

STUDY CONCERNING FOREST ECOLOGIC RECONSTRUCTION ON DEGRADED LAND IN RANGE OCOLUL SILVIC "VALEA CIBINULUI", SALISTE, ROMANIA

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Abstract

The study examines the stationary conditions, determine solutions to improve degraded land, assessing the cost of ecological restoration work needed in the area of improving degraded lands at Rapa - Copăcel, estimated benefits of the project and its viability. Objectives of the paper: need to introduce in the circuit of productive forest lands within the improvement of the area "La Rapa - Copăcel" danger zone where activation of the phenomena of degradation (erosion, landslides) predominate. Out of 102.33 ha as area for improvement, the effective area of 101.6 ha is forested, representing a difference of 0.73 ha, 1.2 m wide strip that is to be the place for hedges. Viability of the project results from the ratio calculated benefit/cost = 2.3 which justifies the need and opportunity for investment. Opportunity project results in immediate and potential beneficial effects of the a forestation namely stabilization by stopping land erosion and landslides with positive influences on human settlements, infrastructure and communication lines, reducing the intensity of land degradation processes and the gradual improvement their production capacity as the direct effect of forest cultures, the role of forests in improving the main factors of environmental water, air, climate, reducing extreme values of climatic factors (temperature, evapotranspiration, wind speed, humidity) and air purification by the ozoning phyithoncide releasing the destructive effect of microbes; regulating rainfall, ensuring constant and permanent water flow, reducing the effects of drought and floods, improving stationary conditions for the maintenance and development of herbaceous vegetation and forest. It specifies the role and sanogene functions of the forest – ambient of the forest, an constructive and necessary factor for the ecosystems and human health, and its other roles: aesthetic role "attribute of all forests" - contemplating a sylvan landscape with positive effects on the psyche (lights, shadows, colors, contrasts, echo), thus improving the appearance of the landscape area surrounding Loamnes; diversifying and increasing social functions, conservation of biodiversity, creating a favorable climate for wildlife, creating database, nectarous economic effects are related to obtaining wood in a wood shortage area.

Key words: degraded land, af forestation, environment, forestry, reconstruction

INTRODUCTION

Ecological reconstruction of soils must take into account general measures of protection of the land and specific measures for agriculture, presented in previous reports. [3, 4, 5, 10] It requires sustained promotion of the objectives and measures set out in the National Strategy and National Action Plan to combat desertification, drought and land degradation. [12] According to a lot of researchers [2, 7, 9] the Romanian development depend of such of strategic objectives like as: application of the principles and practices of sustainable development into the programs and policies of Romania; reaching the average level of existing

sustainable development indicators in EU member states.

MATERIALS AND METHODS

The objectives of the research are:(a) to design, compare, and implement solutions for ecological restoration of degraded lands; (b)to identify and test recovery techniques of degraded lands; (c) ecosystem restoration; (d) to identify revegetation techniques.

Describe actions for ecological restoration of degraded lands and improvement of soil quality:

In the analyzed territory, demarcated twelve units Station (U.S.). These were grouped into four types of resorts degraded by erosion and

displacement (TS). The four types Station, with compositions (formulations) suitable afforestation (F1) ... (F4) are:

-TS I - Land tilt (less 60) affected by weak to moderate erosion with regional soils (brown clay illuviated), moderately deep, loamy, representing 36.73 ha.

(F1) 50St 25Fr (C, m Pa, Pa, St r) 25Lc (Sat, Pd) with 5000 seedlings / ha in the hearth of 80x60 cm, 40x40x40 cm pit at St. 30x30x30 cm and the rest of the species . with loamy texture.

-TS II - Courts strongly undulating ground tilt (less 80) affected by recent landslides stepped weak to moderately fragmented, largely maintaining the humus horizon surface without excess water with moderately deep soils with clayey texture -clay, low carbonated (regosols moderately eroded islands pseudorendzine) on clay marl deposits on the substrate marl and clay, representing 27.87 ha. (F2) 75 Sc 12.5 Fr (MI, C, Str) 12.5 Lc (Sat, Pd) - 5000 seedlings / ha; mixture in bunches of 100-150 m² acacia and bunches of 25-40 m² for mixed species and shrubs. Preparing the ground: hearts of 80/60 cm.

TS III - Undulating land with low slope (5-60) affected by old and recent landslides, grass, local hydrophilic species with a less disturbed soil complex (pseudo regosol rendzinic not eroded or poorly eroded soil gleic representing 34.36 ha.

(F3) 50 Fr 25 St r (C, Pa, MI) 12.5 A nn.12, 5LC (Let Pd) with 5000 seedlings / ha (ash, the best land, red oak, the more settled portions with poor drainage, alder, red oak under the same conditions and stagnant water around microplateau). Preparing the ground: Vetra 80/60 cm

-TS IV - Micro-depressions with permanent excess of water, hygrophile vegetation (reed, rush, rush) pseudogleic marshy soil, representing 2.44 ha. (F4) 50An.n 50Sa with 5000 seedlings / ha.

Site preparation: hearts of 80/60 cm.

RESULTS AND DISCUSSIONS

Preparing land for afforestation

How to prepare the land for most situations, it is in the form of hearths, process which was

applied to 70.45 ha, given that the land was mingled, inaccessible to tractor. The 31.15 ha land not affected by landslides, but powerful fallow, it was provided that the preparation by plowing US2, US9-integral and U.S. 6 part.

Hearts (with dimensions of 60x80 cm with the longer side contours) were arranged in a parallelogram, at a distance of 1.0 m on the level curve and 2.0 m on the line of greatest slope. hearts depth is 12 to 15 cm, provided that penetrate beneath the fallow to be removed.

Plowing was done with tractor drawn plow at a depth of 25-30 cm along the curve. Was plowing followed by disking operation executed disc harrow, tractor mounted, working depth of 10-15 cm. It is advisable to prepare the ground by plowing a year before plantation.



Photo 1. Preparing the land

Paving the hearth and making plantations

The land affected by weak to moderate erosion, but not subject to landslides, generally former arable land, fallow, the main species was chosen oak base that supports both heats of summer, even accompanied by drought and frosts in winter, plus compared to the oak, vegetation and soils can compact, relatively high clay content.

As a species mixture was introduced, 25% ash, and the privet bushes was chosen. Between oak and ash mixture (sycamore) was done in bunches, not to be removed first species, due to the delay of growth in the early years; Instead, between oak species and shrubs help on the one hand, and between ash species and shrubs help, on the other hand, the mixture will be private. 5000 seedlings were used per hectare, 1.0 scheme x 2,0 m.

In order to combat mildew oak crops was

sprinkling them with Sulfavit (wetttable sulfur) for five years.

Said composition (F1) was applied to 36.73 ha (representing 37% of the effective area of woodland) in the US2, US4, US5, US6% to US9.



Photo 2. Preparing the land and making plantations

Undulating land affected by landslides updated with moderate fragmentation and prevalence soil surface species basis, participating in 75%, the locust, thanks to its breeder of degraded land: planting less demanding with high power tillers and drajonare, with rapid growth in the early years, securing and covering the field after four or five years after planting. His choice was considered perimeter results in another improvement from the nearest perimeter Rapa - Copăcel and having conditions similar to its stationary: acacia brushes created 18 years ago by former land slide realized a diameter average of 10.6 cm and a height of 11.7 m, with well conformed copies, is a Class III production. At present, the land is consolidated and stabilized against landslides. As main species mixing, chosen as in the previous case, all the ash entering the formula in 12.5% likely to be accompanied by Malin American bird cherry, red oak. It should be noted that, except for red oak, all species proposed for mixed formulas (F1) and (F2) are also represented in nearby crops or as separate patches (ash, cherry pussy, Malin U.S.) or disseminated, in both cases with a good development.

The mixture will be in bunches of 100-150 sqm acacia and 25-40 sqm of mixed species and shrubs. Ash will be installed preferably free places or even opposed slight slope, located at the base of old gear slipping

Instead, American Malin can be introduced into the mixture with acacia (safer on the edge bunches of acacia), being one of the few species that can withstand the sublevel acacia. Among the shrubs mentioned in the formula, underbrush white hawthorn can be used for fixing the sliding surfaces detachment with small bump (0.5 - 1.0 m) with underbrush, we obtained very good results on terms plantations similar and hawthorn as noted increases spontaneously, under the most difficult, even within the perimeter at Rapa - Copăcel.

Culture density of 5,000 seedlings/ha. Said composition (F2) is applied to the 27.87 hectares (27% of the effective area of the perimeter) in US3, US7, US12.

Low sloping land with old slides and present a less disturbed soils complex, sometimes with pronounced wet and hygrophile vegetation, the main species used is ash, participating in 50%; Alternatively, you can use red oak (25%) and black alder (12.5%), the rest of the composition is completed by shrubs. Ash is planted on well-drained land, red oak, poorly drained portions and alder, especially around microplateau stagnant water. 5000 were used seedlings / ha.

Said composition (F3) is applied to the 34.56 hectares (34% of the effective area of the perimeter of) the lower portion of the study most of the units.

The micro-depressions with permanent excess water, hydrophilic vegetation (reed, rush rush) were used in equal proportions, the white alder and willow; introduced especially towards the periphery and around those microzones and the second, on their premises, the model performed even within the perimeter where there are enough copies (some willow căprească) installed naturally in such pools.

Insofar as land allows, we can do that microzones drainage using open ditches.

Said composition is applied to 2.44 ha (about 3% of the actual forested perimeter), the lower portions of most units of study.

As technology work as planting seedlings expected to be made in ordinary pits 40x40x40 cm for oak from formula (F1) and

30x30x30 cm for the remaining species in the prepared field as hearths or plowing.



Photo 3. Black alder and willow seedlings by excess moisture in micro-depressions

CONCLUSIONS

The analysis documentation and discussions revealed the aspects mentioned below.

The study examined the stationary conditions, determined solutions to improve degraded land, assessed the cost of ecological restoration work needed in the area of improving degraded lands at Rapa-Copăcel, estimated benefits of the project and its viability.

The necessity of putting on the productive forest land in the area of improvement of their La Rapa - Copăcel, the danger zone activation phenomena of degradation (erosion, landslides) predominate.

Of the total 102.33 ha as area destined to be improved, the effective forested area was 101.6 ha, representing a difference of 0.73 ha 1.2 m wide strip that is to be considered hedges.

Estimate work in the project is estimated at 2,406,193 lei.

The benefits resulting from this project regarding the wood mass and carbon storage totalized Lei 5,524,281. Viability of the project resulting from the benefit/cost ratio is 2.3 which justifies the need and opportunity for investment.

The project opportunity results from the benefic effects of immediate and future reforestation works as follows: [8]

-Stabilization by stopping land erosion and landslides with positive influences on human settlements, infrastructure and communication lines

-Decrease the intensity of land degradation processes and the gradual improvement of their productive capacity under the direct effect of forest crops.

-The role of the main factors in improving the forest environment water, air, climate

-Decrease extreme values of climatic factors (temperature, evapotranspiration, wind speed, humidity).

-Air purification by fitoncide ozonizing and releasing the destructive effect of microbes.

-Adjusting rainfall, ensuring constant and permanent water flow, reducing the effects of drought and floods, improving stationary conditions for maintaining and developing herbaceous vegetation and forest.

-The role and functions of the forest sanogene - constructive and necessary factor for the forest environment health human ecosystems.

-Aesthetic role "attribute of all forests" - contemplating a forest landscape with positive effects on the psyche (lights, shadows, colors, contrasts, echo), thus improving the appearance of the area surrounding landscape of the Loamnes, diversification and increasing social functions.

-Conservation of biodiversity.

-Creating a favorable environment for wildlife.

-Create database bees.

-Economic effects are related to the production of wood in a wood-deficient area.

The role of forests in retaining dust and industrial pollutants - carbon storage through photosynthesis given that "pollution has no borders." [1, 11]

To adopt appropriate solutions as it is necessary to pursue further work carried out and perform experiments on different species best suited to stationary conditions, afforestation technologies adopted, the effect of amendments and fertilizers etc. [6, 13]

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