AGro FORestry practices in WEst Balkan
for sustainable development:
weaknesses and strengths

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Agroforestry practices applicable in Bulgaria

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„AGRFORESTRY“ is a general name for all land use and production systems in which perennial woody plants or shrubs, agricultural crops and/or livestock are deliberately grown simultaneously or sequentially on the same area. Agroforestry systems ensure sustainability of land use, diversification of the production and persistence of farmers‘ incomes.

In agroforestry, tree species have both a production and supporting functions. They provide wood, building material, fruits and other raw materials and help maintaince of soil fertility, erosion control, create a specific microclimate, protect against adverse environmental factors, outline the territory and property, etc.

A main feature of agroforestry systems is their higher degree of resistance to adverse external influences compared to traditional monotype crop production. In agroforestry, the resources of the environment are preserved in the system, exchanged between its individual components. The presence of numerous and diverse plants favors the development of a large number of parasites, predators and antagonists that control pest densities and reduce the need for anthropogenic intervention. The role of agroforestry in preserving biodiversity is particularly significant.

According to the characteristics of the area, agroforestry is able to provide a variety of benefits:

- Improves the physical properties of the soil and its fertility; provides stable protection of the upper root-habitable soil layer both from degradation and any erosion.
- Creates more favorable conditions for the development of agricultural crops and domestic animals and increases their overall productivity, as a result of preserving soil fertility and forming a better microclimate.
- Increases the efficiency of water use by plants and animals; helps to improve the quality of water intended for drinking, household or agricultural needs.
- Gives an additional opportunity to reduce the amount of carbon dioxide released.
- Increases the biodiversity of the local landscape, creating conditions for the development and preservation of wild plant and animal species.
- Reduces the energy invested in crop production - direct (physical, biological) and material (mineral fertilizers and other chemicals, growth regulators etc).
- Increases the diversity of the local economy and reduces risks in conditions of competition.

This Guide provides practical information on the introduction of a wood component in traditional agricultural production systems and the establishment of agroforestry systems specific to part of the Southeast Europe and Western Balkans region.

AGROFORESTRY SYSTEMS IN REGIONS OF SOUTHEAST EUROPE AND WESTERN BALKANS

Protective forest belts – Serbia, Bulgaria		
Silvoarable systems – Croatia (Slavonia), Serbia (Vojvodina)		
Silvopastoral systems – Croatia (Dalmatia) and Montenegro		

AGROFORESTRY PRACTICES APPLICABLE IN BULGARIA

The possibilities for growing forest-tree species in agricultural areas are unlimited, but there are two main types of agroforestry systems:

• *Simultaneous* - on the same area, tree and agricultural species are grown at the same time, between which strong competition is often observed. For the conditions of the temperate climate, they are divided into alley-cropping, protective belts, silvopastoral system and forest farming.

• *Successive* - tree and agricultural crops are grown separately. Examples are woody plantations for the production of biomass.

ALLEY-CROPPING

The alley system involves planting trees and/or shrubs in single rows or multi-row strips, between which alleys of different widths and with sufficient area for agricultural crops are formed.

Requirements for tree species: to give products of high value and steady local market; have a short rotation and fast growth, adapted to the soil and climatic conditions of the area; quick, easy and cheap propagation; narrow crown (for minimal shading of the agricultural crops); not to form a superficial root system; to be tolerant to the fertilizers and herbicides used in agriculture; to be resistant to common diseases and damage.

Main groups of agricultural crops:

• *Food* - trench crops (various vegetables, potatoes, peas, beans, soybeans, maize), cereal crops with a fused surface (wheat, oats, rye, triticale, barley) and less often fruit and forest fruit trees (sour cherry, plum, hazelnut, chokeberry)

• *Forage* - cereal grasses (ryegrass, cornflower, fescue) or legumes (alfalfa, clover), forage mixtures.

• *Special (technical)* - essential oil and medicinal plants (herbs), Christmas trees or decorative species for landscaping, fruit trees for planting material, etc.

• *Crops for biomass production* - woody (poplars, willows, birches, sycamores) or grass species (maize, sugar and technical broom, sorghum, rapeseed, soya bean).

PROTECTIVE FOREST BELTS

Depending on the **functions** they perform, the protective forest belts are:

• *Windbreak belts* - provide protection for various crops - grain, vegetable, fruits and vineyards. They are formed in flat areas where steady winds are available.

• *Anti-erosion (water-regulating, water-retaining) belts* - are established on inclined and steep terrains to regulate the runoff of falling precipitation and melting snow, and to protect the area from water erosion.

• *Road protection belts* - protect roads from forming snowdrifts and increase traffic safety.

- *Protective belts in pasture areas* - to improve the microclimate in natural or artificial pastures. Varieties: pasture-protective forest belts, tree barriers, protective belts around livestock farms, protective belts in urbanized and industrial areas.
- *Riparian buffer strips* - are established along rivers, streams, natural and artificial lakes and other water bodies to protect the coasts from erosion, agricultural lands from flooding, waters from pollution, etc.

SILVOPASTORAL AGROFORESTRY SYSTEM

Silvopastoral agroforestry systems combine the simultaneous cultivation of trees and forage crops (for grazing or fodder) with domestic animals. Basic requirements when choosing the components:

- *The wood component* must be of high quality, with a deep root system, tolerant to adverse environmental factors.
- *The forage component* can be a pure crop or a mixture of annual and perennial species, with a relatively long period of use, good productivity in partial shade and moisture stress, tolerant to grazing and trampling.
- *The animal component* can be cattles, sheeps, goats, pigs, birds, etc., biologically consistant with the cultivated tree and fodder species, with the ecological and legal requirements for land use.

FOREST FARMING AGROFORESTRY SYSTEM

ГForest-farming systems are artificially established and intensively maintained. .

They include: Cultivation of forest fruit and berry species; medicinal, essential oil and spice cultures; ornamental vegetation; agricultural crops for the production of seeds and planting material; production of wild mushrooms under natural conditions; beekeeping; sericulture; snail farming.

BIOMASS PLANTATIONS

In biomass plantations, agricultural and tree plants are grown separately. The main goal is to create the maximum amount of biomass. They are established both on low-productivity agricultural areas and on high-productivity terrains suitable for intensive agricultural production.

• *Agricultural crops grown* for biomass production - rapeseed, sunflower, soya bean, maize, chinensis silver grass.

• Wood species suitable for biomass production - mainly poplars, willows, black locust, but sycamores, ash trees, planes trees, and globally most often eucalyptus trees can also be used.

Obtaining biomass from woody plants can diversify and increase farmers‘ incomes. Plantations have the effect of protective belts for agricultural crops, as well contribute to the stabilization of soil fertility by limiting erosion and runoff. They create opportunities for hunting, provide fire protection, improve the aesthetic condition of the landscape etc.

Possibilities for financing the creation of agroforestry systems are specified in Ordinance No. 3 of March 10, 2023 on the conditions and procedure for implementing interventions in the form of direct payments included in the Strategic Plan, for inspections, reductions in payments and the procedure for imposing administrative sanctions https://www.mzh.government.bg/bg/normativni-aktove/naredbi/. According to Art. 53 par. 6 of the Ordinance, agroforestry systems are eligible for support if they meet the requirements of Annex 17 of the same Ordinance.

NOTES