganum harmala	Above-ground part	400	500	Wild
7	Shepherd's purse	Capsella bursa-pastoris	Above-ground part	300	500	Wild
8	Horsetail field	Equsetum arvense	Above-ground part	400	600	Wild
9	Beggarticks three-separate	Bidens tripartita	Above-ground part	500	700	Wild
10	Milfoil	Achellia millifolium	Flowers	700	900	Wild
11	Muskat Sage	Salvia sklarea	Above-ground part	700	900	Wild
12	Plantain big	Plantago major	Leaves	800	1000	Cultural
13	Kadanopsis	Kadanopsis sp	Above-ground part	1000	1300	Wild
14	Licorice	Glitheriza glabra	Roots and rhizoids	350	500	Wild
15	Motherwort cordial	Leonurus cardiaca	Above-ground part	700	800	Wild
16	Tansy	Tanasetum vulgare	Flowers	700	850	Cultural
17	Peppermint	Mentha piperita	Above-ground part	800	1000	Cultural

№	The Russian name	The Latin name	Collected parts	Procurement price Sum	Wholesale price	The note
18	Senna	Cassia acutifloria	Leaves	800	1000	Cultural
19	Half-floor	Pol pola	Above-ground part	500	700	Cultural
20	Tannic Sumy	Rhus cariaria	Leaves, Fruits	300	500	Cultural
21	Camomile chemist's	Matricaria hamomillae	Flowers	2000	3000	Cultural
22	Calendula medicinal	Calendullae officinalis	Flowers	1500	2500	Cultural
23	Nettle diclinous	Urtica diotica	Above-ground part	700	900	Wild
24	Coriander	Coriandr sp	Fruits	1500	1700	Cultural
25	Basil	Ocimum basilicum	Above-ground part	400	600	Cultural
26	Bunium	Bunium persica	Fruits	8000	12000	Cultural
27	Onions	Allium Suvorova	Leaves	500	700	Cultural
28	Houseleek creeping	Ajga turkistanica	Above-ground part	1500	2000	Wild
29	Corn	Zea mays	Stigma	1000	1500	Cultural
30	Pumpkin	Cukurbita sp	Seeds	2000	3000	Cultural

Conclusion

The analysis of the information on availability and a condition of forests, and also on use of not wood production by the population of eight countries of the Caucasus-Central Asian region and the contribution which introduces use of non wood forest products to sustainable development of these countries, has shown the following. Opportunities of countries in use by the population of non wood forest products hardly differ from each other (Table 24) and depend on many factors: from the area covered with a forest; from quantity of forests on one person; from richness of these forests in the floral attitude and value of wood production for use by the population; from a saturation of the market this production, etc.

Table 27 Parameters on forest resources of countries of region

The state	The general area, ha	Quantity of the population, one thousand person	Population density, the person on км^2	The area of a forest resources, thousand hectare	The area covered with a wood, thousand hectare	Terrain covered with a forest, %	Quantity of forests on 1 person, hectare	Quantity of kinds of trees and bushes, pieces
Azerbaijan	8660,0	8202,4	95	1213,4	989,3	11,4	0,12	435
Armenia	2974,3	3212,0	108	407,8	283,5	9,5	0,09	200
Georgia	7000,0	4993,0	71	3005,3	2767,2	39,5	0,55	300
Kazakhstan	271730,0	15172,1	5,4	26200,0	12400,0	4,6	0,82	600
Kyrgyzstan	19990,0	5065,0	25,3	3321,5	864,9	4,3	0,17	200
Tajikistan	14310,0	6400,0	41	1800,0	460,0	3,2	0,07	268
Turkmenistan	49120,0	6298,8	12,8	9943,5	412,7	0,84	1,53	127
Uzbekistan	44884,4	26410,0	58,8	5040,0	2240,0	5,0	0,085	250

If Georgia which in 3.9 times is less on the area, than Kazakhstan, in 4.5 times is less by quantity of forests, in 1.5 times it is less by quantity of a wood on one inhabitant and in 2 times less on arboreal flora, it does not mean, that its contribution of non wood forest products in development of a society there is less. The population lives at Georgia more compactly and has more access to NWFP and use of this production in all country is more easily carried out. In Georgia this production because of richer structure of forests including subtropical, and boreal and even taiga elements, is much more diverse and is applicable for different categories of use - and as food stuffs, and as medical products, both as ornamental plants, and as materials for hand-worked, etc.

In Kazakhstan, despite of the big parameters, forest percentage of the lands almost in 9 times are lower, than in Georgia (4,5 and 39,5 % accordingly); forests are sparse in the big territories and access of the population to them is possible only for those who lives in immediate proximity from them; despite of rich general arboreal flora, the population uses only its small part which is nearby from the settlings and place of residing and has smaller assortment of NWFP. A significant part of forests of Kazakhstan are arid forests, in which only represent one kind of NWFP - a grazing of personal cattle of the people. By virtue of low productivity of such forests, pastures can improve a standard of living only a small quantity of the population and the big contribution to resistant development of country cannot render, though opportunities in Kazakhstan in maintenance of the population by non wood forest production are higher, than in other countries of Central Asia (Figure 9.1).

Azerbaijan, as well as Georgia, has good potential in use of NWFP for increase of its contribution to a raising of well-being of the people of the state on the same causes, as in

Georgia and due to exclusive arboreal flora and its utility and an opportunity of use for the population.

Armenia has the smaller percentage of the forest lands and the worse, than in other countries of Caucasus conditions and structure of forests, because of dryness of a climate, has smaller opportunities in size of contribution of NWFP in increase of a living standard of people.

In Kyrgyzstan only in a southern part of the state in a zone of broad-leaved forests with a rich species composition of fruit plants there are good opportunities for the population in use of NWFP for increase of a standard of living. In a zone of coniferous forests basically the grazing of cattle is used only.

Tajikistan and Uzbekistan by virtue of small percentage of forest land and only the small areas of broad-leaved forests with nuciferous breeds cannot give the big contribution to economy of the state from use of NWFP though any part of the population living in a zone of these forests, improves a standard of living from collecting of NWFP. For Uzbekistan with the biggest population in the region, and furthermore incorporating of a large part of low-productive arid forests, contribution of NWFP to development of a society cannot be high.

In Turkmenistan where almost all forests arid or rarefied mountain, consisting of a juniper, no wood forest products use consists in a grazing of cattle on the forest fund areas, where efficiency of pastures low, but by virtue of the big territories covered with a wood (4127 thousand ha) and concerning a small number of the population (6299 thousand pers.), NWFP brings a significant values in increase of a standard of living.

Concrete figures on use of NWFP not official bodies (forest enterprises), but by local population is impossible to present for the lack of statistics on this question in all eight states. If forest enterprises keep account collected production of NWFP, its cost and incomes of realization, use by a wood of the population is completely neglected also supervised by nobody.

Meanwhile, absence of the control over the tax, collecting and use of non wood forest production by local population results in an attrition of wood resources, especially in conditions when in all eight states poverty has grown, and in some them, such as Uzbekistan, Turkmenistan, Tajikistan - the population grows significantly, and together with it the human pressure on forest ecosystems has considerably grown.

The population in many cases destroys separate species of plants and animals if in time to not enter restriction and by that the source of its incomes will be destroyed. In Uzbekistan thus some species like the edible onions - *Allium suvorovii* and *A. stipitata* almost have been completely destroyed, tulip Greigi (*Tulipa greigii*), and they already become listed to the national Red books; now the people actively use, collect and sell the onions - motor (*Allium motor*), a rhubarb (*Rheum sp*.), other kinds of tulips and other ornamental plants.

In all states of region the crops of a Persian walnut, an almond, a chestnut, a pistachio nut, etc., having a seller's price in the market completely is going, not abandoning them neither for forest regeneration, nor for a feed by the wilding. Everywhere the intensive overgrazing of the cattle destroying in a wood natural rehabilitation - a seedling growth and an undergrowth of the trees, many kinds of grasses and reducing efficiency of pastures is observed.

At the same time, the population frequently under exploitation opportunities and benefits which can be received from non wood forest production which provisional list is resulted in table in attachment. Here it is possible to relate many kinds of medicinal grasses, and raw material for dyes, and raw material for utensils and hand-worked, and development of beekeeping, etc. which is not effected or on own ignorance, or for the lack of demand in the market because of ignorance of consumers of production, or because of the "know-how" of separate kinds of production lost in the course of time from collateral use by a wood. The help of the state and government agencies in the conforming learning and education of the population is very necessary to provide.

In some cases it is necessary to involve the population in a joint management of forests that people realized necessity to achieve a resistant condition of forests for their sustainable uses is on occasion carried out. So, in Kyrgyzstan the work in nuciferous forests on building of public management of forestry under the control of forest enterprises is carried out, however, this work only begins. Almost in all countries of region plots of a forest for preparation of non wood forest production are handed over to the population in the short-term lease, but it is only particulate measure. The population frequently does not perceive many benefits from use by a wood and non-wood forest products, such, as benefit from an avoidance of the dangerous natural phenomena appearing in territories where forests are destroyed and disappeared - torrents, landslips, floods in the flooded-lands of the rivers, etc. because of a breakage in time between destruction of a wood and appearance on these lands of the catastrophic phenomena. In this case also public awareness and educational work is necessary.

For rational and inexhaustible uses of no wood forest production and intensifying of its contribution to sustainable development of countries of regions it is necessary to improve the legislative base of countries concerning questions of management of forestry and its comprehensive use. It is necessary to develop and ratify such documents worked in former times as the Rule of collateral uses in a forestry, the Rule of a hay - mowing and a grazing of cattle on the lands of state forest fund, the Order of use of state lands forest fund for recreational, tourist and other purposes, to develop also penal rates for an abuse of regulations of use by a wood and the order of collection of these fines and many other things.

Management of forests demands rational approaches and a technical analysis to understand the influencing factors infringing balance of ecosystems and to find in each of the states the adequate measures preventing attrition and a degradation of natural wood resources. Thus requirements of all forest consumers and first of all those who has the biggest interest and benefit in forests, not only local residents living in mountains, but also the population of foothill of the plains suffering disasters from the catastrophic phenomena, germing on deforested territories should be taken into account.

For sustainable management of forests with the purpose of increase of a living level of the population it is necessary to have constantly updated information on a condition of forests and wood resources, by periodic realization forest managemental works determining a source of raw materials of forests and non wood forest production, constant realization of the state count of forest resources, management of constant monitoring of a conditions of forests, realizations of a forest cadastre and many other things. The special attention should be given the collateral wood uses performing which play the important role in life of a certain part of the population of countries of region. In all countries of region now there is no database as on availability in forests of a large part of non wood vegetative production on volumes of its tax

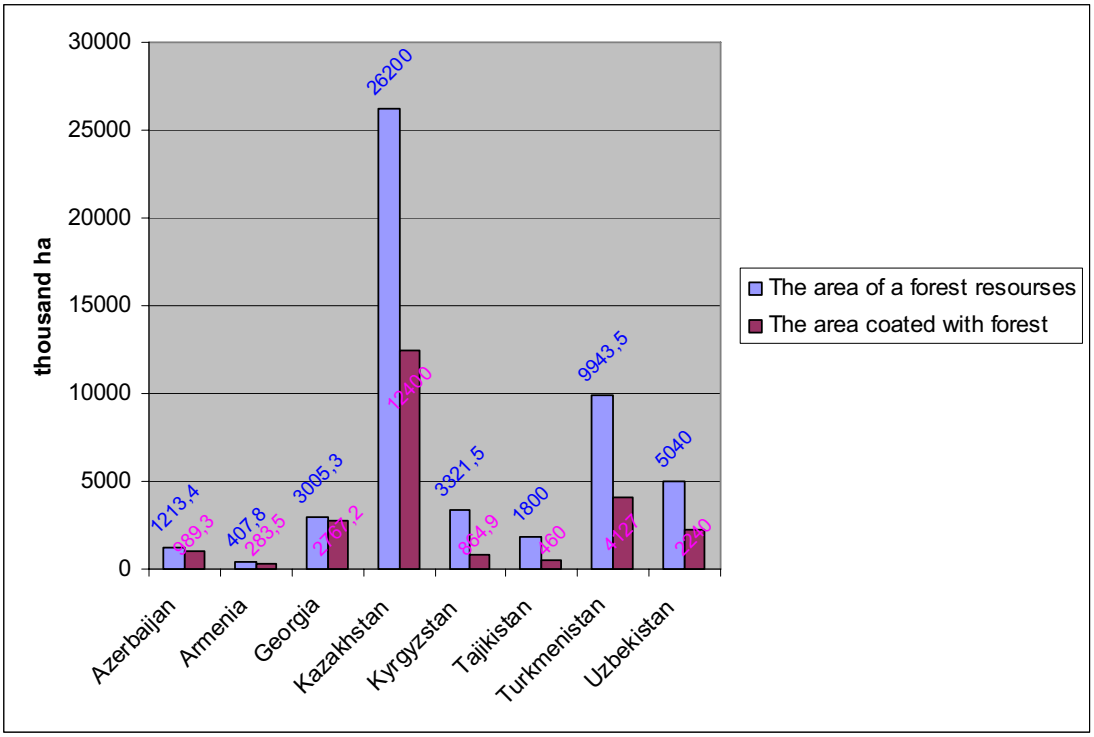
and use by forest enterprises and the population, and on pricing and a seller's market of this production both inside countries, and behind their limits.

Additional financing for fulfilment of works by definition of stores of NWFP in all countries on a uniform technique, and also definitions of scientifically reasonable norms of their use is necessary. For qualitative and multilateral monitoring it is necessary to use the modern methods of GIS giving an opportunity to predict a condition of forests in different temporary cuttings, to estimate influence of various factors on forest ecosystems.

Experience of management by forests in countries of region shows, that sustainable management of forests is impossible without resistant social and economic base of local population. Therefore by development of a management system of forests it is necessary to consider both social requests, and economic functions of forests, and problems of recruitment phenomenon of the big groups of people in decision-making process. All this puts a problem of development of optimum methods of sustainable management of forests and a problem of liquidation of poverty of the population in forests and accumbent territories to forests extremely important, but at all not investigated. It needs realization of special research works.

Within the framework of the present project in each of eight countries for studying a degree of contribution of NWFP for sustainable development and the analysis of system of management of NWFP it is necessary to provide the collecting of the initial information on all questions concerning NWFP, in the several key pilot areas covering most widespread forest types in each from the states, and to conduct their analysis. It will allow defining in short period of time the optimum control of wood resources for liquidation of poverty of the people.

Figure 3 ***The area of forest lands in the countries of Central Asia and Caucasus – the general area of forest fund (blue colour) and the area covered with woods (dark pink colour)***



List of non-wood Forest Production used in Central Asia and Caucasus

List of Non-wood Forest Production in Central Asia and Caucasus	AR	AZ	GE	KZ	KG	TJ	TM	UZ
			Plants/raw material					
			Production effected by trees and bushes					
Pine *(Pinus sp.)* 3 kinds		3, 5	3, 5	3, 5				
Fir *(Abies sp.)* 3 kinds	3, 5	3, 5	3, 5	3, 5 ,6	3, 5, 6			
Larch Siberian *(Larix sibirica Ledeb.)*				4, 5				
Spruce *(Picea sp.)* 3 kinds			3, 5 ,6	3, 5 ,6	3, 5 ,6			
Cedar Siberian *(Pinus sibirica)*				1, 3, 4, 5 ,8				
Juniper, Central Asian juniper *(Juniperus sp.)* 8 kinds	1, 3, 5, 6, 7	1, 3, 5, 6, 7	1, 3, 5, 6, 7	1, 3, 5, 6, 7	1, 3, 5, 6, 7	1, 3, 5, 6, 7	1, 3, 5, 6, 7	1, 3, 5, 6, 7
Beech east *(Fagus orientalis)*	1, 5	1, 5	1, 5					
Hornbeam *(Carpinus sp.)* 2 kinds	5	5	5					
Elm *(Ulmus sp.)* 3 kinds		4, 5, 8		4, 5, 8	4, 5, 8	4, 5, 8	4, 5, 8	4, 5, 8
Poplar *(Populus sp.)* more than 10 kinds	5	5	5	5	5	5	5	5
Chestnut *(Castanea sativa)*	1. 5	1. 5	1, 5					
Maple *(Acer sp.)*	5	5	5	5	5	5	5	5
Linden *(Tilia caucasica)*	3, 6	3, 6	3, 6					
Willow *(Salix sp.)*			2, 3, 4, 6	2, 3, 4, 6	2, 3, 4, 6	2, 3, 4, 6	2, 3, 4, 6	2, 3, 4, 6
Oak *(Quercus sp.)* 10 kinds	3, 5, 8	3, 5, 8	3, 5, 8	3, 5, 8				
Alder *(Almus sp.)* 3 kinds	3, 5	3, 5	3, 5	3, 5				
Ash *(Fraxinus sp.)* 2 kinds	5	5	5	5	5	5	5	5
Birch *(sp. Betula sp.)* 6 kinds	3, 5	3, 5	3, 5	3, 5	3, 5	3, 5		3, 5
Persian walnut *(Juglans regia)*	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5
Almond *(Amygdalus sp.)* 4 kinds				1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4
Filbert *(Corylus avellana)*	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4				
Pistachio nut *(Pistacea vera)*	3, 4, 5, 8	3, 4, 5, 8	3, 4, 5, 8	1, 3, 4, 5, 8	1, 3, 4, 5, 8	1, 3, 4, 5, 8	1, 3, 4, 5, 8	1, 3, 4, 5, 8
Pear *(Pyrus sp.)* 3 kinds	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5
Date - plum *(Diospyros sp.)* 2 kinds	1, 3	1, 3	1, 3			1, 3	1, 3	1, 3
Apricot dace *(Armeniaca vulgais)*	1, 3, 8	1, 3, 8	1, 3, 8	1, 3, 5, 8	1, 3, 5, 8	1, 3, 5, 8	1, 3, 5, 8	1, 3, 5, 8
Apple tree *(Malus sp.)* 4 kinds	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5
Fig, fig tree *(Ficus carica)*		1, 3	1, 3			1, 3	1, 3	1, 3
Unabi *(Zizyphus jujuba)*					1	1	1	1
Sumy *(Rhus sp.)* 2 kinds	4, 6	4, 6	4, 6	4, 6	4, 6	4, 6	4, 6	4, 6
Malines *(Rubus idaeus)*	1, 3	1, 3	1, 3	1, 3	1, 3			
Dewberry *(Rubus caesius)*	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4
Dogwood *(Cornus sp.)* 2 kinds	3, 4, 5	3, 4, 5	3, 4, 5					
Grape *(Vitis sp.)* 3 kinds	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4
Cherry *(Cerasus sp.)* 6 kinds	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4
Plum *(Prunus sp.)* 5 kinds	1, 3, 4, 5, 8	1, 3, 4, 5, 8	1, 3, 4, 5, 8	1, 3, 4, 5, 8	1, 3, 4, 5, 8	1, 3, 4, 5, 8	1, 3, 4, 5, 8	1, 3, 4, 5, 8
Hawthorn *(Crataegus sp.)* 6 kinds			1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4
Mountain ash *(Sorbus sp.)* 3 kinds	1, 3, 4, 5, 7	1, 3, 4, 5, 7	1, 3, 4, 5, 7	1, 3, 4, 5, 7	1, 3, 4, 5, 7	1, 3, 4, 5, 7		1, 3, 4, 5, 7
European birdcherry *(Padus racemosa)*	1, 3	1, 3	1, 3	1, 3				
Cherry - mahaleb *(P. mahaleb)*				3, 4	3, 4	3, 4		3, 4
Viburnum *(Viburnum opulus)*	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4				
Currant *(Ribes sp.)* 5 kinds	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3		1, 3
Barberry *(Berberis sp.)* 2 kinds	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4	1, 3, 4
Hackberry *(Celtis caucasica)*	5, 6	5, 6	5, 6	5, 6	5, 6	5, 6	5, 6	5, 6
Jasmine *(Jasminum sp.)*	3, 6		3, 6					
Dog rose *(Rosa sp.)*	1, 3	1, 3	1, 3	1, 3, 6	1, 3, 6	1, 3, 6	1, 3, 6	1, 3, 6
Elaeagnus *(Elaeagnus sp.)*	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5
Sea buckthorn *(Hippophae rhamnoides)*		1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5	1, 3, 4, 5		1, 3, 4, 5
Gooseberry *(Grossularia sp.)* 2 kinds		1, 3	1, 3	1, 3				
Elder *(Sambucus sp.)* 2 kinds	1, 3	1, 3	1, 3	1, 3				
Silk - tree *(Albizzia julibrissin)*		3, 6						
Honeylocust *(Gleditschia sp.)* 2 kinds		1, 3, 6						
Common laurelcherry chemist's *(Laurozerasus officinalis)*	1, 3, 6	1, 3, 6	1, 3, 6					
Rhododendron *(Rhododendron sp.)* 6 kinds	6	6	6					
Buckthorn fragile *(Frangula alnus)*		3, 4, 6	3, 4, 6	3, 4, 6				
Honeysuckle *(Lonicera sp.)* 9 kinds	3, 6		3, 6	3, 6	6	3, 6	3, 6	6
Common buckthorn *(Rhamnus sp.)* 2 kinds	3, 4	3, 4	3, 4	3, 4, 6	3, 4	3, 4	3, 4, 5	3, 4
Spindle - tree *(Euonymus sp.)* 3 kinds	8	8	8	8	8	8		8
Aflatunia *(Aflatunia ulmifolia Franch.)*				8	8			
Yew berrylike *(Taxus baccata)*	4, 6	4, 6	4, 6					
Jerusalem thorn *(Palisrus spinachrists)*	4, 6	4, 6	4, 6				4, 6	
Persian parrotia *(Parrotia persica)*	6	4, 6						
Zelkova *(Zelkova caprinifolia)*	4, 6	4, 6	4, 6					
Wingnut *(Pterocarya fraxinifolia)*		4, 6	4, 6					
Tamarix *(Tamarix sp.)*	4, 6	4, 6	4, 6	4, 6	4, 6	4, 6	4, 6	4, 6
Spirea *(Spiraea sp.)*	6	6	6	6	6	6	6	6
Box - tree *(Buxus hyrcana)*		4, 6	4, 6					
Halimodendron *(Halimodendron halodendron)*	6	6		6	6	6	6	6
Staphylea *(Staphylea pinnata)*	1, 4	1, 4	1, 4					
Laurel *(Laurus nobilis)*			1, 3, 6					
Sumac *(Cotinus coggigria)*	4, 6	4, 6	4, 6		4, 6	4, 6	4, 6	4, 6
Spindle - tree *(Euonymus sp.)*	8	8	8	8	8	8		8
Ephedra *(Ephedra sp.)*	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3
Salsol *(Salsola sp.)*				3, 4		3, 4	3, 4	3, 4
Calligonum *(Calligonum sp.)*		2, 3		2, 3		2, 3	2, 3	2, 3
Sandy acacia *(Ammodendron conollyi)*				5			5	5
Pea tree *(Caragana sp.)*	4, 5, 8	4, 5, 8		4, 5, 8	4, 5, 8	4, 5, 8	4, 5, 8	4, 5, 8
Mazzard cherry *(Cerasus avium)*	1	1	1					
Biwa *(Mespilus sp.)*	1, 5	1, 5	1, 5					
Woadwaxen *(Genista tinktoria)*	3, 4	3, 4	3, 4					
Small cranberry *(Oxycoccus sp.)*	1	1	1	1				
Blueberry *(Vaccinium uliginosum)*	1	1	1	1				
Whortleberry *(Vaccinium myrtillus)*	1, 3	1, 3	1, 3	1, 3				
Pomegranate *(Punica granatum)*	1, 3, 4	1, 3, 4						
Cowberry *(Vaccinium vitis-igaea)*	1, 3, 7	1, 3, 7	1, 3, 7	1, 3, 7				
Stone - berry *(Rubus saxatilis)*	1		1					
Wild strawberry *(Fragaria sp.)*	1, 3	1, 3	1, 3	1, 3				
Butcher's - broom *(Ruscus colchicus)*	1, 3	1, 3	1, 3					
Hop *(Humulus lupulus)*	3, 7	3, 7	3, 7					
Privet *(Ligustrum vulgaris)*	6	6	6					
Herbaceous plants								
Alexandria laurel branchy *(Danae racemosa)*	6		6					
Primrose *(Primula sp.)*	6	6	6	6	6	6	6	6
Cyclamen *(Cyclamen sp.)*	6	6	6					
Nightshade *(Solanum sp.)*	3	3	3	3				
Horsetail *(Equisetum arvense)*	3	3	3	3	3	3	3	3
Crowfoot *(Ranunculus sp.)*	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6
Sage-brush *(Artenisia sp.)*	2, 3, 7, 8	2, 3, 7, 8	2, 3, 7, 8	2, 3, 7, 8	2, 3, 7, 8	2, 3, 7, 8	2, 3, 7, 8	2, 3, 7, 8
Geranium *(Geranium sp.)*	6	6	6	6	6	6	6	6
Crow-eye *(Paris sp.)*	3	3	3	3				
Woodruff *(Asperula sp.)*	6, 7	6, 7	6, 7	6, 7	6, 7	6, 7	6, 7	6, 7
Campion *(Silene sp.)*	6	6	6	6	6	6	6	6
Willowweed *(Epilobium sp.)*	7	7	7	7	7	7	7	7
Origanum *(Origanum sp.)*	3, 8	3, 8	3, 8	3, 8	3, 8	3, 8	3, 8	3, 8
Aconite *(Aconitum sp.)*	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6		3, 6
Coltsfoot *(Tussilago farfara)*	3	3	3	3	3	3	3	3
Everlasting *(Helichrysum arenarium)*	3	3	3	3	3	3	3	3
Radio-gramophone *(Rhodiola sp.)*				3, 6	3, 6	3, 6		3, 6
Ungernia *(Ungernia victoris)*						3		3
Ziziphora *(Ziziphora sp.)*				3, 8	3, 8	3, 8	3, 8	3, 8
Saffron *(Crocus)*	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6
Rhubarb *(Rheum sp.)*				1, 7	1, 7	1, 7	1, 7	1, 7
Dittany *(Dictamnus sp.)*	6	6	6	6	6	6	6	6
Gentian *(Gentiana sp.)*	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6
Milk vetch *(Astragalus sp.)*	2, 3, 7	2, 3, 7	2, 3, 7	2, 3, 7	2, 3, 7	2, 3, 7	2, 3, 7	2, 3, 7
Mint *(Mentha sp.)*	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3
Scabious *(Scabiosa sp.)*	6, 7	6, 7	6, 7	6, 7	6, 7	6, 7	6, 7	6, 7
Prangos *(Prangos pabularia)*				2, 7	2, 7	2, 7	2, 7	2, 7
Giant-fennel *(Ferula sp.)*				2, 3, 7, 8	2, 3, 7, 8	2, 3, 7, 8	2, 3, 7, 8	2, 3, 7, 8
Codonopsis *(Codonopsis clematidea)*				3, 6	3, 6	3, 6		
Alhagi *(Alhagi sp.)*	2, 7			2, 7	2, 7	2, 7	2, 7	2, 7
Dogbane *(Trachomitum sp.)*	8	8	8	8	8	8	8	8
Onions *(Allium sp.)*	1, 6	1, 6	1, 6	1, 6	1, 6	1, 6	1, 6	1, 6
Mallow *(Althaea sp.)*	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6
Aster *(Aster sp.)*	6	6	6	6	6	6	6	6
Cowparsnip *(Heracleum sp.)*	1, 3, 6	1, 3, 6	1, 3, 6	1, 3, 6	1, 3, 6	1, 3, 6		1, 3, 6
Bunium *(Bunium sp.)*				1, 7	1, 7	1, 7	1, 7	1, 7
Centaurea *(Centaurea sp.)*	3. 6, 7	3. 6, 7	3. 6, 7	3. 6, 7	3. 6, 7	3. 6, 7	3. 6, 7	3. 6, 7
Peganum *(Peganum harmala)*	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4
Capparis *(Capparis spinosa)*	1	1	1	1	1	1	1	1
Sanguisobra *(Sanguisobra sp.)*	2. 3	2. 3	2. 3	2. 3	2. 3	2. 3	2. 3	2. 3
Agrimonia *(Agrimonia sp.)*	1	1	1	1	1	1	1	1
Mellisa *(Mellisa officinalis)*	3, 7	3, 7	3, 7	3, 7	3, 7	3, 7	3, 7	3, 7

Tansy *(Tanacetum sp.)*	3	3	3	3	3	3	3	3	3
Motherwort *(Leonurus sp.)*	3. 7	3. 7	3. 7	3. 7	3. 7	3. 7	3. 7		3. 7
Soapwort root *(Allochrusa gypsophiloedos)*				1, 8	1, 8	1, 8	1, 8	1, 8	1, 8
Fern of wives. *(Athyrium filix-femina)*	1, 2, 6	1, 2, 6	1, 2, 6	1, 2, 6	1, 2, 6				
Female fern the husband. *(Dryopteris filix-mas)*	3	3	3	3	3				
Gladiolus *(Gladiolus sp.)*	6	6	6	6	6	6	6	6	6
Chalk plant *(Gypsophilla sp.)*	3, 7	3, 7	3, 7	3, 7	3, 7	3, 7	3, 7	3, 7	3, 7
Licorice *(Glycyrrhiza glabra)*	1, 3, 8	1, 3, 8	1, 3, 8	1, 3, 8	1, 3, 8	1, 3, 8	1, 3, 8	1, 3, 8	1, 3, 8
Lily of the valley *(Convallaria majalis)*	3, 6	3, 6	3, 6	3, 6					
Adonis *(Adonis sp.)*	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6	3, 6
Lily *(Lilium)*	6	6	6	6					
Rhaponticum *(Rhaponticum carthamoides)*				2, 3, 6, 7					
Asparagus *(Asparagus officinalis)*	1, 3	1, 3	1, 3	1, 3					
Sorrel *(Rumex sp.)*	1, 3	1, 3	1, 3	1, 3	3	3	3	3	3
Orchis *(Orchis sp.)*	6	6	6	6	6	6			6
Bell - flower *(Campanula sp.)*	6	6	6	6	6	6	6	6	6
Autumn crocus *(Colchicum sp.)*	3, 7	3, 7	3, 7	3, 7	3, 7	3, 7	3, 7	3, 7	3, 7
Poppy *(Papaver sp.)*	3. 6, 8	3. 6, 8	3. 6, 8	3, 6, 8	3. 6, 8	3. 6, 8	3. 6, 8	3. 6, 8	3. 6, 8
Anemone opened *(Pulsatilla patens)*				3, 6					
Anemone *(Anemone sp.)*	6	6	6	6	6	6	6		6
Eminium *(Eminium sp.)*				3	3	3	3	3	3
Hazel grouse *(Fritillaria sp.)*	6	6	6	6	6	6	6	6	6
Sage *(Salvia scabra)*	3. 6	3. 6	3. 6	3. 6	3. 6	3. 6	3. 6	3. 6	3. 6
Valeriana *(Valeriana sp.)*	3	3	3	3	3	3	3	3	3
Tulip *(Tulipa sp.)*	6	6	6	6	6	6	6	6	6
Madder *(Rubia tinctoria)*				4	4	4	4	4	4
Pink *(Dianthus sp.)*	6	6	6	6	6	6	6	6	6
Yarrow *(Achillea millefolium)*	3	3	3	3	3	3	3	3	3
Sweetclover *(Melilotus sp.)*	3	3	3	3	3	3	3	3	3
Mullein *(Verbascum sp.)*	3	3	3	3	3	3	3	3	3
Thermopsis *(Thermopsis sp.)*				3	3	3	3	3	3
Skullcap *(Scutellaria sp.)*	3	3	3	3	3	3	3	3	3
Fodder grasses									
Bluestem *(Andropogon sp.)*	2	2	2	2	2	2	2	2	2
Fescue *(Festuca sp.)*	2	2	2	2	2	2	2	2	2
Hedgehog combined team *(Dactylus glomerata)*	2	2	2	2	2	2	2	2	2
Smallreed *(Calamagrostis sp.)*	2	2	2	2	2	2	2	2	2
Barley *(Hordeum sp.)*	2	2	2	2	2	2	2	2	2
Brome grass *(Bromus sp.)*	2	2	2	2	2	2	2	2	2
Wheat - grass *(Elytrigia sp.)*	2	2	2	2	2	2	2	2	2
Sheep's fescue *(Festuca sulcata)*				2	2	2	2	2	2
Feather grass *(Stipa sp.)*	2	2	2	2	2	2	2	2	2
Reed *(Phragmites communis)*	2	2	2	2	2	2	2	2	2
Halostachys *(Halostachys caspica)*									
Sea pink *(Limonium otolepis)*	2, 6			2, 6	2, 6	2, 6	2, 6	2, 6	2, 6
Aellenia *(Aellenia subaphulla)*				2				2	2

Aristida *(Aristida pennata)*				2			2	2			
Anabasis *(Anabasis salsa)*				2			2	2			
Salsola *(Salsola arbuscula)*				2			2	2			
Salsola *(Salsola rigida)*				2			2	2			
Clover *(Trifolium sp.)*	2, 7	2, 7	2, 7	2, 7	2, 7	2, 7	2, 7	2, 7			
Vick, a vetch *(Vicia sp.)*	2, 7	2, 7	2, 7	2, 7	2, 7	2, 7	2, 7	2, 7	2, 7	2, 7	2, 7
Sedge *(Carex sp.)*	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3			
Wild-rye, wild rye *(Elimus sp.)*	2	2	2	2	2	2	2	2			
Mushrooms											
Mushrooms (an aspen mushroom, a birch - mushroom, a pepper cap, a white, steppe pepper cap, honey agarics, common mushrooms, puffballs, etc.)	1	1	1	1	1	1	1	1			
Products of an alive origin / Raw material											
Honey-bee family *(Apoidia)* 4 stems of 105 kinds	1	1	1	1	1	1	1	1			
Lepidoptera (2 species)				10	10	10	10	10			
Birds which are got(procured) in the hunting purposes and for the decorative content											
Chicken (the Red grouse, ytap, the wood grouse, partridges, a pheasant, mountain patridge)	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12			
Pigeons and turtledoves				10, 12							
Pierocles *(Pterocles)* 4 species				10, 12							
Quail *(Coturnix coturnix)*				10, 12							
Ducks and gooses	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12			
Wood - cocks				10, 12							
Cranes (a coot, etc.)				10, 12							
Bustards				10, 12							
Passerine birds				9							
Mammals which are got(procured) for the hunting purposes and objects of foreign trophy hunting											
Dogs (the wolf, a jackal, the fox, corsac)	10, 12	10, 12	10, 12	10, 12	10, 12		10, 12	10, 12			
Cat's (cane, steppe and wood cats, an arid cat)				10, 12	10, 12	10, 12	10, 12	10, 12			
Lynx *(Felis lynx)*	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12			
Brown bear *(Ursus arctos)*	10, 12	10, 12	10, 12	10, 12, 13	10, 12, 13	10, 12, 13	10, 12, 13	10, 12, 13			
Martens (caress *(Mustella nivalis)*, marten, bandaging, a marten and a stone marten, a raccoon dog, a badger, an ermine, columns, the European mink, a sable, a glutton)	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12			
Wild boar *(Sus scrofa)*	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12			
Chamois *(Rupicarpa rupicarpa)*	10, 12		10, 12								
Deer *(Cervus sp.)*	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12			
Roe deer *(Capreolus sp.)*	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12			
The moose *(Alces alces)*				10, 12							
Musk deer *(Moschus moschiferus)*				10, 12							
The Siberian mountain goat	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12			
Argalis	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12			
Hares (3 species)	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12	10, 12			
Squirrel *(Scuisus vulgaris)* and a chipmunk		10, 12	10, 12	10, 12							
Porcupine *(Hystrix indica)*				12	12		12	12			

1. Food stuffs
2. Hay
3. Raw material for medical and perfumery products
4. Raw material for dyes and paints
5. Raw material for utensils, hand-worked and constructions
6. Ornamental plants
7. Secreted substances
8. Other vegetative products
9. 9. Alive animals
10. 10. Skins, fur, trophies
11. Honey of natural bees and a beeswax
12. Meat of wildings
13. Raw material for medicine
14. Raw material for dyes