

School gardens in Denmark – organization and effects of the Gardens for Bellies school garden program

Author

Pernille Malberg Dyg, Post Doc., Associate Lecturer, Metropolitan University College, Copenhagen, Denmark.

Abstract

Studies show that school gardening helps children enhance their understanding of science and promotes their interaction with the environment gaining historical, cultural and ecological understandings (Green, 2013, Johnson, 2012, Sloan, 2013; McCarty, 2010; Dyg, 2014; Chenhall 2010; Hess, Trexler 2011). School gardens are sprouting in rural and urban areas across Denmark. This case study research sheds new light on various school garden models under the Gardens for Bellies program in Denmark, including school-, community-based and central school gardens. This study aims to document the organization of school gardens, which is not studied in international research. It also analyzes immediate effects according to pupils and other stakeholders. The research is based on five explorative case studies, involving observations and interviews. The findings show that school gardens open up opportunities for involving a range of new stakeholders. Garden-based learning has a number of positive immediate effects on pupils' food knowledge, cooking skills, and well-being.

Key words

School gardens, community gardening, food literacy, connectedness to nature, community involvement.

1. Introduction

Studies and popular concern in the US, Denmark and elsewhere highlight that children and youth in general lack connectedness to nature and food literacy, including an understanding of where food comes from (Dyg, 2014; Chenhall 2010; Hess, Texler 2011). As a solution to this challenge, school gardening is shown to connect children to nature and enhance their understanding of and motivation for science (McCarty, 2010). Pupils enjoy the combination of being outside, doing practical activities while learning theory (Passy, R., 2014). Studies find that school garden pedagogy promotes pupils' interaction with their environment, where they gain historical, cultural, and ecological understandings. (Green, 2013, Johnson, 2012, Sloan, 2013; Dyg, 2014)

School gardens have existed in Denmark since the late 1800s. In 1928, they were common with 16 in Copenhagen alone and about 200 across Denmark: both central and school-based gardens. From 1950s, most shut down due to e.g. demands for land. (Herrik, 2013) Since 2010, school gardens are spreading again across Denmark. There is no documentation of the exact number. Since 2014, 20 small and large-scale school gardens have started under the 'Haver til Maver' school garden program (s'Gardens for Bellies'). It is a gastronomic school garden concept established in 2006 at a farm north of Copenhagen. It differs from other school gardens with its focus on gastronomy, food growing and nature education. Other gardens, e.g. Copenhagen School Garden, have a stronger focus on nature education and cultivation. Coinciding with a school reform in Denmark and a general interest in health promotion, sustainability, community and social inclusion, the interest in school gardening has exploded. The school reform in 2014 involved longer schooldays, more science and demands for alternative teaching methods. Municipal authorities, politicians, schools, parents and private initiators, like farmers, chefs, teachers and others have started up school gardens in many locations around Denmark. However, a comprehensive mapping of all

school gardens in Denmark has not been conducted so far. Gardens for Bellies received private funding to establish 20 gardens and for evaluation research: to study ways of organizing school gardens and the effects on children's food knowledge, taste education, connectedness to nature, academic learning, wellbeing and social competencies. Based on this, the paper will investigate the following questions:

1. How are school gardens emerging in Denmark under the Gardens for Bellies program organized?
2. What are the immediate effects on learning of the various school garden models according to the participants?

2. Methodology

The research is based on explorative case studies involving interviews with: decision-makers (i.e. heads of schools, city council members, heads of municipal departments etc.) (n = 9), garden educators (i.e. staff teaching in the school gardens) (n = 8), teachers (from the schools) (n = 16), schoolchildren (n = 30) as well as observations of garden activities. Interview guides included questions about the process and organization of the school garden, pedagogy and self-reported immediate effects related to food knowledge, cooking skills, tasting, nature understanding, academic learning, well-being and social interactions. All interviews with children were conducted 2 months after completion of the garden program.

Cases were selected based on these criteria:

- Geographical diversification – gardens in urban and rural areas
- Dispersion of the physical location: school gardens located on farms, in schoolyards, in community settings and in castles/manors.
- Differences in stakeholders and organization of the gardens, i.e. initiated and organized by either private farmers, the municipality, teachers/school boards and others.

Five maximum variation cases were selected, which met the criteria:

Gentofte: Centrally located urban garden in a castle park initiated and organized by the Department of Parks and Castles and the municipality.

Gribskov: Centrally located garden on a rural organic farm initiated and run by a farmer and chef.

Aarhus: Three centrally located gardens at a nature centre, an agricultural school and at a playground in Denmark's second largest city, initiated and run by the municipality.

Assens: Ten school gardens each located near a school in a rural area initiated by a garden expert and run by school boards/school heads and teachers.

Roskilde: Garden located on the school grounds, initiated and run by the teachers, pupils and school management in a medium-sized town.

Selecting maximum variation cases can reveal more information about various circumstances and outcomes and it is possible to generalize from multiple case studies (Flyvbjerg 2004), which is the reason for selecting the five cases.

In November 2015, an online questionnaire was sent to parents of children participating in the gardens in 2014-2015 with questions about their child's learning and well-being after participating in the school garden. It was distributed through teachers to 136 parents; 96 responded. Due to limited time and responses from teachers, only parents in Aarhus and Gribskov were surveyed. No distinction was made between the time of participation (2014 and 2015). Thus, the longer term effects were not analysed from the questionnaire, which might have provided interesting insight.

3. Findings

The original Gardens for Bellies model is the central school garden located on a farm. Most new Gardens for Bellies gardens are central school gardens located on an unused piece of land in the city or on a farm with gardening and food experts teaching (farmers, biologists, horticulturalists, chefs, nature guides or other professionals), some with a background in teaching and pedagogy. This is the case in 10 of the municipalities, who have started school garden projects: in some municipalities there are more than one school garden for which reason the total number of gardens is 20. Seven of the ten municipalities have one or more central gardens. Only three municipalities have school- or community based gardens. Two were included, as the third one had not started yet. The school- and community-based gardens are re-emerging types of school gardens. Findings about the five cases will be presented in the following pages.

3.1. The central school gardens

The main features of centrally located school gardens cases are summarized below and will be elaborated in relation to the three cases.

Name	Geographical location	Initiators
Gentofte	Urban, castle garden	Municipality, Department of Parks and Castles
Gribskov	Rural, private farm	Private farmer and chef
Aarhus	Urban, nature centre, agricultural school and playground	Municipality

The Gribskov case – central farm-based school garden

This school garden is located on an organic farm in a rural area bringing children from the rural area to the farm. Each season approximately 750 children visit the garden as part of an eight visit program. They grow vegetables, have access to a haystack playground, cook in the outdoor kitchen, learn about beekeeping, construct an insect hotel, work with compost and learn about plants, insects and ecological cycles around the farm. The teaching is done by a chef, nature guide, a horticulturalist and the owner teaches animal husbandry. The program is financed by the municipality with the aim to promote health and physical activity in schools and kindergartens. The aim is for the program to become a permanent program for the municipality's pupils.

The Gentofte – central castle-based school gardens

This garden is placed in a castle park in an urban area near Copenhagen. It is part of the municipality's and the Park's strategy to continue an old tradition of vegetable growing in the park combined with new initiatives of strengthening schoolchildren's personal, social and academic development and promoting healthy living. The municipality's objective is for the school garden to create synergy and connections between different age groups by including kindergarten children, schoolchildren and children with special needs in the garden activities. There are plans to extend this to refugee children for them to learn about Denmark, develop language skills and connections in a stress-free environment. In addition to food growing, the garden has an outdoor kitchen and a wooded area for playing. Garden experts run all the educational activities. The garden started in 2015 with 120 children in the initial year. The program is financed by the municipality with in-kind contributions from the Park.

The Aarhus case – central city school gardens

Aarhus city has three central school gardens. Due to the city's large size, the municipality is running three school gardens across the city: one at a nature center with animals and a natural fence nearby, the other at an agricultural school and the third at playground with an old farmhouse and animals. The daily activities, practical matters and planning of the educational content of the program are coordinated centrally by the

project staff and garden educators. Although the eight visits are coordinated and run in parallel in the three locations, there are some unique activities in each location, such as beekeeping, chicken rearing, recycling and composting. The municipality's aim is to support the Danish education reform, including the goal of strengthening natural sciences. The municipality finances the program combined with each class paying a fee of 1345 Euro. In 2015, 600 schoolchildren participated.

Findings show that the professional garden educators have tremendous passion and expert knowledge to teach about food, nature and cooking to children. However, this model is also costly and challenging for teachers to integrate the garden experience back in the school.

3.2. *The school- and community-based school gardens*

The main features of the school- and community- based cases are summarized below followed by further analysis:

Name	Geographical location	Initiators
Assens	Rural, located on vacant spaces near schools	Local garden expert and school boards/heads and teachers
Roskilde	Rural, located on school grounds	Teacher and school board

The Assens case – community-based school gardens in a rural municipality

The ten school gardens in Assens are examples of community-based gardens across the rural municipality. Rural children learn about food growing and different citizens, including teachers, garden enthusiasts, pupils, scouts, elderly and other active citizens collaborate. Teachers teach in the gardens, receiving expert advice on gardening and ecology from the project initiator; a gardening enthusiast. Subjects like science, languages and home economics are taught in the gardens and produce is brought back to schools and used at the school. Only one of the gardens received start-up funds from Gardens for Bellies. Since 2014, another nine gardens were established near schools: in a private garden, on school grounds, communal areas and playgrounds. Teachers have established a municipal network to exchange ideas, resources and practical advice. This model is useful when resources are scarce: it is an inexpensive model and a good way of strengthening teachers' ownership. However, it relies on the coordinator's willingness to volunteer and support from school management. In 2015, more than 600 schoolchildren participated.

The Baunehøjskole, Roskilde case - the school-based garden

At Baunehøjskole in a rural town, a 700 m² garden with raised beds and a chicken coop was built by pupils in collaboration with students from a local vocational center, teaching 7th graders about carpentry, measurement and other vocational skills. The teacher, who had the school garden idea, emphasizes:

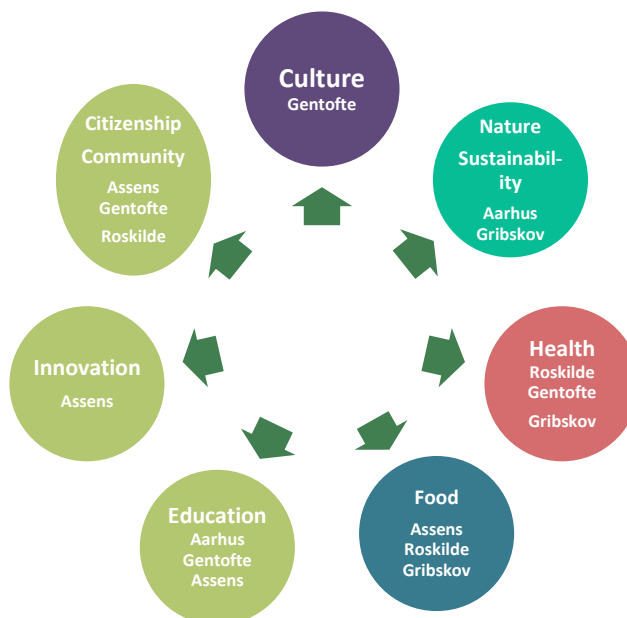
"It has been important for us that the pupils were part of it from the beginning to ensure that they feel ownership for the garden."

Pupils are also assigned as 'chicken ambassadors' responsible for taking care of the school's chickens. The school's aim is to promote healthy eating and enhance children's understanding of the seed-to-plate process. The garden has a greenhouse, insect hotel, beekeeping and compost connected to the school canteen and kitchen, where vegetables are used and waste is returned to the compost. Teachers teach home economics, languages, math, sports, science, arts and design in the garden and it is a place for relaxation and reflection. A local beekeeper is involved and teachers want to involve a local farmer, elderly

or others that can help maintain the garden and expand the learning. The garden is financed by the school and additional funding from the municipality. There are 550 pupils at the school: not all use the garden yet.

3.3. Agendas in school gardens

The findings show that the school gardens are linked to multiple political agendas in the different municipalities, which decision-makers here see as important underlying objectives for the school gardens. The municipal agendas for each case are summarized here:



School gardens agendas as stated by decision-makers in the five cases

School gardens are viewed by the different decision-makers as a strategy to promote health, food literacy, connect to nature, promote sustainable development goals or contribute to change and new effective learning methods. New agendas, which were not part of the initial Gardens for Bellies project, are about fostering community action, connectedness and citizenship, innovation and new collaboration amongst several stakeholders. This is the case with the Assens, Roskilde and Gentofte school gardens, where new stakeholders are part of the school gardens, including vocational school students, scouts, elderly and refugees. The school- and community-based gardens draw in different new stakeholders to the gardens. It brings in experts and builds synergies with the local community for practical reasons and opens the gardens to other community benefits. In the central school gardens, passionate and idealistic experts want to build closer links to schools and contribute to reforming education, fostering food literacy and connectedness to nature.

3.4. Immediate effects of the various school garden models

Project initiators and garden educators all note a lack of understanding of nature, the cultivation process and vegetables as problems for rural and urban children alike. They highlight that garden projects enhance pupils' understanding, motivation and respect for the cultivation process and knowledge about vegetables. In observations and interviews with pupils, they wish to learn about more new and unknown vegetable varieties. They show clear signs of ownership of their garden and vegetables: they give their vegetables names, play with them as dolls and are proud to show off their harvest. According to the pupils themselves, being in the open space and interacting with their peers in a different way, increases their well-being and

eagerness to learn. The survey amongst parents supports this finding. Interactions with peers, teachers and garden educators are filled with successful experiences, recognition and new ways socializing.

Central gardens

In central gardens, children have the possibility to reconnect with nature on a farm or in an urban green space. Garden educators work with taste development in different ways: children taste new vegetables, flowers, wild berries and plants. It increases their sensory learning and they develop courage to taste the unknown. During interviews and observations, children do not talk about or focus on pickiness: They say that they trust the food, they have cultivated themselves. Tasting new foods becomes natural to them. The same is the case for school- or community-based gardens. Yet, limited access to nature here makes trying wild plants less feasible. Chefs and nature guides in central gardens have skills and authenticity to create excitement amongst children around trying wild foods. Children perceive access to nature and beekeeping as exciting. It increases their understanding of nature and their own role in it: they show trust and familiarity with bees, plants and manure. This is more easily fostered in school gardens with access to wild plants, insects, and nature guides and biologists, who have knowledge and passion to teach about nature. Garden educators characterize their pedagogy as appreciative, emphasizing children's successes.

School- and community-based gardens

According to teachers, there is a stronger synergy between the garden and classroom here than in the central ones. Garden educators in the central gardens mention being challenged by the fact that many teachers do not know how to integrate the garden back in the classroom and leave most of the teaching up to the garden educators. According to teachers in the school- and community-based gardens, garden-based learning holds numerous opportunities for working with learning goals in practice in subjects like science, home economics, languages, math, arts and other subjects. It facilitates experiential learning. They see these opportunities more clearly than teachers, who leave the teaching up to the garden educators. Teachers in the school- and community-based gardens feel a strong ownership of the gardens and learning. A teacher explains:

"It's a wonderful 'classroom' out here. You can use it for any subject. So I don't think it's hard to use the garden."

4. Conclusion

Findings show that the spread of the Gardens for Bellies program opens new ways of organizing school gardens. Yet, school- and community based are garden models, which are widespread in the US and elsewhere and used to be found in Denmark as well. These gardens foster opportunities for involving teachers and numerous new stakeholders in rural and urban settings. In both garden models, there are plans to broaden the participants to scouts, elderly and refugees, to create stronger connections between schools, gardens and surrounding communities. According to children and their parents, the immediate effects of their participation include increased motivation for learning academically and improved food literacy, including cultivation- and cooking skills and willingness to taste. So far, it has been easier to link the garden learning to subjects in school- and community-based gardens due to stronger ownership by teachers. The central gardens on the other hand have the benefit of having inspiring and authentic 'experts' to teach, which pupils enjoy. Finally, the gardens in general improve children's well-being, social interactions and give them a stronger feeling of connectedness with their environment and food. Long-term effects were not studied, neither were community benefits and intergenerational- and intercultural learning, both of which would be relevant topics for future research.

5. References

- Chenhall, L. C. (2010). Improving cooking and food preparation skills - A synthesis of the evidence to inform program and policy development. Healthy Living Issues Group of the Pan-Canadian Public Health Network. Canada.
- Dyg, P.M. (2014). Fostering Food Literacy and Food Citizenship through Farm-School Cooperation and beyond: Theoretical Perspectives and Case Studies on Farm-School Cooperation and Food and Agriculture Education. Ph.D. dissertation, Department of Planning and Development. Aalborg University.
- Flyvbjerg, B., 2004. Five misunderstandings about case-study research. In: Seale, C. et al, (Eds.), *Qualitative Research Practice*. Sage, pp. 420-434.
- Green, M. (2013). Place matters: pedagogies of food, ecology and design. *Environmental Education Research*. Vol. 19 Issue 2, p. 252-253.
- Herrik, J. L. (2013). Blandt blomster og bybørn – En kulturanalytisk diskussion af natursyn og læringsprocesser i Lersøparkens Skolehaver. Copenhagen University.
- Hess, A. and Texler, C. (2011). Qualitative study of agricultural literacy in urban youth: Understanding for democratic participation in renewing an agri- food system. *Journal of Agricultural Education*, 52(2), pp. 151-162.
- Johnson, S. (2012). Reconceptualising gardening to promote inclusive education for sustainable development. *International Journal of Inclusive Education*. Vol. 16 Issue 5/6, p. 581-596. 16 p. 4 Charts.
- McCarty, J. (2010). The nature of school gardens. *Exchange*. Issue 195, p.95-95.
- Passy, R. (2014). School gardens: teaching and learning outside the front door. *Education* 3-13. February 2014, Vol. 42 Issue 1, p.23-38.
- Sloan, C. (2013). Transforming Multicultural Classrooms through Creative Place-Based Learning. *Multicultural Education*, Vol. 21 Issue 1, p26-32.

Short biography

Pernille M Dyg is post-doc and associate lecturer at Metropolitan University College, Copenhagen. She does research on school and community gardens and sustainability. She holds a Master's degree in Environmental Planning from Roskilde University and a Ph.D. from Aalborg University in Denmark. Pernille has worked with NGOs on agriculture and alternative food systems in Denmark, USA and Laos.