

SPECIFIC WORKS FOR THE MAINTENANCE OF AGRO-FORESTRY SYSTEMS

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Abstract

Agroforestry systems, silvopasture or agroforestry-pastoral systems are currently forms of expressing the former pastures and/or the former wooded pastures.

The particular works of the agroforestry or silvopasture systems are characterized by its own specific and resulting in structure, function, and their exploitation.

It is a known fact that the operation of agroforestry or silvopasture systems aims at achieving as many as possible diversified productions that meet several requirements of society.

Carrying out productive activities in these systems involves a series of specific tasks which are intended to ensure their conservation and functionality in correlation with the established objectives.

The works of conservation and maintenance of agroforestry and/or forest-pastoral systems are necessary to be periodically ran after a tremendous draft activity plan being staggered space-temporary, in accordance with the objective reality on the ground, namely the necessity and their appropriateness.

Obtaining positive results, respectively diversified productions, requires maintenance, preservation and proper operation of these productive systems, scientifically, ensuring continuity and sustainable exploitation of their productive potential.

The case study was conducted during 2014-2015 in Nădălbănești town, village Ignești, Arad county, an area of approx. 150 ha, which were carried out a series of specific agroforestry and/or forest-pastoral system works.

The works were performed 85% mechanized, based on economic and technical projects and execution of general and detailed mappings prepared in accordance with the reality on the ground and the laws in force.

Financial support for the proposed work was done and completed by the association which administers and manages the agroforestry systems, namely the forest-ownership Nădălbănești, taking in consideration the status and provisions for setting up and functioning.

The obtained results are landmarks for the coordination and conduct of administrative and productive now and in the future related to agroforestry and / or forest-pastoral systems.

Also, in carrying out the work, was as well performed an audit (control) towards the activities under these production systems over the last 20 years.

Key words: Keywords: agro-forestry systems, silvo-pasture systems, agro-forestry-pastoral systems, particular works, diversified productions.

INTRODUCTION

Agro-forest systems are wooded pastures and pastures, which are important resources of diversified products, of plant and animal origin, in the plain, plain, hill and mountainous areas.

In areas that were not collectivized until 1989, these systems were managed, managed and properly exploited, representing considerable means of subsistence for local communities (Crainic, 2000).

Although the usefulness and importance of agro-forestry systems is evident (Crainic, Stamate, 2009), the interest of owners to promote their specific activities is relatively low and in some instances even non-existent.

These complex ecosystems present a series of structural and functional features that are directly influenced by the conditions of vegetation, the way of administration, management, exploitation and maintenance. As a result, there are agro-forestry systems which consist of land for a series of agricultural crops and fruit trees and, respectively, areas with tree vegetation and bushy forest vegetation.

Another category is represented by the forest and rearing livestock systems, consisting of more or less extensive areas planted by biogrops of trees, interspersed with grassland for livestock breeding (buffaloes, horses, goats, sheep, cows, pigs).

There are also agro-forestry and livestock breeding systems, which have transient characters between the first two categories, consisting of crop and/or horticultural areas, areas covered with forest vegetation and pastures for livestock.

At present, agro-forestry systems and agro-forestry and livestock breeding systems have a high proportion which are located within the forest-ownership.

Forest-ownership are the pastures, hills, and forests that belong to several owners and are used in common, whatever their provenance, being indivisible properties (<http://www.rasunetul.ro/padurile-si-pasunile-composesorale-lumina-prevederilor-noului-cod-civil>). These properties are inherited on the basis of old, nineteenth-century property documents, which are called Urban, which were assigned to the serfs for the current activities in the agro-forestry sector within the communities where they lived (Crainic, 2000).

These properties are inherited on the basis of old, joint ownership documents (of the nineteenth century), what are called land records, which were attributed to serfs, for current activities in the agro-forestry sector within the communities where they lived (Crainic G. C., 2000).

The exploitation of these complex agro-forestry holdings is differentiated, depending on a series of factors (structural-functional characteristics, vegetation conditions, current legislation, management, etc.) that make this activity conditional.

MATERIAL AND METHOD

The case study was carried out within the forest-ownership of Nădălbești locality, Ignești commune, Arad county, during 2014-2015-photo.1.

The main objectives of the case study carried out within the forest ownership of Nădălbești are represented by:

- analysis and study of agro-forestry systems components;
- analysis and study of the exploitation of the agro-forestry systems components;
- the establishment of the necessary works and their realization in the agro-forestry systems;
- the mode of realization of the preservation and maintenance of the agro-forestry systems.

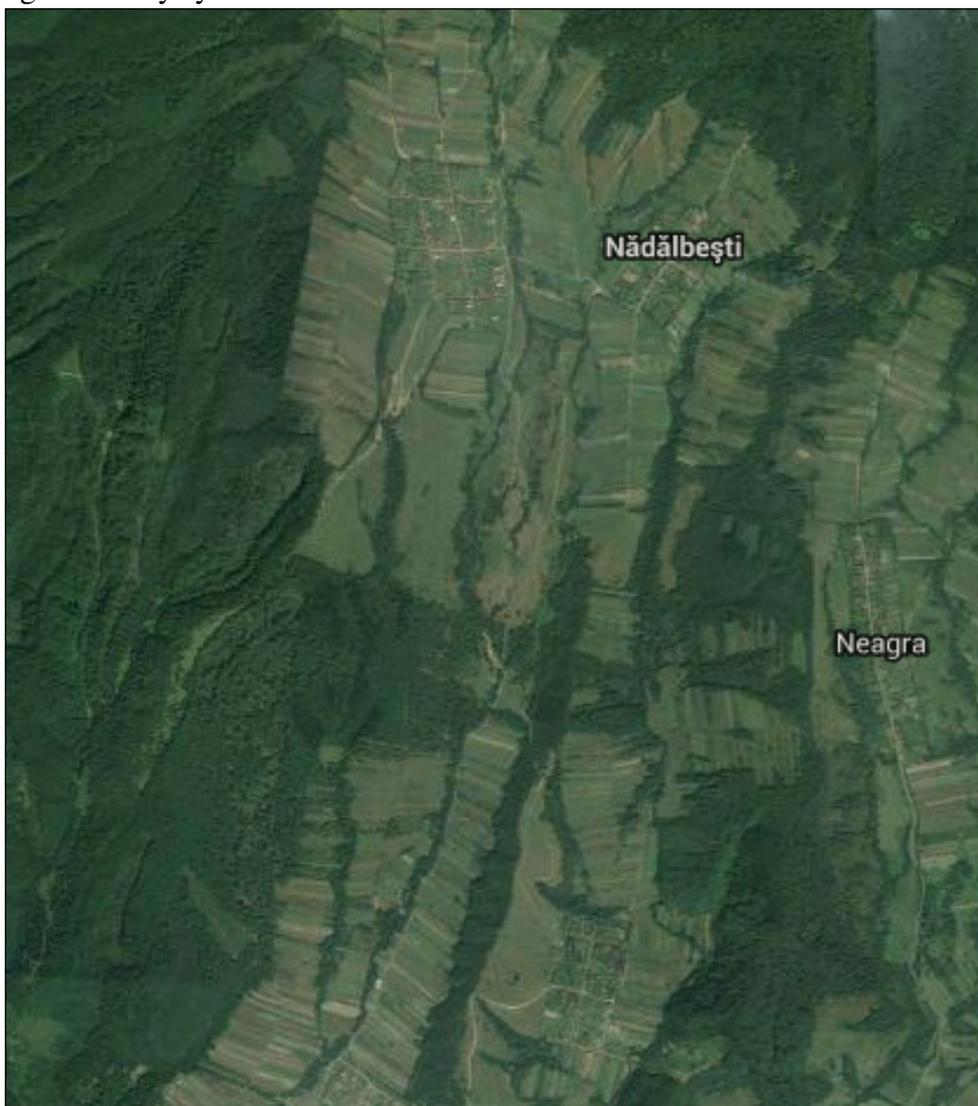


Photo. 1 - Location of the study

(ro/maps/place/Nădălbești+317197/@46.4537803,22.1875763,883m/data=!3m2!1e3!4b1!4m2!3m1!1s0x474f520f8cc31cdb:0x998ba535c93654dd)

The research methods used were represented by: bibliographic documentation, observation on the itinerary, stationary observation, experiment, comparison, simulation.

For the mapping and delimitation of the surfaces on which the necessary works will be carried out, according to the objective reality in the field, the thematic maps for the forest ownership, made with MapSys 8.0, are used.

Surfaces and related works within the agro-forestry systems, which were established and proposed to be carried out in the field observations, were materialized on thematic maps in order to streamline the design and technical-economic evaluation stage of these activities.

Field data were recorded in the vegetation season and vegetative rest season, respectively, to capture all aspects necessary to establish the appropriate technical solutions.

The preservation and maintenance of the silo-pastoral systems were mechanized, with motounels equipped with discs and cutting chains (Marincaș, Crainic, Damian, Ștețco, 2009) - photo.2.

RESULTS AND DISSCUSIONS

On the occasion of the registration of primary data in the field, a series of structural and functional features of the agro-forestry systems were revealed, within the forest ownership of Nădălbești.

As a result, areas of different sizes have been identified, where specific conservation and maintenance works are required as follows:

- cutting the grass vegetation;
- cutting of arbustive vegetation (photo 3, photo 4);
- cutting of young woody vegetation (natural regeneration less than 2.0 m high);
- cutting of wood vegetation with a height of more than 2.0m;
- gathering and stacking the resulting plant material.

Surfaces specific to works within the agro-forestry systems were materialized on the ground with wooden logs, being positioned with the GPS system. Their area was calculated using the analytical method using MapSys 8.0.

The quantitative and economical evaluation of the necessary works, which were proposed to be carried out in the agro-forestry systems analyzed and studied within the forest ownership Nădălbești, similar works in the forest sector - tab.1, tab.2, tab.3 and tab. 4.

The elements of the quantitative and economical evaluations of the proposed works are:

- name of the work;

- unit of measure;
- quantity;
- unit price;
- total labor;
- direct costs;
- indirect costs;
- profit,
- T.V.A.;
- total costs.



Photo. 2 - Shrubs cut with cutter disc (Crainic G.C., Nădălbești, Arad, 2015)

The specificity of the works was established when making the observations on the itinerary.

The unit of measurement used for the quantitative evaluation of these works is the hectare.

The unitary tariff was established on the basis of local rules adopted according to several elements that influence the performance of the works.

The proposed direct costs represent 20% of the total I (total labor), indirect costs represent 6% of the total II.

The profit to be realized is 4% of total III.

T.V.A. has a fixed value and represents 24% of the total IV.

The total value of the estimate (total) is obtained by summing the total IV with T.V.A.



Photo. 3 - Shrubs (*Rubus spp.*) that need to be cut with a disk drive
(Crainic G.C., Nădălbești, Arad, 2015)

As a result, areas of different sizes have been identified, where specific conservation and maintenance works are required as follows:

- removal of grass vegetation (photo 3, photo 4);
- removal of arbustive vegetation (photo 3, photo 4);
- removal of young woody vegetation (natural regeneration less than 2.0 m high);
- removal of wood vegetation with a height of more than 2.0m (photo. 6, photo 4);
- gathering and stacking the resulting plant material (photo. 6).

Surfaces specific to works within the agro-forestry systems were materialized on the ground with wooden logs, being positioned with the GPS system (Iovan, Crainic, 2009). Their area was calculated using the analytical method using MapSys 8.0 (Bodog, Crainic, 2016; Damian, Crainic, 2016).

The quantitative and economical evaluation of the necessary works, which were proposed to be carried out in the agro-forestry systems analyzed

and studied within the forest ownership Nădălbești, similar works in the forest sector - tab.1, tab.2, tab.3 and tab. 4.

Elements of the value estimate for the proposed works are: name of the work, unit of measure, quantity, unit price, total labor, direct expenses, indirect expenses, profit, T.V.A. and total value.



Photo.4 - Shrubs of the hawthorn species (*Crataegus* spp.) to be cut
(Crainic G.C., Nădălbești, Arad, 2015)

The specifics of the works were established on the ground, when the observations were made on the itinerary.

The unit of measurement used for the quantitative evaluation of these works is 100 m².

The unitary tariff was established on the basis of local rules adopted according to several elements that influence the performance of the works.

The proposed direct purchases represent 20% of the total I (total labor), indirect costs represent 6% of the total II.

The profit to be realized is 4% of total III.

T.V.A. has a fixed value and represents 24% of the total IV.

The total value of the estimate (total) is obtained by summing the total IV with T.V.A.

The elements of the quantitative and economic assessments of the proposed works can be found in tables 1, 2, 3 and 4.

Table 1

Technical and economic evaluation of the works designed and realized
between 28 08 2014 - 03 01 2015

Nr. crt.	Name of work (activity)	U.M.	Quantities	Unitary tariff (RON)	Total price (RON)
1	Cutting grass vegetation	100 m ²	1350	2.0	2700.00
2	Cutting shrubs	100 m ²	150	3.0	450.00
3	Cutting grass vegetation and shrubs	100 m ²	1400	4.5	6300.00
4	Cutting wood vegetation with a height of less than 2.0 m	100 m ²	1064	5.5	5852.00
5	Cutting wood vegetation with a height of more than 2.0 m	100 m ²	1500	6.5	9750.00
TOTAL I			5464	-	25052.00
Direct cost (20%)					5010.40
TOTAL II					30062.40
Indirect cost (6 %)					1803.74
TOTAL III					31866.14
Profit (4 %)					1274.65
TOTAL IV					33140.79
T.V.A. (24%)					7953.79
TOTAL VALUE					41094.58

The maintenance and conservation works designed for the agro-forestry systems of the forest ownership Nădălbești were staggered on four stages: 28 08 2014 - 03 01 2015, 04 01 2015 - 30 03 2015, 01 04 2015 - 09 05 2015 and 01-22 10 2015.

In the first three stages, the whole area occupied with pasture and forestry pastures of the forest ownership Nădălbești was traced with specific works, as there was a complete lack of these works in the last 10-15 years.

Also, there were identified a number of areas where the vegetation (grassy and shrubs) was burned, to replace some of the works that were required to be executed.

In the last stage, for economic reasons, specific works on agro-forestry systems were carried out on an area of 50 hectares.

In order to maintain the agro-forestry holdings in optimal conditions, it is necessary to observe and periodically analyze their state and the way of

exploitation, and technical and managerial decisions will be made on the basis of these.

In photo 5 are presented the activities (work) carried out between 28 08 2014 - 03 01 2015.



Photo. 5 - Works done during 28 08 2014 - 03 01 2015
(Crainic G.C., Nădălbești, Arad, 2015)

Table 2

Technical and economic documentation for the works planned and carried out between 04 01 2015-30 03 2015

Nr. crt.	Name of work (activity)	U.M.	Quantities	Unitary tariff (RON)	Total price (RON)
1	Cutting wood vegetation, grass vegetation and shrubs	100 m ²	2000	6.6	13200.00
2	Cutting grass vegetation and shrubs	100 m ²	1000	5.4	5400.00
TOTAL I			3000	-	18600.00
Direct cost (20 %)					3720.00
TOTAL II					22320.00
Indirect cost (6 %)					1339.20
TOTAL III					23659.20
Profit (4 %)					946.37
TOTAL IV					24605.57
T.V.A. (24%)					5905.34
TOTAL VALUE					30510.91

In photo 6 are presented the activities (work) carried out between 04 01 2015 - 30 03 2015.



Photo. 6 - Work done during 04 01 2015 - 30 03 2015
(Crainic G.C., Nădălbești, Arad, 2015)

Table 3

Technical and economic documentation of the designed and realized works
between 01 04 2015 and 09 05 2015

Nr. crt.	Name of work (activity)	U.M.	Quantities	Unitary tariff (RON)	Total price (RON)
1	Cutting wood vegetation, grass vegetation and shrubs	100 m ²	650	8.8	5720.00
2	Cutting grass vegetation and shrubs	100 m ²	1256	5.4	6782.40
TOTAL I			1906		12502.40
Direct cost (20%)					2500.48
TOTAL II					15002.88
Indirect cost (6%)					900.17
TOTAL III					15903.05
Profit (4%)					636.12
TOTAL IV					16539.17
T.V.A. (24%)					3969.40
TOTAL VALUE					20508.57

In photo 7 are presented the activities (work) carried out between 01-22 10 205



Photo. 7 - Work done during the period 01-22 10 205 (Crainic G.C., Nădălbești, Arad, 2015)

Table 4

Technical and economic documentation of the designed and realized works
in the period 01-22 10 2015

Nr. crt.	Name of work (activity)	U.M.	Quantities	Unitary tariff (RON)	Total price (RON)
1	Cutting wood vegetation, grass vegetation and shrubs and her settlement in heaps	100 m ²	5000	2,75	13750.00
TOTAL I			5000		13750.00
Direct cost (20%)					2750.00
TOTAL II					16500.00
Indirect cost (6 %)					990.00
TOTAL III					17490.00
Profit (4 %)					699.60
TOTAL IV					18189.60
T.V.A. (24%)					4365.50
Total value					22555.10

The study was conducted on the occasion of works contracts carried out by S.C. ECOPROD FOREST S.R.L. within the forest ownership Nădălbești, Arad County, during 2014-2015.

CONCLUSIONS

The rational, sustainable exploitation of agro-forestry systems presupposes their identification and detailed knowledge, in organizational and structural-functional terms.

The superior and sustainable exploitation of the productive potential of agro-forestry systems is a fundamental criterion for their management.

The different and/or complementary use of the productive potential of agro-forest holdings is also a fundamental criterion for their management.

The lack of maintenance and conservation work undoubtedly leads to their degradation, often irreversible, involving considerable financial efforts to restore them.

Also, the lack of interventions (or a careful, serious concern) can lead to changing the use category (integral or partial) of the land within the agro-forestry systems, with negative implications on their integrity and specificity.

The use of funds for works in agro-forest holdings is the most appropriate way for their good functionality.

REFERENCES

1. Bodog Marinela, Crainic Ghiță Cristian, 2016, Some Specific Characteristics of the Geomatic Applications in the Agro-Forestry Sector, *Analele Universității din Oradea, Fascicula Protecția Mediului*, Vol. XXVII, 2016, pp.337-346, ISSN 1224-6255

2. Crainic G. C., Stamate G., 2009, Agro-Forestry Systems - A possible valorization alternative of the forestry potential in some extreme sites, *Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Horticulture*, Vol. 66, No 1, Issn - 1843-5394, pp. 572-577;

3. Iovan C., Crainic G. C., 2009, Some Aspects with Regard to the Design of Transport Instalations in Forestry Fund Using Modern Technologies, *Revista Lucrări științifice - Seria Agronomie, Universitatea de Științe Agricole și Medicină Veterinară Iași*, Vol. 52 (1), ISSN - 2069 – 7627, pg. 351-358;

4. Crainic G. C., 2000, *Istoricul pădurilor din localitatea Vîrfurile, administrate de Ocolul Silvic Hălmagiu, Județul Arad - referat, Specializarea Silvicultură, Catedra de Silvicultură, Facultatea de Protecția Mediului, Universitatea din Oradea;*

5. Damian Vasilica Laura, Crainic Ghiță Cristian, 2016, Possible Use of Geomatics for the Analysis of Spatial Distribution of Chestnut (*castanea sativa* mill) Populations in Romania, *Analele Universității din Oradea, Fascicula Protecția Mediului*, Vol. XXVI, 2016, pp.185-194, ISSN 1224-6255;

6. Marinceș I. B., Crainic G. C., Damian L., Ștețco I., 2009, Aspects of Mechanization of the Possibilities of Thinnings of the UP I Sîniob, O.S. Săcuieni, D.S. Oradea, *Analele Universității din Oradea, Fascicula: Protecția Mediului*, Vol. XIV, Anul 14, ISSN - 1224-6255, pp. 77-86;

7. <http://www.rasunetul.ro/padurile-si-pasunile-composesorale-lumina-prevederilor-noului-cod-civil;>

8. [ro/maps/place/Nădălbești+317197/@46.4537803,22.1875763,883m/data=!3m2!1e3!4b1!4m2!3m1!1s0x474f520f8cc31cdb:0x998ba535c93654dd.](http://ro/maps/place/Nădălbești+317197/@46.4537803,22.1875763,883m/data=!3m2!1e3!4b1!4m2!3m1!1s0x474f520f8cc31cdb:0x998ba535c93654dd)