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Food forest resources as a component of environmental management

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Abstract. Forest resources are concerned as renewable natural biological resources. Wood is the main type of forest operation products. Non-timber and food forest resources are also valuable. The article presents an overview of food forest resources of Far Eastern Federal District, such as wild berry, walnut raw materials and pharmaceuticals, and the main ways of its using in industrial production. Article shows food forest resources harvest by types. The main share of it contains mushrooms and berries. Food forest resources harvesting and processing are advanced direction in environmental management, which can stimulate the development of new production organization approaches in related spheres: food, processing and agro-industrial industries.

1. Introduction
The material base of state socio-economic development provided by natural resources concentrated on its territory. Russia is one of the leaders of natural resources reserves. Russian Federation (RF) ranks first in the world in terms of natural gas and wood reserves, second in terms of coal deposits and third in terms of gold deposits.

Forests are renewable natural resources. Forest natural resources are multifunctional resources. Forests perform air and water purification, affect the climate stability, atmosphere composition, water accumulation in the soil.

The purpose of the work is to review food forest resources concentrated in the territory of Far Eastern Federal District (FEFD). The theoretical basis of study is regulatory documents and scientific publications. The information base is the reporting data of the Federal State Statistics Service and the Unified Interagency Information and Statistical System.

2. Results and discussion
Russia has a forest area of 1184.5 million hectares. Forests are distributed unequally across the Russian Federation. It is caused by climatic conditions, economic and demographic changes. The forest resources are based on forests concentrated in two regions: the Siberian and Far Eastern Federal Districts (figure 1). The total forest area in these regions is over 74%. Forest cover is 53.8 and 47.9%, respectively. In other territorial entities, the forest area does not exceed 10% [1].
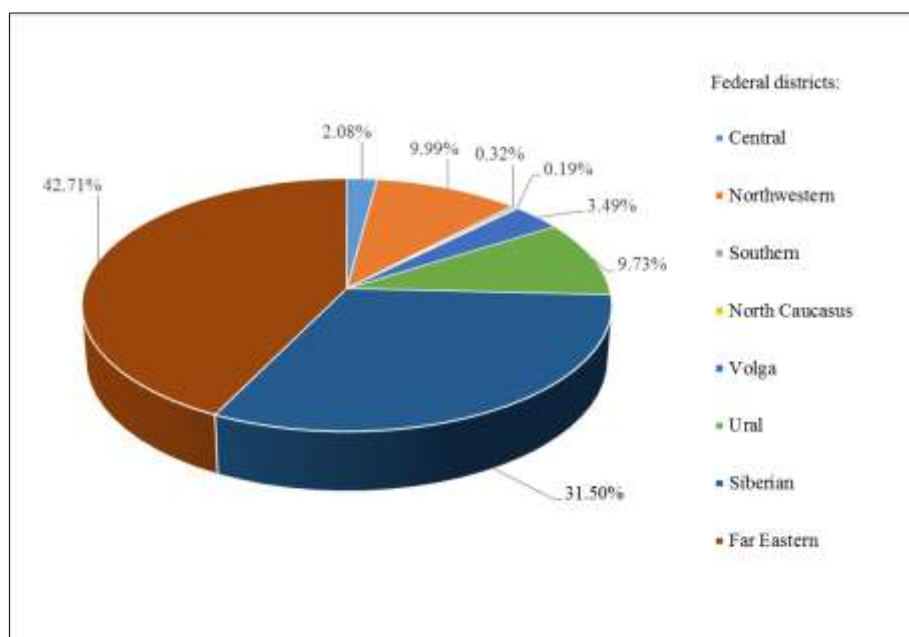
Figure 1. Regional distribution of forest area in the Russian Federation.

The Far Eastern Federal District is one of the largest and at the same time the most remote from the most industrially developed central districts. 42.7% of the total forest area in Russia is located on the FEFD territory. The use of forest resources is carried out in two main areas: harvesting of wood and other raw wood, harvesting and processing of non-timber and food forest resources. Food forest resources group includes wild fruits, berries, seeds, nuts, mushrooms and birch sap [2]. It is precisely this type of bioresources that is currently growing in demand. It is due to socio-economic changes, consumer reorientation towards healthy, high-quality, safe food. The forests of the Far East are distinguished by high biodiversity: over 3000 species of higher plants grow here, about 1000 of them are medicinal, 350 are food and 300 – are honey-bearing and pollen-bearing [3]. The biological stock of the main types of forest food resources is presented in figure 2. These figures indicate that 13.2% of all wild berries biological stocks in Russia grow in the Far East. FEFD owns 64.9% of the all-Russian cedar pine and cedar elfin nuts biological stock and 49.8% of mushrooms stock [4].

From the point of view of industrial production, the use of wild berry raw materials plays a special role. This raw material is a source of vitamins, macro and microelements and biologically active substances (BAS) [5]. According to biologically active substances content wild plant raw materials are equivalent to cultivated varieties, and certain types of forest products exceed many cultivars in terms of nutritional value and utility [6]. These properties allow developing on their basis various food products, including those with functional properties. Berry raw materials are used as the main ingredient for the production of non-alcoholic products: nectars, juice drinks, fruit drinks [7]. Many types of wild berries are used to design and manufacture confectionery and bakery products. Wild berries are one of the main types of raw materials in the production of sweet canned food, for example, jams.

Wild berries of the Far East are represented by 109 species, with 12 of them being fruits. Lingonberry has a high biological yield of 450 tons, blueberries - 300 thousand tons, cranberries - 250 thousand tons, blueberries - 30 thousand tons, currants - 18 thousand tons, raspberries - 10 thousand tons. At the same time, the total annual biological yield for all types of wild berries is conventionally defined as 1.1 million tons. in year. The yield on the production fund of this raw material is 116 thousand tons year [8].
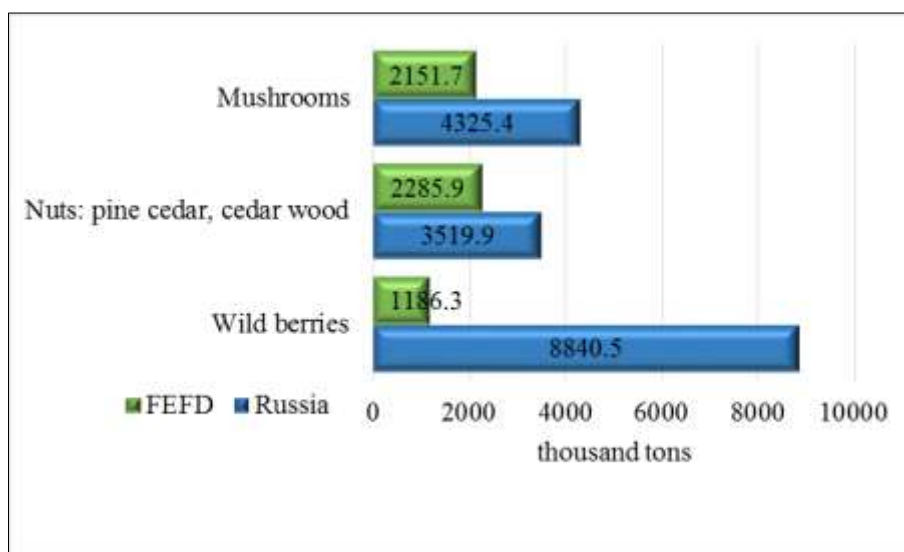
Figure 2. Biological reserves of the main types of food forest resources.

Nut plants are a source of raw materials for confectionery, oil and butter industries. The processed products of nut plants (cedar oilcake) are also have nutritional value and are used as non-traditional raw materials in food production [9]. In the Far East, they are represented by cedars: Siberian and Korean, cedar elfin wood, hazelnut, water chestnut, Manchurian nut, and Siebold. Cedars are the most popular and have special value. Areas of nut growth are concentrated in Primorsky Region (43%), Khabarovsk Region (18%), the Republic of Sakha (Yakutia) (19%). Total area of nut-growing in other FEFD areas is 20%. The most valuable FEFD walnut is cedars. The average annual biological yield of Korean cedar is 50 kg / ha, and that of the Siberian cedar 160 kg / ha. At the same time, the average annual harvest of Korean cedar nuts is 17 kg / ha, and that of the Siberian cedar is 55 kg / ha. The presented figures indicate that the production fund yield is only one third of this raw material biological stock yield. This is due to reduction of cedar forests area. Some of them are in protected areas, other are inaccessible.

Elfin cedar is another type of walnut widely distributed in the FEFD territory. It grows on ridges and in coastal strip. Cedar elfin area is 32358.2 thousand hectares. Production fund area is 3225.8 thousand hectares. Average annual stock of nuts is 32.3 thousand tons, but size of possible harvesting is 9.7 thousand tons. It is indicates that the industrial development of this natural resource type is 30%.

Medicinal plants represent a special group of natural forest resources, being a promising direction in functional, specialized and enriched products development [10]. Medicinal and technical raw materials are also used in pharmaceutical industry. In the Far Eastern region 974 plant species grow that can be used for medicinal purposes and as a preventive measure, 200 of them are officially considered medicinal, but only 70 are used in medicine. Among the harvested plants are lemongrass, wild rose, celandine, eleutherococcus, mountain hawthorn, hawthorn, Aralia Manchu and many others. The most developed plants are Aralia Manchu and Eleutherococcus spiny. Preparation of medicinal and technical raw materials is concentrated in the Primorsky Region. It accounts for 90% of the blanks. Billets are conducted on 40 species of plants. Total harvest is 1.5 thousand tons per year, including 63% of Eleutherococcus spiny and 10% - for aralia Manchu.

The estimated food forest resources harvest by species is shown in figure 3. These figures indicate that in the FEFD, mushrooms and wild berries are the most popular food forest resources, their estimated share in total harvest of all food forest resources types is 38.4 and 26.6%, respectively [4].
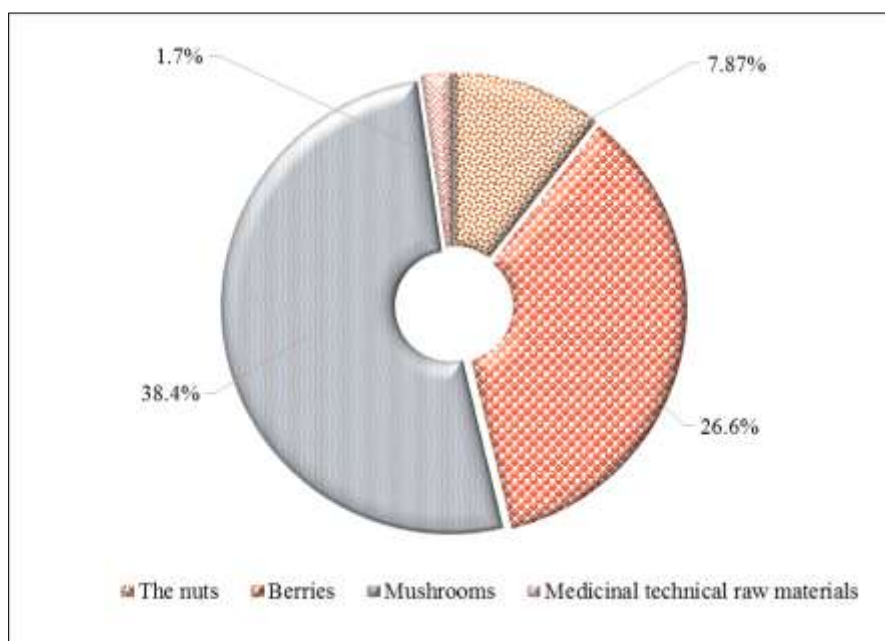
Figure 3. The estimated size of the collection of wild plants FEFD %.

3. Conclusion

FEFD has a powerful bioresource base. At the same time the leading direction in the use of forest natural resources is the harvesting of wood and other wood raw materials. Food forest resources are used only partially. This is due to a number of factors: the inability to accurately assess and predict the volume of biological reserves of various wild food resources types, pronounced seasonality and cyclical harvest of food forest resources, which increases the risk of attracting various sources of funding, remoteness and sometimes difficult areas of procurement accessibility from enterprises and centers processing, lack of industrial transport infrastructure and qualified personnel in the field of harvesting and food resources processing. However, today the field of forest and medicinal raw materials harvesting and food resources processing are one of the promising areas in nature management, since they are based on unused renewable bioresources that do not require serious investments for reproduction. This area development will give impetus to development of new areas in related industries - food, processing, pharmaceutical industry and agro-industrial production and the social sphere, contributing to employment and organization of additional jobs, especially in hard-to-reach areas with a low level of production development.

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