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SCIENTIFIC-TECHNOLOGICAL PLATFORM**

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SCIENTIFIC SESSION III
MULTIFUNCTIONAL USE AND SUSTAINABLE MANAGEMENT
OF FOREST RECOURCES

PLENARY LECTURE
INFLUENCE OF FORESTS ON THE FOOD-STUFFS SAFETY

Yancho NAIDENOV¹, Denitsa PANDEVA²

Abstract: *The food-stuffs safety is determined by complex reasons including political, social, economical and ecological aspects in management of nature resources. In the fast and recently forests are of the most important factors in this matrix and affect on the food-stuffs security in three main sectors:*

Agriculture – forest ecosystems create favorable conditions for increasing the effectiveness of agricultural productivity by preventing of soil erosion, improvement of soil fertility and optimization of micro-climate. The investigations in Bulgaria show that the protective shelter-belts in Dobrudja occupy about 3% of the arable area but increase the yields averagely 25-35%. World-wide, 240 million live stocks is fed with fodder from forests.

Economy – many counties in the world depend on the utilization of non-wood forest products to ensure economic stability of municipalities and entire regions. In Canada million people are employed in organized forest excursions, study on forest ecosystems and bird live, tourist trips, extreme sports, fishing and hunting. Worldwide, more than 500 million people are economically dependant on manufacturing, trade and consummation of non-wood forest products.

Forests as foods resource – the forests are source of edible fruits, nuts, leaves, roots, mushrooms and herbs, which ensure valuable nutrition elements and balanced diet. Game meat ensures up to 75-80% of the protein for the population in mountainous regions of the world.

Key words: forest, food, economy, ecology.

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1. INTRODUCTION

Forests and the benefits they provide in the form of food, income and watershed protection have significant and, in some cases, critical role in enabling millions of people in different regions of the world to secure stable and adequate food supply. The definition of food security concerns not only the current economic and physical access to food by people at all time but also implies sustainable food supplies for future generations (FAO, 1983). In this aspect forest management and the tendency of continuous deforestation and degradation of forests in world scale directly influence sustainable livelihoods and food security. From 1980 to 1990, an estimated 146 million ha of natural forests in the tropics were cleared, with an additional loss of 65 million ha between 1990 and 1995 (FAO, 1997). The area of degraded forest is estimated to be even greater (WRI, 1999). Deforestation significantly increases the risk of erosion processes, the frequency and strength of floods, lowers the level of underground water, negatively modifies the microclimate and decreases the protection of agricultural areas against wind erosion (Naidenov, 2006). The massive floods in Europe in the spring and summer of 2005-2006, as well as the unusually strong hurricanes in North America and Asia in the last years prove the negative effect of forest destruction and degradation, as result of overexploitation, on the environment and agricultural production. It is important, however, to recognize that deforestation and forest degradation may also generate profits, from timber or other product sales, forest food products for consumption or crop and livestock production for subsistence or market. In assessing the implications of forest degradation, it should be considered how the value obtained compares with the costs incurred, taking into account the full implications for the global community, including non-human life forms (Lipper, 2000).

2. FORESTS AS A FACTOR FOR SUSTAINABLE LIVELIHOOD

Food security is a key element of livelihood. It is determined by a complex of social and economical, political and ecological factors. Sustainable livelihood depends on 5 main forms of capital: natural, physical, financial, human and social (Warner, 2000). Forests, as source of a variety of foods supplementing and complementing what the agricultural production, wood fuels and a wide range of traditional medicines and other hygiene products, are one of most important natural factors. It has been recently estimated that one quarter of the world's poor population depends directly or indirectly on forests for their livelihood (World Bank, 2000). The role of forests in reducing poverty and increasing food supply is expressed in three main sectors:

1. Agriculture and fish-farming

Forests create and maintain favorable conditions for development of agricultural crops by decreasing soil erosion, improving soil fertility and preserving the microclimate humidity. Trees roots penetrating deeply in the ground help the active interaction between soil and main rock thus ensuring viable for the plants nutrition elements. According Radkevich (1983) and Naidenov (1990, 2003) the forest shelter-belts are the most successful ecological experiment. Established for the first time by the great Russian scientist Dokuchaev in the stony steppes of Russia in XIX century to protect the agricultural crops from dry winds and to accumulate of snow cover, recently they are widely distributed all over the world and increase significantly agricultural production. In Bulgaria shelter-belts occupy about 2-3% of the arable lands ensuring 25-30% higher yields from cereal crops. Additionally, these forests provide fire wood and timber, help development of honey production ensuring pollen collection by bees, etc.

About 240 million livestock in the world are bred with fodder from forests. In the near past sheep-breeding, goat-breeding and, to a great extent, cattle-breeding in Bulgaria depended strongly on leaf fodder yielded through so called “branch-cutting management” – a prototype of modern agro-forestry. It is proved that the alder leaves improve the fodder quality and increase the quality and quantity of milk. Taris (1959) noticed that poplar fodder improves the quality of sheep cheese.

Fishing and fish-farming are also closely related to forests. Forest lakes and rivers create excellent conditions for development of these activities especially in the mountain regions, which ensures additional incomes for the local population. Forest ecosystems regulate the level and volume of water flow, protect watershed areas, prevent erosion and have positive influence on water resources and the biodiversity in them even outside the afforested areas.

2. Economy

In the development of human civilization forests have crucial part helping people to survive and overcome natural disasters, political cataclysms and revolutions, economical crises and poverty. According FAO (1999) data the harvesting of timber and its processing accumulates incomes of approximately 13 billions USD. Timber industry ensures tens of millions jobs, especially in the rural regions where the unemployment is usually higher. Most of the timber enterprises are small-scale, low budget and their activity is combined with agriculture. In some regions of the world up to 90% of the forest workers are women collecting mushrooms, medical plants, fruits, seeds, fuel wood, etc. More than 3 000 million people rely on fuel wood or charcoal for heating and cooking (FAO, 1995). Non-wood products also present important resource of incomes and their significance for the modern society gradually increases. The existence of about 500 million people in the world depends on transformation, purchase and consumption of

non-wood forest products. In the region of Amazon River the harvesting of fruits and rubber ensures incomes 6 times bigger than the harvesting of timber and, in the same time, this is successful alternative of coca production in the poor regions of Colombia (Gonzalez, 2000). The exploitation of the natural resources is the biggest part of Canadian trade sector with annual value of about 32.6 billion USD and 300 municipalities rely mainly on incomes from forests. The annual incomes from recreation, excursions, nature observations and other activities related with forests annually present more than 11 billion USD.

In Bulgaria resin production from conifer plantations well developed in the near past, ensuring up to 1 000 working places and good incomes for the forestry sector.

3. Foods from forests

Forests are source of edible fruits, nuts, leaves, roots and root crops, mushrooms, juices with high nutrition quality. In periods of nature disasters or poor crop yields forests are irreplaceable food storage, ensuring the survival of people.

Game-breeding and hunting as alternative food resource is also fully dependant on proper and sustainable forest management. The population in Nigeria, for example, provides 84% of the necessary protein from game consumption. Hunting tourism is one of the most profitable activities for many countries, Bulgaria inclusive.

3. RECENT CHALLENGES TO FORESTRY AS A FACTOR OF FOOD SECURITY

Social and economical development of society is a complicated process determined by many different factors and phenomena. In this aspect food security should be considered as multifunctional and interdisciplinary concept. The problem is in the focus of many governmental and non-governmental institutions and organizations but practical knowledge is still insufficient. The experience in Bulgaria shows that isolated decisions taken in one sector can influence negatively other economic spheres. Typical example from the last decades is the privatization of lands, which caused direct conflict among rural communities. The disorganization of agricultural cooperatives and enterprises as result of land ownership reformation led to sharp decrease of agricultural production for a period of 10-12 years.

In a world scale it is considered that the privatization of forest areas in the equatorial regions will decrease the role of forest ecosystems for food security and lower the economic stability by increasing the risk of poverty and hunger in these communities. This is especially important for the economy of rural regions, which are most vulnerable to nature forces. In seasons of poor crop yields due to unfavorable climatic conditions the

reliance on forest products to fill gaps and complement other sources of subsistence inputs and income is expected to increase, when other sources of income are not available. Small forest enterprises are also one of the best alternatives to ensure seasonal or additional incomes for the population in rural communities.

Forests are the most species-diverse terrestrial habitat on a global level. Their genetic resources provide raw materials for improvement of food and cash crops, livestock and medicinal products. Genetic diversity in crop and livestock species may have positive benefits to producers, particularly in marginal production zones as insurance against production risks (Brush and Meng, 1998). The uncontrolled economic development, however, can have negative effect on natural environment. The deforestation for establishment of new arable lands, pastures and industrial zones causes loss of biodiversity and genetic resources, as well as aggravation of ecological conditions. In deforested regions there is no source of fuel wood and timber, the quality of water lowers and some water resources can even disappear. In this way forest destruction can strongly affect the livelihood and health of local communities.

The improvement of food security by implementation of sustainable forest management and protection of nature resources requires multidisciplinary and complex approach, including all sectors and members of the society. Many scientific and practical methods in this field were developed, most effective seeming to be the different agro-forestry systems. Agro-forestry integrates forest ecosystems with agricultural food production, increasing the level of productivity and the efficiency of land use. The implementation of contemporary modern technologies in agro-forestry allows combining harvesting of timber and fuel wood with production of high quality crops and fodders, preserving in the same time the soil structure and fertility. The establishment of forest shelterbelts, for example, improves the microclimate of arable lands. Bigger forest complexes contribute to livelihoods by providing materials for construction, baskets, storage structures, agricultural implements, boats and hunting and fishing gear, from one side, and ensure inputs for farm systems such as fodder and mulch, contribute to soil nutrient cycling, help conserve soil and water and provide shelter and shade for crops and animals, from the other.

In regions with dense population and limited agricultural lands the cultivation of different crops (maize, peanuts, etc.) can be combined with plantations of fast growing, suitable for regular pruning trees at distances from 6x6m to 12x12m as source of biomass and pulp production, fuel wood, green fertilization, etc. In Bulgaria poplars in mixed crop and tree plantations are traditionally used in the regions of Danube and Thracian Plains and prove to be very effective. The total area of poplar plantations is approximately 20 0000 ha. Some forest plantations are specially constructed to create suitable environment for cultivation of medical plants. Recently

projects on combining low density stands of valuable forest tree species with animal husbandry are under experimentation.

The future role of natural forests in food security and sustainable livelihood depends on development of proper policy, legislation and strategy taking into consideration the high price of products and services that forests provide; the institutional liberty in relation to forest ownership and management; the conservation of biodiversity and genetic resources; the necessity of investments for development of small and middle scale forest enterprises, planting of artificial stands on degraded lands in order to reduce the pressure on natural forests and to improve soil properties; working on and establishing of suitable for the concrete conditions agro-forestry systems.

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