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I Want to Participate—Communities of Practice in Foraging and Gardening Projects as a Contribution to Social and Cultural Sustainability in Early Childhood Education

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Abstract: Learning and development in early childhood is highly dependent on social interaction and exploration through continuous encounters with the real world. Foraging and gardening are outdoor pedagogical practices that have relevance to education for sustainability. Previous work suggests that engagement in such activities can be characterized by the concept "community of practice" (CoP). In this paper, we explore how characteristics of the CoP can be recognized in foraging and gardening projects performed in the Arctic region of Norway, and we discuss how these activities can contribute to social and cultural aspects of sustainability. Data collection included focus group interviews with kindergarten staff (teachers and assistants) and videos taken of foraging and gardening activities with the children. Our data indicate that the hallmarks of CoP, domain, community, and practice, are strongly recognized in these projects through increased interest, social interaction, and agency for learning. This mutual engagement and participation in the CoPs for foraging and gardening connect both staff and children to local food heritage and culture for a sustainable future.

Keywords: social sustainability; early childhood education; foraging; gardening; local food; children's agency; cultural sustainability

Citation: Bergan, V.; Krempig, I.W.; Utsi, T.Aa.; Bøe, K.W. *I Want to Participate*—Communities of Practice in Foraging and Gardening Projects as a Contribution to Social and Cultural Sustainability in Early Childhood Education. *Sustainability* **2021**, *13*, 4368. https://doi.org/10.3390/su13084368

Academic Editor: Enrique-Javier Díez-Gutiérrez

Received: 1 March 2021
Accepted: 12 April 2021
Published: 14 April 2021

1. Introduction

Sustainability is a growing research field in early childhood education (ECE) [1–5]. Early childhood education for sustainability (ECEfS) has evolved from learning about nature and sustainability issues to becoming more active by learning in nature and for a sustainable future [6]. Recurrent experiences in nature during early childhood advocate for a relational connection to the natural environment that acts as a precursor to achieving sustainability and pro-environmental behaviour [7,8]. Children's active participation and agency in everyday educational practices for the environment have therefore been raised as important goals in ECEfS [9–11].

A recent systemic review of ECEfS has increased the focus on interdisciplinary approaches and has identified three cornerstones for the implementation of sustainability activities in the early years (scientific action-integrative, community based, and value-oriented scopes) [1]. The review also presents three potential pedagogical approaches to give practical examples for the implementation of ECSfS, which include (1) art-based inquiry experience, (2) outdoor education as a basis for ECEfS, and (3) project and problem-based learning (PPBL) [1]. PPBL is emphasized as a future learning method as it highlights

social learning in real-world settings [12]. Interdisciplinary approaches that engage children in real-life problems that overlap all four dimensions of sustainability (ecological, economic, social/cultural, and good governance) are also suggested [4]. Most research on ECEfS has placed a hegemonic weight on environmental education (EE) and ecological issues, while the cultural and social aspects have been neglected [13,14].

This paper presents two projects on foraging and gardening for food in ECE. Such projects are in line with the framework plan for kindergartens in Norway, which states that "kindergartens shall help the children to gain an insight into food sources, food production and the path from ingredient to meal" [15] (p. 49–50). In previous theoretical work, we have discussed how children both are and are becoming eco-citizens through their natural curiosity, active participation and exploration in nature, and through food foraging and gardening activities [16]. Here, we intend to focus on the social and cultural dimensions of sustainability through foraging and gardening in ECE. The reason for this focus is that it covers socially-oriented practices that facilitate a sense of belonging, connection, and inclusion between people, nature, and culture [14,17,18].

Social sustainability is a broad term that includes the preservation and development of stable societies with social justice, equal rights, citizenship, participation, well-being, health, education, and safety for all people in the community [14,19,20]. Since social participation, participatory decision making, and agency are important aspects of the social dimension of sustainability, we aim to confine the focus of this paper to the active role played by participation (agency) and to learning about the origins of food, by both adults and children.

Cultural sustainability is usually seen as part of the social dimension of sustainability and has been conceptualized as an interdisciplinary framework for identifying different roles of culture in sustainability [18,21]. In our context, foraging and gardening activities belong to place-bound cultural traditions and practices in which the relationship between heritage and food is evident but they also embody a connection to local food traditions [22,23].

1.1. Background

Norwegian ECE institutions are named kindergartens and provide a socio-cultural educational and care facility for children under six years of age. All Norwegian kindergartens are based on democratic values and children's participation, and outdoor activities are endorsed in all seasons [15,24]. Norway values nature and outdoor recreation greatly and has an outdoor law (friluftslov) providing common access to nature areas for activities such as hiking and recreation [25]. This law ensures that everyone has the freedom to harvest wild plant resources and mushrooms for their own use with due care. The Norwegian Government suggests that children and youth should get insight into foraging as a part of the Norwegian culture and as a contribution to education for sustainability [26].

This enables Norwegian kindergartens to focus on local food traditions through outdoor activities, transferring to the children practical skills and local knowledge about natural food resources, including places and seasons for foraging. In the Arctic region of Norway (north of the polar circle), the context for learning activities outdoors is highly dependent on the Arctic climate, the changing seasons, and the local cultural traditions [27]. Historically, practices of foraging for food through fishing, hunting, and gathering berries and plants have been part of daily life in northern Norway, especially in the rural areas and as part of the Sami tradition [28]. Gardening skills are also largely dependent on practical and climatic knowledge, especially in the Arctic where the growing season is limited to three cold summer months. Working together in a community with real settings for foraging and gardening in ECE provides opportunities for both the social and cultural aspects that are important in an urbanizing world.

1.2. Foraging Practices and Gardening to Learn about Food

Hunting and harvesting food from the wilderness, also termed foraging practices, and gardening plants for food provide children with social and practical skills that may last for

a lifetime [29–31]. Childhood foraging can add onto ecological, environmental, and cultural identity development for sustainability [32–34]. A meta-ethnographic review of children's learning in hunter-gatherer societies shows that children are active learners who participate in learning by choice, and for whom learning is an ongoing, playful activity, not separated from the rest of life [29]. Within foraging societies, cultural knowledge is distributed differently according to the individuals' age and gender, which has relevance for children's learning [35]. Cultural transmission of knowledge and skills in gardening and foraging practices are traditionally transmitted from adults to children (vertical transmission) [34,36], and recent studies report that learning also occurs horizontally from child to child (horizontal transmission) or even from child to adult (retroactive transmission) [37,38].

We need to raise awareness of the pedagogical potential of local food in ECE [39]. When children are actively engaged in holistic authentic collaborative activities, such as growing and caring for plants, they are able to develop socially, emotionally, and cognitively through natural self-motivation and discovery [30,31]. Through engagement, garden-based learning relates learning content to context and stimulates curiosity and wonder [40]. Learning about food from direct first-hand experience through recurrent encounters with the food garden, gardening tools, seasons, climatic conditions, and plant species are integrated along the journey [41]. Anthropologist Tim Ingold uses the term "wayfaring" to describe how we integrate and embody knowledge though interaction with the environment [42]. He argues that knowledge is not transmitted, but rather integrated along paths of movement and engagement with the environment through a process [42]. In other words, wayfaring in projects related to foraging and gardening means that the people involved actively explore and learn through inhabiting the process of retrieving food with their hands, heads, and hearts along paths of engagement [41,42]. This active engagement of attention, perception, and participation establishes a relational connection to the task at hand that is essential to learning [42–44].

1.3. Community of Practice (CoP)

Active engagement in a situated learning context has been described as a "community of practice" (CoP) [45]. A CoP is a learning system with a strong relationship to the social construction of knowledge and can be defined as a "group of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" [46]. It is founded on the belief that what people see, learn, and do is situated in their role as members of a community—a CoP [45,47].

One needs to distinguish between what a CoP is and what it is not. Three structural dimensions are all crucial in the formation of a CoP: (1) domain, (2) community, and (3) practice. A community's effectiveness as a social learning system depends on its strength in all these three dimensions [48,49]. (1) *The domain:* The CoP is not just a group or network of friends, co-workers, or another kind of network with a shared interest. The domain is defined by a form of identity that is linked to a shared domain of interest. Passion and curiosity for the domain are crucial and often form deep parts of members' personal identity [48–50]. (2) *The community:* This concerns the community itself and how the members build relations that enable them to learn together and from each other (collaboration, interaction, and mutual involvement). Members are often from diverse age-groups, backgrounds, and disciplines, but the quality of the relationships in the group is crucial [48]. Some communities are self-organized, and they are fundamentally self-governed, but most communities need both frames and structure and some form of leadership to run the process going forward [49]. There will often be core members of the group who take a special responsibility for the process, while other members play more peripheral roles. CoPs work best when they are based on the voluntary engagement of members [48]. (3) *The practice:* The members of a CoP develop a repertoire of resources which, among other things, imply experiences shared and developed in common, ways of doing things, resources, tools, actions, and events. Building learning competence and

skills from practice is central. In short, they share interest and passion in their practice and address problems and tasks along the way [48,49].

A CoP may be a strong actor in the greater engagement in sustainability and can provide, as mentioned above, a framework for understanding social learning [51–53]. However, in the ECE setting, the CoP should evolve to include the children to a greater extent, to involve them as part of the real adult world instead of being situated in a child-sized artificial play world [54]. This is particularly important in creating a sense of cultural belonging and for meaningful and transformative experiences that may empower the children to become agents of change [11,55].

1.4. Purpose of the Study

We have learned that foraging and gardening activities in ECE contribute to the ecological dimension of sustainability [56–58]. These activities have added to the children's knowledge about local plants and animal species as food resources and how everything is interconnected in nature. Both children and adults explore how food is collected or grown by actively engaging in foraging and gardening [41,56–58].

In this study, we focus on the social and cultural aspects of sustainability as related to foraging and gardening through the dimensions of the CoP. Our research questions are as follows:

1. To what extent can two ECE projects, engaging with local foods through foraging and gardening activities, be recognized and categorized as CoPs?
2. How can foraging and gardening activities work to implement pedagogical approaches to ECEfS?
3. How do these activities contribute to the participants' (staff and children) learning and agency as related to the social and cultural aspects of sustainability?

2. Materials and Methods

2.1. Participating Kindergartens and Ethical Considerations

We recruited participating kindergartens for this study from previous collaborations or personal relations with some of the ECE teachers whom we knew had some interest or experience in foraging or gardening for food. The kindergartens were medium sized (60–75 children, aged 1–6 years) and were located in northern Norway. One of the kindergartens implemented a wild food (plants and animals) foraging project (FP) and the other carried out a gardening project (GP). The study was approved by the Norwegian Centre of Research Data. The kindergarten staff (teachers and assistants) and the children´s parents gave their written consent regarding their participation. In addition to the parents' consent, the children were asked to approve filming during some of the activities, to which they all agreed. All data were anonymized.

2.2. Description of the FP and the GP

The FP was carried out in 2013–2015 and the GP in 2020 (during the COVID-19 pandemic). The FP was performed in the local community and most of the wild plant resources could be harvested within walking distance of the kindergarten. When foraging wild animal resources, such as various freshwater fish and ptarmigans, the kindergarten used bus transport to visit different local habitats where the various species resided. The freshwater fish were caught with nets or hooks. The activities connected to foraging for ptarmigans in autumn were designed to let the children carry a self-made toy gun when they walked together with staff who had a hunting license and carried legal hunting weapons. During the winter, a legal trapping system was used. These activities did not yield ptarmigans, but the staff had brought some to study and eat. The FP project also included a visit to a Sami reindeer husbandry community at a reindeer fence where the children could observe the slaughtering of reindeer and have an opportunity to touch and study parts of the reindeer. All harvested food resources were prepared as food for meals both outdoors during the harvesting trips and indoors in the kindergarten.

The GP was performed in the outdoor area within the fence of the kindergarten. The activities included sowing seeds, planting seedlings outdoors in garden boxes, caring for the plants during growth (watering), foraging and tasting crops, and preparing food from crops both indoors and outdoors.

2.3. Semi-Structured Focus Group Interviews

In order to get insights into the staff's overall experience with the FP and GP, qualitative data were collected from five semi-structured focus group interviews with the staff. We chose focus group interviews because the CoP is based on the social construction of knowledge [46]. One of the authors conducted the interview with each group. The focus groups varied in size from two to six informants. Two groups were from the FP (5 and 6 informants in each) and three groups were from the GP (2 informants in each). The interviews were performed shortly after the end of the projects and lasted between 30–55 min. The interviews were based on open-ended questions with a focus on the effects of the projects on both the staff and children. The interview guide involved questions about motivation, engagement, curiosity, knowledge, bildung (education and competence), and sustainability (see interview guide in Supplementary Data). The interviews were recorded and transcribed.

2.4. Video Sequences of Activities

Some of the FP and GP activities were documented by video, either with a handheld camera (for the FP) or with a wearable GoPro-camera on two of the kindergarten children (for the GP) in order to gain insights into the children's actions and interests. Wearable cameras enable children to explore freely and provide a method for capturing children's perspectives in the natural environment [59]. The video sequences used in this article were strategically selected with the aim of exploring the interview data further, especially in relation to the agency of the children in the activities.

The FP videos were taken on an early autumn day when a group of 10 children and 3–6 adults were pulling fishing nets from a mountain lake. Afterwards, they studied the fish and prepared them for a meal cooked on an open fire. The GP videos were taken on an early summer day when one of the authors brought seedlings to the kindergarten for planting in garden boxes in the outdoor area of the kindergarten. These videos include approximately 5–10 children and two adults working together outdoors with the plants, soil, and water. The contents of the videos were transcribed—both in respect of the verbal and physical expressions.

2.5. Data Analyses

CoP theory was used as the basic methodological framework for the analyses with respect to the main characteristics of CoP [46]. The transcribed video sequences and the transcripts from the interviews were analysed and characterized into the three CoP dimensions: *the domain*, *the community,* and *the practice.* This was performed by using an approach termed collective qualitative analysis [60]. This means that three or all four authors worked together during reoccurring intensive workshops to arrive at a common understanding of the data content. The dimensions were labelled thematically and analysed in the course of several rounds to refine the results [61].

The *domain* dimension was used every time the staff or children showed particular "interest and/or curiosity" in the FP or GP, and especially when this was connected to their identity with or passion for the project. The *community* dimension was used when the staff and/or children interacted through collaboration or drawing upon each other's knowledge, skills, or abilities for the task at hand, or if they reached out to the children's family members or other stakeholders for expertise. The *practice* dimension involved building experience, knowledge, and skills by being involved in the practice of foraging or gardening.

In order to explore how these activities may contribute to participants' learning and agency for the social and cultural aspects of sustainability, we focused on signs of the staff's and children's agency within the dimensions of CoP. The interview data from the staff related both to their own involvement (*staff's agency*) and to the children's participation (*children's agency*) in the project's activities. The staff's rather wordy statements have largely been retained but are somewhat modified and are grouped based on similarities. The language translation from Norwegian to English may have influenced the interpretation of the results.

3. Results

The analyses, based on the three hallmarks of CoP as taken from the interviews and video material, are summed up in the following sections. We present the staff's agency first, as stated in the interviews, and then the children's agency, as described in the interviews and supported by the videos. The tables included in each section gives a summarized overview of the different dimensions of the CoP as it emerged from the focus group interviews and video sequences. The essence of statements derived from an analysis of interviews with the staff are presented in the tables. Video expressions (physical and verbal) that exemplify children's agency are drawn from an analysis of the video sequences. When labelled FP (foraging project) or GP (gardening project) the description represents only one of the projects.

3.1. The Domain—Interest, Passion, Identity and Curiosity

3.1.1. The Staff's Agency

The staff from both projects expressed that they experienced the project's activities as interesting, exciting and fun, and as promoting learning (Table 1). The FP staff further claimed that the different tasks in the FP, as well as their own commitment and curiosity, made the interest and engagement "contagious," both between staff members and between the staff and children: *"We see that the children's interest has increased. We see that we have created an engagement in the children. And we have done it together with them."* The staff from the FP emphasized that the duration of the project (three years) was important as it enabled the skills and activities to be deepened and developed further (Table 1).

The staff from the GP highlighted family traditions, culture, and a desire to be self-sufficient as important reasons for engaging in gardening activities in the kindergarten (Table 1). This was especially important for staff who were of Sami heritage. The staff's motivation was also driven by the opportunity to support the children's growing interest in working in the garden. The staff also mentioned that the increased popularity of gardening on social media had enhanced interest in it. Both staff groups (FP and GP) stated that they wanted to support the children's interest and they experienced how their own curiosity and interest influenced the children (Table 1). The foraging videos demonstrated how the adults and children explored together. For example, both children and adults in the FP worked tightly together and expressed interest and curiosity when studying the fish and preparing a meal from the fish (Table 1). In the GP, children and adults worked together and dialogued around what the seedlings needed for growth.

3.1.2. The Children's Agency

The staff described how the children generally showed great interest and a commitment to the activities in both projects, both verbally and physically as well as through play (Table 1). The staff said that the children took the initiative in doing the foraging and gardening activities (e.g., picking berries and digging for worms) when they were outdoors where the activities took place. The video material from both projects confirmed that the children were eager to participate (Table 1). The children in the FP made statements like *"I want to hold the fish."* In the GP, there were statements such as: *"I want to water the plants,"* and *"Can we plant this one?"* In both projects, the children were physically engaged in their foraging and gardening tasks.

Table 1. The Domain dimension of a community of practice (CoP).

The Domain Dimension (Including Interest, Passion, Identity and Curiosity)		
Interview statements—staff's agency	*Interview statements—children's agency*	*Video expressions—children's agency*
The projects are described as interesting, fun, exiting, promoting new learning, etc. Easy to prioritize based on interest and engagement	The children are engaged and involved in the projects	Children are eager and involved both verbally and physically in fishing activities. They want to touch and hold fish and parts of fish (FP) Most children are present, interested and verbally active during gardening activities (GP)
Initial interest based in culture, family tradition or some previous experience (GP) The project itself creates deeper interest	They want to participate (show interest) in every task They take initiative in doing activities on their own (picking berries, digging for worms, tasting crops etc.)	Children express eagerness to participate both verbally and physically They actively take the initiative to do gardening tasks at hand (GP)
Interesting to work over a longer period—to become immersed in it (FP)	The children want to taste 'everything'	Most children express interest in tasting cooked fish and some ask for more (FP) Several children taste plants (GP)
Advantageous to build on previous experience	The children show their interest through asking questions and making statements	Children ask questions: "Is that the . . . ?" and make statements: "That is . . . "
Want to support and follow the children's interest Adults' attitudes, interest, curiosity, involvement and engagement affect the children	Interest develops through repetition and possibilities for 'hands on' experiences	They take the initiative in repeating the tasks several times Children are involved in a rich variety of hands-on activities

The staff reported that the children showed interest in being involved in the entire process from planting seeds and foraging to food preparation and eating (Table 1). However, the staff experienced that the children had to be physically close to be engaged. One of the staff informants said: *"They must be able to reach it and touch it and look properly for them to be interested."* The staff expressed that the children also showed a general interest in tasting both the raw food materials and the food prepared from the ingredients. The staff stated that the children wanted to taste "everything" that was presented as food, and some children even wanted to taste it more than once (Table 1). This interest in tasting was confirmed by the videos where children were to be seen tasting plants and fish—both when an adult offered it to them and also due to their own interest: *"I want to taste more"* (FP/GP).

In the FP, the staff experienced that the dissection of the animals created a significant engagement where many of the children expressed a desire to contribute and physically hold parts of the animal, such as the heart and head (Table 1). Throughout the videos of the fishing activities, this was confirmed through children's statements such as: *"I also want to hold the heart," "I want to hold the head of this fish,"* and *"I want to hold the eggs [*fish roe*]."* The children also showed verbal interest through confirmative questions such as: *"Is that what the fish eats?"*

3.2. The Community—Interactions, Collaboration and Mutual Involvement

3.2.1. The Staff's Agency

The staff of both the FP and the GP reported in the interviews that they appreciated having a joint project in which everyone in the kindergarten was involved (Table 2). In both projects, the staff exchanged resources, skills, and competencies throughout the process and thus became more confident in trying out and taking leadership in different tasks and activities along the way. One of the staff in the GP said: *"It has to do with five heads thinking better than one. Yes, it has to do with the community that makes it [easier]."* A staff member from the FP put it this way: *"If someone had told me that this is how it would be three years*

later, I would never have believed it. For it has been a fantastic journey." The staff in the FP also reported being more curious and wondering together with the children (Table 2).

Table 2. The Community dimension of CoP.

The Community Dimension (Including Interaction, Collaboration and Mutual Involvement)		
Interview statements—staff's agency	*Interview statements—children's agency*	*Video expressions—children's agency*
The staff like having a defined joint project where everyone is involved (it is perceived as unifying)	The children participate together in the whole process from the soil (GP) or field trip (FP) to the meal (cooking/ tasting)	The children work actively together with the adults in pulling nets, taking out fish, dissecting, cooking and tasting fish (FP) and in planting seedlings and watering (GP)
The staff have contributed to each other's learning, mastery and well-being at work (FP) The staff exchange resources, skills, ideas and competence	The children want to participate, help the adults and give input on ideas for joint activities	The children initiate suggestions about what children and adults can do together
Staff and external stakeholders with special knowledge and skills are important for the project's progress	The children have conversations and convey their knowledge and experience to other children, staff and parents Adult-child conversations are important for prolonging interest (FP)	The children point out what they see and express their own theories to the others (FP)
The staff have learned to be curious and wonder together with the children (FP)	The children help each other with tasks and challenges. Often older children guide the younger ones.	The children collaborate both verbally and physically on several tasks The children inspire each other to try out more
Reduced collaboration between sections in the kindergarten were due to the corona pandemic (lack of mutual leadership in GP)	Engagement by the staff and parents inspires the children and vice versa. The children and the adults explore and wonder together (FP)	The communication between the children and the adults is active and instructive in relation to the task at hand

The staff in the FP expressed that it was important that the project included some internal enthusiasts. The project was experienced as unifying by the FP kindergarten throughout the three-year project period (Table 2). In contrast, the GP staff mentioned that collaboration between sections in the kindergarten had been reduced due to the COVID-19 restrictions, and they were affected by a lack of mutual leadership due to this reduced collaboration (Table 2). The staff in both projects emphasized the value of receiving input from external experts and stakeholders (Table 2). In the GP, the children's parents were also engaged in the garden activities. The staff believed that their engagement inspired the children to want to learn and to do more.

To sum up, both FP and GP staff described the interactions between the various participants in the projects and how this evolved throughout the project periods, although a little differently between the FP and GP. The staff emphasized the importance of their own engagement and agency.

3.2.2. The Children's Agency

The staff described how the children expressed their desire to participate and to cooperate throughout the FP and GP processes (Table 2). The children took an active part in the CoP. One staff member in the GP explained: *"The children are present all the time as members of the working community. The children contribute with working when they feel like it."* This eagerness to participate was also confirmed in the transcribed videos through several children's statements, as described under domain (Table 1) and through their physical engagement in different tasks. The staff described how the children came up with their own suggestions and ideas for activities, and how they would convey intently what they knew and wanted to do (Table 2). In one of the FP videos a child suggested: *"Can we study*

the heart [of the fish]?"

As mentioned earlier, the staff felt that they inspired the children through their curiosity. However, the children also seemed to inspire the staff and the other children through their own interest and curiosity. This mutual engagement in the projects thus inspired the participants at a collective level, both from adults to children, and vice versa (Table 2). One of the staff members in the FP expressed: *"The children did a presentation about the ptarmigan to us all together [. . .] it was fun."*

One of the staff members in the FP talked about the children's eagerness to share information with others—both children and adults: *"It is obvious that it has become a part of them and that they want to tell. The fact that you want to tell means that it has given a positive impression. You won't be super eager to talk about something you think is boring."* The videos also demonstrated children sharing their knowledge and experiences with other children and adults (Table 2). For example, a child in the FP explained to another child what fish they had caught in the net: *"This is a char–a char."*

3.3. The Practice—Tools, Knowledge, Skills and Competence

3.3.1. The Staff's Agency

The staff in both projects expressed that their practice had developed and changed during the project due to sharing knowledge with each other and gaining practical experience (Table 3). This, among other things, meant that the staff expanded their involvement and the range of activities they were responsible for. Several of the staff members said that they had matured by taking greater responsibility for activities related to foraging and gardening with the children (Table 3). One of the staff members from the FP put it this way: *"When I started working here, I hid behind the curtains when we dissected ptarmigans. I thought I could never do that. But I'm responsible for that [dissecting ptarmigan] this year [laughing]."* Another staff informant from the GP said: *"I am no expert, but I [or we] figure it out eventually*."

Table 3. The Practice dimension of CoP.

The Practice Dimension (Including Learning Competence)		
Interview statements—staff's agency	*Interview statements—children's agency*	*Video expressions—children's agency*
New practices and knowledge were established during the project period	The children show competence in foraging and gardening, both physically and verbally	The children participate actively in all kinds of activities, both with fish (FP) and in the garden (GP), and they use specific biological terms
The practices improved and expanded over time	The children have learned that they can go straight into the forest or to the garden to find food resources	It seems naturally for the children to make food from the fish caught (FP) and to taste and water the plants (GP)
The practice created engagement and ownership (GP)	The children repeated and expanded on the activities	The children showed interest in dissecting different fish (FP) Their interest in tasting was evident throughout the video (GP)
The practice created desire for more competence (FP)	The children cared for their plants and crops after repeated practice in the garden (GP)	The children took the initiative in planting out seedlings and watering plants, especially those standing in dry soil (GP)
The practice changed attitudes towards spending more time outdoors (FP)	The children gained motor skills through the harvesting trips (FP)	The children were moving around in rough terrain when pulling the fishing nets (FP)

The knowledge, skills and competences that evolved were more pronounced in the interviews with staff from the FP than from the GP. One of the FP staff said: *"Well, I've learned incredibly much. I got knowledge about things I've never ever done before."* The FP staff

felt that they had become more courageous about trying out new things in the course of the project (Table 3). The staff in the GP also felt that they had gained in competence. One of the GP staff put it this way: *"It [the competence] has increased of course, but it is not that we are on top of it and know everything."* Yet another from the GP was not so sure about her competence: *"I don't know if we have learned so much . . . the potatoes are still small."*

The staff in the FP described that they had become more aware of the opportunities that lie in foraging natural resources from the local area. They emphasized their intention to be more spontaneous in taking the children outdoors and the value of focussing on the process rather than on the outcomes of a trip (Table 3). Foraging for nature's resources has become a tradition in the FP kindergarten, and they now practice it all year round. The GP kindergarten has also established gardening as an annual activity with garden boxes in several spots in the kindergarten area, and this had commenced before the official GP was established. However, the official GP was part of a research project on ECEfS with the aim of widening the gardening activities to engage all the staff and children in the process and to involve parents and external experts.

3.3.2. The Children's Agency

The staff of both projects claimed that the children showed increased competence during the project, and that this was expressed both verbally and physically (Table 3). The children developed the necessary skills to plant, harvest, and prepare food based on the raw materials. They passed on their knowledge to others (adults and children), used correct scientific terms, and expressed their knowledge of where the food came from and where they could find it outdoors (Table 3). Such knowledge was confirmed in the FP fish videos, for example, in statements like: *"Here is the stomach," "This is a trout,"* and *"This is a char."* In the GP videos, the children's competence and knowledge was exemplified through their own initiative in irrigating plants that were dry, and by children who expressed that they wanted to smell and taste certain plants (Table 3). The GP staff remarked that the children acknowledged the difference between a carrot from the grocery store and a *"real carrot"* that they had grown themselves. The staff commented that the children developed their competence through the repeated activity (Table 3).

4. Discussion

The first aim of our study was to explore to what extent working with ECE projects on food foraging and gardening in kindergartens could be recognized and categorized as CoPs as defined by Wenger-Trayner (2015) [49]. This was done to establish the participatory effect of the social and situated learning for all members who were working together on the practice of a certain domain of interest, such as foraging and gardening. The second aim was to explore how these activities worked in implementing pedagogical approaches to ECEfS, and the third aim was to establish whether these activities could contribute to learning and agency for the social and cultural aspects of sustainability within the context of ECE. We narrowed the scope for social and cultural sustainability to include participation, agency, collaboration, inclusion, belonging, and sustaining cultural heritage as related to foraging and gardening for food.

4.1. Community of Practice in the FP and GP

Our results suggest that, in both similar and different ways, the two projects can be categorized under the dimensions of CoPs through learning, agency, and the interaction of adults and children during the practice. We see clearly that both staff and children showed, to varying degrees, interest, curiosity, and passion for the domains of foraging or gardening. For some of the adult participants, the interest was connected to their identity through their own cultural upbringing (e.g., the Sami tradition) or something they also did in other areas, outside of the kindergarten (e.g., at home). Passion for the domain is crucial to a CoP, and it is often a deep part of the members' personal identity [50]. It seems as though the members' identity as connected to foraging or gardening was only present to a minor extent prior to

the project period and it became more strongly developed through the time spent on the projects. This was quite evident in the FP, which lasted for three years, but less so for the GP that went on for just one year. The children had to be physically close to be interested and engaged, which suggests that the real-life encounters with food foraging and production were important in creating their passion for the domain. This is also acknowledged by Pecaski McLennan who states: "Young children need repeated experiences observing, exploring, and experimenting within a supportive social context in order to be actively engaged in authentic learning and connected to their peers" [31] (p. 333).

Some CoPs are self-organized, and they are fundamentally self-governed, but most CoPs need both frames and structure and some form of leadership to run the process going forward [49]. There will often be core-members of the group who either have or take special responsibility for the process, while other members play a more peripheral role. In the FP, the staff emphasized the importance of having internal enthusiasts who took informal leadership roles in the project, thus forming core member initiatives. In contrast, the GP staff experienced a lack of such mutual leadership, probably due to the COVID-19 outbreak, which impacted the restricted collaboration experienced in the GP. This restricted collaboration, and the shorter duration of the GP compared to the FP, may suggest that collaboration and mutual engagement within the kindergarten CoP over time are important for its development and progress. Although the children had a more peripheral role as members of this CoP regarding when and how they did things, they were highly engaged, both verbally and physically, with the task at hand in the field or in the garden. The children's agency in both CoPs was based on their request. The children wanted to participate, explore, share ideas, collaborate, contribute, and help each other with the tasks at hand. This is in line with the findings of a participatory case study in a New Zealand kindergarten, which was working with education for sustainability, where belonging, contribution, communication, and exploration were found to be central [11]. A case study that explored kindergarteners' learning when they were engaged in hands-on garden activities suggests that children share their knowledge about the world with others while developing important skills [30].

The practice in a CoP includes developing a repertoire of resources, which, among other things, implies the common development and sharing of ways of doing things and of using resources [49]. The staff in both projects expressed how new practices were initiated, evolved, and shared throughout the project period. The findings indicate that these projects had an impact on the day-to-day practice of the kindergartens, establishing traditions of gardening and foraging that exceeded the end point of the projects. The fact that the practice occurred frequently also inspired the children to harvest food on their own and to share their knowledge about food with their parents. This is another form of children's agency that arose from "wayfaring" this practice together with competent adults in the kindergarten [41]. Similar findings involving the establishment of children's agency through foraging projects have been obtained from an Alaska native rural context [33]. In foraging societies, children are reported to be active learners who participate in learning from their own free will, and the learning is an ongoing, playful activity that is part of everyday life [29]. In these contexts, learning may be an "incidental by-product of social life" [29](p. 386). This description of children's agency for learning in foraging practices resembles the concept of CoP in our FP and GP studies.

4.2. Foraging and Gardening as ECEfS

Foraging and gardening for food are authentic "real-life" activities that everyone can relate to as being important since all people need food every day. The FP or GP may therefore have a different status or value to the participants in comparison to an art or science project, even though these latter mentioned projects also include hands-on experience. Our results confirm that foraging and gardening activities are mainly situated outdoors, they include children in real "adult work" and in our cases, the process of learning is community-based where the children participate actively, both verbally and physically.

Our study has accommodated several of the cornerstones of ECEfS that have been outlined in a recent systemic review that promotes community-based learning approaches that are value-oriented (ethically) and promote agency [1]. The same review acknowledges outdoor education as a basis for ECEfS as it elicits long-lasting bonds between the child and the local environment (place). Repeated encounters with the natural environment and the harvested food were acknowledged by the children in our study as being genuine and more real (e.g., *"a real carrot"* in Section 3.3). The children also learned that they can go straight into the forest or into the garden to find food resources (Table 3). This suggests that foraging and gardening in ECE are significant in achieving a real connection with nature and its resources, which is an important aspect of learning sustainability [7,8]. The children's early connection with the environment through their engagement in local food activities is thought to establish the ecological or environmental identity needed for sustainability [32–34]. The outdoors also gives young children greater freedom to act autonomously [9,59], which is confirmed by the video material in this study. Project and problem-based learning are also highlighted as pedagogical approaches to ECEfS [1,12], and this is at the heart of our study in that children and adults explore different aspects and approaches to foraging and gardening together.

4.3. Foraging and Gardening for Social and Cultural Sustainability

The findings from the FP and GP show that the adults in the kindergarten included the children in the work. The staff believed that the children were able to do things and the children wanted to participate. Together, the children and adults coped with the challenging work of sowing, watering, picking berries, catching fish, and examining the insides of animals, all while gaining experience in working side by side to obtain food. This may provide the basis for coping with complex situations and solving critical problems through collaboration and negotiation with others later in life [12].

Our FP and GP studies have shown that the social learning context outdoors, in collaboration with stakeholders of different ages and levels of expertise, created spaces for deep engagement, coping, and mastery of new skills together with a curious exploration of local food resources at different levels. Some of the staff participants matured into daring to do things they never believed they could master, and others were driven by their curiosity and interest to learn more. We postulate that the FP and GP projects have created a sense of belonging to nature through foraging and gardening for food and by belonging as members to an evolving CoP. The children were situated within the adult world and were embedded and included in the learning activities [54,55]. This is highly relevant to the social aspect of sustainability, which advocates participation, agency, collaboration, inclusion, and belonging. The children in the kindergarten clearly wanted to participate from their own free will and to explore and taste the food that they had retrieved or grown themselves.

Food connected to the local area is a strong cultural marker, and therefore the engagement in the FP or GP in kindergarten leads naturally on to a discussion on the cultural dimension of sustainability. The Arctic food culture has traditionally been highly connected to the local environment and the resources people can find during the different seasons. Traditionally, the food resources for surviving the long winter have mostly come from animals since plant materials are scarce and only available during the short summer. Although most people in northern Norway, including the indigenous Sami, now obtain the majority of their food resources from the grocery store, to a certain extent, the harvest culture is still ongoing. The Norwegian Government also emphasizes that children and youth should get insights into foraging as a part of their Norwegian culture and as a contribution to education for sustainability [26].

In our study, external stakeholders with some expertise in foraging and gardening were initially involved in the projects in the kindergartens, thus providing vertical transmission of knowledge and skills, as described by Nugent and Beames [36]. However, most learning and exploration were obtained through mutual engagement by both the children and adults

during the practice. Learning also occurred between the children (see Table 2), representing horizontal learning (between people of the same age) or as retroactive learning (from child to adult) [37]. However, direct perceptual engagement with the situated practice of gardening in kindergarten is ultimately a process of wayfaring [41] where cultural and place-bound "knowledge is integrated alongly" [42] (p. 154). Wayfaring is described as active engagement through attention, perception, and participation, which establish a relational connection to the task at hand that is essential to learning [42–44]. Learning, in this sense, is thus not transmitted but obtained through recurrent encounters with the cultural practice: "we know as we go, not before we go" [43] (p. 230).

The social and cultural learning context of foraging and gardening for food is highly relevant for ECEfS. Food has special status for us as human beings as it nurtures us, stimulates our senses, and is in the daily practice of shared meals. Children's participation and agency in growing and obtaining local food and their discovery of local food heritage and traditions will be significant knowledge for generations to come.

5. Conclusions

The foraging and gardening projects in this study can be recognized as CoPs where all the members in the kindergartens were engaged and learned in the practice. The staff and children explored and learned through hands-on activities and meaningful experiences based on social interactions and a growing interest in the domain of practice. The authentic practice of obtaining local food in the outdoor environment through community projects, problem-based learning, and children's agency and participation involved highly relevant pedagogical approaches for ECEfS. The way learning occurred in these projects was not only based on a traditional vertical transmission of knowledge from "expert" adults to children. Rather, the growing competence arose from a mutual engagement in foraging and gardening for food in a local and traditional context (cultural aspects). Both adults and children showed active participation and agency during the process (social aspects), and their inner drive to know and experience along the way was essential to the outcome. To be part of a kindergarten CoP that is engaged in practical actions for the traditional and place-based use of food resources can contribute to learning and agency for both social and cultural sustainability. We may need to be more sustained by local foods in the future. Maybe these skills and this knowledge will be highly significant for the new generation in our growing urbanized world threatened, as it is, by climate change? Further research should focus on how participation in foraging and gardening projects in the kindergarten will contribute to children's agency for sustainability in the future.

Supplementary Materials: The following are available online at https://www.mdpi.com/article/10.3390/su13084368/s1.

Author Contributions: All authors contributed equally to conceptualization, methodology, validation, formal analysis, resources, data curation, and writing—original draft preparation. Writing—review and editing—was done by V.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research was partly funded by the Norwegian Research Counsel, grant number 275575.

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and it was approved by the Ethics Committee of the Norwegian Centre for Research Data with protocol code 35535, date of approval 12 November 2013 (foraging project) and 920483, date of approval 12 September 2019 (gardening project).

Informed Consent Statement: Informed consent was obtained from all participants involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy and ethical considerations.

Conflicts of Interest: The authors declare no conflict of interest.

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