

Forests and forestry in the current kindergarten and primary school core curriculum in Poland

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Abstract. The aim of this work was to present topics related to forest and forestry in the current core curriculum of pre-school and general primary school education in Poland. For this analysis, teaching content related to forests and forestry was selected from the first three annexes of the Regulation (2017). This content is intended for children starting from the kindergarten age all the way to 8th grade as well as pupils with intellectual disabilities.

In the current core curriculum, there are more topics devoted to forests and forestry than in previous analogous documents. This applies in particular to themes related to forest management, sustainable development and forest functions. Nevertheless, many topics related to biology and forest ecology remained in the curriculum, while little of the teaching content is related to threats and protection of the forest, hunting or harvesting of wood. In recent years, these have been issues that caused a number of social conflicts and controversies. Therefore, the content of forest education, which is not included in the core curriculum, should be thoroughly discussed in particular in non-formal education, because students most often have not previously been exposed to these issues.

The broadened scope of themes related to forests and forestry in the current core curriculum for kindergartens and primary schools is the result of good cooperation between the State Forests and the Ministry of National Education. It would be worthwhile to continue this cooperation to implement coming changes of the above-mentioned document, supplementing the missing content as well as possible.

Keywords: Formal education, forest education, education of various age groups

1. Introduction

According to Grzywacz (2000), forest education is a prerequisite for society's acceptance of all the development activities occurring in forest management, as well as to change the mentality of people and their attitude towards nature in forests and the possibilities of its utilization. The international forum drew attention to this issue in the Witerbska Declaration adopted in 1990, devoted to the forestry education of society, as well as professional forestry education. Not much later – in 1994 – similar theses were found in the Polish policy of comprehensive forest resource protection (Grzywacz 2000), and their relevance is discernible to this day, as evidenced, for example, by the topic of this year's (2018) Winter Forestry School organized at the Forest Research Institute: 'Contemporary Problems of Social Communication and Education in Forestry' (www.zsl.ibles.pl).

Knowledge about forests and forestry can be communicated to the public within the framework of formal education (school) and non-informal (out-of-school) (among others: Polityka 1997, Grzywacz 2000, Strategy 2001). The aim of this study is to present the content on forests and forestry included in the current core curriculum for pre-schools and primary schools that is implemented in formal education. Knowledge of the scope of this content presented in pre-school and individual grades of primary school can be helpful to employees of the State Forests National Forest Holding (hereinafter: State Forests), as well as for employees of forested national parks and landscape parks, in conducting forest education, as these are the age groups representing the most numerous recipients of their education among school children (Chrzanowski 2017). Such knowledge allows one to refer to concepts, facts and skills known to pupils so that classes can take place smoothly. On

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the other hand, it also provides educators with an awareness of the content that the pupils have not yet learned in school and requires deepening or better explanation.

2. Methods

The article is based on the current Regulation of the Minister of National Education of February 14, 2017 on the core curriculum of pre-school education and the core curriculum of general education for primary school, including pupils with moderate or severe intellectual disabilities, general education for the stage I sectoral school, general education for the special education school for work preparation, and general education for post-secondary school (Regulation 2017).

The first three annexes (235 pages of text) of the cited regulation are considered:

1) Annex 1: core curriculum of pre-school education in pre-schools, pre-school units in primary schools and other forms of pre-school education,

2) Annex 2: core curriculum of general education in primary school,

3) Annex 3: core curriculum of general education for pupils with moderate to severe intellectual disabilities in primary schools.

The teaching content relating to forests and forestry – directly or indirectly, comprehensively or partially – was selected from each of the three annexes. The content was divided into the following age groups: pre-school, grades 1–3, grade 4, grade 5, grade 6, grade 7, grade 8 and pupils with intellectual disabilities. The collected information was discussed on the basis of available literature referring to education about forests and forestry conducted by foresters from the State Forests.

3. Results

3.1. Pre-school

At the pre-school stage of education, educational and developmental content is foreseen in two areas of child development: emotional and cognitive, which foresters can refer to when conducting forestry education (Regulation 2017 – Annex 1).

The content on the emotional development of pre-school pupils seeks, among others, to have the child perceive that animals are able to feel and that they should be treated with kindness and care. A second skill to instil in children is for them to perceive the emotional value of the natural environment ('emotional value' is however not defined in any way) and to derive aesthetic satisfaction from it.

In the area of the pupil's cognitive development, among others, the following content is anticipated:

- natural phenomena, for example, rainbow, rain, storm, leaves falling from trees, seasonal bird migration, trees blooming, water freezing,
- the lives of animals, plants, people in the natural environment,
- use of natural resources, for example, mushrooms, fruits, herbs,
- the professions performed by parents and persons from their closest environment (what does a person who performs a given profession do) – one of these could be the profession of forester (author's comment).

3.2. Grades 1–3

At the outset, it is worth noting that among the general assumptions of education and child development in primary schools (both as part of the first and second stages of education) is shaping the pupil's attitude to respect the natural environment, including disseminating knowledge about the principles of sustainable development, motivating pupils to undertake activities to protect the environment and developing an interest in ecology.

Integrated education is implemented in the first stage of education (early childhood education) (Regulation 2017 - Annex 2). Forest and forestry related content can be discussed in the following areas:

- location and natural conditions of the area, including forms of terrain, natural elements,
- reading simple plans and maps,
- popular (present in the surroundings) plant and animal species, including protected species,
- features of ecosystems, such as: meadow, lake, river, forest, commercial forest,
- ecosystem components and the functions of a selected example, for example, forest, forest layers, glades, peat bogs, dead tree in the forest,
- the principles of caring for animals,
- nature conservation, including locally protected areas and objects (national parks, landscape parks, natural monuments),
- characteristics of selected occupations and professions of people known from the place of residence and public service professions: profession of a forester,
- threats from the natural environment, for example, hurricane, thunderstorm, drought, their consequences, and ways of behaving in such situations,
- waste segregation (author's note: although it is not a topic strictly related to forests and forestry, it is often addressed by foresters as part of their activities).

3.3. Grade 4

The subject of 'nature' is taught only in the fourth grade (Regulation 2017 – Annex 2). It is designed to bring the surroundings of the school and place of residence closer to the student.

Forest and forestry related content can be discussed in the following areas:

- equipment used to explore nature,
- use of plans and maps,
- weather phenomena, their consequences and the principles of behaving safely in case of dangerous phenomena,
- poisonous plants, animals posing dangers to humans (including venomous ones),
- components of animate and inanimate nature in the area,
- factors determining life on land and the adaptations of organisms to life,
- common organisms occurring in the vicinity, including in the forest,
- forest layers (differentiation of abiotic conditions and the occurrence of particular plant and animal species),
- rules of proper behaviour in the forest,
- autotrophic and heterotrophic organisms,
- common edible and poisonous fungi, the importance of fungi in nature and human life,
- places with protected areas, natural monuments in the nearest vicinity (the need to protect them),
- the beauty of the landscape and the natural heritage of the ‘local homeland’ (shaping a sense of responsibility for the state of the environment, the need to take action, sensitivity to the beauty of nature).

Individual topics relating to the forest and forestry are also discussed within the framework of the ‘applied technical skills’ subject, conducted in grades 4–6, but the core curriculum does not specify which issues should be discussed in which class (Regulation 2017 – Annex 2):

- wood and wood-based materials (characteristics, properties, maintenance methods, rational management),
- tools for machining materials (including wood and wood derivatives).

In addition, one of the aims of teaching the subject ‘applied technical skills’ is for the student to assume a pro-ecological attitude (including responsibility for the state of the environment, waste segregation, eco-technologies).

As part of the subject ‘ethics’ conducted in grades 4–8 (Regulation 2017 – Annex 2), the relationship between humans and nature is considered (recognizing its value, the need for protection, proper use and activities for the benefit of nature), but the curriculum does not state in which specific class this is to occur.

3.4. Grade 5

In classes 5–8, two main subjects are taught that can include content relating to forests and forestry: ‘geography’ and ‘biology’ (Regulation 2017 – Annex 2).

Geography integrates knowledge about the natural environment with socio-economic and humanities knowledge. Therefore – in accordance with the assumptions of the core

curriculum – it should contribute to understanding the sense and conditions of implementing the principle of sustainable development, including by learning about examples of rational management, assessing the inhabited environment and shaping a sense of responsibility for creating order and beauty where one lives (Regulation 2017 – Annex 2).

Content relating to forests and forestry proposed for discussion in grade 5 (as suggested in the cited regulation) includes:

- using a map,
- the main Polish landscapes, positive and negative changes in the landscape as a result of human activity,
- natural heritage of Poland, the region and the ‘local homeland’ (attitude of respect towards the natural environment and beauty of the landscape, responsibility for the state of the environment),
- own proposals of actions to maintain valuable elements of the local landscape and the environment.

The second subject – biology – aims to develop students’ willingness to explore the world, to develop a proper attitude towards nature and the environment (Regulation 2017 – Annex 2).

Content relating to forests and forestry (division of the material into individual classes in accordance with the suggestion in the cited regulation) includes:

- photosynthesis,
- classification and differentiation of organisms, organisms from the closest environment (using a key to identify them),
- plant tissues,
- characteristics and significance of mosses, ferns, club mosses, horsetails as well as gymnosperms and angiosperms,
- fungi – the environment in which they live, importance to nature and humans.

As previously mentioned, individual issues relating to the forest and forestry are also discussed within the framework of the subject of ‘applied technical skills’, conducted in grades 4–6 (Regulation 2017 – Annex 2):

- wood and wood-based materials (characteristics, properties, maintenance methods, rational management),
- tools for machining materials.

One of the aims of the applied technical skills classes is for pupil to assume a pro-ecological attitude (including responsibility for the state of the environment, waste segregation, eco-technologies).

As part of the subject ‘ethics’ conducted in grades 4–8 (Regulation 2017 – Annex 2), the relationship between humans and nature is considered (recognizing its value, the need for protection, proper use and activities for the benefit of nature), but the curriculum does not state in which specific class this is to occur.

3.5. Grade 6

Content relating to forests and forestry, proposed to be covered in grade 6 as part of the subject ‘geography’ (as suggested in the cited Regulation 2017 – Annex 2):

- using a map,
- the Earth's movements and their consequences for nature.

Content relating to forests and forestry, proposed for discussion in grade 6 as part of the subject 'biology' (as suggested in the cited Regulation 2017 – Annex 2):

- characteristics and importance of particular taxonomic groups of animals, their importance in nature and to human beings,
- examples of human activities affecting animal diversity.

As previously mentioned, individual issues relating to the forest and forestry are also discussed within the framework of the subject of 'applied technical skills', conducted in grades 4–6 (Regulation 2017 – Annex 2):

- wood and wood-based materials (characteristics, properties, maintenance methods, rational management),
- tools for machining materials.

In addition, one of the goals of teaching the subject 'applied technical skills' is to have the pupil adopt a pro-ecological attitude (including responsibility for the state of the environment, waste segregation, eco-technologies).

As part of the subject 'ethics' conducted in grades 4–8 (Regulation 2017 – Annex 2), the relationship between humans and nature is considered (recognizing its value, the need for protection, proper use and activities for the benefit of nature), but the curriculum does not state in which specific class this is to occur.

3.6. Grade 7

Content relating to forests and forestry, proposed to be covered in grade 7 as part of the subject 'geography' (as suggested in the cited Regulation 2017 – Annex 2):

- using a map,
- natural environment of the region, 'local homeland',
- relationships between the elements of the geographical environment in the region,
- natural heritage of Poland, the region and 'local homeland' (attitude of respect towards the natural environment and beauty of the landscape, responsibility for the state of the environment),
- selected soils in Poland (cambisols, podsols, chernozems, alluvial soils and rendzinas),
- types and distribution of forests in Poland,
- forms of nature conservation in Poland (including knowledge about the surrounding nature reserves, landscape parks and natural monuments),
- the importance of individual sectors of the economy in the development of the country,
- features of the regional economy,
- natural and non-natural conditions favouring or limiting the production of energy from non-renewable and renewable sources,
- assets of Polish tourism, including, among others, the Baltic coast, the area where pupils live,
- own propositions of actions aimed at maintaining the assets of the local landscape and the environment.

In grade 7, there is no content relating to forests and forestry foreseen in the subject 'biology' (Regulation 2017 – Annex 2).

Individual issues relating to forests and forestry are also discussed in other subjects (Regulation 2017 – Annex 2):

- chemistry (grades 7 and 8 – with no indication of which specific class) – the oxygen and carbon cycle in nature; the effects of air pollution; pH scale,
- ethics (grades 4–8 – with no indication of which specific class) – the relationship between humans and nature (recognizing its value, the need for protection, proper use and activities for the benefit of nature).

3.7. Grade 8

Content relating to forests and forestry, proposed for discussion in grade 8 as part of the subject 'geography' (as suggested in the cited Regulation 2017 – Annex 2):

- using a map.

Content relating to forests and forestry, proposed to be covered in grade 8 as part of the subject 'biology' (as suggested in the cited Regulation 2017 – Annex 2):

- the connections between living and non-living elements of the ecosystem, the trophic structure, food chains,
- characteristics of a population,
- antagonistic and non-antagonistic interactions (e.g., symbiosis),
- lichen scale,
- renewable and non-renewable energy sources, rational economy,
- threats to and protection of biodiversity, including forms of nature conservation.

Individual issues relating to forests and forestry are also discussed in other subjects (Regulation 2017 – Annex 2):

- chemistry (grades 7 and 8 – with no indication of which specific class) – the oxygen and carbon cycle in nature; the effects of air pollution; pH scale,
- social studies (grade 8) - main sources of revenue in the township budget (one of them is the forest tax (Act of 2002 – art. 6.5.3)),
- safety education (grade 8) – environmental threats (including in forests) and rules of conduct in case of their occurrence (including emergency telephone numbers); one's own contribution to nature protection to improve one's own and society's health,
- ethics (grades 4–8 – with no indication of which specific class) – the relationship between humans and nature (recognizing its value, the need for protection, proper use and activities for the benefit of nature).

3.8. Pupils with intellectual disabilities

The core curriculum of general education in primary schools for pupils with moderate to severe intellectual disabilities (Regulation 2017 – Annex 3) does not foresee subjects

as defined in the previous subsections, nor does it divide recommended topics by the age groups of the pupils. In addition to revalidation classes, educational activities are conducted in the following thematic areas: personal and social functioning, development of communication, development of creativity, physical education and ethics. However, the detailed requirements for the teaching content set forth in the later sections of the regulation are not categorized by the listed thematic areas.

Content relating to forests and forestry may be included within the following thematic areas (the following categorization of the content is partly based on the description of the types of classes enumerated in the cited regulation, and partly from the author's interpretation of the regulation's article):

- personal and social functioning: recognizing the seasons and accompanying phenomena, exploring the world of plants (including their significance, cultivation and gardening work), exploring the animal world, promoting pro-ecological behaviours,
- activities developing creativity: woodworking, growing plants,
- ethics: shaping a positive attitude towards the natural environment.

The school is charged with providing the conditions for learning about the natural environment, arousing interest in and respect for nature in the immediate vicinity, and promoting behaviours that enable a life in harmony with nature (Regulation 2017 – Annex 3).

4. Discussion

As mentioned in the introduction, knowledge about the forest and forestry conveyed in pre-schools and primary schools (formal education) can facilitate non-formal education about forests and forestry provided by the employees of State Forests, national parks, landscape parks, as well as all the environmental education centres or non-governmental organizations. One can refer to the content already known by pupils, but also, for example, better match the program and content of non-formal education to the age, level of knowledge and perceptual abilities of the recipients of such education. One of the errors of non-formal education is the fact that it is too 'ambitious' in this respect (Grzywacz 2010 in: Grzywacz 2011).

Focusing solely on State Forests employees, it should be noted that forest education is included in the activities of all its units, and the framework of this education (including content) as well as the requirement to develop forestry education programs in the forest districts, is included in Regulation No. 57 of 2003 of the Director General of State Forests (Regulation 2003).

The content of forest education implemented by State Forests employees covers five basic issues: the construction and functioning of forest ecosystems; the importance of the forest: environmental, production and social [functions]; threats to and protection of forests; nature conservation; tasks of foresters and forestry (Regulation 2003 – Annex 2).

The current core curriculum refers to this as follows, recommending the following content for individual age groups (a list with slightly simplified content in relation to the results, question marks are given in the absence of information in the core curriculum of the grade to which a given topic applies):

1) the construction and functioning of forest ecosystems: movements of the Earth and their consequences for nature (grade 6), natural phenomena, including seasonal ones (pre-school, students with disabilities) and the weather (grade 4), natural conditions in the area (grades 1, 3, 7), relationships between elements of the geographical environment in the region (grade 7), selected soils (grade 7), pH scale (grades 7 and 8), types of forests in Poland (grade 7), classification and differentiation of organisms (grade 5 – plants, 6 – animals), plant tissues (grade 5), popular plant and animal species (grade 1–3, 4, 5, students with disabilities), common edible and poisonous mushrooms (grade 4), the importance of fungi in nature (grade 4, 5), species posing dangers to humans (grade 4), adaptation of organisms to life (grade 4), photosynthesis (grade 5), autotrophic and heterotrophic organisms (grade 4), trophic structure, food chains (grade 8), elements of animate and inanimate nature (grade 4) and their connections (grade 8), features of the forest ecosystem (Classes 1–3), components of the ecosystem, for example, forest layers, dead wood, glades, peat bogs (Classes 1–3, 4), population characteristics (grade 8), antagonistic and non-antagonistic interactions (grade 8),

2) the ecological, production and social importance of forests: Poland's landscapes (grade 5), functions of the forest ecosystem (grades 1–3), the oxygen and carbon cycle in nature (grades 7 and 8), the life of animals and plants (pre-school), factors determining life on land (grade 4), the importance of plants from various taxonomic groups (grade 5, students with disabilities), the importance of animals from various taxonomic groups (grade 6), natural heritage, value of nature (grades 4, 5, 6, 7, 8), using forest resources (pre-school), wood and wood-based materials (grades 4, 5, 6), the importance of fungi to human life (grade 4, 5), aesthetic values of the forest, of nature (pre-school, grades 4, 5, 7), value to tourism (grade 7),

3) threats to and the protection of forests: consequences of natural threats, for example, hurricanes, droughts (grades 1–3, 4, 8), lichen scale (grade 8), segregation of waste (grades 1–3, 4), rules of behaviour in the forest (grade 4), rules of the proper use of the forest (grades 4, 5, 6, 7, 8), the effects of air pollution (grades 7, 8),

4) nature conservation: protected species of plants and animals (grades 1–3, 7, 8), (locally) protected areas and objects (grades 1–3, 4, 7, 8), empathy towards animals, caring for them (pre-school, grades 1–3), the need to protect nature, including undertaking one's own activities in this area (grades 4, 5, 6, 7, 8, disabled students), shaping responsibility for nature, respecting nature (grades 4, 5, 7, pupils with disabilities), examples of human activities affecting animal diversity (grade 6), threats to biodiversity (grade 8),

5) tasks of foresters and forestry: profession of a forester (pre-school, grades 1–3), use of plans and maps (grades 1–3, 4, 5, 6, 7, 8), use of equipment for exploring nature (grade 4), tools for machining materials (including wood and wood derivatives) (grades 4, 5, 6), woodworking (grades 4, 5, 6, pupils with disabilities), positive and negative changes in the landscape resulting from human activity (grade 5), distribution of forests in Poland (grade 7), importance of individual sectors of the economy to the country's development (grade 7), features of the economy in the region (grade 7), conditions conducive to or limiting the production of energy from renewable sources (grades 7, 8), rational economy (grade 8), main sources of revenue in the township budget (grade 8).

It should be noted that the content contained in the cited core curriculum (Regulation 2017) is the minimum scope of information that should be relayed to students. Each teacher may expand on these issues provided that the required content is covered (Mrowińska 2018). The above division of the program content into the thematic areas of forest education is subjective (author). Some content can in fact be attributed to several topics, for example, 'examples of human activities affecting animal diversity' – could be included not only in the 'nature conservation' topic, but also in the 'tasks of foresters and forestry' and 'threats to and the protection of forests'. Nevertheless, it can be noted that some branches of forest education are more strongly reflected in the current core curriculum than others. This mainly concerns topics on nature relating to the construction and functioning of the forest ecosystem, and to a lesser extent, topics on the importance of the forest, forestry and forestry tasks, and nature conservation. The least represented content was about the threats to and protection of forests. It is worth noting that in earlier core curricula (Regulation 2014, 2016), problems such as poaching, littering the forest, excessive noise (Grades 1–3) were present, whereas in the current ones, they are not directly mentioned, and are at most included as part of the general issues covered by 'rules of behaviour in the forest' or 'rules of the proper use of the forest'. These are important problems from the point of view of the quality of the forest's functioning. The costs of cleaning up and removing rubbish from forests are considerable. The State Forests spent PLN 17–18 million a year for this purpose in 2015–2016 (Leśnictwo 2017). The current core curriculum also does not directly address content relating to biotic threats to forests and the need to limit them. Meanwhile, in recent years, this has become one of the most important topics evoking social conflicts that relates to the work of foresters. Another, conflict-generating topic – also not directly reflected in the previous and current core curriculum – is hunting, one of the objectives of which is to reduce threats to the forest. On the other hand, many issues in the topic of 'nature conservation' can also be covered in the forest education area of 'threats to and the protection of forests', since forests are a component of nature (Grzywacz and Referowska-Chodak 2017). It is worth emphasizing the importance of the content on the pro-

tection of ecosystems, because this is listed as one of the most important, common civilizational values of Europe (Grzywacz 2000). Given the situation where the above-mentioned issues (together with the issue of harvesting wood cited below) are neither directly nor indirectly included in the current core curriculum of formal education, special emphasis should be placed on non-formal education. This then becomes the only source of reliable knowledge on these topics. Eventually, supplementing the core curriculum with these issues in the future would require that they be adapted to the age level of the children being taught and the subjects in which they would be covered. The following solutions can be proposed:

- harvesting wood: pre-school – as part of discussing the profession of a forester, gifts of the forest – where do paper, pencils or furniture come from; grades 1–3 – as part of discussing the profession of a forester; grades 4–6 – in the topics of wood and its processing of the subject 'applied technical skills'; grade 7 – in the topic 'the importance of particular sectors of the economy in the development of the country' of the subject 'geography'; grade 8 – in the topic 'renewable and non-renewable energy, rational economy' of the subject 'biology' (discussion of the importance of forests in human life is proposed by Czołnik and Mrowińska (2007) in grades 1–3, the economic functions of the forest and wood as a human-friendly product in grades 4–6, and the concept of sustainable development in forestry (an element of which is wood harvesting) – in lower secondary school, or grades 7 and 8 in the current core curriculum. However, it seems that it is worth introducing this subject already in pre-school, as indicated above);

- threats to the forest from littering, noise: pre-school – to be supplemented according to the suggestion of Czołnik and Mrowińska (2007) in presenting the rules of behaviour in the forest; grades 1–3 – as part of 'shaping attitudes of respect for the natural environment', rather in grade 1 or 2, because in grade 4, this topic can be developed under the 'rules of behaviour in the forest' of the subject 'nature', and repeated in grade 8 in the topic 'proper use of nature' of the subject 'ethics';

- hunting and poaching: grade 6 – within the topics on 'the importance of animals for humans' and 'examples of human activities affecting animal diversity' of the subject 'biology', and repeated in grade 8 in the topic of 'the proper use of nature' of the subject 'ethics' (the topic of hunting is proposed by Czołnik and Mrowińska (2007) in grades 4–6, but it seems that the older age group (grade 6) is better able to understand and consider this topic; additionally, it is compatible with issues presented in biology);

- biotic threats and overcoming them: grade 7 – in the topic 'natural and non-natural conditions conducive to or limiting the production of energy from non-renewable and renewable sources' of the subject 'geography' (the issue of harmful insects and methods of combating them is proposed by Czołnik and Mrowińska (2007) in grades 4–6, but in the case of the discussed core curriculum, it would be better to

add/expand on this topic in grade 7).

It should be noted that compared to the previous core curricula (Chrzanowski 2007; Grzywacz 2011; Regulation 2014, 2016), the scope of information provided to pupils about forests has been expanded, especially in relation to topics on forest management (economic topics are mainly addressed in grades 7–8, although without any direct indications, for example, about the topic of harvesting timber), sustainable development and the functions of the forest. This is the result of cooperation with the State Forests administration in developing the current core curriculum (Mrowińska 2018a, 2018b). This then fulfils the postulate already contained in the state forestry policy of 1997, which states the need to introduce ‘necessary information about forests as useful natural and economic systems fulfilling numerous and important social functions and participating in the economic development of the country’ (Polityka 1997 – point IV.8.a). The proposal to better correlate formal and non-formal forest education curricula was stated again in 2011 (Grzywacz 2011), but this has been achieved more fully only in the core curriculum of 2017. However, it should be clearly stated here that children’s knowledge about the forest and forestry acquired in formal education is worth checking and correcting in the non-formal education conducted by foresters, because the information in school textbooks is very often not correct or up-to-date. (Mrowińska and Mrowiński 2003; Czołnik and Roźmiarek 2012; Grzywacz et al. 2016) or are not remembered well (Referowska-Chodak 2017). It is also believed that the main responsibility for conveying knowledge about the principles of forest management, the tasks and problems of forestry, and the specific characteristics of the forester’s profession should rest, in spite of everything, with foresters (Mrowińska and Mrowiński 2003, 2007) as specialists and practitioners in these fields. Especially valuable (in terms of effectiveness) in this case is education conducted in the field, but this may be difficult to implement due to, among others, travel costs for groups to classes, the irregularity of conducting classes in a forest (these are usually one-time activities for a given group of children), foresters’ difficulty in serving all interested groups (especially in large cities) or teachers’ difficulty in taking the time for a field trip, especially in the second stage of education (Referowska-Chodak 2013).

As can be seen from the results, knowledge about the forest and forestry in the current core curriculum is included in the various subjects that are taught. Ilona Mrowińska, a forest education practitioner, draws attention to the possibility of expanding the spectrum of teachers who have worked with foresters so far – apart from pre-school, biology and nature teachers, they could also include geography and applied technical skills teachers (Mrowińska 2018a, 2018b), possibly also those teaching ethics, social studies or safety education. Good, substantive and methodological cooperation between foresters and teachers results in a form of ‘integrated’ education – an intermediate model of education between formal and non-formal education

(Grzywacz 2000; Będkowska 2013), and also enables an integrated approach to education (Kapuściński 2003). Cooperation between foresters and teachers is also proposed at the stage of developing forest education programs for society in the forest districts (Chrzanowski 2003).

To enrich the activities conducted by foresters and make them more interesting to a wider audience than just nature enthusiasts, it is worth conducting interdisciplinary activities, combining various school subjects and content (e.g., mathematics, Polish language, art, music, history, etc.). This is recommended by Antczak (2003) in the context of the educational path, and by Czołnik (2007) in the context of being able to conduct several days of classes, for example, during ‘green’ schools. This is indirectly encouraged by the current core curriculum, especially in grades 1–3. At this stage of education (Regulation 2017 – Annex 2), classes in writing require pupils to compose several sentences to describe elements found in the world of nature, whereas in understanding geometric concepts, to note the symmetry found in the natural environment. In using mathematics in everyday situations, pupils are to note the rhythms in the natural environment, while in the life functions of humans, health and safety protection and resting – knowledge of emergency telephone numbers, and in playing musical instruments – experiments using sticks, grass and other natural materials. In turn, the assumptions contained in the cited regulation (Regulation 2017 – Annex 2) for the second stage of education state that art (classes 4–7) is to arouse sensitivity to the beauty of nature. But in addition to art, almost any other subject provides the opportunity to use its selected content in forest education.

5. Conclusions

1) The current core curriculum for pre-school and primary school includes more issues devoted to forests and forestry than the previous analogous documents. This particularly applies to the topics relating to forest management, sustainable development and the functions of the forest. Information provided to students in formal education should, however, be verified by foresters in the framework of non-formal education, which is indicated by the previous experience and research (the presence of errors, outdated data, or the incorrect interpretation of the issues being discussed).

2) Many issues are still covered relating to biology and forest ecology. They are mainly presented in the following subjects: pre-school child development, early school education, biology and nature, and to a lesser extent in geography.

3) There are still too few (and in some cases none at all) issues covered in the core curriculum on the threats to and protection of the forest, hunting, and harvesting wood. Meanwhile, these have been the subject of a series of social conflicts and controversies in recent years. On the other hand, there is fear about the quality (correctness) of how these topics will eventually be presented in formal education.

4) The content of forest education (Mrowińska and Mrowiński 2007) that is not included in the core curriculum should be particularly thoroughly discussed in non-formal education, because pupils most often have not been exposed to these issues.

5) The increased scope of issues relating to forests and forestry in the current core curriculum for pre-school and primary school is the result of cooperation between the State Forests and the Ministry of National Education. It is worth continuing this mutual cooperation the next time changes are to be introduced to the core curriculum to supplement the missing content as much as possible.

Conflict of interest

The author declares no potential conflicts of interest.

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