

## FOREST EDUCATION PROGRAMMES PROPOSED BY THE NATIONAL FOREST ADMINISTRATION-ROMSILVA IN PARTNERSHIP WITH SPECIALIZED UNIVERSITIES AND OTHER STAKEHOLDERS (NGOS ETC) (PART 3)

Georgeta SEGHEDEIN<sup>1</sup>, Adrian Ioan TIMOFTE<sup>2#</sup>

<sup>1</sup> National Forest Administration-Romsilva, 9A, Petricani Street, Bucharest, Romania, e-mail: [georgetaseghedin@gmail.com](mailto:georgetaseghedin@gmail.com)

<sup>2</sup> University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048, Oradea, Romania, e-mail: [atimofte@uoradea.ro](mailto:atimofte@uoradea.ro)

### REVIEW ARTICLE

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#### Abstract

Maintaining and developing a permanent awareness policy of the young generation on the importance and way of sustainable management of forests, is one of the constant efforts that the National Forest Administration (NFA) Romsilva makes over time to ensure their continuity for the future generations.

The paper addresses one of the forestry education programs proposed by NFA-Romsilva, which is aimed especially at secondary school students, following four main themes.

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**Keywords:** forestry education, awareness, sustainable management, forest fund, target group

#Corresponding author: Adrian Ioan TIMOFTE

#### INTRODUCTION

The general purpose of this program: promoting the activity of NFA-Romsilva (the only administrator of the state forest fund in Romania) and the role of forestry personnel in ensuring the continuity and sustainable management of the national forest fund.

The activities proposed within the educational programs have a learning, information, skill acquisition, awareness, sensitization and involvement role.

The general objectives of the educational programs consist of: the transmission of information in order to acquire knowledge about the forest and its administration/management; the formation of a proactive attitude towards the forest as an ecosystem and the development of a responsible attitude of the civil society towards the environment; carrying out practical indoor and outdoor activities for setting the knowledge and developing the skills of the target audience; which are the species of flora and fauna that can be found in the forest fund, as well as ways to conserve biodiversity.

#### MATERIAL AND METHOD

In order to implement these programs, it is necessary to go through the following stages:

the training of the staff within the forestry departments that connect to the target groups related to each educational program; signing partnerships with school inspectorates/schools/children's palaces, museums, local authorities, NGOs, etc.; establishing the topics to be developed.

The work methodology will take into account the following stages: drawing up a calendar of activities; contacting the target group; ensuring the logistics related to the activities; the preparation of the teaching materials (Daia, M., 2003; Hac, P.A., 2010; Nedelcu, G., 2003; Petrescu, D.C., 2009; Popovici, I., 1985; Zotta, M., 2005); indoor and outdoor activities (excursions on thematic routes, guided visits in the field, practical demonstrations, interactive actions, team games, workshops, therapeutic walks in the forest (forest bathing) etc.); involvement in volunteer actions on the ground alongside forestry specialists; monitoring quantifiable results from a quantitative (number of activities, meetings, etc.) as well as qualitative point of view (feed-back questionnaires); disseminating the results in the local media and social networks, as well as allocating a budget at the forestry directorate level in order to implement forestry-educational activities.

The results had in view following the application of this program are: the training of future generations who know general notions about forestry and understand the role of the forest and forester in ensuring the continuity of the forest; promoting the forestry profession and the fact that NFA-Romsilva is a reliable partner.

Below, it is presented in detail one of the educational programs aimed at students in secondary schools (Seghedin, G., 2019).

Name of the program: P3 - Discover the forest universe (presentation of the Romanian

Academy during the International Symposium - Forests and Education. The activity of foresters in the development and protection of forests - means of education in the spirit of respect for the forest, 2019, Bucharest)

Target group: children from secondary schools (V-VIII)

Main competences: learning, information, skill acquisition, awareness, sensitization, involvement, curiosity, practical application of theoretical knowledge, development of civic sense.

Table 1

**P3 program - Secondary competences and themes addressed**

<b>Secondary competences</b>			
What should the children feel?	What to do?		
<ul style="list-style-type: none"> <li>- curiosity and interest in the forest;</li> <li>- respect and appreciation for the profession of forester;</li> <li>- the support of the forestry personnel, trust towards the forestry staff;</li> <li>- responsibility towards nature;</li> <li>- appropriate behavior towards the forest, the joy of being in the forest, freedom, harmony, empathy.</li> </ul>	<ul style="list-style-type: none"> <li>- to spend more time in the forest;</li> <li>- to get involved and participate in forestry-specific voluntary actions, in communication sessions, to plant correctly;</li> <li>- to become a volunteer forester/ranger for a day.</li> </ul> <p><b>What to know?:</b> what is a food web/chain, notions of forest regeneration, forest nursery = seedling reservoir for the forest, the role of the forest in people's lives, what does the forest provide? What is the role of the forester in sustainable forest management, why is it important to ensure the continuity of a forest and how is this achieved? Recognition of the profession (forester, ranger, engineer), notions about protected natural areas, to know the forests in the area etc.</p>		
Allocated time: maximum 50 minutes			
<b>Themes addressed within the P3 program:</b>			
<ul style="list-style-type: none"> <li>- What is the forest? The role and functions of the forest;</li> <li>- Sustainable forest management and the role of the forester in the forest management;</li> <li>- Species of flora and fauna;</li> <li>- Conservation of biodiversity. Virgin forests. Protected species. Natural protected areas.</li> </ul>			
<b>Location</b>	<b>Didactic methods</b>	<b>Suggestion of additional content</b>	<b>Allocated budget</b>
<ul style="list-style-type: none"> <li>- county forest administrations;</li> <li>- forest districts;</li> <li>- forest nurseries;</li> <li>- administrations of national and natural parks;</li> <li>- secondary schools;</li> <li>- museums;</li> <li>- cultural and educational centers.</li> </ul>	content analysis, simulation, role play, case study, cooperative learning activities, discussions and debates through the use of interactive methods that can contribute to the practice of teamwork, cooperation and/or competition, to the development of communication skills, to demonstrate the critical, tolerant, open and creative spirit of the students, to involve the students in decision-making exercises, to propose strategies for solving problems in the group they belong to, in the school or in the community etc.	<ul style="list-style-type: none"> <li>- activities for the benefit of the community;</li> <li>- worksheets;</li> <li>- additional bibliographic material;</li> <li>- audio-video materials, internet, etc.</li> </ul>	<ul style="list-style-type: none"> <li>- infrastructure NFA-Romsilva;</li> <li>- a budget for the development of educational materials;</li> <li>- budget for travel, transport, meals, the salary of the staff involved, etc.;</li> <li>- the purchase of didactic and promotional materials.</li> </ul>
<b>Period</b>	period of the school year, minimum 1 meeting/topic		
<b>Recommendation:</b>	A class of students should go through all the topics to achieve the goal of this program.		

Table 2

**Topic 1. Sustainable forest management and the role of the forester in forest management**

<b>Specific competences</b>	<b>Abilities</b>	<b>Knowledge</b>	<b>Attitudes</b>
<b>1. Summing up the knowledge about forest</b>	- understanding that the tree is the defining element of the forest as a complex ecosystem; - identification of a stand development stages; - identification of pioneer species.	- the developmental stages of the forest - from seed to exploitable stand; - the application of silvicultural measures for the sustainable management of forests.	- awareness of the fact that the forest is a complex universe with multiple interactions among the component elements; - adopting a responsible attitude towards the forest;
<b>2. Who and how manages the forest?</b>	- understanding the categories of forest managers (state and private); - awareness of the role of the forester in forest management; - understanding the reading of a forest management map and deciphering the conventional signs on the map in the field.	- administration of the forest fund through state and private forest districts; - foresters are a category of specialists and forestry is a science; - forest management = the forester's bible.	- adopting a friendly attitude towards forestry personnel; - awareness of the complexity of the forestry profession and the means necessary for its practice.
<b>3. Role of the forester in each stage of the forest development</b>	- getting familiar with the main types of forestry works.	- the forestry works foreseen in the forest management plans, depending on the age of the forest and its functional category.	- awareness of the complexity and importance of the forester profession as well as of the means necessary for its practice.
<b>4. Harvesting of forest products (wood and non-wood)</b>	- understanding the various types of forest products; - identification of marked trees; - identification of a felling area; - recognition of the field indices regarding the cleaning of the felling areas, the delimitation of access roads, warning panels; - places to collect forest fruits, medicinal plants.	- forest signs and markings, tools for marking; - notions related to the exploitation ages, an ABC of care works and treatments, exploitation technologies and equipment and soil protection measures.	- the development of a responsible attitude towards: foresters and other adjacent professional categories (planners, etc.).
<b>5. What happens after the wood is harvested? Methods of forest regeneration: natural, artificial and mixed</b>	- identification of a natural/artificial/mixed regeneration; - understanding the types of works to help natural regenerations and care for plantations; - identification of forest species by different types of fruits and seeds; - understanding how to produce forest saplings.	- wood harvesting - part of the forest regeneration process; - natural regeneration from seeds, shoots or suckers; - artificial regeneration: sowing, planting or propagation; - support of natural regeneration and maintenance works in the plantations; - knowledge of several types of fruits and seeds; - knowledge of the methods of producing seedlings in the nursery.	- the development of a positive attitude towards the forester's activity regarding the continuity of the forest.
<b>Examples of activities</b>			
<ol style="list-style-type: none"> <li>1. Practical training/field trips to observe different aspects, for example: stands/forest of different ages, afforestation, plantations, natural forest regeneration, limits and symbols used in the field.</li> <li>2. The management plan for a Production Unit as a tool for awareness and understanding of the works in a forest.</li> <li>3. Example of a marking hammer, what a mark on the tree looks like, where it is located etc.</li> <li>4. Evaluation of forest products and benefits, responsible consumption of forest resources.</li> <li>5. Field trips to a forestry nursery.</li> </ol>			
<b><i>It is recommended to present curiosities from nature, legends and stories for each topic addressed in order to capture the children's attention.</i></b>			

**Topic 2: That is the forest? The role and functions of the forest**

<b>Specific competences</b>	<b>Abilities</b>	<b>Knowledge</b>	<b>Attitudes</b>
<b>1. What is the forest?</b>	- differentiation of abiotic and biotic factors specific to the forest ecosystem (biotope and biocenosis); - understanding the principles according to which the forest ecosystem works.	- the forest is the living environment for various types of microorganisms, plants and animals; - geological, hydrological, pedological, climatic factors.	- adopting a positive attitude aimed at knowing the forest as an element of the ecosystem.
<b>2. What is a forest made of?</b>	- identification of some categories of forest plants and animals; - knowledge of the relationships established between living things and their living environment.	-forest flora and fauna; - the composition of the stands; - knowledge of the structure of the forest, the layers of vegetation (trees, shrubs, grassy soil cover).	- developing a positive attitude towards the flora and fauna of the forest.
<b>3. The tree, the defining element of the forest</b>	- the analysis of a basic cross section through the trunk of a tree (bark, sapwood, heartwood, pith, annual rings); -determining the age of a tree (annual growth rings); - measuring the height of a tree (height measuring instruments).	- knowledge of the wood structure through a cross section of the tree; -differences among wood essences; - knowledge of the main species of trees.	- awareness of the structural differences of wood, correlated with its various uses; - awareness of the role of the forester in the promotion of species with economic utility.
<b>4. Forest resources and functions</b>	- identification of wood and non-wood products of the forest; - knowledge of forest functions.	- the forest - renewable natural resource; - recognition of fruits from different species (of trees, plants), mushrooms, medicinal plants; - the functions of the forest (production and protection – balance between the two functions).	- the use of renewable natural resources for economic and social needs; - conservation of natural resources; - awareness and appreciation of the food and therapeutic value of non-wood forest products.
<b>5. Distribution of forests at national level</b>	-identification of different forest types (according to its layers and vegetation zones).	- knowledge of the different types of forest within the national forest fund.	- awareness of the correlations between environmental conditions and forest type.
<b>6. Main dangers that threaten forests today</b>	-identification of the main dangers that threaten forests today and ways to reduce or eliminate them.	- knowledge of the main dangers that threaten forests today and methods of reducing or eliminating them.	-becoming responsible as regards the indications of the presence of some dangers; - behaviors responsible for maintaining the natural balance of the forest; -adopting a responsible attitude towards the forest.
<p><b>Examples of activities</b></p> <ol style="list-style-type: none"> <li>1. Presentation of a forest model (including animals, species).</li> <li>2. Boards with the vertical structure of the stand: trees, shrubs, grassy soil cover.</li> <li>3. Field trips, forest exploration activities (students discover in teams what the forest is made of, differences between deciduous and coniferous trees, what is a layer of vegetation, the distribution of forests in the world, workshops).</li> <li>4. Listening to the sounds of the forest (sounds of animals, birds).</li> <li>5. Using tools to measure the diameter, age and height of a tree, compass and map.</li> <li>6. Human intervention – changes in the forest generated by human activities.</li> </ol> <p><i>It is recommended to present curiosities from nature, legends and stories for each topic addressed in order to capture the children's attention.</i></p>			

Table 4

<b>Topic 3: Species of flora and fauna</b>			
<b>Specific competences</b>	<b>Abilities</b>	<b>Knowledge</b>	<b>Attitudes</b>
<b>1. Wood and non-wood forest flora species</b>	-identification of some species of trees, shrubs, herbaceous flora, mushrooms, mosses, lichens; -morphological differences at the level of leaves, buds, rhytidom/bark.	- knowledge of the main tree species in the country's forests; - flora in the forest (the characteristics of the flora determine the type of forest and the stand); - species of edible mushrooms vs. inedible; - species of medicinal plants from the forest.	- awakening interest in species identification methods; - developing a positive attitude towards forest fauna.
<b>2. Species of animals/fauna in the forest</b>	-identification of some species of animals/fauna in the forest; - morphological differences (anatomical peculiarities, traces, excrement); - determining the specific habitat for rodents, birds, small and large mammals etc.	- knowledge of the main fauna species in the forest by various categories (birds, mammals, fish).	- developing a positive attitude towards forest fauna; - arousing interest in species identification methods.
<b>3. Food web and species relationships</b>	- knowledge of natural balance; - identification of the links between species – producers, consumers, decomposers.	- the natural balance; - knowledge of trophic relationships/trophic pyramid; - silvicultural measures are applied in order to preserve the natural balance.	- the habit of not destroying the natural balance of plants and animals; - awareness of the importance and role of each species in its natural habitat.
<b>4. The influence of environmental factors on the development and spread of organisms</b>	- understanding the environmental factors that influence the biocenosis (e.g. drought, floods, use of chemical fertilizers in areas adjacent to the forest, noise pollution etc.); - awareness of the rights and obligations of the population over the flora and fauna in the forests (visiting routes, rules of behaviour).	- knowledge of the interdependencies between the environmental factors and the elements of the biocenosis; - listing the rights and obligations of communities/civil society in relation to the forest.	- appreciation of the correct human behavior in the relationship with the forest; - the analysis of the interdependence between the manifestation of personal rights and wishes and compliance the environment.
<b>5. Rare protected/exotic plant species and animals. Their protection.</b>	- identification of rare/protected/endemic/exotic plant and animal species and their location in the county; - awareness of the disappearance of rare/endemic species and the danger of invasion by other fast-growing species or with low economic value.	- information about the existence of lists of rare, endangered, vulnerable and endemic species; - informing about the current trends in the promotion of some species unsuitable for climatic and seasonal conditions.	- the ability to care for and protect plants and animals protected by law; - raising awareness related to maintaining the appropriate composition of the natural fundamental types of forest.
<p><b>Examples of activities</b></p> <ol style="list-style-type: none"> <li>1. Field trip in the field, in a forest or a park with the purpose of carrying out some practical activities.</li> <li>2. Creation of sheets with the most common species of flora and fauna, and signs of the presence of fauna species. Age-appropriate determiners will be use.</li> <li>3. Making games about species discovery. Competitions with prizes for the determination of species.</li> <li>4. Making the food web game; food web sheets.</li> <li>5. Highlighting sustainable behaviors in the relationship between man and nature through play.</li> </ol> <p><b><i>It is recommended as the activities to have a practical part where the students, in teams, have direct experiences.</i></b>  <b><i>It is recommended to present curiosities from nature, legends and stories for each topic addressed in order to capture the children's attention.</i></b></p>			

Table 5

**Topic 4. Preservation of biodiversity (virgin forests, protected species and protected natural areas)**

Specific competences	Abilities	Knowledge	Attitudes
<b>1. What is biodiversity? Importance of nature/forest ecosystem conservation.</b>	- understanding the environment suitable for the life of plants and animals; - understanding the interdependence of organisms and the consequences of the disappearance of some species.	- knowledge of the living environment of plants and animals; - awareness of the importance of biodiversity for continuous evolution, for the stability of the food chain and for human society.	- developing a responsible attitude towards the forest.
<b>2. What are virgin forests? Why is it important to keep them?</b>	- criteria and indicators for identifying virgin forests and their importance; - highlighting the differences between a cultivated forest and a virgin/quasi-virgin forest.	- knowledge of the characteristics of virgin and quasi-virgin forests; - the study of the ecosystem developed in natural conditions, without human intervention, can serve as a model for establishing optimal forest management solutions.	- developing a responsible attitude towards the virgin/quasi-virgin forest.
<b>3. What are protected areas and what role do protected species play?</b>	- awareness of the disasters that can be triggered by destroying the natural balance; - understanding the notion of protected natural areas, of a protected, rare species etc.- elementary notions - why we need protected natural areas	- knowing the natural balance; - knowledge of the classification of protected natural areas; - knowing the benefits of protected natural areas.	- learning not to destroy the natural balance of plants and animals; - learning not to destroy the protected plants and animals; - developing a responsible behavior towards nature in general and towards the forest in particular (including material recycling).
<b>4. What are the nearest protected areas in the area?</b>	- identification of the nearest protected areas; - identification of national and natural parks in Romania.	- knowledge of the protected areas in the area; - mention of the national and natural parks in Romania; - for the analyzed area, exemplification of some endangered plant and animal species.	- developing a responsible attitude towards the forest, observing and understanding nature.
<b>5. Rules of behavior in a protected area and in general in the forest. Ecotourism</b>	- learning the rules of behavior in a protected area and in the forest; - practicing responsible and forest-friendly tourism.	- knowledge of the rules of behavior in a protected area and in general in the forest.	
<p><b>Examples of activities:</b></p> <ol style="list-style-type: none"> <li>Field trip in a protected area (the closest). It is recommended to invite some persons from the management team of a protected area.</li> <li>Use of a map with protected areas in Romania.</li> <li>Where possible, visiting a natural or national park in the area.</li> <li>Presentation of videos about protected areas.</li> <li>Plant and animal species.</li> </ol> <p><i>It is recommended as the activities to have a practical part where the students, in teams, have direct experiences.</i> <i>It is recommended to present curiosities from nature, legends and stories for each topic addressed in order to capture the children's attention.</i></p>			

## CONCLUSIONS

In the implementation of the themes presented above, an increased interest of the children in acquiring new knowledge in the forestry field was found, showing active involvement and showing an overflowing curiosity. Therefore, it has been proven that the educational program described above, addressed to the target group - secondary school students - has a positive impact in acquiring a long-term forestry awareness among the young generation, NFA-Romsilva demonstrating and wanting to maintain a permanent and transparent communication with all the factors interested in the implementation and development of these educational programs initiated by her.

## REFERENCES

- Daia, M., 2003, *Forestry*, Ceres Printing House, Bucharest, 239 p.
- Hac, P.A., 2010, *Environmental education. Environmental Educator's Guide*, Administration of Mureşului Natural Park, Arad, 156 p.
- Nedelcu, G., et al., 2003, *Environmental education and volunteering in environmental protection*, ECOTOP

- Foundation for Ecological Culture and Education, Cluj-Napoca, 98 p.
- Petrescu, D.C., 2009, *Forest and Water*, Bioflux Printing House, Cluj-Napoca, 39 p.
- Popovici, L., et al., 1985, *Botanical Atlas*, Didactic and Pedagogic Printing House, Bucharest, 216 p.
- Seghedin, G., 2019, *Forest education programs developed by RNP-Romsilva*, paper presented within the International Symposium "Forests and Education. Activity of Foresters in the Development and Protection of Forests – means of education with respect towards the forest", Romanian Academy Bucharest.
- Zotta, M., et al., 2005, *Piatra Craiului. Handbook of ecological education grades V-VII*, Transylvania University Printing House, Braşov, 50 p.
- \*\*\*, 2022, *Handbook of ecological education in the Rodnei Mountains National Park*, 128 p.  
[http://www.kogayon.ro/files/4113/8545/3408/21\\_Caiet\\_teren\\_RJ\\_.pdf](http://www.kogayon.ro/files/4113/8545/3408/21_Caiet_teren_RJ_.pdf)  
<https://www.facebook.com/silviu.geana/posts/2106189966126116>  
<https://www.turnulsfatului.ro/2019/03/21/simpozion-international-dedicat-silviculturii-si-educatiei-forestiere-de-ziaua-internationala-a-padurilor-137030>  
<https://prezi.com/8ha3gp5-mpv8/medii-de-viata-padurea/>  
<https://prezi.com/fexhmlrsvk2h/ecosistemul-unei-paduri/>  
[https://prezi.com/\\_u\\_awzo6rkud/relatii-intraspecifice/](https://prezi.com/_u_awzo6rkud/relatii-intraspecifice/)  
[https://prezi.com/\\_5gpggwgcck\\_/copy-of-relatii-interspecifice-la-plante/](https://prezi.com/_5gpggwgcck_/copy-of-relatii-interspecifice-la-plante/)  
<http://fliphtml5.com/fscl/wsijk/basic/251-300>  
<http://www.scritub.com/economie/agricultura/silvicultura/PADUR-CA-CA-FENOMEN-ECOLOGIC-SI23412.php>  
[https://issuu.com/aimee53/docs/protejarea\\_naturii\\_prezent\\_si\\_viit](https://issuu.com/aimee53/docs/protejarea_naturii_prezent_si_viit)  
[http://gheorghijulea.ucoz.ru/photo/stiinte/modulul\\_lv13](http://gheorghijulea.ucoz.ru/photo/stiinte/modulul_lv13)  
<http://www.scritub.com/economie/agricultura/silvicultura/SILVO-TEHNICA-INGRIJIRII-SI-CON73937.php>  
[https://terramileniultrei.ro/wp-content/uploads/2011/06/Cu\\_un\\_copac\\_nu\\_faci\\_padure1.pdf](https://terramileniultrei.ro/wp-content/uploads/2011/06/Cu_un_copac_nu_faci_padure1.pdf)