

## **Economic Aspects of the Agroforestry as a Form of Sustainable Land Utilization in Bulgaria**

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The agroforestry economic aspects are founded on its common basis and more specifically the combined land utilization for agro- and forestry economic output. In that context the agroforestry examination and analysis are supposed to be taken within the bounds of the two business sector branches of the country economy - agriculture and forestry. Those two branches have their own share in the Bulgarian Economy. The agriculture contributes to Bulgarian GDP respectively 14% from the public sector and 20% from the private one. At present the forestry has extremely modest contribution to GDP - about 0.2%- 0.3% (Table 1).

Table 1. Main Economic Indexes (2000-2003)

<i>Indexes/ Years</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>
1. Agricultural and forestry GDP (millions lv.)	3289	3520	3446	3422
2. Relative GDP share in the agriculture and forestry from the total GDP (in %)	12.3	11.9	10.7	10.0
3. Number of people employed in agriculture and forestry (thousands )	781.2	766.4	768.5	746.5

It is obvious that the agriculture has had a sizable contribution to the country GDP, about 3500 million lv (1lv ~ ½ \$) in absolute measurements, for the period 2000-2003 year. There is a tendency for absolute and relative share decrease for that period.

The land reform which takes place in Bulgaria is the main factor that carries weight over the agriculture. A characteristic feature of the agrarian reform is that 4,1 million hektar of land were reinstated to nearly 2 million landowners which makes 25 million plots. That strong land parcelation brings the necessity of a respective land consolidation. State control is needed in future because the re-allocation could not be accomplished by pure market mechanisms. That is why state investment in land consolidation is needed in order the arable land profitability to be ensured.

2400 agricultural co-operations have worked after 2000 year in Bulgaria and have cultivated 1.6 million ha. The average cultivated land size by one cooperation is about 650 ha which makes them the largest growers in the branch. Today they operate in complicated economic environment. On one hand it is because the lack of economic infrastructure and on the other hand because the high prices increase of the industrial goods and services and the very low agricultural production prices. That lowered the purchasing power sharply and put the growers in a difficult situation. One possibility for the branch stabilization is the subsidies provided by the State Fund "Agriculture" but the limited financial resources can not compensate for the prices disproportions and bends. That is why after the closure of chapter "Agriculture" in the negotiations for the Bulgarian full right participation in the EU, which took place in June this year, the growers continue to depend and prefer most of all the provided direct subsidies (Table 2).

Table 2. Agricultural Aids (2000-2003)

<i>Indexes/ Years</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>
1. Budget transfers ( thousand lv)	22104	28099	51500	157000
2. Short-turn credits given ( thousand lv)	30000	26000	25000	13000
3. Direct subsidies given ( thousand lv)	10000	19000	25000	47000

According to the Bulgarian integration negotiations with EU the funds are going to be enlarged both for agriculture and agroforestry. And within the bounds of the funds provided for forestry there are ones for agroforestry.

The analysis of the National Forest Policy and Strategy document shows that Bulgarian woodlands have been extended with 8% from 3.6 to 3.9 million ha for the last 35 years. Nowadays the woodlands cover 34% of the Bulgarian territory and 87% of it are forests. The forest territories have extended at the expense of lands unsuitable for agricultural utilization. There is a tendency for woodlands extension by afforestation and most of all by natural succession on waste lands.

That is why a combined agricultural and forestry utilization on those lands is possible. However there is a number of problems behind the opportunities for forestry and agroforestry development. On one hand they originate from the property rights change for part of the Bulgarian woodlands and especially from the new subjects who use the forests. At present time the 178 state forestries have been replaced by 1800 private companies which do the same duties as the latter - lodging and wood processing. So, now there are many new subjects who cause management problems and bring corruption. Those problems affect mostly the mountain and submountain regions as they cover 2/3 of the country territory. 85 percent of the woodlands are state property. That means that the state of Bulgaria will be always interested in the management of that natural goods. It is characterized with extremely long (about 100 years) productivity cycle but with important share in the country economy and social development. Unfortunately forest and forestry problems have never been among the country priorities. Undoubtedly that is a problem which must be solved in future. Besides that a number of authors and researches [1, 3, 4, 5] prove a wrong course of the forest reform has been realized in our country. There are 145 state forestries and 37 state game-breeding stations. The latter do the economic activities. The state forestries are only patrolling the woodlands.

The other 15% forests in Bulgaria belong to nongovernment forestries and 90% of their territories are private ones smaller than 2 ha. In most cases one forestry owns several small (about 0.1-0.2 ha) and scattered about large territory forests. But the special feature here is that there are vast areas of state woodlands. That is why the next important problem of the Bulgarian woodlands is their effective utilization-development of mechanisms for re-allocation or land exchange. State funding and co-operation organizations among the private woodland owners are needed in order the problem to be solved.

All that will also undoubtedly help the Bulgarian agroforestry development. At first both landowners from the private sector and landholders from the forest fund for agricultural growing will embrace the agroforestry. That forest fund consists of about 20 thousand ha lands under cultivation which are parceled among 5 million mountain and submountain pastures. Those pastures can support 350 thousand cattle and 2.5 million sheep and goats.

The woodland yield in Bulgaria for an year with average growing conditions is about 8000 t herbs, 5500 t forest fruits and 5000 t mushrooms.

All those facts show that the Bulgarian agroforestry has very good development conditions which were used in full value as a complex forestry and agro-stock-breeding activity. Unfortunately that model operated in the conditions of centrally planned forestry with constant state subsidies. Today the priorities that stand before the forestry are woodlands re-allocation and implementation of technical and financial support to the forest sector. The latter is necessary for the realization of the forestry ecologic, social and economic functions such as erosion protection, pastures, tourism and biologic diversity preservation.

In the context of the problems exhibited so far the good Bulgarian agroforestry experience since 1925 year should be mentioned. The creation of 13200 ha shelterbelts in the Dobroudja during 1925-1940 is the largest Bulgarian agroforestry experience. A complete shelterbelt network was created between 1951-1956 year, a network which has extremely positive influence on the agrarian production until present time.

It is determined that the shelterbelts in Bulgaria rise the yields with average 30-35% and that the maximum yield is about 2 to 3 times higher than those in open lands (Peev, Hinkov, 2000). The various crops react differently to the shelterbelt protection. In the effective preservation zone the grain crops yield could be risen with 20-40%, the fruit-trees yield with 45-60% and the forage weeds yield up to two times. The yield rise is lower in particular years and can be even indistinguishable. The more unsuitable the development conditions are during the year, the better is the shelterbelt positive effect manifested. The average frequency of a good manifested positive shelterbelt influence on crops productivity reaches 50%.

The higher economic agroforestry effectiveness in comparison with pure agro- and forest biocenoses is in many cases due to the different terms for investments return. For example crops growing between the rows for the first 3-4 years is a common practice in Bulgaria when creating poplar plantations. That alley cropping version provides higher revenue from lands occupied by trees because of the additional crop receipts which cover the growing expenses of the newly established plantation.

High economic effectiveness in other agroforestry systems has been determined. Riparian buffer strips as an agroforestry system are significantly more cheaper and reliable technology for coastal stabilization and land remediation in comparison with the technologies based on the use of complex technical installations which consume a lot of energy. In many cases the agroforestry technologies are the only possible remediation method.

The economic benefits of the tree species inclusion baffle in most cases the economic valuation. Such benefits are field protection from water and wind erosion and soil fertility preservation in the long run as well as the support of larger biodiversity due to the fact that many birds and wild animals use the shelterbelts as hiding places from predators, transport passage-ways and for food.

In most cases the agroforestry technology development solve both ecologic and economic problems but its main purpose is to create a stable basis for sustainable agriculture. Faster transition from the initially targeted nature protection functions to their gradual combination with economic benefits is needed.

Today the agroforestry has extremely favorable conditions for development and should become the main form of land utilization in Bulgaria because of the following reasons:

- Progression of the social-economic reform and abundance of many landowners who posses both arable lands and woodlands.
- Presence of vast areas of uncultivated fields especially in the mountain and submountain country regions.
- Necessity of woodlands extension because in particular country regions the forests are below the critical minimum.
- Presence of vast areas of unsustainable and low productive woodlands which should be reconstructed.

The following things should be mentioned in conclusion:

1. The agroforestry is a specific form of land utilization and is grounded on the positive relations between the elements of agriculture, forestry and natural goods management.
2. The Bulgarian experience in the field of agroforestry also proves the higher economic effectiveness of the agroforestry technologies in comparison with the pure agrarian and forest production. That is a result of the bigger and more stable in time and space total productivity than the independent forest plantations or the pure agrobiocenoses. There are few causes that lead to that conclusion:
  - The larger diversity of plant species and the good manifested vertical and horizontal agroforestry system structure allow more effective and economical use of all available environment resources.
  - Possibilities for compensation processes in the agroforestry systems when the environment conditions are unfavorable according to the so called "biomass preservation law".
  - Better microclimate which reduces the plants energy expenses for adaptive processes.
3. Through agroforestry our country will execute in practice the negotiated terms of the three world conventions - the biodiversity preservation, the prevention of the global climate change results and the drive against the wasteland progress. Those facts make it possible for Bulgaria to use resources from a number of national and international funds.

In addition to all that the great German poet H. Heine foresaw that the verdancy of forests and vegetation is the tint of the future generations. And it is going to be a concern of the entire humanity.

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