

## NECESSITY, OPPORTUNITIES AND PRIORITIES FOR DEVELOPMENT OF AGROFORESTRY IN BULGARIA

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### Abstract

By its nature agroforestry is a form of multifunctional, environmentally friendly and sustainable land management and could provide good income, employment, economic and social stability in many less favoured rural and mountainous areas in Bulgaria. Achievements, policies, legislation, financial instruments and prospects for the development of agroforestry in Bulgaria are reviewed. The review underlines the priorities and opportunities, such as development of agroforestry in mountainous areas of the country; renovation and establishment of new forest protective belts and coastal buffer agroforestry systems; introducing of new agroforestry practices in production of fruit productive trees with high value timber, and in the forest farms. We are pointing out the need for a comprehensive strategy and policy in this field, for facilitating financial access, and for introducing of an assessment system for “good practices” and new agroforestry technologies. Implementation of agroforestry systems in the practice would have important economic, environmental and social impact on the development of local communities and the society as a whole.

**Key words:** financial instruments, legislations, perspectives, politics.

### Introduction

Forests are a key element of the environment and have important economic, ecological and social functions. The reasonable use of forests for providing economic and social benefits is a challenge to the society, landowners, politics and forestry management in Bulgaria. Reconciliation of production functions and environmental protection-related functions concerning forests are the main objectives that are posed in strategic and program documents in sectors “Agriculture” and “Forests”. In

terms of economic crisis, climatic changes and natural disasters, new approaches and mechanisms should be found in order to reach a sustainable growth of the sectors and the society as whole. Agroforestry is such approach of land use management allowing diversification of production and reduction of economic risk, together with an improvement and conservation of biodiversity; better carbon retention in ecosystem in comparison with monoculture farming; better combat against desertification and loss of soil fertility (Ramachandran Nair et al. 2009, Ramachandran Nair 2014,

Stancheva et al. 2015). As specified in the definitions, agroforestry is a combined system for land management, which includes all systems of land use and technologies of production by which tree and shrub vegetation is incorporated with crop and grass and/or animals on the same land area. These systems are obtained by planting trees on agricultural land or introducing agriculture in existing woodland or orchards. Agroforestry is uniquely suited systems of sustainable land management for improvement nowadays critically reducing ecosystem services. Such artificially created ecosystems should be constructed to be not only more resilient, but also both highly productive and sustainable. Namely, the establishment of vital and functioning forest-agricultural combined ecosystems capable to provide high value of ecosystem services, and simultaneously to provide economic benefits for owners, is the aim of such an approach used for natural resources management. Agroforestry is not only multifunctional but also ecological land management that takes advantages, which would be achieved by combined growing of various biological species, and an appropriate use of the current financial mechanisms and which can provide economic and social stability of many disadvantaged regions of Bulgaria (NAPSMCD 2007–2013). This is suitable method for land management by which boosting of producer's incomes could be achieved whilst improving the environmental conditions (Burgess 1999, Gold et al. 2013, Mclvor et al. 2014). In this sense, this is a sustainable management of the land use (Mosquera-Losada et al. 2009). By this method, we can obtain a total increase of biomass output per unit area, better preserved and improved soil fertility and a large number of environmental benefits. These benefits are reached due to a better

balance of nutrients in the system and carbon sequestration, better use of water in the system, greater biodiversity, providing more and better habitat for animal species, soil quality, protection against erosion, regulation of the water cycle, increase of local water use due to improved micro-climatic conditions and increasing resilience (better prevention against torrential waters among others) (Garret et al. 1994, Rigueiro-Rodríguez et al. 2009, Ramachandran Nair et al. 2009, Ramachandran Nair 2014, Yakimov et al. 2003, Stancheva et al. 2004, 2015).

The aim of the present review was to identify the best practices of agroforestry systems applied in Bulgaria and to outline prospects and priorities for future development of agroforestry, according to the need and opportunities that are provided on the basis of legal, political and financial instruments available in the country, and to consider the need of improvement of these instruments and measures.

## Material and Methods

The methodology consisted of the analysis of available strategic and program documents, scientific publications and theoretical summaries on the matter. Acting political, strategic and regulatory documents promoting the agroforestry development in Bulgaria have been analyzed – laws and regulations (rules, regulations, orders, etc.), archival data, surveys, published materials, statistical reports, etc. Recommendations concerning the harmonization with European legislation were also considered, as well as respective recommendations for further development of agronomic politics in this direction as a solution for current economic and environmental crises in agriculture.

## Results and Discussion

As a combined system land management, agroforestry is displayed both in traditional and innovative form by which agro-ecological, socio-economic and innovative-technological benefits for society could be reached through a proper application. In Bulgaria, agroforestry has its traditions, distinctive features and peculiarities. Agroforestry systems with high ecological and economic values were established. Particular successes were achieved in the establishment of protective forest shelter belts in Dobrudja plane and in row shelterbelts along rivers, water basins, roads, industrial objects, etc. Another example is the agricultural use of forest area, establishment of forestry-pasture complexes (silvopastoral practices), and cultivation of Walnut plantations for production of high value timber and nuts. Establishment and maintaining of agroforestry systems like specialized forest plantation complexes and forest farming could help the overcoming of energy crisis related to climate change and reducing the poverty and unemployment, particularly in rural areas.

There were some studies in Bulgaria for identifying of proper combinations and compositions of tree, shrub and crop formations, of appropriate silvicultural actions and measures, as well as agrochemical, agricultural and animal husbandry practices, including identifying proper places and lands for cultivation. These studies contributed to the maintaining of agroforestry systems to provide better implementation of their ecological and economic services (Georgiev 1960, Peev 1989, Peev and Hinkov 2000, Bencheva 2004, Gyuleva 2014). From ecological point of view the role of agroforestry systems to reduce carbon and other gas emissions in the atmosphere is much appreciated. Also

these systems could have water-protective, water-retention and water-purification functions, they are able to preserve soil fertility and control of erosion, and to protect biodiversity, etc. (Peev 1989, Peev and Hinkov 2002a, Broshtilova and Broshtilov 2004, Gyuleva et al. 2012). Efforts were posed on clarifying of their economic role to boost incomes of people by diversification of production, and realization effective and rational use of available natural resources (Alexandrov et al. 2001, Peev and Hinkov 2002b, Yonovska 2003, Yovkov et al. 2003, Gyuleva et al. 2013, Milev 2013).

The present review address the following important points: necessity, good practices, opportunities, priorities and financial instruments for development of agroforestry in Bulgaria.

### **Necessity for development of agroforestry in Bulgaria**

It is imposed by the economic, ecological and social advantages, which these systems provide. Economic considerations are connected with increasing demands of timber on global markets and its use as raw materials in a number of production processes. Besides, as renewable energy resource timber could be used to produce new ecologically conforming bio-products (fibres, composts, building materials, "green materials" etc.), and for development of "green economy", and to reach to "smart" and "intelligent" solutions in agricultural and forestry management. Increasing demands of wood, particularly in bio-economy and bio-energy, requires combining the production process with resource-effective use and sustainable management. The application not only of silvicultural but also the agricultural practices, like intercrop planting of grasses

and shrubs among the trees and intensive care such as green manure, usage of soil fertilizers and amendments, inoculation of fungi, mushrooms etc. particularly in forest tree plantations, could lead to overall increasing of productivity and sustainability of ecosystems. Agroforestry allows achieving of good territorial balance of the country development, and to be a tool for improving of economics of many poorly developed and mountainous regions. This could be done by using the biggest resources of biomass, which are located in the less populated and remote areas of the country. By production and/or gathering of wild forest and bio-products, by obtaining of forages and using the forest territories for livestock pastures the economy could be diversified and additional value for all kind of forestry domains and ownerships in the country could be achieved. It was shown that the proper implementation of agroforestry systems has led to overall production increase, generation of more biomass and an increase of incomes of people engaged in agroforestry. Furthermore, the sustainable forest management is a pillar in rural development. The lack of forest management leads to the lack of sustainability of forest ecosystems, particularly in the contemporary conditions of climatic changes, to rapid deforestation and forest fires. The application of good practices only could enhance the entire economic effectiveness in forestry holdings. Such practices could include intensive care against diseases and pests, and for improvement of health conditions, optimization of organic matter (OM) decomposition, improving the carbon cycle in the system, usage of agricultural plants for green fertilizing etc. It could be claimed that the concept of agroforestry in Bulgaria is in accordance with the overall goal of the flagship strategy of EU

– Europe 2020 for achievement of “smart, sustainable and inclusive growth”. That concern also relates with intelligent management of resources, and achievement of balance in establishment and managing of forest ecosystems. This concept is consistent with the tree objectives of the Common agricultural policy (CAP): food security; competitiveness and sustainable management of natural resources and climate change; balanced territorial development.

Ecological considerations are related to the positive contribution of agroforestry systems to environment protection, adaptation of natural ecosystems to climate changes, conservation and improvement of biodiversity and soils. Forest areas covered with vegetation are the main greenhouse gas sinks and core tools to mitigate the climate change. Wood is the main binding material of CO<sub>2</sub> in the atmosphere, and forests are main CO<sub>2</sub> – retaining ecosystems on the earth during the millions of years (reservoirs of CO<sub>2</sub>). Integration of tree vegetation in the agricultural plots results in the enhancement of land quality (improvement of soil quality and decrease of soil erosion); enhancement of the carbon retention; protection of biodiversity; improvement of water purification and its percolation; combat soil desertification; improvement of local climatic conditions and providing of a better ecological services for local society (Palma et al. 2007, Rigueiro-Rodríguez et al. 2009, Mbow et al. 2014, Stancheva et al. 2015).

### **Good agroforestry practices in Bulgaria**

The opportunities concerning agroforestry development in Bulgaria are connected with the achievements and the good prac-

tices in this direction, existing national legislation, developed policies, strategies, programs, and the access to financial instruments and resources.

Good practices are achieved in implementation of Agricultural Uses of Forest Areas. Poplar plantations were proven to be particularly appropriate. They were successfully cultivated with some important crops, like sunflowers, cabbage, corn, pepper and eggplant, melon and pumpkins, cauliflower, wheat, beans. Furthermore, plantations of oaks, walnut and alder with corn were grown in practice (Yakimov et al. 2003). There was increase in crops as a result of better extraction of nutrients and water from a deeper tree root system, reduction of expenses for arboricultural measures – hoeing, nourishing, and watering. Final result was realization of additional income due to increased diversity of the products (Yakimov et al. 2003, Stancheva et al. 2015). Agricultural Uses of Forest Areas is combined well with organic production, especially in clean mountain areas, by applying of agronomic, biological and mechanical methods of tillage. The wrong implementation of Agricultural Uses of Forest Areas is connected with improperly combination of trees and crops and releasing of root phytoncides and substances with allelopathic effects by agricultural plants (Stancheva et al. 2015). There are new technological schemes that should be investigated, like the one developed in Italy along the rivers, with poplar and oak for producing wood together with wheat and other crops. Another very important agroforestry system with extremely good results in Bulgaria is represented by Protective Forest Shelter Belts. Their application resulted in achieved improvement of micro-climatic conditions through protection against the strong winds, purification of the air, improvement of water and

temperature regimes, increase of the crops yields and of the quality of products obtained (Peev 1989; Totev et al. 1995; Peev and Hinkov 2000, 2002a; Marinov et al. 2003; Yakimov et al. 2003). Currently there are about 9000 ha protective forest belts in Northern Bulgaria, with main purpose protection against strong winds. There is an understanding about the importance of protective forest belts for agriculture, particularly in areas with harsher climatic conditions, and also for protection of urban places, industrial objects, livestock farms, and roads. This requires supplying of financial resources for establishment of new protective forest belts and reconstruction of the already existing ones. Relatively large Silvopastoral Complexes have been established. In this systems tree and shrubs species are reconciled with fodder culture (grass mixture, etc.), and these areas are being used for grazing of animals. By such established forest–pasture complexes an ecological livestock breeding could be developed, and a balance of animal nutrition could be reached. Additional extraction of wood, economic effectiveness, environmental friendliness and social benefits for society have been achieved (Stancheva et al. 2004). It will be good the foreign experience to be investigated, such e.g. in England and Wales (AGFORWARD 2014) for a reconciliation of tree and shrub species with grazing and mowing of grass for realization of additional incomes. There are new practices in Europe, such e.g. in Germany, where trees are grown in alleys for biomass production (AGFORWARD 2014).

Particular interest from the side of forestry holdings should be paid on the establishment of Forest Tree Plantations with High Value Wood by applying intensive methods for husbandry and management. Parts of these intensive methods are connected with applying of agroforestry prac-

tices. In this aspect we recommend the usage of the other countries experience, e.g. new agroforestry practices implemented in Spain for grazing and incorporation of vegetation among high value tree species: wild cherry and walnut (AGFORWARD 2014). In our country plantations of forest fruit species have been established: from walnut (*Juglans regia* L.) and to a lesser extent from hazel (*Corylus avellana* L.) and almond (*Prunus dulcis* (Mill.), as well as plantations of Wild cherry and *Sorbus*. There are some positive results, but some difficulties were reported too (Alexandrov et al. 2001). There is a special interest to the establishment of walnut plantations in Bulgaria. Walnut plantations form sustainable agroforestry systems and are preferred because of the high value of wood and sufficient earnings from fruit selling (Glushkova et al. 2008). The development of Forest Farming in Bulgaria, as an agroforestry system in which naturally and artificially created tree and shrub vegetation is reconciled with economic activities, is still at its early stage. Except wood, the other products can be obtained for consumption and manufacture processing – oil cultures, mushrooms, medical plants, forest fruit, ornamental plants, etc. New ways to incorporate these activities in forestry and agricultural holdings and farms should be developed. Examples that could be given include cultivation of herbs, medical plants, mushrooms, and some useful research was done in this respect (Stoyanova 1997, 2006).

### **Regulations, politics, programs, strategic documents and financial instruments concerning agroforestry in Bulgaria**

Legislation is connected with enforcement of the Law on ownership and us-

age of agricultural land (LOUAL); the Forest Act (FA), the Law on protection of agricultural land (LPAL); the Law for supporting agricultural producers (LSAP), etc. The Ministry of agriculture and food (MAF) is the institution, which authorizes schemes for single payment according to CAP, provides information to owners, authorizes measures on land protection and proper tillage, also activities concerning restoration of ecological functions and enhancement of soil fertilities, etc. LSAP represents the schemes and measures of single payments: the single payment per areas, the green payments and specifies the rules, approvals and implementations of the Rural Development Program (RDP). The agroforestry system “protective forest belts” is authorized in FA. Forest belts established in 1950s and 1960s are identified as public state property. The terms and conditions of the usage of non-wood products, including mushrooms, medical and aromatic plants, Christmas trees, foliage fodder, etc., are clearly laid down. The terms of grazing in forest areas are also set out. Concerning agroforestry systems specialized forest plantation and forest farming, art. 88 (5) of the FA introduces that the following categories are not managed as forests: 1. Christmas trees and greenery plantations; 2. Trees and shrubs designed for rapid production of biomass; and 3. Fruit productive plantations. The agroforestry system forest-pasture complexes is described and the terms and conditions for grazing in forest areas are specified in art. 123 to art. 125 of FA.

Decree №2 on the terms and conditions of the afforestation lands used for establishment of special protective and economic forests with art. 32 postulates that newly established plantations are managed also by use of “agricultural crops planting among intercrops spaces”.

Policies, which are connected with applying of agroforestry systems, are based on the development of strategies and programs targeted to rural areas, to enhancement of the vitality and competitiveness of agricultural and forest farms, maintaining of its sustainable and environmentally-friendly management. The political documents highlight the need of economic growth, with preventing degradation and contamination of the environment. Through wise implementation, agroforestry could have the advantages over other agricultural practices, whose monoculture intensive production results in soil depletion, water deficit, and significant green gas emissions. Particularly great are the opportunities of agroforestry for finding technologic solutions and resource provision for “green economy” to which is faced the modern world.

The policy of Bulgaria concerning agrarian sector, as the state member of EU, should be harmonized with the policies adopted by European Parliament and European Commission. The EU respects the competences and specifics of the state members, especially in devising of their strategic and program documents. Regulation No1698/2005, article 39 clearly and precisely stated that “Agroforestry systems can acquire a high ecological and social value by combining extensive agriculture and forestry systems, aimed at the production of high quality wood and other forest products. The establishment of such systems should be supported.” Unfortunately, the measure 222 of the old RDP (2007–2013) for supporting the development of agroforestry in Bulgaria did not started at all. Currently, realization of the CAP of EU, a number of regulations were adopted: Regulation (EC) №1305/2013 on support for rural development by the European Agricultural Fund;

Regulation (EC) №1303/2013 concerning the improvement of coordination and harmonization of CAP from EU funds; Regulation (EC) №1306/2013 for financing, management and monitoring of the CAP. Agroforestry also finds its place in the regulatory documents of the CAP. There is a certain art. 23 supporting the construction of agroforestry systems in the new Regulation (EC) №1305/2013 on rural development. The member states should set out the minimum and maximum number of trees per hectare, taking into account the local soil and climatic conditions, native forest species and need of ensuring of sustainable land use. Further, art. 20 postulates that measures to support forestry as an integral part of rural development should cover the increase and improvement of forest resources through afforestation of land and establishment of agroforestry systems combining extensive agriculture and forestry. These systems are advisable also for recovering of forests affected by fires or other natural disasters.

At the national level, the development of agroforestry is directly linked to the development of the forestry. The National Strategy for Forestry Sector Development in Bulgaria (NSFSD 2013–2020) highlighted that in accordance to the vision 2020 Bulgaria should have a vital, productive and multifunctional forests; conserved biodiversity and quality and quantity of water resources. These are three strategic objectives related to ensuring sustainable development of forestry sector. They have been set out for strengthening the role of forests of ensuring economic growth of the country and for increase of their contribution to “green economy”. Of four priorities for achieving the strategic objectives, particularly close and important in terms of opportunities of agroforestry is the fourth one, about the potential of forest sector for

green economy development. There are concrete measures and actions for implementing the priorities that are directly or indirectly related to agroforestry systems. For example, priority 1, measure 1.4 recommends elaboration of “modern program for recovering of existing and establishment of new shelterbelts”. Priority 4, measure 4.1 recommends the necessary actions concerning research, analysis and evaluation of the potential of forest areas in Bulgaria for the production of energy from wood biomass; development of a National scheme for sustainable production and consumption of woody biomass, which should contain relevant sustainability criteria; developing best practices for creating and managing of intensive plantations for biomass production, including the fostering of energy crops production – planting of tree and shrub species, created for rapid production of biomass. In the analytic part of NSFSD there is a conclusion that during the period 2006–2011 a reduction of the amount of revenues from non-timber products and benefits was established. The incomes from livestock and crop production can be evaluated as a minimum. In the forest sector there are services and activities that could bring significant additional incomes for forest holdings, like gathering of charge for grazing in forest areas; usage of the territory for temporary storage of wood and other building materials; temporary stay of livestock; usage of ski slopes; for placement of temporary facilities and equipment for conducting business activities; setting up of camps, tents and others. Such activities are related to the presence of agroforestry systems, some of which are with a significant value for tourism.

Another important strategic document in the forestry sector is the Strategic Plan for Forestry Sector Development (SPFSD

2014–2020). The document is a brief analysis on the development of the forestry sector, with the major challenges identified. The relevant operational objectives; the activities for achieving of expected results; responsible and related institutions; indicators for performance; necessary financial resources for their implementation; time and more, are specified. In operational objective 1. “Increasing forest areas, timber stock and carbon stock of in forest areas” (that relay to the measure 1.1. of NSFSD) in activity 1.2. the expected results connected with recovering and building of new shelterbelts and reducing the negative influence of wind erosion on agricultural farmland are specified. The operational objective 2 “Improving the management and use of forests” (that relay to the measure 1.2. of NSFSD) in activity 2.7. “Research, analysis and evaluation of the potential of forest areas in Bulgaria on available opportunities to provide services, produce and realization of non-timber forest products and their environmentally friendly use”, defines the expected results regarding the improvement of forest services, increase the production of non-timber products and organization of fees for their use. Expected results are also connected with increasing the revenues from these business activities.

The “Program of measures to adapt forests in the Republic of Bulgaria and mitigate the negative impact of climate change on them” includes measures for the establishment, maintenance and improvement of agroforestry systems such as “protective forest belts” and “forest-pasture complexes”. Relatively insufficient funds are set in the Programme for realization of the measures, mainly targeted at conduction of arboriculture activities in ecosystems.

In the “Third national action plan on climate change (2013–2020)” is necessary to seek financial resources for the

implementation of measures aimed at: increasing the land areas from categories – absorbents of greenhouse gases: forests, pastures and meadows; increasing the potential of forests for carbon sequestration; long-term retention of carbon in wood products.

Main financial instruments for development and maintaining of agroforestry systems in Bulgaria are the European Funds, which are accessible via the following national and European programs:

1. Operational programs: “Environment”, “Science and education for smart growth”, “Innovations and competitiveness”;
2. Operational programmes for cross-border, transnational and international cooperation;
3. Both pillars of CAP – single payments and RDP;
4. Horizon 2020;
5. Other EU and international mechanisms such as: Trading of greenhouse gas emissions and etc.;
6. Additional funding from the Bulgarian government is also possible: e.g. “Green investments” ensuring by Ministry of agriculture and food.

Practically, there is no funding for agroforestry in the draft of the new RDP (2014–2020). However, there are some measures supporting the forests and agriculture, and therefore there are subsidies for certain agroforestry activities or projects. Such activities are: recovery and establishment of new protective forest belts; bio-agriculture; erosion control; increase soil productivity. Subsidised funding is possible for maintenance and recovery of grass fields with high natural value, erosion control, and traditional practice for seasonal grazing also should be financing. Investments are planned for the development and usage of new technologies

for recycling of the wood waste.

Programme LIFE+ (Program for environment and climate action) from 2014 has been created with Regulation 1293/12.11.2013 of the European Parliament and the European Council. Funds could be used foreseeing for priority areas “Environment and resource efficiency” and “Adaptation to climate change”.

Horizon 2020 Programme launched in 2014, as well as by new OP “Environment”; “Science and education for smart growth”; “Innovation and competitiveness”, may also be used for obtaining substantial financial resources for the development of agroforestry in Bulgaria.

The financial support, which can be received by agricultural and forestry farmers and producers under National schemes and government aid can be considered as a form of support to agroforestry. There are some short and long-term loans granted by Government Fund “Agriculture” through some commercial banks at preferential terms for guarantees. Specifically, funds for development of agroforestry systems in Bulgaria can be obtained in other national schemes authorized by Ministry of Agriculture and Food as a “green investment”; development of animal husbandry, beekeeping, sericulture. Moreover, the six State Forestry Enterprises (SFE) and their forest and hunting territorial divisions are eligible for financial investments from fund “Investments” established through the Forest Act.

### **Potential and priorities for the development of agroforestry in Bulgaria**

There are opportunities and potential for the development of modern agroforestry in Bulgaria, taking into account the specif-

ic environmental and climatic conditions, characteristics of the local economy and existing good practices.

A promising activity could be the application of agroforestry technologies for production of tree species with high quality wood (high value trees), and at the same time, forest fruits, nuts and seeds – walnut, wild cherry, chestnut. Good practices in this regard can be developed considering the experience in some European countries. There are some practices in Bulgaria during the last 5–7 years to establish plantations of oak and hazel, whose roots are “inoculated” with fungi of truffles, and there are some recommendations for inoculation with other fungi and mushrooms to stimulate the growth of forest plantations. This is a way to improve the yield in specialized plantations for production of high quality trees and biomass and for realization of good extra income. The introducing of agroforestry systems, especially in forest nurseries and plantations is connected with using of proper herbaceous and crop species for plant nutrition, with biological pest control, intensive organic and ‘green’ fertilisers, using of appropriate soil improvers, soil amendments and physiological regulators. Good practices in this area are particularly needed.

Agroforestry systems can be combined well with organic production of agro- and forest-products as a form of ecological agriculture, and in this direction introducing of new practices and innovative technologies are expected too.

Establishment of effective agroforestry systems for flood protection in the light of the current realities is also urgent and necessary (Petkova 2004).

There is a need in mountainous areas and there are no well-established silvicultural complexes with well-maintained grazing woodland and semi-opened pas-

tures. The good semi-natural grasslands in mountain areas, which were established in the past, were abandoned, but there are expectations for funding in the new RDP (2014–2020) to be restored. There is a possibility for the implementation of best practices of agroforestry connected with grazing of animals and extraction of plant biomass and forage. The country has an understanding of environmental value of the forestry-pasture complexes and they are in the category of lands with recognized high nature value (HNV).

Natural and climatic conditions of the country are particularly suitable for the development of forest farming, and in this direction a number of expectations are connected by land and forest owners, especially in the mountainous areas of the country where the livelihood is connected mainly with tobacco production. In this way the income of people could be significantly increased by cultivation of berries, medicinal plants and herbs, ornamental plants, mushrooms, raw materials for processing and craft activities, and technical plant. Construction of forest farms, however, still in early stage of development. Thinning of forests due to the illegal logging and negative natural phenomena – drought, disease, fires, etc. allows the farmers to build forest farms on their affected lands with little investment. The presence of many small forest owners with limited opportunity for timber harvesting and limited income, provides good opportunities for the development of this form of agroforestry in the country. Particularly valuable system of agroforestry in relation to the improvement of environmental conditions at the local level is forest shelter belts. It is necessary to ensure sufficient funds for their good management, both from the state and from the land owners, roads, industrial sites, farms. For this purpose

dissemination and exchange of information and mobilization of expert potential is highly desirable.

## Conclusions

Agroforestry, as a social-economic and ecological system for land management targeted at development of rural areas, and in the same time, a system that gives opportunities to introduce “know-how” in the field of “green technologies” takes its place in the European strategically and program documents. The requirements for increase of the total production of the ecosystems, and for their ecological and sustainable management, for reducing the costs from one side, and the observed delegation of the soil, the deficit of water, climate change and the insecurity of the stock markets on the other side are the reasons for introduction of agroforestry, as an intelligent and modern system for land use.

In the State forestry enterprises (SFE) the efforts should be directed towards the construction of plantations for the production of high quality wood and biomass by applying intensive production methods. Suitable are agroforestry systems with proper mixture of tree, shrub and grass species in afforestation of forest areas affected by forest fires.

The implementation of agroforestry systems in practice will have important economic, environmental and social impact on local communities and society as a whole. But, it is necessary to create an overall concept and to be devised National Strategy for development of agroforestry in Bulgaria. It should be clearly pointed out, not only “the principle for sustainability”, but also “the principle of subsidiarity”, which to be introduced as a base of the

Program and Conception. In the future National Strategy, besides the analysis of achievements should be indicated also the framework for development of agroforestry in the agricultural and forestry holdings, and to be also set out the access to financial instruments for implementation. Modern National long-term strategic development program of agroforestry in Bulgaria (2016–2025) should be devised and adopted by the Council of Ministers. Other opportunities could be given under National schemes for government aid, and their activities are controlled by Ministry of agriculture and forestry. Moreover, is necessary to change the legislation in the forest sector in order to ensure the possibility of State Forest holdings and their territorial divisions – State forestry and Hunting holdings to have access to funds from the Fund “Investments” and to be able to diversify its revenue. It is also necessary to develop criteria and a comprehensive evaluation system for “best practices”. An important point is to ensure a better link between science and practice, and a better interaction and greater use of expertise.

The introduction of agroforestry systems in forestry and agricultural practices will have important economic, social and positive impact on the environment and will boost economy of disadvantaged areas and society as a whole.

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