



Use of school gardens in elementary schools in Slovenia

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Abstract

Status of school gardens in Slovenia was studied using a questionnaire composed of 62 items. A total of 267 elementary schools completed the questionnaire, resulting in a 63% response rate. Of schools 79% had a school garden. The schools used their gardens in afterschool programs (77%), extracurricular activities (71%) and academic instructions (52%). According to our research, the most common types were produce garden (49%) and ornamental garden (47%), whereas 21% of schools used their garden for natural science education. Almost all schools (93%) had plants in school buildings. Additionally, our study determined the barriers which prevent schools to use their gardens more successfully. The results of this study will serve as a basis to design a contemporary school garden which will enable experiential learning in the framework of science and environmental education.

Key words: School gardens, elementary schools, evaluation, education, Slovenia.

Introduction

The term »school garden« can be understood in its basic and its broader definition. In the basic definition it is land intended for growing vegetables, fruit, field produce, ornamental garden beds or other types of plantation. Its broader definition, however, includes all other school plots of land as well, e.g. parks, grassland, forest and sports surfaces. Graham *et al.*¹ defined garden as plants grown in the ground, in raised beds, in pots or in greenhouses in both classroom and outdoors.

The development of Middle European school gardens occurred in the middle of the 19th century. In 1869 in Prussia, school gardens became a law in compulsory schools². Almost simultaneously, the first school gardens were introduced in Slovenia as well. As early as in 1842, Slovenian bishop Slomšek encouraged planting of orchards in the vicinity of schools, designed manuals for garden work, and gave lectures to his students in the garden. School gardens were designed with the intention to facilitate the development of agriculture, major branch of economy of the time, and were, simultaneously, a means of natural science education. At first, orchards were used exclusively but introduction of vegetables and, to a lesser extent, ornamental plants was soon to follow. The intention and contents of school gardens have been changing through times. Today we can establish that there is a growing movement among educators in many countries around the world to include gardens as a teaching tool within schools^{3,4}.

Concern for health and nutritional intake of youth is an important issue in many countries. So they continue to seek innovative and effective approaches to improve dietary intake among children and adolescents⁵. School garden programs have been identified as an intervention that may successfully and cost-effectively address these problems⁴. There seems to be a lasting positive effect of garden programs, since evidence suggests that children who take part in these programs are more likely to continue healthy eating habits throughout their life⁶. Benefits of garden-based programs include positive influences in teaching environmental education⁷⁻¹¹. These programs also proved to be beneficial for

purposes that have value beyond school such as intergenerational educational community focused programs¹², afterschool programs that provide growth-enhancing activities for youth¹³ and multicultural programs that bring communities together³. Research indicates that garden-based education may lead to improved academic achievement⁵. Students who participated in garden-based learning could more correctly identify fruits and vegetables, recognize the benefits of eating fruits and vegetables and have better general nutrition knowledge⁴. It has been demonstrated that environmentally-based educational programs can have a beneficial impact on performance on standardized achievement tests, as well as attention and enthusiasm for learning¹⁰. Some studies and much anecdotal evidence suggest that there is a potential for school gardens to enhance the academic curricula of elementary schools, particularly with regards to science concepts, as well as math, social studies, language arts, environmental studies, and nutrition¹⁴. The results of study by Klemmer *et al.*¹⁵ showed that the science achievement of students, who participated in a hands-on school gardening program was higher than that of students who did not participate in gardening activities as part of their science curriculum.

Purpose of this study: While gardening programs have become progressively more common, empirical research into the impact of these programs is limited^{3,11}. Few peer-reviewed studies that examine the effects of school gardens have been published, resulting in major gaps between research and practice with respect to school gardens^{4,16}. There is a need for evidence-based studies to understand the impacts of school gardens and to inform development of programs and policies. Policy makers and the teachers they support, need to better understand if and how school gardens improve childrens well-being⁴. Some researches¹⁶ also state that it is important that inquiry on school gardens extend beyond nutrition to the potential effects of the psychosocial and academic development of youth and on the school as a setting for

development.

Despite their long tradition, school gardens in Slovenia have been in decline according to anecdotal evidence. With the last study dating back to 1946, it was necessary to re-evaluate the status of gardens in Slovenian elementary schools at the beginning of the 21st century in order to plan further use and development of this potential educational environment. Therefore, the purpose of this study was to assess three aspects of school gardens: (1) current status of school gardens, (2) current use of school gardens, and (3) barriers pertaining to having and using a school garden.

Materials and Methods

Questionnaire: For the purpose of this study, the term »school garden« is used identically to the definition by Graham *et al.*¹ and Zidenberg-Cherr¹⁷, namely, as the land of school in its entirety including plants in school buildings. Data were collected with a questionnaire composed of 62 items, which were categorical yes/no questions, multiple choice questions or open-ended questions, and covered three aspects: current status, current use, and barriers. Our questionnaire was based on the 1946 study questionnaire, which was partly modified for our purposes. The respondents were asked whether their school had a garden and, if so, what was its size, equipment, type, and purpose. Furthermore, they were asked to name the workplace, which was assigned the responsibility for the garden and were encouraged to identify the barriers which prevent their gardens to be used more efficiently.

Participants: Being acquainted with current practices in Slovenian school gardens, we decided to focus our study on elementary schools exclusively. In Slovenian elementary schools, where students aged 6 to 14 years are enrolled, school gardens are most frequently used. In their study, Graham *et al.*¹ and Zidenberg-Cherr¹⁷ established that gardens were predominantly located in elementary schools and K-8 level schools. These findings are not surprising due to the fact that curriculum standards at these grade levels may be perceived as easier to meet with the use of the garden compared with standards in middle and high schools.

Questionnaire distribution: The questionnaire was submitted via postal mail to the principals of 426 elementary schools throughout Slovenia, which represented 95% of all elementary schools in the country. A cover letter was added asking for their participation in the survey. Completed questionnaires were returned by 149 schools (35%), thus the goal to obtain at least a 30% response rate was achieved^{1,17}. Some of the schools had not answered all of the questions and, consequently, we have not reached the minimum of 30% answered questions. Therefore, the questionnaire was sent again to the schools, which had not completed it in the first attempt. The questionnaires were then returned by 118 (41%) of the schools. A total of 267 schools returned the questionnaire, resulting in a 63% response rate and representing 59% of all elementary schools in the country. Some of the questionnaires were still not completely filled out, but were nevertheless used in our data analysis and, therefore, the response rate to some of the questions is lower than 63%. The response rate to each particular question was calculated according to the number of schools responding to it, which is not always the total of 267 schools.

Results and Discussion

Description of school gardens: Of the schools, which returned the questionnaire, 79% had an outdoor garden, mostly either adjacent to the school building or in its immediate vicinity (97%). The schools which had the opportunity to use their land to plant a school garden had already done so. The number of school gardens has slightly decreased since the time after the WWII when 87% of schools had a school garden¹⁸. This decline is most likely a consequence of the industrialization and decreasing rates of self-sufficient growing of food in the post-war period, all of which reflects in educational system as well. These results are not in accordance with research in some other countries, where it was established that gardening programs are increasingly popular in schools around the world^{3,4}. The reason for this discrepancy could result from the fact that school gardens are generally perceived as an effective approach for improving healthy eating among youth. So far, obesity has not been critically widespread among Slovenian school children population, thus, this factor does not contribute to the development of school gardens in Slovenia.

During the time of our research, approximately 60% of Slovenian students aged from 6 to 14 attended schools with a school garden. In combination with 79% of the schools, which returned the questionnaire having a garden, this suggests that schools with lower number of students are more likely to have a school garden as opposed to schools with higher enrolment numbers. We contributed this to the fact that bigger schools are more likely to be located in urban areas, where land for a school garden is hard to find.

The smallest school garden size was 10 m², the largest extended over 130.40 ares, and the majority (66%) were gardens under 10 ares (Fig.1).

Only 34% of the gardens were partly or fully fenced, 24% of the gardens had tap water, 23% had tool sheds and garden machinery. The most of the garden machinery were lawn mowers (75%), whereas the rest was mostly agricultural machinery and less commonly found (Fig. 2). Of the schools 63% had basic garden hand tools, e.g. hoe, shovel and rake. Only a few among the schools had sanitation, changing room or shelter, and 11% of the schools had an outdoor teaching facility to be used by at least one class of students in non-winter time. A few schools had hotbeds or greenhouses (5%).

A comparison with the data from 1946¹⁸, which reported 9% of the schools having greenhouses at the time, showed that the number of greenhouses has since decreased. According to our findings, the equipment of school gardens was generally modest in the time of our research. The results suggested that the majority of the schools had a meadow, either for decorative reasons or natural science education. Relatively large share of schools was

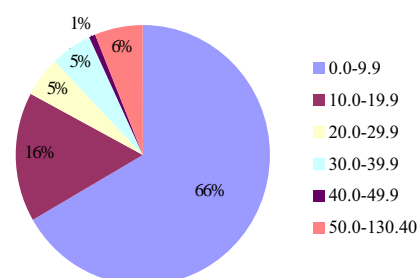


Figure 1. The size of school gardens (in ares) of Slovenian elementary schools.

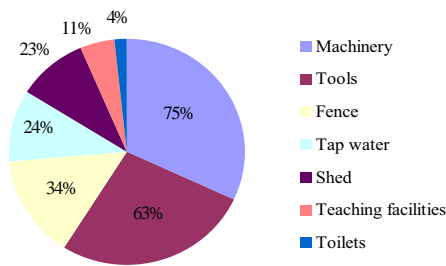


Figure 2. The equipment of school gardens of Slovenian elementary schools.

equipped with garden hand tools. Unfortunately, the exact number of tools for a particular school is not known, thus, we cannot draw conclusions about the number of students that could in fact participate in garden cultivation.

Purpose of school gardens: Schools used their gardens in afterschool programs (77%), extracurricular activities (71%), and academic instruction (52%) (Fig. 3).

Opposite to some other countries, the potential Slovenian schools saw in their school gardens was spending free time in extended school programs and providing edible produce in the framework of afterschool programs and extracurricular activities. Comparable study by Graham *et al.*¹ and Zidenberg-Cherr¹⁷ found that extracurricular activities were a reason for having a school garden in only 60% of schools. Relatively uncommon use of Slovenian school gardens for academic instruction is obvious when compared to the development in other countries. As Subramaniam² stated, academic instruction is among the most important reasons for having a garden. Apparently, Slovenian schools have not yet recognized the potential of using school garden in the framework of currently adopted national curriculum for elementary schools.

According to our research, the most common types of school garden were produce garden (49%) and ornamental garden (47%), whereas 21% of the schools used their garden for natural science education. Produce, ornamental or educational garden were in practice not separated units, as they were more or less integrated and their surfaces overlapped (Fig. 4). One third of the schools had an apiary with 1 to 12 beehives. A small share of the schools with apiary employed an apiculture expert (37%), while others were contracting local beekeepers or other external experts as mentors. Considering the long tradition of beekeeping in Slovenia, relatively frequent presence of apiaries in school gardens is unsurprising.

Products grown in produce gardens were mostly vegetables (57%), 34% grew fruit, 13% of the schools used the garden for agriculture, and 2% for viticulture. The percentage of vegetable gardens has declined in comparison with the post-war data, which established 68% of elementary schools had such a garden in 1946¹⁸. Vegetable gardens were most frequently used for growing root or

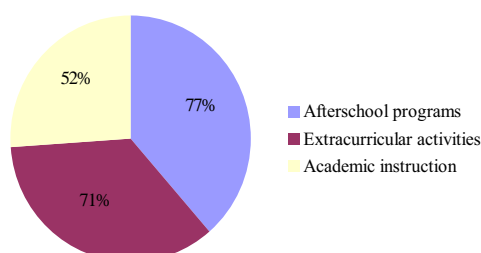


Figure 3. The use of school gardens of Slovenian elementary schools.

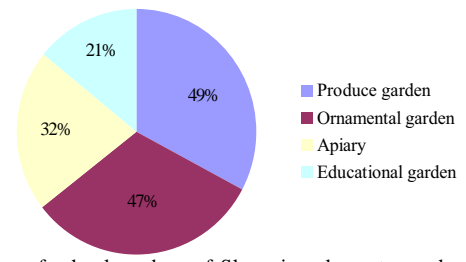


Figure 4. The types of school gardens of Slovenian elementary schools.

leaf vegetables, growing bulbs, herbs and spices was somewhat less common and followed by growing cabbages, nightshades and legumes. Therefore, the contents of Slovenian school gardens were comparable with school gardens in other countries, since the survey by Graham *et al.*¹ and Zidenberg-Cherr¹⁷ showed that vegetables and herbs were the most commonly grown plants in school gardens, at 77% and 53%, respectively.

From the introduction of school gardens up to the post-war period, fruit growing had been almost continuously the most important activity in school gardens, but it has significantly declined by the time of our research. School orchards predominantly grew low-trunk fruit trees, mostly apple and pear trees, for which growth conditions are optimal in Slovenia and, consequently, have had a long tradition in the gardens outside school environment as well. Vineyards have almost completely disappeared when compared to 1946 data of 22% of the schools having a vineyard. On the other hand, agriculture, which had been previously less present in school gardens, has since increased in importance. Agricultural plants grown in school gardens were mostly potato and corn.

Ornamental plants and plantations: Once just an addition to school gardens, were during our research represented almost equally to produce garden. Ornamental gardens consisted mostly of trees and shrubberies (54%), less present were flower bulbs (27%), perennials (23%) and other plants. Among woody plants, Slovenian school gardens predominantly included genera *Betula*, *Picea* and *Forsythia*, while *Pinus*, *Rosa*, *Acer*, *Berberis* and *Larix* were less frequently grown. All these genera are typically grown in Slovenian park plantations. Among flower bulbs, most frequently present genera were *Tulipa* and *Narcissus*, while *Dahlia*, *Paeonia* and *Iris* were most frequently grown perennials. Only a few school had aquatic and wetland plants or rockery, one of the probable reasons being that construction of artificial water environment or rockery takes a lot more time and is harder to maintain. According to data and anecdotal evidence, ornamental school gardens in Slovenia are mostly arranged as park plantations of trees and shrubberies with predominating meadow and 25% of the surface is covered with flowering plants in beds. In some other countries, contrastively, flowering plants represent 90% of school gardens^{1,18}.

Of the schools with garden 21% intended for natural science education, used mostly grassland for this purpose, whereas plants in beds or pots and woody plants were less frequently used. Garden was most frequently used for science and environmental studies. Comparable survey by Graham *et al.*¹ and Zidenberg-Cherr¹⁷ showed that garden was used for academic instruction by 85% of responding schools. The most frequently taught subjects in this case were science, environmental studies, and nutrition. School garden is apparently not perceived as important means for

promoting academic instruction in Slovenia. We identified three main reasons for that: (1) dominance of traditional classroom-based methods in our schools, (2) lack of suitable garden-based teaching material that meets national curriculum learning objectives, and (3) lack of supplemental pre-service and in-service teacher training in order to integrate the garden into the curriculum effectively.

In addition to all these types of garden, many schools had plants and animals in school buildings as well. Of the schools 35% kept animals, predominantly aquarium fish. Almost all schools (93%) had plants in school building. Predominantly, they grew genera *Pelargonium*, *Ficus*, *Begonia*, *Tradescantia*, *Sanseieria* and *Monstera*. These plants had mostly ornamental function, as only 18% of the schools stated they were using them for natural science education.

Barriers: According to evaluation of more than a half of the schools, they were able to rely on local residents (55%) for help with school garden, and less than 25% thought they could expect help from other sources, too (craftsmen, garden centres, companies, etc.). As barriers preventing more successful use of school gardens, schools identified improper funding, lack of or too small plots of land (urban area schools in particular), lack of trained school personnel to be in charge of a school garden, difficulty finding external experts, school personnel feeling overworked as it is and, consequently, expressing less interest to be in charge of a school garden. Only a few schools identified summer vacations as an obstacle. Additionally, the respondents expressed the need for introducing a counselling service for providing help and guidance in the use of school garden. Most of these barriers are not specifically limited to Slovenia, as surveys have identified them in other counties as well^{19,20}.

The limitation of this study is the response rate, which should be at least 30%²¹. The response rate of 62.7% was achieved for the majority of the questions, while for some of them it was under 30%. Anecdotal evidence suggests that the schools, which do not have a school garden feel less obligated to return the questionnaire compared to schools with a garden. Therefore, we estimate that proportionally larger share of non-respondent schools does not have a school garden. This could, in turn, suggest that perhaps less than 79% of Slovenian schools have a school garden.

Conclusions

The results will serve as a basis to design a contemporary school garden and will help schools in its use. We aimed first and foremost to facilitate the development of school garden which will enable experiential learning in the framework of science and environmental education.

Our findings showed that, so far, growing popularity of gardening programs in schools around the world has not significantly influenced the development of school gardens in Slovenia. After our survey was carried out last year, however, we detected a school garden revival trend in elementary schools, particularly in connection with environmental education. In a few years, it would be reasonable to carry out a follow-up study using a revised questionnaire in order to determine the direction, in which Slovenian school garden are developing.

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