Sorinel Ionel BUCUR

Institute of Agricultural Economics, Romanian Academy, Bucharest
bucursorinelionel@yahoo.com

PROTECTIVE FOREST BELTS IN ROMANIA – REGULATORY FRAMEWORK AND CURRENT SITUATION. A CASE STUDY – REGION SOUTH-MUNTENIA

ABSTRACT

The climate changes produced in recent years have brought to the foreground the importance of establishing forest shelterbelts in Romania together with the enlargement of the already existing ones, with the main role to protect the localities against adverse natural phenomena (soil erosion, snow drifting, flooding, etc.). The need for shelterbelts, which was acknowledged by Ion Ionescu de la Brad even since 1860, has been the subject of the decision-makers' debates, in order to identify, on the basis of the current situation, the necessary measures and financial resources to establish protective forest belts.

Starting from these considerations, the present approach intends to investigate the current regulatory framework and the situation of protective forest belts in the component counties of the region South–Muntenia, corroborated with the possible intervention measures in this area.

Key words: protective forest belts, regulation, intervention.

JEL Classification: Q23, Q50, Q54.

1. INTRODUCTION

As an important natural resource, the protective forest belts have brought significant benefits in terms of sustainability of economic-social and environmental systems. However, in the last 30 years, large parts of forest shelterbelts were subject to degradation, which resulted in the significant diminution or even the annulment of their eco-protection effect. Mainly in the plain zones, with small-sized forest areas, the shelterbelts have an important influence upon the environment, with climate protection role, reducing the wind speed on an area equal to 5 up to 10 times their width. The protective forest belts also have a significant contribution in the retention and even distribution of snow, improving the temperature by the diminution of daily temperature amplitudes, controlling the flooding effects by lowering the groundwater level. These add to the role of forest shelterbelts in the protection of localities, of communication ways and crops, in noise diminution, environment depollution, being also considered a source of industrial and food products.

2. STATE OF KNOWLEDGE

The history of forest shelterbelts in Romania started in the year 1860, when Ion Ionescu de la Brad established the first plantations as "*shelterbelts against the wind*". Studies and research works on the establishment of protective forest belts were conducted both by public institutions and by specialized institutes or even by land owners for the protection of their crops. Thus, the Forest Research and Management Institute (ICAS), developed a "*Study on the establishment of the national protection system of crops and forest shelterbelts in the areas under desertification risk*" within its research programs.

According to the specialty literature, ICAS elaborated 119 field studies on the establishment/rehabilitation of certain protective forest belts for the protection of fields or communication ways, namely:

- Field protection (new shelterbelts) – 15500 ha (counties DJ, TR, MH, OT);
- Roads (new shelterbelts) – 2 150 ha;
- Railways (new shelterbelts) – 250 ha;
- Railways (rehabilitations) – 467 ha.

Three technical documentations (5 198 ha) were also elaborated for the following counties: CT (3 800 ha); TL (1 157 ha); IF (241 ha) 2012-2013, as well as 5 feasibility studies and technical projects for protective forest belts on certain sections of A1 and A2 highways (49 ha).

Without minimizing the importance of other studies and research works by other authorities/institutes/institutions, ICAS has had a significant contribution to the development of protective forest belts, which was materialized into:

- Conducting research works in relation the establishment and management of protective forest shelterbelts in different zones of the country;
- Elaboration of technical guidelines and technical assistance necessary for the establishment and management of protective forest belts;
- Elaboration of necessary field studies for the establishment of protective forest belts (for the protection of fields, of communication ways, of irrigation channels, etc.);
- Forest management for the already existing shelterbelts.

3. MATERIAL AND METHOD

The present approach is based on public information supplied by public institutions/authorities/research institutes with attributions or experience in this field as well as on statistical data from the Tempo-online database of the National Institute of Statistics. The analysis of the regulatory framework has a special importance in our analysis, the starting point being the updated primary legislation.

We must also specify that information processing was based on well-established statistical methods, of comparison or structural type, the results being presented under tabular or graphic form. The tabular presentation results in a greater visual clarity of data.

4. RESULTS AND DISCUSSIONS

4.1. THE CURRENT REGULATORY FRAMEWORK IN THE FIELD OF PROTECTIVE FOREST BELTS

According to the current Forest Code, approved by Law no. 46/2008, with subsequent modifications and completions, regulating all the aspects related to forestry, the protective forest belts are defined as forest vegetation formations, located at a certain distance from each other or from a certain objective, with the purpose to provide protection against certain harmful factors and/or for the climatic, economic and aesthetic-sanitary improvement of land.

With a targeted specificity, Law no. 289/2002 *on the protective forest belts*, republished, classifies the protective forest belts into five categories, namely:

a) for agricultural land protection against the harmful weather factors and for improving the weather conditions in the respective area;

b) against erosion, i.e. to protect the soil subject to erosion phenomena;

c) for the protection of communication and transport ways, mainly against snow drifting;

d) for the protection of dikes and banks against currents, flooding, ice and other;

e) for the protection of localities and of different economic and social objectives.

The network of protective forest belts forms the National system of protective forest belts, as public utility system, implemented by the central public authority in charge of the forestry sector.

According to the legal framework into effect, the protective forest belts on the agricultural land areas are established in the Romanian Plain, Tisa Plain, the Danube Meadow and the Dobrudgea Plateau, which are frequently affected by drought; the location of forest shelterbelts is based on field studies, mainly consisting of rectangular networks and phased according to their priority, with the land areas located in the driest zones ranking first.

The anti-erosion forest shelterbelts are established in all the zones of the country, on agricultural land areas under different degradation stages, the identification and afforestation of degraded land areas being stipulated by specific regulations. The land areas with mobile sands are also included in this category, which require afforestation works for their stabilization.

The forest shelterbelts for the protection of communication and transport ways are set up on one side or the other of them, on the segments frequently affected by massive snow drifts.

The forest shelterbelts for the protection of dykes and banks against currents, flooding and ice floes are located along the dykes and banks into rectangular alignments, on different lengths and widths, depending on the land orography, water flow speed, wave height and ice push.

The forest shelterbelts for the protection of localities and of different economic and social objectives are established around the urban and rural localities, the polluting industrial units and around certain economic, social, cultural and strategic objectives.

In the case of setting up forest shelterbelts in a natural protected area it is necessary to comply with certain legal provisions with regard to the natural protected area regime, the conservation of natural habitats and of wild flora and fauna.

In the case when the land areas on which the protective forest belts are established are included on the list of contaminated sites, it is necessary to comply with the legal provisions on soil and subsoil protection.

According to the legal provisions, the protective forest belts are managed through forest ranges, which are in charge of their protection against theft and unauthorized grazing of animals.

The central public authority in charge of the forestry sector, through the commissaries of forestry and hunting and the forest ranges on the territory of which these are located, organize the control on the application of the forestry and security rules of forest vegetation as well as of the rules on the movement of timber resulting from these land areas.

The current legal framework stipulates that the funding sources for the elaboration of technical-economic documentation for the establishment of protective forest belts as well as for the related works are represented by:

a) land improvement fund and allocations from the state budget;

b) forest conservation and regeneration fund;

c) environment fund;

d) allocations from the local budgets of communes, towns, municipalities and counties;

e) sponsorships from commercial companies regulated by the Law on commercial companies no. 31/1990, republished, with subsequent modifications and completions, foundations and others;

f) non-refundable external financial sources or external credits on long term;

g) voluntary contribution of natural persons or legal entities, interested in the execution of amelioration works;

h) other legal sources.

Each year, the central public authority in charge of forestry, as technical coordinator of actions for the National System of Protective Forest Belts, must ask

for including the necessary funds for their afforestation in the next year in the state budget. At the same time, each year, the central public authority in charge of forestry allocates the necessary funds for the establishment of protective forest belts for the agricultural land areas in order to prevent and control drought and desertification.

4.2. REGION SOUTH–MUNTENIA – ASPECTS REGARDING THE IMPORTANCE AND CURRENT SITUATION OF PROTECTIVE FOREST BELTS

With seven counties in its componency (Argeş, Dâmbovița, Prahova, Ialomița, Călăraşi, Giurgiu and Teleorman), the region South–Muntenia covers about 14.5% of Romania's total area, i.e. 34 453 km², with a total number of about 3 million inhabitants.

The approach to the protective forest belts issue in this region should start from the characteristics of component counties in the first place. We must specify that three out of the seven counties (Argeş, Dâmbovița and Prahova) have similar characteristics in terms of relief units (plain, hills and mountains), while for the other four remaining counties the main characteristic is represented by their location mainly in the plain area.

The existence of various relief forms noticeably influenced the local economic and social development level, through the development of various forms of pluriactivity, unlike the plain zones, where the prevailing agricultural areas led to the practice of activities of farming type.

In terms of land structure, in the year 2014, out of the total area of the region South-Muntenia (3445.3 thousand ha), the agricultural land area totaled 2433.5 thousand ha, out of which 80.9% arable land, while the forests covered only 672.3 thousand ha (Table no. 1), with significant differences across counties.

Practically, the area under forests in three counties (Argeş, Dâmbovița and Prahova) accounts for 82.8% of the total area of the region, while the counties located in the plain zone account for only 17.2% of the regional forest land.

Table 1
Land use structure in the region South–Muntenia, 2014 (thou. ha)

	Total area	Agricultural area	Arable area	Area under forests
AG	682.6	342.3	173.9	285.0
CL	508.8	425.8	410.5	22.2
DB	405.4	247.9	175.3	121.1
GR	352.6	275.6	259.0	37.9
IL	445.3	374.5	352.1	26.2
PH	471.6	269.4	143.2	150.3
TR	579.0	497.9	454.8	29.7
Total	3445.3	2433.5	1968.9	672.3

Source: Tempo–Online database, NIS, 2016.

The public information on the protective forest belts in the region South–Muntenia is rather scarce, either out of information protection reasons or due to the absence of a correlated database between all the institutions with attributions in this field. What we can certainly specify is that in the case of protective forest belts for the agricultural crops, there is no information related to the old developments. However, ICAS elaborated field studies for the establishment/rehabilitation of forest shelterbelts on 15,500 ha in the counties Dolj, Teleorman, Olt and Mehedinți and three technical documentations for the counties Constanța (3,800 ha), Tulcea (1,157 ha) and Ilfov (241 ha).

As regards crop and road protection through protective forest belts, we can notice that the first 20 ha of forest shelterbelts were established in the county Ialomița in the year 1880. Among the first studies on the efficiency of forest shelterbelts of network type, we can mention those conducted in the region South–Muntenia in Călăraşi (Dâlga) and Ialomița (Mărculeşti). (http://www.lumeasatului.ro/).

Until 1960, other 5,000 ha of protective forest belts were planted in Dobrudgea (Valul lui Traian – Constanța), Bărăgan (Chișcani – Brăila, Jegălia – Călăraşi, Mărculești – Ialomița, Moara Domnească – Ilfov); afterwards, the establishment of protective forest belts was abandoned, and large parts of these areas were deforested.

In the recent period, although the current legal framework has created the premises for a National Program of protective forestry belts for the protection of highways and national roads, providing for the establishment of 5,257 ha of forest belts in 33 counties, to protect 1,752 km of roads, with significant investments in the counties Călăraşi (162 km of roads, 488 ha of forest belts) and Teleorman (125 km of roads, 375 ha of forest belts), only 23.69 ha have been planted so far (0.45% of program total), corresponding to the segment of Highway A2 between Cernavodă and Feteşti, which will protect 11 km of highway against snow-drifting, on both sides.

From the data supplied by Romsilva, through the Department of Communication from the Ministry of Environment, Waters and Forests, besides the area planted on A2, technical documentations were also elaborated for other 39.71 ha of forest shelterbelts (0.75%), as follows: 31.81 ha on the Highway A1 Bucharest – Pitești, near the localities Dragomirești Vale (Ilfov), Vânătorii Mici, Joița (Giurgiu), Corbii Mari, Uliești (Dâmbovița) and Rătești (Argeș); 8.53 ha on the Highway A2 Bucharest – Constanța, on the segment between Cernavodă and Feteşti.

Starting from the characteristics of each county, the establishment of zones where it is necessary to establish forest shelterbelts must have in view a set of criteria (climate, vegetation, hydrological, pedological criteria and criteria related to the socio-economic importance of the objectives to be protected); some of these criteria have a determining role, depending on the nature of the objective to be protected.

The climate criterion is considered the determining factor in the emergence and manifestation of aridization and desertification phenomena, even though in

certain situations the negative climate changes are also at least partially the consequence of the actions of other factors.

According to experts, a first climate criterion for determining the areas where protective forest belts are needed would be specifying the regions with low rainfall or sufficient rainfall for the development of agricultural vegetation, yet unevenly distributed in time and where dry harmful winds are blowing. A second criterion would be to determine the regions with dry weather in the country on the basis of climate formulae or taking into consideration the soil types as accurate enough indicator of the climate in which these have evolved.

Another criterion would be to determine the regions subject to periodical dryness, on the basis of statistical data of weather factors, of soil moisture and evolution of agricultural vegetation or production. Another criterion, the most accurate one, yet the most expensive, resides in determining the weather factors that impose setting up protective forest belts at local level.

Starting from the weather criterion, it is estimated that in the region South-Muntenia, which is included in the warm-dry climate area, taking into consideration the total agricultural area, the necessary protective forest belt area ranges from minimum 80564 ha to maximum 120846 ha (Table no.2), which represents about 9.3% of the necessary shelterbelt area nationwide.

Table 2
Estimates of the need for protective forest belts in Romania, at national level, depending on the weather criterion (2016)

Climate zone	**Region**	**Necessary protective forest belt area - ha**	
		Minimum	**Maximum**
Warm-dry	South-East	98982	148473
	South-Muntenia	80564	120846
	South-West	88010	132015
	Bucharest-Ilfov	85101	127651
Without great temperature variations – sub-humid	North-East	80093	120139
	North-West	432750	649124
	Total	865500	1298248

Source: Toncea, I. (2016): Agricultural protective forest belts, paper available at the following address: http://agriculturadurabila.ro/perdele-forestiere-agricole.

It is an obvious fact that the establishment of protective forest belts presupposes the identification of adequate financial sources to cover the necessary costs. In this respect, within the National Rural Development Program, non-refundable finance can be received for the establishment of protective forest belts under the measure “First afforestation of agricultural land”.

The investments of this type are applied to agricultural land areas of at least 0.5 hectares, on which the forest plantation is established, which must be maintained until it reaches the exploitability age, which can reach 40 years. In case

of agricultural income loss, compensatory premia are offered, differentiated by type of beneficiaries. These are divided into "farmers" and "other owners of agricultural land" (non-farmers). The compensations are received for a period of 15 years, starting with the year when the forest plantation was established, consisting of standard sums, expressed in euro per hectare per year.

At the same time, within the Strategic Environmental Assessment, the Environment Report 2015 provides for investments in the development of forest areas and for the improvement of forest viability, aiming at afforestation of land areas and creation of forest areas. This mainly refers to the creation of forested areas on agricultural and non-agricultural land, as well as to the establishment of protective forest areas on this land.

The support under this measure is represented by standard costs, targeting the premium for the establishment of forest plantations and the annual premium per hectare for a 12-year period, in order to cover the maintenance and care costs for the forest plantation and for compensating the agricultural income losses following the afforestation. Practically, this financial support aims at increasing the area under forests nationwide, with an impact upon the effects of climate changes, soil erosion decrease, improvement of water retention capacity, as well as to restoring and preserving local biodiversity.

5. CONCLUSIONS

With an important protection role against different disturbing factors, the protective forest belts represent an important asset in terms of the sustainability of existing limited resources. The climate changes of the recent period (flooding, extreme temperatures, snow-drifting etc.), the changes produced in the soil structure, the overall economic development are just a few elements that justify the need to establish protective forest belts.

In the region South–Muntenia such shelterbelts are extremely important, as this region is characterized by the prevalence of counties located in the plain, with a warm-dry weather (in summer), but with extremely low temperatures in winter time and with permanent danger of snow-drifting.

On the other hand, it is worth mentioning that in the four plain counties (Călăraşi, Giurgiu, Ialomița and Teleorman), the protective forest belts have an important role in maintaining soil moisture and in increasing farm productivity implicitly.

Another noticeable effect of forest shelterbelts, at the level of the region South-Muntenia, consists in road protection and control of snow drifting on roads, resulting in carrying traffic under normal conditions, in winter time inclusively.

Without mentioning the beneficial effect of protective forest belts upon pollution level diminution, one should keep in mind that in order to increase their establishment efficiency, the legal status of land that will be the object of this

approach should be clarified, and the primary and secondary legislation in this field should be gradually adapted.

Last but not least, the elaboration of technical-economic specifications for studies and projects in uncovered areas should be permanently correlated with the necessary funding both from the state budget and from the EU.

It is obvious that a much more efficient co-operation should exist between all the institutions in charge in order to identify the best solutions for the creation of such protective forest belts. Such co-operation can start from the creation of a public interactive information base that can make it possible to know the changes produced in certain areas, so that an adjustment and intervention can be made in the shortest time possible so as to remove the eventual negative phenomena.

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