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IS THERE ANY FORESTRY EDUCATION IN ROMANIA? GEOGRAPHY TEACHERS' PERCEPTIONS, ATTITUDES, AND RECOMMENDATIONS

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ABSTRACT. The problem our study found a solution for was the lack of efficient forestry education in Romania. In this context, studies argued that many of the citizens' attitudes towards forests formed during teachers' organized activities. Because the efficiency of those activities for forestry education depended on the school curriculum and on the Geography teachers' training, beliefs, and attitudes, in our research, by administering a questionnaire to 208 Geography teachers, we wanted to identify: their perceptions of the impact certain factors had, of certain activities efficiency and of certain components in the Geography school curricula; the approach of forest topics in official documents; teachers' involvement of their students in diverse activities; their opinions on forest topics that should have been included in the official curriculum. For forestry education in Romania, they perceived school and family as having the biggest impact, and the activities in the forests as the most efficient ones. Research showed that Romanian Geography teachers participated frequently at actions that focused on forestry education. They perceived as weak and very weak the approach of forest topics and their protection in diverse official education documents, and because of this they recommended improvement, suggesting relevant themes, in compliance with the forestry literature.

Keywords: *forest protection, forestry learning, forestry curriculum, education for forest sustainable development, forest sustainable management*

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ZUSAMMENFASSUNG. Das Problem für welches unsere Studie eine Lösung gefunden hat, war der Mangel an effizienter Wald- und Forstwirtschaftsbildung in Rumänien. In diesem Zusammenhang argumentieren Studien, dass viele der Einstellungen der Bürger gegenüber Wälder während der organisierten Aktivitäten während der Schulzeit geprägt werden. Da der Wirkungsgrad dieser Tätigkeiten für die schulische Forstwirtschaftsbildung vom Lehrplan und von der Ausbildung der Geografielehrer, sowie ihrer Überzeugungen und Einstellungen abhängt, haben wir in unserer Forschung eine Umfrage unter 208 Geographielehrer durchgeführt, um folgende Aspekte zu erkennen: ihre Wahrnehmungen bezüglich der Auswirkungen bestimmter Faktoren, der Wirkung gewisser Aktivitäten und Elemente des geographischen Curriculums; die Herangehensweise an Waldthemen in den offiziellen Dokumenten; die Einbindung ihrer Schüler in die vielfältigen Aktivitäten; ihre Meinung zu Waldthemen, die in den offiziellen Lehrplänen aufgenommen werden sollten. Für die Forstwirtschaftsbildung in Rumänien erkannten sie die Schule und die Familie als maßgebend, und die Aktivitäten in den Wäldern als die am effizientesten. Wissenschaftliche Untersuchungen haben gezeigt, dass die rumänische Geographielehrer häufig an wald- und forstwirtschaftliche Bildungsaktionen teilgenommen haben. Die Herangehensweise an Waldthemen und Waldschutz in verschiedenen offiziellen Bildungsdokumenten betrachteten sie meistens als schwach und sehr schwach, und deshalb haben sie Verbesserung empfohlen, wobei sie bedeutende Themen vorschlugen, im Einklang mit der aktuellen Literatur zur Forstwirtschaft.

Schlüsselwörter: *Waldschutz, Wald- und Forstwirtschaft im Lehrplan, Bildung für nachhaltige Forstwirtschaft, nachhaltige Forstwirtschaft*

1. Introduction

As a result of our research, we found a solution for the lack of efficient forestry education in Romania. Citizens perceived forests to be valuable, but the forestry ecosystems of Romania were characterised by disturbances with obvious effects (Griffiths et al., 2014). On the present territory of Romania, the percentage of natural forests decreased gradually from 80% to 27% in 2009 (Giurgiu, 2010, p. 3), although the optimum percentage calculated for Romania was 45%, while forests and other areas with forestry vegetation covered over 42% of the EU area (Giurgiu, 2010, p. 5). After 1989, in Romania, they realised unauthorised forest restitutions (Giurgiu, 2012), the number of forest owners reached to almost one million and would increase through inheritance, they cut and degraded hundreds of thousands of forest hectares, the state lost sometimes control over the forest management, and in many forests they did

no forestry works (Giurgiu, 2010). Responsible for this situation of the forests in Romania were perceived the central, regional, and local authorities and citizens as well, because of their attitudes and actions. In this context, we underline that appropriate forestry education forms attitudes towards forests.

In the international literature of the field on forestry education, most of the studies referred to higher forestry education. In studies after 2000, there was concern in Vietnam – for improving forestry education through participatory curriculum development – (Taylor, 2000), in Philippines – for reorienting forestry education to sustainable forest management (Rebugio et al., 2005) and for reformulating agriculture and forestry education (Cruz et al., 2013). Studies about forestry and forestry education there were also in other states with small forest areas such as Afghanistan (Groninger, 2006) and Mongolia (Batkhuu, 2011). In Europa, such studies focused on forestry and forest-industry education in Finland (Jeglum & Scarratt, 1989), on forestry education in Russia (Teplyakov, 1994), and on the design of forestry education at the Faculty of Forestry in Poland (Skorupski, 2012; Zasada, 2012). Focusing on higher forestry education, in a comparative study, researchers analysed forestry students' opinions in Brazil, China and Finland and they identified similarities concerning specific competences, experiences and favourite fields of work (e.g. students were very fond of field work and of certain fields such as environmental protection – Arevalo et al., 2012).

In addition, certain studies focused on the ways to realise forestry education in other contexts than higher forestry education. In the European countries, they organised diverse activities in the forest environment. In Austria, they offered forestry pedagogy courses, guided forest trips and other "forest pedagogical activities" for students and adults. Certain companies from Finland provided bird watching and wildlife tours. In Norway, they offered outdoors adventure activities (alpinism, rafting, trips, etc.). In Romania, they offered services for watching wildlife as well as recreational activities in the forest. In Great Britain, they offered mountain bike routes in the forest and additional services (Niskanen, 2006). In the same country, the Forest School offered children the possibility to have experiences in the forest and to learn at the same time from academic activities and practical ones on the basis of the learning constructivist theory (O'Brien & Murray, 2007). The National Forest Office in France was involved into environmental education. It offered pedagogical forestry services in forestry exploitations (watching the plant and animal collections, shows with birds of prey, exhibitions, trips on thematic routes, sculptures in wood trunks, etc.) (Cadar, 2014).

Forestry education is important because it influences people's attitudes and actions of protecting and exploiting forests in a sustainable way, a topic people are very well aware of and support at the European and global level and

less at the national level of Romania. Forest protection and exploitation depend on citizens' perception towards the effects of forest clearances and the possibilities to prevent them. The public's realistic perception of the forest situation and of the features attached to the forestry sector is a basic condition for a successful implementation of a forest policy in any country (Riedl & Šišák, 2013). Because people's perception of reality influences political decisions, we should pay attention to this and analyse it (Fabra-Crespo, 2014).

At the global level, studies on perceptions and attitudes focused mainly on forests and much less on forestry education. They started research on the public perceptions of forests and forestry in Europe, at the beginning of the 1990's (Fabra-Crespo et al., 2014). A meta-analysis realised in 2003 of 45 studies focused on Europeans' forestry attitudes and perceptions from 16 countries (Rametsteiner & Kraxner, 2003). Another analysis focused in 2009 on the public opinion about forests and forestry in 21 European countries, along 26 studies which had been published starting with 2003 (Fabra-Crespo et al., 2014).

In Finland, forest owners and the public considered that to maintain healthy forests was the most important objective of forestry management, followed by the management of their own forests, the multiple use of forests, increasing their protection and, much less wood production and ensuring jobs (Kangas & Niemeläinen, 1996). An analysis of the public opinion on forests and forestry in Finland, between 1993 and 2012, showed that the Finns were well informed and good observers, that forests were very important for them, that they managed them correctly, but that they cut too much compared to the growth rhythm of the trees in their forests. Although the Finns perceived forests as a source for jobs and wealth, even if they were aware that forestry industry did not function well at the international level and that they imported raw materials, they required that forests were protected (Fabra-Crespo et al., 2014) and this was a proof of a good forestry education.

Another study of the public opinion about the problems of forests and of forestry policy in Valencia region (Spain) showed a big difference between the wishes, preferences, and priorities of the society and the policies of the regional government (Fabra-Crespo et al., 2012). In the Check Republic, data showed that the situation of the forests improved, but public perception did not reflect that (Riedl & Šišák, 2013). In mountain tropical forests, the locals had very good knowledge about the species, ecosystems, their relationships and their historical or recent changes. At the local level, the local social and cultural values, perceptions and beliefs, as well as the economic and political factors influenced the use, management and preservation of natural resources. For a sustainable development of mountain ecosystems, under the threat of clearances, of forest fragmenting and disappearance of species, researchers argued that it

was necessary to study the people's perception of the environment, of their knowledge and of land use (Pohle, 2013). In the USA, they analysed the influence of four indicators of population diversity on the use of forests, on the environmental attitude and on the correlation between the forestry value and attitude. They assessed four values of forests: wood products, clean air, beauty, and the patrimonial value (Tarrant & Cordell, 2002).

In Romania, researchers analysed the forestry engineers' perceptions and opinions of the possible impact of climate change on forestry ecosystems and of adapting the forest management to vulnerability and risks induced by the climate change. They discovered that most of the respondents agreed that the forests of Romania would be affected by climate change, but that potential effect was perceived to be minor or moderate. They drew the conclusion that adaptation to climatic change was not a priority for forest management (Mutu et al., 2014). In the study analysing the forest owners' attitudes towards a forest multi-functional management in Suceava County, Romania, Nichiforel (2010) identified a series of values attached to forests that were responsible for diverse attitudes and motivations related to using the forest as a resource. Moreover, this research showed that there were behavioural models ranging from observing the law to illegal activities, resulting a typology of forest owners.

Taking into account this short analysis of the most recent studies on forestry education and on people's perceptions and attitudes towards forests, we asked ourselves what could be done in order to improve forestry education and, indirectly, people's attitude towards forests in Romania. Therefore, while aware that many of citizens' attitudes towards forests were formed as early as in school, during activities organised by teachers, and that the organisation of activities, their quality and efficiency for forestry education in the school environment depended much on the school curriculum and on the Geography teachers' training, beliefs and attitudes, in this research we investigated their perceptions on certain factors, means, and ways relevant for forestry education. We searched for answers to the following questions: Which were the factors with the highest impact on forestry education? Which were the most efficient activities in forestry education? Which was the level of teachers' involvement into discussions about forest and of students' involvement in activities aiming at forestry education? Which components of Geography school text books were useful for forestry education? Which were the forestry topics in the official education documents? How could these be improved? In order to answer these questions, we administered questionnaires to the Geography teachers in the pre-university system from Romania and we analysed several official documents. We analysed their answers taking into account the significance of the concepts related to forestry education and the results of some studies on forestry education.

2. Materials and methods

Research material. This consists of a part of the data obtained by administering a questionnaire related to the forests in Romania. This questionnaire included eight items with answers that we built on the basis of the literature in the field and associated to a Lickert type scale and one more open question. We aimed at identifying: the respondents' perceptions about *the impact of certain factors* in forestry education on citizens in general, about the *efficiency of some activities* in citizens' and students' forestry education, about *certain components from the school Geography text books,* about *the quality of approaches concerning forest themes in Romania and forest protection in school official documents*; the frequency with which that teachers got their students involved into out of school activities organised in order to make them aware of the importance of forests and the need to protect them, and the frequency of discussions about forest issues with diverse people; opinions about the forest issues that should be placed into the official curriculum.

Methods. We realised the questionnaire with Google Forms application in Google Drive. In 2015, we sent the invitation to fill in the questionnaire to the Geography teachers in Romania. For that we used the email and Facebook. 208 Geography teachers filled in it online and voluntarily. We realised the data processing using qualitative interpretation methods and the descriptive graphic as a statistical method. We analysed a part of the data by comparing them with those obtained from the first part of the questionnaire in order to identify the link between personal attitudes and actions and to explain them objectively. Because the answers to the items underlined perceptions of experiences, attitudes, actions, and recommendations, they cannot be assessed as correct and wrong, but they represented a social reality from the teachers' perspective which is important for decisions related to the system of education. For the official documents (curricula, text books), we used the method of content analysis through which we wanted to underline the main themes related to forestry education.

Participants. The respondents form a sample size obtained through simple randomisation that does not concord with the total population of the Geography teachers in Romania (over 4,000), but offered us the opportunity to build a social reality on forest education that is representative for Romania. The sample is structured according to respondents' *origin related to their schools* (34.8% teachers from schools in the rural area, 65.2% in the urban area), *the period they worked* as teachers (9.2% – under 5 years; 12.1% – 5-10 years; 52.2% – 11-20 years; 26.6% over 20 years), *membership in environmental NGOs* (9.4% of them are members), *owners of forest areas* (10.7% of them), and

administrative units (from 35 counties out of the 41 counties of Romania and from Bucharest Municipium). The high percentage of respondents having worked as teachers over 11 years was an indicator of their relevant experience and of their perceptions characterised by a low level of subjectivity in relation to forestry education and some effective recommendations for the school curriculum.

3. Results and discussions

3.1. Perceptions of some factors in forestry education

Impact of some factors in citizens' forestry education. On citizens' education for forest protection in Romania, respondents considered that the highest impact had the school and the family, followed by TV broadcasts, socialising networks (Facebook and others), advertising, online publications (newspapers, magazines, and blogs), and the NGOs (see Figure 1). The town hall representatives, scientific books, the Ministry of Environment, Waters and Forests and scientific journals had low or no impact.

Respondents perceived the school (70.4%) and the family (70%) on the first places in this hierarchy. That correlated with respondents' assertion who argued that their attitude towards forests was influenced very much by their family education and by their school education. This positions showed us the importance of family and school as appropriate environments for forestry education, and also the need to ensure a school curriculum and child and adult forestry education in their families.

Over 40% of the respondents perceived the TV (59.1%), the socialising networks (Facebook and others), advertising, online publications, and the NGOs as having very high impact on forestry education. That perception might have meant, on the one hand, that those were involved into actions for forest protection (e.g. the NGOs) or in advertising them (e.g. TV, socialising networks, online publications) or, on the other hand, that they were well known information sources that those Romanian teachers preferred and used. Researchers argue that "mass communication means have big influence on people's formation, strengthening and change of attitudes, opinions and behaviour" (Rotariu & Iluț, 2006, p. 51).

Respondents' perception of the low or no impact of town hall representatives on forestry protection education correlated with those representatives low involvement through actions at the local community level. As a result, at the local community level, in order to change people's attitudes towards forest protection, one needs activities that require the involvement of the school, of the town hall and of the citizens in the respective communities.

Respondents had a negative perception of the Ministry of Environment, Waters, and Forests as having a low or no impact on forestry education and that correlated with another negative perception, as they considered it responsible for the decrease of the forest area in Romania. These perceptions are correct because the Ministry of Environment, Waters and Forests is the specialized body of the central public administration and is subordinated to the National Environmental Protection Agency, and to the National Guard for Environment. Out of these, the National Guard for Environment has the task to control activities affecting the environment and to apply the sanctions provided by the law (Rădulescu & Rădulescu, 2012). The National Forest Agency - Romsilva aimed at forest sustainable management so that to enable the contribution of forests to the improvement of environmental conditions and to ensure the national economy with wood, other forest products, and forest-specific services. Romsilva manages 22 national and natural parks with high percentage of forests, ensuring biodiversity preservation (http://www.rosilva.ro/categorie.php?id=3).

The respondents perceived scientific books and journals as having low or no impact on forestry education and the explanation is that most Romanians study rarely such sources: "The role of books is important for a deeper understanding and interpretation of certain phenomena, but books and written mass media have higher impact on people with university education than on other social categories" (Rotariu & Iluţ, 2006, p. 52).

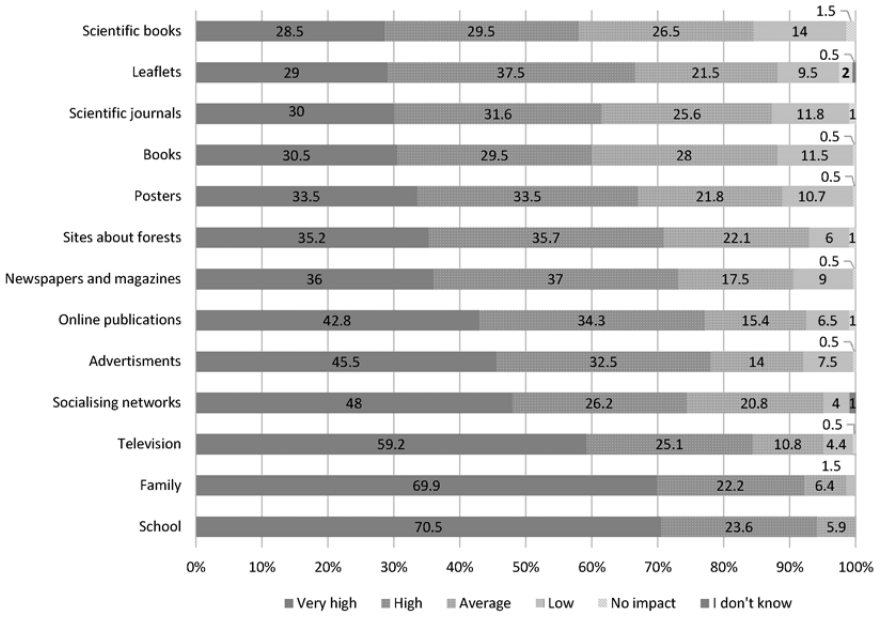

Fig. 1. Impact of certain factors on citizens' forestry education in Romania

Efficiency of certain activities on citizens' forestry education

Over 80% of the respondents (see Figure 2) perceived the campaigns for taking care of the forests and the afforestation ones as the activities with the highest efficiency degree concerning the education for forest sustainable management and protection, although less than half of them participated frequently at afforestation actions and at taking care of the forests actions. This situation showed that it was necessary to organise such activities. Thus, in 2015, starting with the 14th of November, the EcoAssist Association, in co-operation with diverse NGOs and sponsors, with institutional partners (The Ministry for Environment, Waters and Forests and others), within the "We plant good deeds in Romania" project (http://plantamfaptebune.ro), started planting over 1.000.000 saplings, and on the 14th of November, the 9,080 volunteers planted 155,300 saplings on pieces of land outside the forest area. At independent actions, 432 volunteers participated, who planted 7,512 saplings. Simultaneously with those volunteers, Romsilva should have planted 815,000 saplings, on 163 hectares of the forestry area, but there is no information that this happened.

The conclusions of certain studies on enabling positive outcomes in environmental education through experiences in the outdoors (Rickinson, 2001) supported the teachers' perception of expeditions (76%), trips and walks (75.6%), and school camps (73.1%) in the woods as very efficient for forestry education. Moreover, research proved that "attitudes, the quantity of nature-related activities, and knowledge about environment or nature-related issues correlated with one another" (Tikka et al., 2000). We may explain the perception of the lower impact (54.7%) on forestry education of picking fruit, medicinal plants and mushrooms through the fact that teachers participated less at such activities, as most of them lived in areas with small forest areas. The perception of this impact is similar to that of the influence of those activities on their own attitudes and behaviour towards forest protection.

65.7% of the respondents perceived school lessons as very efficient among the activities taking place outside the forest environment. That showed us their role in education and the necessity to organise systematically forestry education activities in formal situations and environments. Positioning family discussions (still, some of these may take place in the forest) on the second place among these activities showed the role of information exchange between generations and the need for family forestry education. Certain studies argued that children learnt in school environmental protection principles and transferred them to their parents (Vaughan, 2003).

Over a half of the respondents considered watching documentaries as very efficient for forestry education, although less than half of them declared that their own attitude and behaviour towards forests was very much influenced by

that. We explain the difference through the fact that nowadays the number of documentaries is much higher, better documented and easier to access than in respondents' childhood or adolescence.

Over a half of the respondents considered workshops and almost half considered debates as very efficient activities for forestry education, but such activities were never or rarely organised in local communities. In this context, teachers' proactive behaviour is a necessity. Several scholars suggested that bringing together people with diverse perspectives facilitated the appearance of novel ideas and thus of solutions to problems (Biggs et al., 2010).

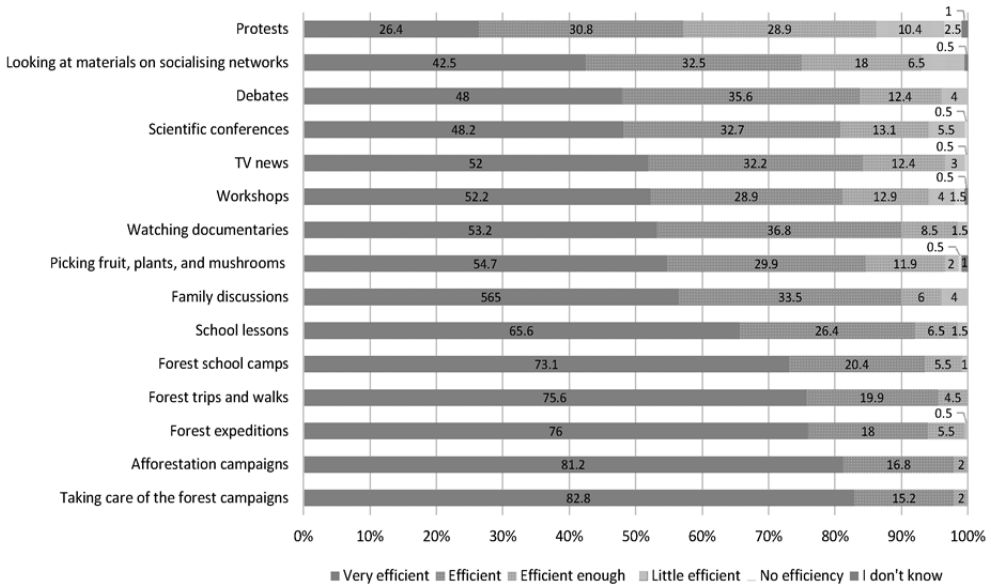

Fig. 2. Efficiency of certain activities on citizens' education for forest sustainable exploitation and protection

Over a half of the respondents considered TV news as very efficient for citizens' education for sustainable forest exploitation and protection. Rotariu and Iluţ (2006, p. 54) argued that mass media influenced people through what they offered, through the structure and contents of the broadcasts. Even if they did not influence people how to think, they certainly influenced them on what to think of.

We explained the fact that only 26.4% of the respondents perceived protests as very efficient for education either through non-participation or rarely participating at protests about irrational forest exploitation and forest

management, or because of their social representations formed through mass-media. Research showed that Romania, because of its communist history, is a democracy characterized by low levels of civic engagement in voluntary organizations (Bădescu et al., 2004). Nevertheless, NGOs' and citizens' protests had positive results in Romania as they managed stopping mining in Roșia Montană in 2013 (Dulamă & Magdaș, 2015) and shale gas extraction since 2014 (Devey et al., 2014), but they had low impact on stopping forest cutting in 2015 (Popescu, 2015).

Efficiency of certain activities on students' education. Respondents perceived as very efficient for students' forestry education the afforestation and taking care of the forests campaigns (thinning, cleaning) (see Figure 3), followed (in the same order as below), by activities organised in forests: expeditions, trips and walks, school camps, systematic observations, picking fruit, medicinal plants, and mushrooms, adventure parks, except campfires.

The fact that over 43% of the respondents considered that all activities organised in the forest environment are very efficient, having a high impact on forestry education, had the same explanation as in the case of adult citizens. Then, the fact that respondents perceived the afforestation campaigns (77.4%) and the taking care of the forests campaigns (74.3%) as very efficient for students' forestry education, these ones changing places in comparison with their perceived efficiency for citizens' forestry education, had the explanation that it was easier to get students involved into afforestation actions than into taking care of the forests activities.

They perceived forest systematic observation as very efficient and efficient (86.2% of the respondents) and this was due to respondents' didactic and research experience. To support this, we underlined that recent research showed that: "experiential education was the most commonly hypothesized explanation for a program's degree of success, followed by issue-based education, direct contact with nature, dosage, investigation, and empowerment." (Stern et al., 2014). The position of the adventure parks on the last place in the hierarchy of activities taking place in the forest is explained by the fact that these are less known and capitalised in Romania. In 2009, there were two adventure parks, and in 2014 over 15 (Dimitru, 2014). Almost a third of them had a negative perception of campfires that they perceived as inefficient or little efficient because the forest was destroyed, not protected.

In the hierarchy of the activities where we did not mention explicitly the forest environment as the place for organising the activity, they placed getting involved into projects on the first place, followed by teachers' actions, meetings with forest rangers, with NGOs representatives, documentaries, realising posters, and socialising networks (Facebook and others). In this activity hierarchy, school activities were on the 16th position. Respondents perceived protests as little and not at all efficient for their students' forestry education.

Starting also from their own experience, 91.6% of the respondents answered that getting students involved into projects was very efficient and efficient for forestry education, offering students the opportunity to identify forest related problems and their solutions. Also recent research associated projects with better outcomes for environmental education than other practices (Stern et al., 2014).

It was not surprising that respondents had positive perceptions about their own activity reflected by the 92.6% of them answering that teachers' actions were very efficient and efficient (the 6th place in the hierarchy of all those activities).

Over a half of the respondents considered the meetings with the forest rangers and with NGOs representatives as very efficient for forestry education. Recent research also supported this. For instance, Krasny et al. (2015) argued that one had to work more on creating measures of social capital that are also relevant to environmental education and that getting 10-18 years old students to participate in recreational, social, and stewardship activities was crucial because these created elements of social capital that enabled more collective action around common environmental goals.

Similarly to the case of adults' forestry education, almost half of the respondents perceived as very efficient watching documentaries and elaborating posters. Although young people in Romania spent plenty of time for activities on socialising networks (Facebook and others) (Dulamă & Magdaș, 2015), almost half of the respondents considered them very efficient for forestry education, probably because they were less concerned about forestry issues and had a rather passive, than active and pro-active attitude. In addition, recent studies (Kane et al., 2012) showed that Facebook was a good environment for meaningful activities such as ecological advocacy, green events dissemination, or eco branding, because users showed preferences for photo tagging, events invitations and causes support.

Taking into account that respondents considered that lessons were very efficient for citizens' forestry education and that more than half of them said that the school influenced very much their attitude towards forests, we were very surprised that only 44% of the respondents perceived lessons as very efficient for their students' education for forest sustainable exploitation and protection. This efficiency diminishing and placing them on the 16th position in the hierarchy of the very efficient activities might be probably explained through the fact that in the present curriculum the number of Geography lessons decreased to half as compared to the communist period (before 1989) and in the school curricula and text books, there were no longer any lessons focusing exclusively on forests.

Less respondents (a little over 30%) perceived research and writing scientific papers, scientific conferences, studying posters as very efficient activities, probably because those required the involvement of a small number of teachers and students.

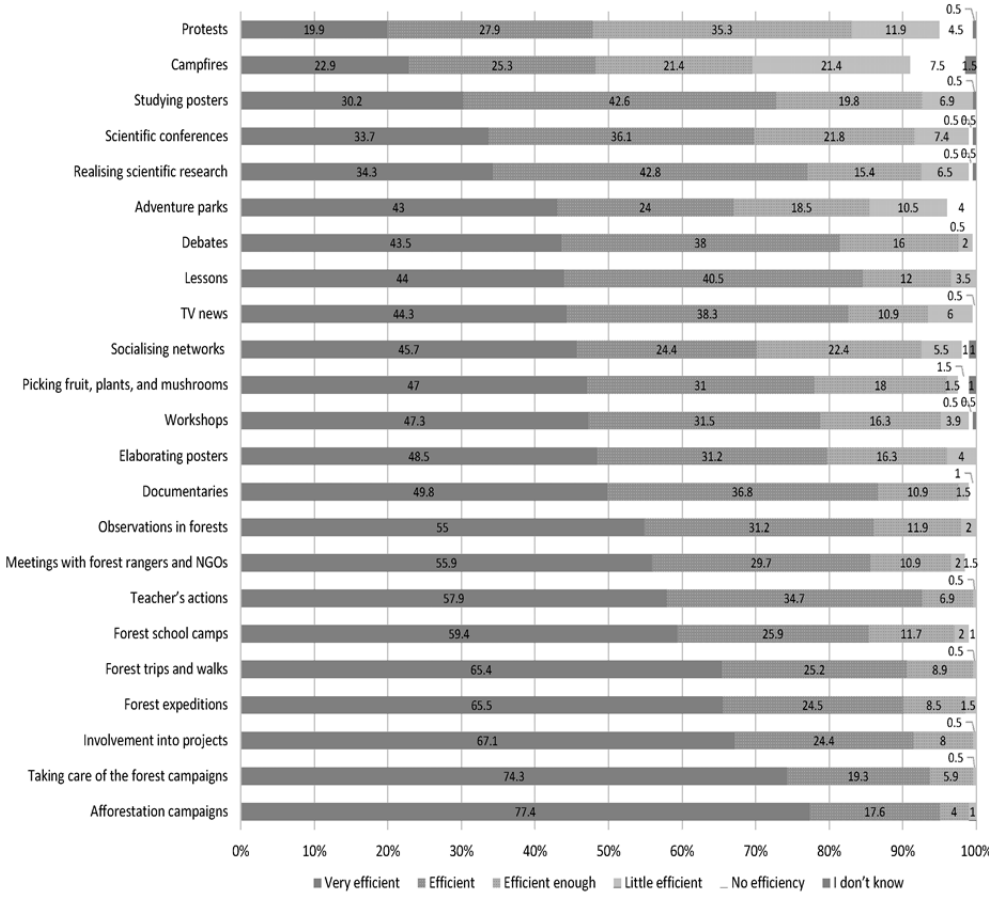

Fig. 3. Efficiency of certain activities for students' education for forest sustainable exploitation and protection

The use of certain components from Geography school text books. Respondents perceived that for the students' forestry education very useful were photos, maps, applications (exercises and problems) (see Figure 4). They perceived as little efficient the texts and assessment tests that the school text books proposed. The fact that the photos in these sources were on the first

place, 55.3% of the respondents considering them very useful was despite their small dimensions, number, low quality and contents, as they could not use them efficiently for learning. The number of photos in the school text books from Romania focusing on forests and the animals those hosted varied from one text book to another. For instance, about the forests and animals in the forests of Romania there were 1-9 photos for the 8th grade and for the 12th grade; about the forests of Europe there were 4 photos for the 6th grade; for other continents there were 2-8 photos for the 7th grade; for the forests of the Earth there were 5-14 photos for the 9th grade, 2-4 photos for the 10th grade and 2-3 photos for the 11th grade. Under such circumstances, it was obvious that teachers used photos from other sources during their activities. In the literature of the field, aerial images were often used for estimating forest attributes (Tuominen & Haakana, 2005), for improving discrimination between tree species (Tuominen & Haapanen, 2013), for forest estimates (Tuominen et al., 2014), and for identifying illegal logging areas (Vorovencii et al., 2013).

The fact that the maps in the school text books had the second place in this hierarchy, being considered as very efficient by 40.6% of the respondents, could be explained by the fact that maps were defined as basic cartographic tools needed for spatial representation (Medzini, 2012, p. 23). In addition, teachers needed a variety of maps in order to foster their students' critical thinking about these essential geographical tools (McCall, 2011, p. 135). Although maps were perceived in general as very useful for forestry education, in school text books there were no maps about forests and their capitalisation, except one world map with forest cutting (Popescu, 2004) and two maps about the wood processing industry in Romania (Neguţ et al., 2000). The distribution and typology of forests may be analysed indirectly on certain maps about the bio-geographical areas of the world (one in the 5th grade, and one in the 9th grade), about vegetation in Europe (one in the 6th grade, one in the 12th grade) and of the continents (one map for each continent in the 7th grade), about vegetation in Romania (one in the 8th grade and one in the 12th grade). In the text books for the 9th and 10th grades, there was a map with the bio-geographical areas or with the environmental types of the Earth, and in the 11th grade there was a map with the environmental types of the Earth and one map for each type of environment in Romania. Research encourages teachers to create opportunities for their students to analyse maps in a critical way and thus "become well-informed and civic-minded citizens" (McCall, 2011, p. 132).

Although the practical applications (exercises, problems) from school text books were on the third place in this hierarchy, being perceived as very useful by 40.1% of the respondents, there were no such applications about forests. The charts in the school text books were on the 4th place according to

their usefulness, being perceived as very useful by 29.4% of the respondents. We found forest related charts only in several text books: "Structure of the forests in Romania according to species", "Structure of the forests in Romania according to their social and economic functions" (Cheval et al., 2007, p. 29), and "Percentage of forested area of continents from the total area of forests on the Earth" (Mândruț, 2008, p. 72).

Almost a third of the respondents (28.1%) perceived the texts in school text books as not at all efficient and little efficient. That perception had several causes. Firstly, in school text books there were no lessons focusing entirely on forests and their protection, but only texts that included information on that topic. Secondly, the informative texts included many irrelevant, old, and poorly systemised information, and therefore reading them did not stimulate curiosity and generated low interest for learning.

17.4% of the respondents perceived the assessment tests in the school text books as little efficient and 8.7% of the respondents perceived them as not at all efficient. Those had as a cause the absence of forest related items and the fact that having knowledge about forests was no guarantee to forests sustainable development and their protection. In fact, studies showed that more years of education were strongly correlated with more knowledge about environmental issues, but that did not necessarily mean strong pro-environmental behaviour (Kollmuss & Agyeman, 2002).

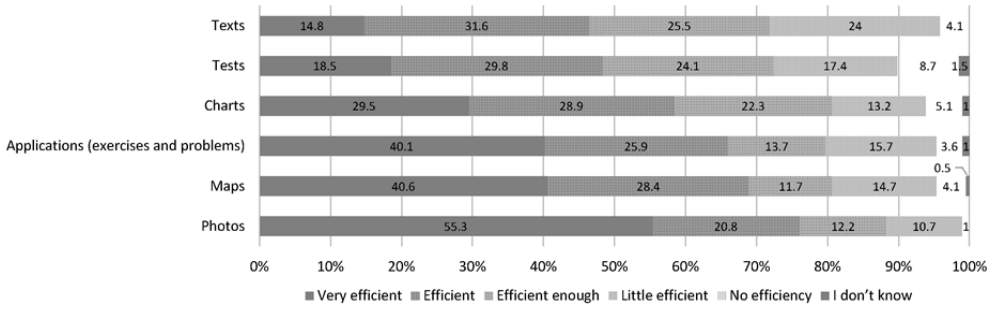

Fig. 4. Usefulness of certain components of Geography school textbooks for students' forest protection education

Forest issues in the official education documents. Most of the respondents (see Figure 5) considered that, in the official documents, in curricular auxiliaries and in the curricula for diverse contests and exams in the educational system, the approach of forest related issues and of their protection is weak and very weak. Almost a fifth of the respondents did not know which was the approach

quality of those topics in the curricula for diverse contests and exams in the education system (that teachers participated at). But one could explain this situation through the fact that respondents either had sat for those exams for a very long time or did not know the present curricula, or they had not read them because they did not have to sit for those exams yet. Nevertheless, it is important to underline that those who knew those curricula considered that the approach to the forest topic was rather weak and very weak than acceptable. We may understand these perceptions as justified because those curricula did not propose for study subjects about forests, but general topics.

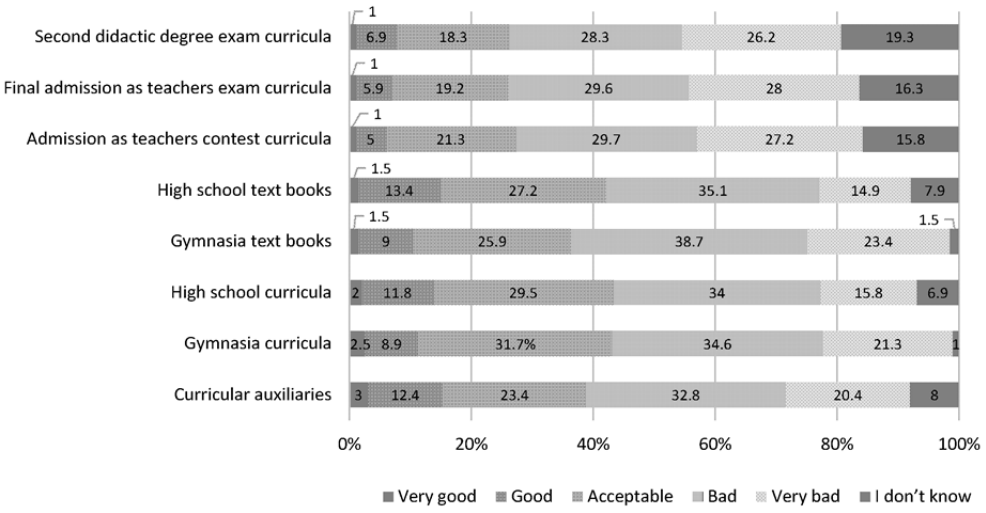

Fig. 5. Quality of approaches on subjects about forests in Romania and about their protection, in official documents

The curriculum for Geography for occupying didactic positions in the pre-university system of Romania (MECTS, 2010) and *the curriculum for the national exam for a definitive degree in the educational system* (MECŞ, 2015) included themes related to: Vegetation zones and levels; Bio-geographical regionalisation; Environmental types; Biodiversity protection and preservation; National parks. They paid little attention to the wood processing industry, and they included it besides other types of industries within this topic. They proposed practical exercises for vegetation mapping. In the reference list, for the definitive teaching degree, there was one book about forests (Rusu, 2012). *The curriculum for obtaining the second didactic degree* (MECT, 2008) proposed for Romania the following topics: "Bio-soil-climatic levels"; "Environmental

preservation and protection issues". Other topics were: "Research and mapping methods for vegetation associations", "Effects of pollutants on vegetation and animals", "Categories of reservations according to the IUCN classification: definition and features". In the reference list, they did not recommend any books about forests, only papers on the Physical Geography of Romania. As a positive feature for forestry education, we underlined the inclusion in the reference list of Law no. 5/2000 on protected areas, of Law 462/2001, on the state of natural protected areas and the EEC no. 92/43 – The Habitats Directive.

About a third of the respondents considered acceptable the approach of the Romanian forest related themes and their protection in the school curricula, in the gymnasium and high school Geography text books and in the curricular auxiliaries. Over 50% of them considered that approach as weak and very weak. Those perceptions were explained by the fact that this topic was integrated into other themes. For the gymnasium, in *the Geography school curriculum for the 5th-8th grades* (MECI, 2009) and in the text books for those grades, they did not include topics on forests and their protection, while these could be studied within the context of other general themes. For the 5th grade, the forests of the Earth could be studied according to the main curriculum at the themes "Biosphere preservation", "Vegetation and animals in the local community and its neighbourhood", "Natural resources", and in the larger curriculum also at the themes "Factors influencing the distribution of the fauna", "Geographical distribution of the fauna: the dry zone, the moderate zone and the polar zone". The texts on the "Bio-geographical zones" of Europe (the 6th grade) and of the other continents (the 7th grade), including cartographical materials and photos, occupied 1-3 pages for each continent. For the 8th grade, teachers could approach this subject during certain themes related to "Vegetation", "Wood industry", "Environmental features", and "Sustainable development elements".

In high school, in the 9th grade, students could study world forests during the themes on "Bio-soil-climatic zones", "Natural landscapes", "Types of natural environments", "Respect for natural and human diversity", "Preservation and protection of the living environment", "The environment of the local community" (MECT, 2004). For the first three themes, there were about 4-5 pages of informative text in the school text books. In the 10th grade, the forests of the Earth could be studied at the theme "Biosphere resources" (MECT, 2004), but this subject was either omitted in some text books or approached within half a page. In the 11th grade, some themes from the 9th grade were approached again, with certain changes of their titles: "Types of geographical environments", "Types of geographical landscapes", "Forest Cutting", "Environmental protection and preservation", "Environmental management", "Natural and agricultural resources. Impact of resource exploitation and capitalisation on the environment", and

"Resource management, economic development, and sustainable development" (MECT, 2006). In certain text books, there were small texts about forest cutting (Neguţ et al., 2006). In *the Geography school curriculum for the 12th grade* (MEC, 2006) and in the Geography text books for the respective grade, students could study forests comparatively and in succession, from Europe to Romania, for the themes: "The bio-soil-geographical cover" and "Environment and landscapes". In this curriculum, they mentioned as values and attitudes "the living environment preservation and protection".

3.2. Participating at forest related activities

Participating at discussions about forest related issues. The fact that most of our respondents (69.3%) participated at discussions about forest related issues more likely with teachers from other disciplines, than with their Geography colleagues, pointed out the high interdisciplinary degree of this subject (see Figure 6).

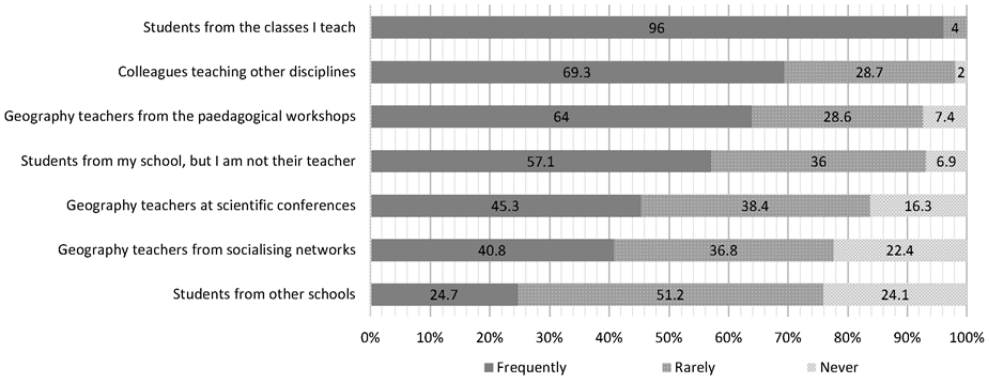

Fig. 6. Frequency of discussions about forest related issues with diverse interlocutors

Placing pedagogical meetings on the second place among the contexts in which Geography teachers discussed frequently about forests (64%), followed by scientific conferences (45.3%), was probably caused by the frequency of organising such activities, by their contents, by the low importance they offered to the forest subject during such meetings, by respondents not participating to conferences and by proactive professional relationships manifestation preferably within familiar environments. Taking into account the multitude of materials on the situation of forests in Romania within the socialising networks, respondents

showed a rather passive attitude towards this subject because, even though they studied and shared such materials, only 40.8% of them participated frequently at discussions, and 36.8% of them did that rarely. Very many respondents discussed frequently about forest related issues with their students, with students in their school, but whom they did not teach, and rarely with students in other schools. These very big differences correlated with the ones characterising the frequencies of activities because respondents had many opportunities to discuss about forests with their own students (96%), as compared to the students in their own school but whom they did not teach (57.1%) and with students from other schools (23.7%).

Teachers' getting their students involved into activities. Figure 7 showed teachers' preference in organising certain activities with their students. With insignificant variations, we noticed that respondents had similar answers to the questions concerning getting their students involved into extracurricular activities organised by other persons or groups and to the previous question when the actions were organised by themselves.

Almost two thirds of the teachers got their students involved mainly in the school environment (watching documentaries, debates and projects) and this is caused by the fact that those activities were easier to organise in the Romanian education system, as access to research and finances was easier in that context. Their preference for watching documentaries was correlated to the assertion that 80.6% of the teachers declared that their attitude towards forest protection had been very much and much influenced by the activities they participated at. In the schools from Romania, teachers and students participated frequently at local, regional, national, and international extracurricular projects, while many of those focused on environmental protection and environmental education (Deleanu, 2013).

69.5% of the respondent teachers organised frequently trips and walks in the woods with their students and that correlated to the fact that most of them participated during their childhood, adolescence and adulthood at such activities, and they argued that experiential learning influenced very much and much their behaviour towards forests.

56.2% of the teachers got their students involved into systematic forest observations that they organised themselves and 52.3% got them involved into the activities organized by others. These showed both the importance attached to such activities and the fact that they could organise them easily and with low costs.

Moreover, the fact that respondents got their students frequently involved in the afforestation activities they organised (53.3%) more than in the ones others organised (52.5) showed their proactive managerial behaviour manifested more frequently than the one of participating at afforestation actions (44.3%). Respondents indicated the same behaviour during actions of taking care of forests (cleaning, thinning).

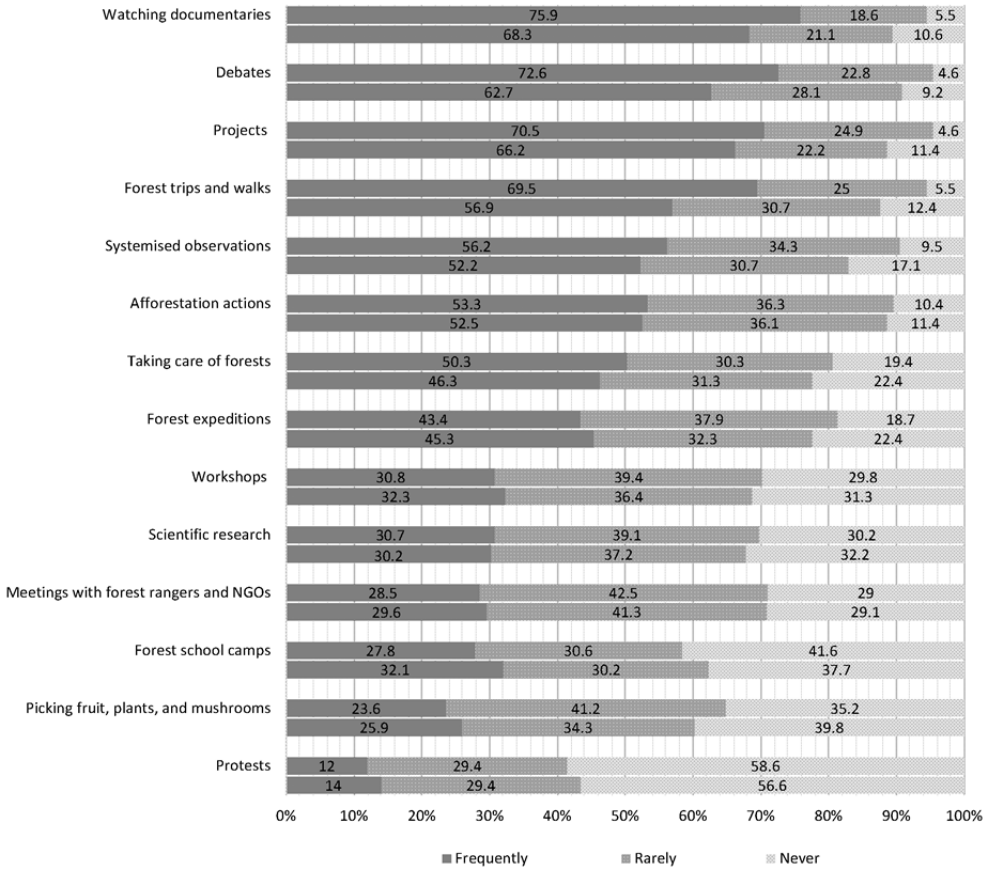

Fig. 7. Frequency of teachers' involving students into out of school activities, organised by themselves or by other persons and groups, in order to raise awareness related to the importance of forests and the necessity to protect them

The teachers' rarely getting their students' involved into their forest expeditions (43.4%), in comparison with the ones organised by the others (45.3), as well as getting their students involved into school forest activities showed the lower interest for such activities that required big organising effort and resources. The fact that a third of the respondents got their students frequently involved in scientific research on forests that they or other persons organised showed a small interest in these both from teachers and their students. Although workshops were easy to organise, the fact that less than a third of the respondents got their students involved into such activities could have as a cause the lack of such a tradition in Romanian schools.

Almost a third of the respondents got their students to participate at meetings with forest rangers and with NGO representatives and that was caused by the fact that the school curricula did not prioritise forest issues. In addition, respondents' low involvement of their students into activities of picking forest fruit, medicinal plants, and mushrooms, while 47% of these teachers considered them very efficient for forestry education and over 50% argued that such actions had influenced their behaviour towards forests, could be explained through the fact that in post-communist Romania we did not participate at such activities in a formal manner, mainly because the state did not impose them anymore.

We noticed the students' low involvement into the protests organised by their teachers for forestry protection. These activities were on the last place among teachers' own out of school activities, organised for raising awareness about the importance of forests and of the necessity to protect them, in which teachers (88.1%) rarely or never asked their students to join them. This attitude was correlated to the fact that teachers never or rarely participated to such protests themselves.

3.3. Forestry topics proposed for the official curriculum

Respondents proposed that students study the following topics on forests: the concept of forest (3.36%), features (species, biodiversity, structure) (8.65%), functions (44.76%), typology (2.4%), distribution (4.28%), evolution (4.28%), actual situation (3.36%), sustainable management (21.15%), forest clearances (causes, effects, prevention and control measures) (29.32%), afforestation actions (8.65%), legislation (14.94%), forest protection and conservation, including biodiversity (protection forms, protection ways; institutions, organisations, organisms) (33.65%), and ecologic education (3.36%). Even if certain topics were proposed only by a few respondents, taking into account the forestry literature, those were relevant and necessary in order to ensure quality forestry education and to change Romanian citizens' attitudes towards forests.

4. Conclusions

In citizens' education for forest protection in Romania, school and family had the highest impact, followed by TV, socialising networks, advertising, online publications, and NGOs. Small and no impact had the town halls, the scientific books, the Ministry of Environment, Waters and Forests, and the scientific journals. They perceived as the most efficient activities for students' and citizens' forestry education the ones which took place in forest (afforestation campaigns and those for taking care of the forests, expeditions, trips and walks, school camps, systematic observations, picking forest fruit, medicinal plants and mushrooms, adventure parks), except campfires. They perceived as the most efficient activities organised mainly outside the forest the following: participating at projects, teachers' actions, meetings with forest rangers and NGO representatives, documentaries, elaborating posters, and the socialising networks.

The Romanian Geography teachers participated frequently at forestry education actions and most of them answered that they discussed much about forests both with other teachers, in diverse contexts, and with the students in their school. Similarly, most of them asserted that they frequently got their students involved into activities that they themselves organised or in those organised by other persons in human made environments (watching documentaries, debates, projects) and in forestry environments (trips and walks, systematic observations in the forest, planting trees, taking care of the forest).

Respondents pointed out that the approach of forest topics and of forest protection was very weak in official documents, in curricular auxiliaries, in the curricula for diverse contests and exams in the education system. Therefore, they considered that those needed revision and improvement. Analysing the usefulness of school text books for students' forestry education, they considered the following as very useful: photos, maps, and practical applications. They perceived as less efficient the texts and assessment tests. The fact that teachers recommended the inclusion in the official curriculum of relevant topics for forestry education underlined they were well informed about forest issues.

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