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Passive feeding or active learning in the kindergarten foodscape?

Qualitative insights from the Dagmar intervention

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Abstract.

Introduction

There is a growing interest in actions that can contribute to increased food literacy and health among young people. As a result, the topic is increasingly becoming the subject of policymaking both in public health and in the educational system. Public engagement in these fields has led to a new focus on the importance of food for young people in institutions. However, approaches seem to follow slightly different paths. Food is mainly seen as a question of providing food or as both a question of providing and learning about food. This paper aims to explore the latter of these. Do kindergartens have the potential to move beyond simple provision and become active spaces for learning and literacy development? And, if so, what are the potentials and barriers for such approaches?

Methodology

A formative evaluation of the Dagmar foodscape intervention implemented in the Fuglsang kindergarten in the Danish city of Aalborg was performed. A case study approach based on observations, interviews, and focus groups was applied. The Dagmar intervention – an integrated food provision and learning programme – was developed and implemented. Qualitative data was collected to gain an insight into the potential and constraints for developing food literacy among children using such an approach. Pedagogues and kitchen staff were the informants in the data collection. The intervention was organized using an action research approach in which data was collected as an integral part of the intervention. Data was collected using observations and focus groups interviews. The intervention aimed to develop and evaluate new tools and instruments for the creation of food literacy among children with the participation of pedagogues and kitchen staff.

Findings

The intervention succeeded in creating a new type of foodscape in the kindergarten in a way that combines the preparation and the serving of food with both in-door and out-door hands-on food activities for children. A conceptual model of this foodscape consisting of a mealscape, a kitchenscape and a learningscape is suggested. Pedagogues and food workers were identified as important potential change agents in the kindergarten foodscape. Preferences and likings,

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knowledge, skills and competencies, as well as the language children used were identified as important aspects of the food reality in kindergarten. These were perceived as important cornerstones in the understanding of the kindergarten foodscape and its action possibilities. Knowledge, skills, and competencies in the two important professions of the kindergarten workforce were identified as important determinants that need to be addressed if the full potential in the action possibilities of kindergarten foodscapes is to be unleashed. Interdisciplinarity based on a mutual inter-professional recognition was identified as key to the development of the kindergarten foodscape. The study identified two important areas for action: the social practices around lunch and in-between meals as well as stand-alone pedagogical activities based on a hands-on approach and learning by doing. The study suggests that addressing the determinants are important if the kindergarten foodscape is to be used to create healthy eating and food literacy.

Discussion

The study provides new insight into the value of hands-on food activities for fostering food literacy in the kindergarten. In addition, the study functions as an exploration of the application of foodscape studies in understanding the complexity of food and eating in kindergarten. The study identifies important action possibilities in the kindergarten foodscape and suggests that the kindergarten could be an important arena for the promotion of healthier lifestyles and food literacy among kindergarten-aged children. The study suggests that there is a need for a new interdisciplinarity among the two key professions in the kindergarten and that the pedagogical curriculum in the pedagogues' education could benefit from a rethinking focusing on food and eating and problem-based learning.

INTRODUCTION

Sedentary lifestyles and unhealthy eating patterns have negative health consequences, and in particular there is concern about unhealthy lifestyle patterns among children and young people. Low levels of food-related knowledge and skills as well as poor food literacy among young people have been suggested as a contributing factor (Caraher et al 1999). Many lifestyle patterns are established in early life (Kelder et al 1994; Neumark-Sztainer et al 2011; Skinner et al 2002), and studies have shown that health status has a tendency to track into adulthood (Whitaker et al 1997; Wright et al 2001). Also, eating behaviour tends to track into adult life (Birch et al 2007; Mikkilä et al 2005), and studies have shown that children are more likely to accept new foods at kindergarten age than later on when they are school aged (Skinner et al 2002; Neumark-Sztainer et al 2011). As a result, there is a particular interest in population-based strategies that target children in their early years. The settings-based approach has increasingly been suggested in policy documents that attempt to suggest actions counteracting the increasing prevalence of obesity and overweight (Council of Europe 2005; WHO 2006; EU 2007). The settings approach (Dooris 2001) argues that targeting behaviours (e.g., eating) among children in their daily life arenas (e.g., kindergarten) is particularly effective. As a consequence, settings-based strategies aimed at promoting healthier lifestyle patterns in kindergarten have increasingly become an object of scientific inquiry (Mikkelsen 2009; Caroli et al 2011; de Silva-Sanigorski et al 2012; Olesen 2013).

In particular, interventions focusing on food and eating have become popular, since in many cases meal activities are an integral part of daily life in the kindergarten (Hughes et al 2007; Gubbels et al 2010). Furthermore, meal activities as a social practice constitute an opportunity for learning about social life and the meal, as well as about life skills, nutrition, and a healthy lifestyle. Food for children in institutions for children have undergone a remarkable transition over recent decades (Morgan & Sonnino 2008; Mikkelsen 2014). From being considered a rather mundane and trivial task, food services in these institutions are now being explored for their potential to be more than just passive feeding, and a new public engagement in this field can be seen in many countries. As such, the kindergarten is increasingly recognized as a space for both learning about a healthy lifestyle and life skills as well for practising healthy eating practices. And, there is an increased recognition of the need to think about meals for children in such institutions as much more than the simple provision and satisfaction of physiological needs. This also involves addressing the learning potentials as well as social aspects. Andersen and Holm (2013) point to the need for a deeper understanding of the meaning of food culture in day-care meal pedagogy, and in particular how food literacy, food “bildung”, and food enjoyment are interrelated, and Sandell et al (2016) point to the need for using the food practices as active learning components. According to Jonsson et al (2005), there is also an unexplored potential for using hands-on learning approaches and experimental education among young people at school. Truninger and Teixeira (2015) argue for a rethinking of meal practices in order to emphasize, the innovative, sensorial, and creative aspects rather than the ones related only to food provision. In particular, there is need to study the differences in ways of providing food in individual versus collectively organized fashions. According to Karrebæk (2013), traditional lunch box schemes risk creating different food cultures within the kindergarten rather than a collective one.

However, previous studies have shown that far from all pedagogues feel responsibility in relations to the eating patterns of children in kindergarten (Mikkelsen 2011). In addition, the Danish kindergarten system has been the target of an increasing number of policy initiatives over recent decades, including the bill on curricular plans (Ministry of Social Affairs 2004) as well as the bill on lunch arrangements (Ministry of Social Affairs 2010). This politicization of the kindergarten arena may be causing resistance from staff and deserves special attention when new food and nutrition schemes in kindergarten settings are considered. Against this background, the Dagmar kindergarten food-intervention was developed to explore the potentials of an integrative approach to learning about food and nutrition in the kindergarten in which both the *practices around eating* as well as the *pedagogical and didactic opportunities* are taken advantage of.

The aim of the paper was to explore the potentials of the kindergarten to move beyond a simple and passive feeding mode of operation to also act as an active learning space that can contribute to food literacy through hands-on food interventions.

CONCEPTUAL FOUNDATION

Conceptually, the Dagmar study builds on two main concepts. The first one is the idea that it is possible and useful to understand the kindergarten as a foodscape. Foodscape studies have evolved over recent decades and represent a way to underline that the food environment is more than just the food, since it also includes a dynamic socio-physical space in which not only eating takes place but where potential learning about food and eating can also take place (Mikkelsen 2011, 2014; Torralba & Guidalli 2014). Secondly, the paper builds on the idea that we can refer to the learning outcomes of the active learning processes about food and eating as food and nutrition literacy (Vidgen & Gallegos 2011; Dyg & Mikkelsen 2016). The increasing number of papers published

using the foodscape as conceptual framework runs in parallel with the increasing number of studies examining the role of food environments in shaping food choices. Common to both the foodscape and the food environment perspective is that both of them acknowledge the importance of food and the individual but that they in addition also take the “out there ness” into consideration in the sense that contextual factors in the food choice and eating situation is acknowledged as being important. As such it should be noted that the role of kindergartens as “settings” that influences foodways previously has been studied using other terminology for instance a food environment conceptual understanding (Story et al 2008, Hardy et al 2019, Manios 2013).

By taking a foodscape approach, the Dagmar intervention aims to look at the whole of the kindergarten and its activities. It adopts a view where food is not only the feeding of children but also but also the learning and pedagogical activities. In the context of this paper, the idea of a foodscapes approach has been used to frame the complexity of the food reality of the kindergarten. Although foodscape studies has been developing over the past decade it has not yet resulted in clear framework for foodscapes that can be used for analytical purposes and the concept is continually evolving. The current study is an attempt to make a contribution to the development of foodscape studies.

The idea of foodscapes – as well as the idea of food environment studies - takes the settings approach to health promotion suggested by the WHO in 1986 (Dooris 2011) as a point of departure. The settings mindset understands the spaces where everyday life practices unfold as well-suited arenas for actions that can promote a healthier lifestyle in its broadest sense. In the study, the notion of a foodscape is used as a way to refer to, capture, and understand the complex socio-physical environment that makes up the kindergarten in relation to food, eating, and learning. This space is at the same time a place for eating practices in relation to breakfast, lunch, and in-between meals, as well as a place for learning about the multitude of meanings and aspects of food and eating. The foodscapes way of thinking offers a framework for understanding this mesh of people, food, and environment present in the kindergarten environment.

Foodscape studies (FSS) has been a growing area of research among scientists engaged in the study of foodways, and it offer a well-suited conceptual foundation that can be used to accommodate the holistic approach that is needed to understand the complex social interactions taking place in relation to eating at an early age in kindergarten. The concept of foodscapes draws on inspiration from different sources. The idea of “-scapes” was originally put forward by Appadurai (1996) to capture the interconnectedness of things over place and time. It has been further developed by different scholars into the idea of “foodscapes”.

According to Adema (2007) the foodscape can be seen as cultural, economic, historical, personal, political, and social landscapes that are related through food. Foodscapes in institutional settings can be referred to as “captive foodscapes” in order to illustrate the special importance of the places where we eat frequently in “captive” daily life, such as schools, kindergartens, and institutions (Mikkelsen 2011, 2014; Torralba & Guidalli 2014). These foodscapes can be assumed to be of special dietary importance due to the high frequency of eating there. And not only do they have dietary significance, they also offer – under the right conditions – the potential for learning. The idea of foodscapes is further inspired by Gibson’s (1986) notion of affordances – the action possibilities that the environment offers.

The Dagmar intervention uses the idea of a kitcheneur. It is rather new type of role in Danish daycare – at least in the kindergartens. Arrangements for serving food for children in day care has been present for many years and has historically been practiced for the infants and toddlers 0-3 years of age in some institutions. But since the new nation-wide legal framework for lunch

arrangements for the whole of the day care domain was adopted in 2009 a new type of profession has developed. In this paper it is referred to as a kitcheneur. A kitcheneur is a new role in the kindergarten rather than a new educational background. Kicheneurs are thus taking on the responsibility of exploring the opportunities in the borderline between pedagogy and foodservice. Between serving and learning about food. These opportunities has been developing in the wake of the new interest in taking advantage of the possible food literacy training opportunities that the new lunch arrangement schemes has brought along. Kitcheneurs comes with more educational backgrounds and can have a formal education either as administrative dietitians or as home economists. As such, they will have broad knowledge and skills in nutrition. Since official recommendations issued by the National Food Agency exists the kitcheneurs are responsible for making sure that meals are in compliance with those. But kitcheneurs on the other hand has not necessarily received formal training in pedagogically oriented agricultural practices or in new types of urban food, gardening or farming technologies. As such the kitcheneur plays an important role for the kindergartens that has chosen to develop as a way to develop the opportunities that lies in moving from passive feeding to more active learning and pedagogical strategies.

In the Dagmar intervention, the foodscape way of viewing the kindergarten has been used to create a mental and physical space where the actors involved – pedagogues and kitcheneurs – can develop and test the reach of the active approach to learning as an alternative to a traditional passive feeding approach to food in kindergarten. One strength of using the idea of affordances in this context is that it underlines the fact that different actors see different opportunities, and as a result, different actors need opportunities to negotiate a shared view of how the kindergarten foodscape should be used. This is in particular important in the Dagmar intervention, since it builds on the combined efforts of food and learning staff (i.e., the kitchen workers as well as the pedagogues). For obvious reasons, the way of looking at food is different between kitcheneurs and pedagogues. Using a foodscape way of thinking allowed for creating a mentally and physically coherent space encompassing both a backend kitchen part as well as a front stage part for pedagogical and learning purposes.

The idea of food literacy builds on theories that the sum of the knowledge, skills, and competencies of children in relation to food can be expressed as a literacy of the individual. With the increasing prevalence of nutrition-related disorders and unhealthy eating patterns of young people, the idea of literacy in relation to food and eating has increasingly become the subject of scientific inquiry. The role of home economics in fostering food literacy has been studied by Caraher and Reynolds (2005), Smith (2009), and Pendergast et al. (2011), as well as the role of cooking classes (Chenhall 2010). The study of knowledge, skills, and competencies in relation to food and nutrition originates in the work on agricultural literacy, defined as the understanding of the entire food chain architecture (Powell & Agnew 2008). The idea of food literacy focuses on the consumption side and has been dealt with in a number of contributions (Brooks & Begley 2013; Vidgen & Gallegos 2011). Food literacy is the:

relative ability to basically understand the nature of food and how it is important to you, and how able you are to gain information about food, process it, analyse it and act upon it.
(Vidgen & Gallegos 2011)

A growing number of studies suggest that there is a link between hands-on food activities and food literacy. Hands-on food activities are based on the ideas of learning by doing (Dewey 1938; Fordyce-Voorham 2011), and they cover a broad range of activities for young people in

school/kindergarten besides simple eating and are all aimed at creating learning about food and nutrition by integrating them with food activities (Mikkelsen, 2013). These include, growing, harvesting, preparation, menu planning, sensory activities, and other activities related to other parts of the food chain than the meal itself. The literature of such doings is growing and includes activities such as taste education, Farm2School links, outdoor cooking, roof gardens, edible school yards, cooking classes, and school gardens. For instance, the Farm2School cooperation has in a number of cases been successful in creating connections between kindergartens and local farms (Roche et al 2012; Ratcliffe 2012; Moss et al 2013), allowing for cooperation where children and teachers can visit and learn about farm life and where farmers can visit and teach in kindergartens. In some cases, such links with local food geography has also been extended to include local sourcing for the school meal programmes (Ruge & Mikkelsen 2013).

It should be noted the traditional understanding of food literacy does not include agricultural literacy. And the growing and production part is not incorporated in the foodscape literature particularly neither.

The idea of expanding the understanding of food literacy to cover also the farm side part of the farm to fork chain is in line with the increased interest in Nature Based Solutions (Maes & Jacobs 2017) that is dealing with the challenge of increased disconnectedness between man and nature. For the context of the kindergarten Uhlmann et al (2018) has been studying links between the foodscape that surrounds us in the environment and our attraction for living systems and nature. According to Uhlmann et al (2018) connection with nature has been shown to benefit human wellbeing and promote pro-environmental behaviours.

The idea that nature includes for instance urban farming and gardening can potentially be an integral component of urban foodscapes – for instance those that unfolds in and around a kindergarten - has increasingly been studied. There is evidence of the practices of school gardening (Heim et al 2011; Evans et al 2012; Jaenke et al 2012; Ratcliffe et al 2007; Wistoft 2013), and on-site gardening has also been reported – so-called edible school yards (Murphy 2003). In some cases, the cooking activities are linked to outdoor school activities (Bentsen et al 2009; Maller 2009; Mygind 2009). Furthermore, there is some evidence that hands-on school gardening may affect food intake. For instance, Ransley et al (2010) reported an increased consumption of vegetables in schools that had gardens compared to those that did not. The Sapere approach to taste education of children in school and kindergarten has been shown to have an effect on the determinants of food intake. Mustonen et al (2009) showed that children who participated in the training improved their skills in identifying tastes and odours and in characterizing foods. This effect was found in particular amongst younger children. The study by Mustonen et al (2009) showed that sensory education activated children's odour and taste perceptions and improved their ability to describe sensory properties of food. Sensory education has also been shown to be able to decrease food neophobia score and increase the intention to try unfamiliar foods in 8–12-year-old children (Mustonen & Tuorila 2010). Reverdy et al (2010) showed that the effects of taste education could be sustained over time. However, such new approaches to learning that view the food as a learning opportunity tend to interfere with the practices of the institution in which they take place, often requiring new curricular plans and a change of routines and supplies. As such, it is important to examine the extent to which such new practices can be implemented in the daily life of the kindergarten.

METHODS

The study was conducted in a Danish kindergarten in the city of Aalborg. The foodscapes in kindergartens in Denmark have changed dramatically over recent decades due to government regulations. Firstly, since 2004, Danish kindergartens have been subject to a regulation that requires the adoption of kindergarten-specific curricula. These curricula are targeted at children aged 0–6 years in day care and focus on six thematic areas: personal development, social skills, language, motor skills, nature and natural phenomena, as well as cultural expressions and values (Ministry of Social Affairs 2004). The regulation does not mention food, nutrition, and healthy lifestyle specifically, but it has acted as an opportunity to address such issues in many cases. Initially, there was little tradition of serving meals in kindergartens, and children would instead bring their own packed lunch every day. However, due to a government decision, it has been compulsory for municipalities to offer the parent the possibility of voting for a lunch arrangement since 2010. According to this regulation, lunches complying with official guidelines should be available in all municipal and private kindergartens unless a majority of parents vote against it. Lunches are paid for by the parents, but low-income families can in certain cases be eligible for a free pre-school meal entitlement. It is estimated that approximately 30% of kindergartens have a lunch arrangement in operation either as an in-house system or a delivery system (Glavind 2013). The government regulations have fuelled an increased focus on institutions as places for healthy eating and have increased the focus on the responsibility of kindergarten staff as supporters of new types of foodscapes that link the lunch arrangements to the learning potentials in kindergarten.

The Danish kindergarten system has undergone important change over the past decades. It is offered all over the country and covers time before children enter the compulsory educational system. Children attending kindergarten are three to five year-olds. The majority of Danish kindergartens are public and although it is not compulsory to attend a kindergarten most children do. The workforce in kindergartens are mainly professionally trained pedagogues normally with a 3-4 years background from a university college in pedagogics. Unlike the schools kindergartens does not have formal responsibility for teaching. Instead the activities aims to stimulate the social, linguistic and fine motor skills of the children which are expected to be obtained mainly through play. All kindergartens are requested to describe their curricula activities in learning plans. Food service and nutrition education has not traditionally been a part of the activities in kindergarten but this has gradually changed. With the “lunch arrangements in kindergarten bill” from 2009 the Government for the first time introduced a framework for how collective foodservice voluntarily could be offered in kindergarten. The bill mainly deals with the practicalities of serving lunch and not with the pedagogical potentials of integrating food activities into the pedagogical space of the kindergartens.

The increased interest for the role of food service in the Danish kindergarten system coincide with an increased in interest in untapping the potentials using food and nutrition education to develop the literacy of children through the integration of pedagogical food activities with meal activities. It also coincides with an increased attention given to nature based solutions and the tradition of using the natural environments and opportunities to develop outdoor learning activities as part of kindergarten activities.

DAGMAR INTERVENTION

The intervention was developed to explore the effects of lunch arrangements in Danish kindergartens. The name of the intervention Dagmar (“Dannelse og sundhed gennem bedre madrammer i børnehaver”) was constructed as an easy to communicate acronym to signal the idea

of food, literacy and health among kindergarten aged children. Dagmar is at the same time a traditional Nordic girls name with positive associations to words like “joy” “peace” and “adorable”.

It was developed following a participatory approach in the Fuglsang kindergarten in the Danish city of Aalborg to meet the needs that has followed in the wake of a growing interest among pedagogues, parents, politicians, health promoters and the media on the potential positive effects of introducing publically delivered meals in kindergarten. The intervention was evaluated using both a formative approach as well as using a summative approach. The formative part is reported in this paper. Results from the summative research can be found in the research database of Aalborg University (<https://vbn.aau.dk/da/projects/the-learning-preschool-foodscape>).

The purpose of the intervention was to develop and test programme elements that could contribute to the creation of food literacy through hands-on food activities. The intervention was developed using an action research approach (Lewin 1946). This approach is a participatory research strategy in which researchers and practitioners are mutually engaged in the development of the intervention, while at the same time researchers collect empirical data for evaluating the programme. According to Danish standards, the kindergarten is medium-sized, with approximately 50 children, and is based in an old detached house with a spacious garden. It is located in a residential area of the city. The kindergarten is open to children aged 3–6 years and has 11 pedagogues, 1 manager, 2 assistants, and 2 kitcheneurs. In the kindergarten, there is room for 40 children in addition to day care for 10 children aged 0–3 years. However, the Dagmar intervention targeted only the kindergarten-aged children.

INTERVENTION COMPONENTS

According to the extended foodscape view of the kindergarten, the Dagmar intervention targeted two important dimensions of the kindergarten foodscape: the activities evolving around the food and meal provision taking place around the daily lunch arrangement and the learning activities evolving around the hands-on food activities. The idea was to create a consistent and meaningful foodscape encompassing both the meal situation as well as the learning activities of the kindergarten in relation to food, nutrition, and eating.

The hands-on food activities of the Dagmar intervention involved eight different educational activities: Individual Book of Season, Kindergarten2nature, Is Nature Edible? The potato growing project, Our own Gardening program, “From Planting2Harvest”, “End of season” theme, Preserving4Winter, and Taste Workshops based on the Sapere approach. The data collection was structured in two pillars and involved *observation* and *focus groups* with kitchen assistants and kindergarten pedagogues. The kitchen assistants – the kitcheneurs – are responsible for the backend activities in relation to food service, whereas the pedagogues are responsible for the frontend pedagogical activities, including the serving of the food, the staging of the meal itself, as well as for the learning and pedagogical activities in relation to food, healthy lifestyle, and eating.

FOCUS GROUP INTERVIEWS

The focus group interview was carried out based on a protocol developed for the PERISCOPE kindergarten study (Sansolios & Mikkelsen 2010, 2011; Caroli et al 2011). The focus group meetings was conducted after the intervention. The audio recording from focus group interviews was transcribed verbatim and the text was condensed into consistent meaningful units. The purpose of the focus group interview was to provide insight into employees’ knowledge, skills, abilities, and desires, as well as their views on the topic of food in the kindergarten. Secondly, the purpose

was to focus on the factors that help to promote or inhibit the educational work of integrating the subject of food into the six mandatory topics in the curriculum and identify any pattern of agreement and disagreement among kindergarten pedagogues about the possibility of this integration.

The interview guide covered the pedagogues' perceived responsibility for food topics as well as the perceived opportunities and constraints in the structural kindergarten environment. The topic of the interviews was children's lifestyle; eating patterns and food literacy; the types of food; eating practices and preferences; the role of knowledge, skills, and competencies; the interface between the kindergarten and the family foodscape; and role modelling, and in order to decrease the drop-out rate the interviews were carried out in connection with already arranged staff meetings. The interviews took place in the kindergarten and lasted approximately 90 minutes. Participants were informed two weeks before the scheduled focus group interview after the manager had been informed about the necessary length of time. A Dictaphone was used in the focus group interviews, and conversations were subsequently transcribed by condensation of meaning.

Different technology assisted options for thematic analysis was considered including the NVivo software package for qualitative data analysis. However due to the perceived constraints in terms of time consumption for learning, lack of university technical support and limitations in the budget this technology was not chosen.

OBSERVATIONS

Observations based on video recordings were used during lunchtime meals to supplement the findings from the interviews. For these recordings, two camcorders were set up to record the practices around the lunch meal in pictures and sound. Observations were made and filmed during the intervention. The recording functioned as indirect observations, in the sense that the participants observed were aware of the fact that they were being filmed but were not aware of the particular theme. The main advantage of using a camcorder is that the camera captures both sound and behaviour (Lokken & Søbstad 1998). The observer can thus replay the recording after reflecting on some sequences, thus extracting more than would be possible through direct observation alone. For instance, there could be sequences that at first seem random but that later emerge as meaningful when repeatedly replayed and reflected on. Parents were asked to provide their consent that children were filmed during the meal situation and were informed that this was part of a research programme aimed at developing learning around food and nutrition. All parents gave their written consent to the Dagmar project coordinator in cooperation with the kindergarten manager. The observation was performed based on the traditions used in visual ethnography. The purpose of the participant observation was to gain insight into the interaction between the children and kindergarten pedagogues taking place in the foodscape evolving around lunch. The focus of the observation was the interaction observed not only between the individual and the food but also between everyone at the table and their mutual interaction around the food. An observer was present during the lunch situation, and field notes were written while they were fresh in the observer's memory. The video recordings from the meal situation were transcribed and the text was condensed into consistent meaningful units. All interviews and observations were written in Danish and were subsequently translated into English.

Finally, the data collected were analysed using the conceptual foundation as analytical inspiration, and the findings were grouped thematically according to three spheres that were believed to be able to explain important dimensions of the kindergarten foodscape: the

kitchenscape (the backend activities taking place with the kitchen as the centre), the frontend mealscape (centring on the lunch practices), and the frontend learningscape (unfolding around the pedagogical-oriented hands-on food activities).

FINDINGS

A number of themes emerged from the interviews and observations, and altogether they paint a picture of the kindergarten foodscape and its potential for contributing to learning and food literacy. Building on the idea of a kindergarten foodscape the findings has been broken down into three themes – three *-scapes*: The kitchenscape, the mealscape and a potential learningscape that stretches and links with the kitchenscape and the mealscape. The idea of an overall architecture and model for the kindergarten foodscape has been illustrated in figure 1.

MEALSCAPES AS LEARNING OPPORTUNITIES

Eating at lunchtime is the practice in which food is served to satisfy nutritional and physiological needs. The Dagmar intervention demonstrates how it can also be seen as an opportunity for learning where eating – and even growing and preparation of food is integrated in a coordinated approach to create a learning experience. The lunchtime meal is made in the kitchen but is served and staged primarily by the pedagogues. The types of food served are guided by a range of considerations. Meals should comply with official recommendations and with certain financial restrictions. In addition to seeing food provision as a static phenomena, the Dagmar intervention involved elements of increased exposure to new types of food in order to expand food diversity. As a result, children will, to a rather large extent, experience a different kind of cuisine than the ones they find in the family sphere. Therefore, unsurprisingly, the interviews pointed to the fact that the pedagogues' enactment of responsibility and taking an active role in the children's food literacy was challenged by children's food preferences and likings brought from home. These insights were seen as important learning insights for both of the two professions kitcheneurs and pedagogues. According to the pedagogues, children's food preferences changed during the intervention and so did their interest in the foods and ingredients used.

In particular, the observations from the dining situations showed that both kindergarten professions use different approaches to deal with a child's individual taste preferences. While the kindergarten pedagogues seemed to accept that the child did not initially like the food and as a result would offer an alternative, the kitcheneurs used a targeted and more hands-on type of approach. They would use the ingredients in the food to make the experience concrete and recognizable in order to encourage the child to taste it. The following dialogue captured by observation of a child and a pedagogue illustrates the point

Do not like it!

Just eat some bread, but you have not tasted it yet.

So you cannot know whether you like it!

Later, a kitcheneur enters and sits down at the end of the table. Like the pedagogues, she eats what is referred to as an educational meal in the kindergarten every day. The eating arrangement is based on free seating, and pedagogues have the overall responsibility of looking

after a specified number of children and their eating. This snapshot from observations of eating events illustrates a dialogue in the common foodscape where learning about sensory properties, neophobia, and preferences takes place in an informal manner.

*Kitcheneur: Now you need to start.
Child: I do not like it!
Kitcheneur: Have you tasted the gratin?*

The child nods and the kitcheneur continues:

*Do you know what it's made of? It is made
like thick pancakes! Try to taste.*

The kitcheneur then takes the girl's knife as she says:

Shall I cut it up in little bits?

The statement underlines the fact that there needs to be an inter-professional consensus as well as an informal organizational structure including time set aside for creating a learning situation around the meal situation. It also shows that kitcheneurs has an important role to play – not only as providers of meals – but as important role models in the learningscape that can assist children in overcoming some of the constraints and barriers related to neophobia. In particular, data from the focus group discussions showed that there were differences of opinion between pedagogues and kitcheneurs, but also that there was agreement on the need for a focus on the educational challenges and opportunities related to preferences, neophobia, and liking. A few quotes from pedagogues capture from the interviews illustrates the perceived need for training

*It's an advantage if we could seek out more knowledge about it,
or have the opportunity to gain some more knowledge
We do not have the same knowledge about food as kitcheneurs. We do not have the training.
And in some context or other, one can say that now food is in focus here.*

These discussions underlined an apparent need for complementarity and professional interaction between the two professions in the kindergarten. In line with this discussion, the focus group also touched upon the theme of responsibility for children's eating patterns and food literacy. Both pedagogues and kitcheneurs expressed the view that, according to them, there are some important limits between the perceived kindergarten foodscape and its relation to the family foodscape. The fragile borderline between the two foodscapes became apparent as a theme in the interview. An important insight was that pedagogues prided themselves on having a more professional attitude to feeding styles than the parents, in the way that they would not be affected by emotional barriers, for instance, in the case of disliking and neophobia. Many of the staff were aware that the children seemed to react differently towards food served at home compared to the food served in the kindergarten. The kitchen manager pointed to the amount of attention given to each child in the dining situation as a possible cause. In the kindergarten, children do not experience the same amount of attention due to the number of children present in the meal

situation. But the kindergarten seem to offer something in terms of food literacy training that is not found at home. As a pedagogue puts it during an interview:

We do sometimes have children who do not eat anything at home, but cannot stop eating when they are here.

The statement suggests that the social environment is important and that there are clearly differences between the conditions in the domestic and the kindergarten foodscapes. It also suggests that the kindergartens approach to food literacy building is a more professional than emotional one than that provided by the parents. These differences need to be kept in mind by both professions and can ideally form the foundation for a situation where food and eating are put on the agenda in the family–kindergarten cooperation. The home–kindergarten difference is also found in the 2 interview quotes from a pedagogue and a kitcheneur respectively

if there is a child who does not eat at home, I could imagine that there was a lot of focus on the child at home, and so much focus could mean the child does not want to – but it's not like that here

when we experience children who do not really eat, they do not really get a lot of attention from us, and then suddenly they are sitting and eating.

These statements point to the importance of collectivism and the power of the social aspect in fostering food literacy. The question of the role of the kindergarten professions in shaping eating patterns of children was seen to be an important topic. Pedagogues felt that their responsibility was a part of their enactment as role models. Video observations showed several situations where kindergarten pedagogues acted as such, in some situations by performing verbally. In other cases, the situation demanded that an action was carried out while the child was being encouraged to eat a particular food. A situation was observed where a child passed a plate with rye bread to another child. She pointed to the bread and took one piece, and then gave the plate to the pedagogue and finally sent it further around the table. The plate continued quietly around to all the children without the pedagogue intervening.

In the above case, it was enough that a child visually pointed to a piece of bread, and the kindergarten pedagogue then follows up on the action by simply passing the plate around. In this case, no verbal communication took place as to what was going to happen. A similar event took place at another table, which was accompanied by a verbal message: The kindergarten pedagogue served for the children while saying:

Start by taking a little warm food and then I will give you some more, so it cools down.

She then pointed at the plate with rye bread and said at the same time to the child who was closest to the plate:

You can take a piece of rye bread!

The child took a piece, then another child stretched over to reach the plate. The kindergarten pedagogue looked and said:

And then you pass the rye bread on.

The child gave it to the pedagogue, who finally put a piece on three of the children's plates. The interactions showed that pedagogues perceived themselves as having a responsibility for the children's eating practices. Kindergarten managers and pedagogues generally agreed that they had a responsibility due to the fact that the children were in their care for a substantial part of the day. But there was disagreement as to whether this responsibility also included ensuring that the children always ate the recommended types and amounts of food according to nutritional guidelines. The pedagogues were confident that the kitchen manager, from the backend perspective, would arrange for cooked meals that lived up to current nutritional advice. However, seen from a frontend perspective, the question was discussed of whether the child would eat the food on the table, how much the child ate, and how they as kindergarten pedagogues should encourage the child to eat the food that was served.

*During the time that the children are in kindergarten,
I have responsibility for what kids eat in the kindergarten.*

*... If the child after two bites does not want to eat more – then I do
not think that we have fulfilled our responsibilities.*

It is not ok to say: well, that is just fine then. (Pedagogue)

The above statements were the prelude to a lengthy discussion about kindergarten pedagogues' attitudes towards responsibility, limits, and frustrations of not knowing *how* to get kids to eat when they encountered food preference- and liking issues. Two of the kindergarten pedagogues showed a clear position regarding their understanding of responsibility but also where their limits were:

*I want to encourage and teach the child to eat,
but if the child clearly says no, I cannot force them.
I will do a lot to ensure they eat food, but there are also limits. (Pedagogue)*

The discussion continued for some time, but generally the kindergarten pedagogues were looking for answers to ways of handling the situation of children refusing to taste and eat. Three pedagogues expressed the following opinion:

*It's a good educational challenge to go through
the process with the child when the child eats food.*

The focus group interviews showed that if the children did not like the food, they were more likely to ask more about what ingredients the meal consisted of, and, as such, dislike seemed to contribute to creating a language and a vocabulary around food and meals. If they liked the food, the conversation briefly confirmed this view. This fact suggests that unfamiliarity with food and liking seem to be closely related and that not liking the food initially tends to evoke curiosity. The pedagogues expressed the view that, as a result of their perceived responsibility, they felt it was

up to them to take the initiative to talk about the food. The following are four statements from the focus group interview:

*If I start talking about food, they continue. But they do not start the ball rolling.
When the child says, "I do not like that," I reply: "What do you like then?"*

I'm sitting with the same, eldest children every day and they talk a lot about food.

*But maybe it has something to do with the fact that I talk about food a lot!
But it may also be because we have made the food project.*

*The children are very interested in the food and if they like it
they often say: "It tastes good."
And if they do not like it, they ask what's in it. (Pedagogue)*

Several of the pedagogues reported that children seemed to improve the ability to speak up if they liked the food. In addition, these opinions were passed on directly to the kitchen manager. This very honest and straightforward response was observed during the lunch meal: suddenly one of the children turned around and looked at the kitcheneur and said loudly as she nodded:

It tastes good!

The kitcheneur immediately replied:

Oh, thank you!

A NEW ROLE OF THE KITCHENSCAPES – AND THE EMERGENCE OF THE KITCHENEUR

The Dagmar intervention demonstrated how a new role of food professionals develop can develop. This new identity – the kitcheneur takes responsibility outside the traditional domain of food professionals that is constrained to the kitchen. Kitchenscapes play traditionally a less visible role in the daily life of the kindergarten compared to the frontend activities that are the spaces where children spent most of their time and is where parents mainly experience the sense of a kindergarten. Kitchenscapes in comparison are more closed spaces where food is received and prepared and considered as a professional space where food service professionals are in charge. The Dagmar intervention showed to be able to challenge that.

During the Dagmar intervention more room were created for the food professionals and more interaction was developing between pedagogues and food professionals. Children developed their interest in talking about the sensory properties and the type and names of the fruits and vegetables when these were delivered from the food supplier. These events occurred by themselves in that the children gathered around the boxes when they were delivered. Children were eager to share what they recognized and to demonstrate that they could remember the names of the different fruits and vegetables delivered. With the help of the kitcheneurs, this developed into a daily routine, depending however on the time available in relation to the preparation of the afternoon snacks. According to the pedagogues, their focus on the food-related issues during meals was also strengthened. One example was that pedagogues and the kitcheneurs developed an informal

tradition of making small guessing exercises where children were invited to guess the ingredients in a dressing or a herb in a dish.

HANDS-ON FOOD ACTIVITIES IN THE LEARNINGSAPES

Traditionally, kindergarten food is mainly thought of as a provision of calories and nutrients that can satisfy hunger during the day away from home. Moving beyond that perspective and including a learning perspective is a novel approach for most kindergartens, since it requires linking the food practices with the pedagogical spaces. In the Dagmar case, the pedagogues, the management, and the kitcheneurs were for obvious reasons positive towards this, since the concept was part of the inclusion criteria. As a result, the idea of integrating learning in the pedagogical practices was not completely new, and their insights helped to form the actions taken later in the action research process.

The creation of a learningscape evolved in particular around two important activities: the gardening/seasons activity and the taste workshop. The taste workshop for children was developed using the principles of the Sapere method, and the idea was to have children actively involved in the tasting of food and in the discussions about ingredients in relation to what they were able to recognize. A table was set up with fruits and vegetables, and the children were able to try to link the fruits or vegetables' external appearance in raw form with the carved shape on the plate and with the smell and taste. Several of the children seemed to overcome personal barriers by tasting something they had not tasted before. The pedagogues commented that a few of the children who took part in the workshop never usually tasted unfamiliar foods and that she was very impressed by these children's courage to taste during the workshop.

The children were actively discussing during taste tests, not only about how it tasted and how it felt in the mouth but also about other dining experiences they had had and that had contained some of the ingredients in front of them. As taste samples were eaten, there was a growing unrest amongst the children, and many of them wanted to have more of one or the other kind of fruit or vegetable. Observations from the taste workshop showed that the children often had difficulty finding words to express themselves, and they often echoed words they had just heard being used. The children had no difficulties in recognizing sweet, sour, or salty. However bitter taste was perceived as unfamiliar and described as sour. In relation to the mixed basic tastes, children were much divided on taste preferences. It was obvious that they had already developed individual taste preferences but also that they were able to accommodate and accept others' taste preferences.

An important part of the joint workshop for the pedagogues and the kitcheneurs revolved around the diverse aspects of taste: What is taste? Why do we have different preferences? How can taste be defined? How do you explain taste? How can we help others explain a taste? These questions and others were discussed during the workshop. Many of the questions came up again and again during the day. In general, both pedagogues and kitcheneurs felt that the examination of the various basic tastes was important:

Exciting having to put the different basic tastes into words, and exciting to experience that flavours could change the perception of taste.

The taste experience lessons provided not only recognition and understanding of taste but also the dissemination of taste. According to the participants, the taste lessons gave them the ability to be better in helping the children to verbally define the flavours they had and gave them the

feeling that they could communicate the diversity in taste to the children. One kindergarten pedagogue added the following comment:

I have focused on taste and it gives me the opportunity to bring my own knowledge to light – and use it with the new knowledge.

Both pedagogues and kitcheneurs felt that their ability to communicate the diversity of tastes to children had improved. When asked what had made the biggest impression, one of the kitcheneurs made the following comment:

the kindergarten teaching staff were so interested in the course and then talked about it.

The event based on the gardening project evolved around children's picture books of the season. The books acted as log books of what the children did, and illustrations show what was most important for the individual child. They regularly drew or painted the experiences they had had in the sub-projects. Some images were very detailed, with straight rows of vegetables filled with small seeds, while other drawings showed that they watered the vegetable garden – a drawing with a lot of water being sprayed. While the children worked with their imagery, the kindergarten pedagogues spoke with them about their experiences, what they had made, where they had worked well, and about future work in the vegetable garden. This recurring articulation of the experience gave the children the opportunity to recall what they had worked with and put into words what they had done and thus process all the new knowledge they had gained. Besides this, the picture books gave the children a visual opportunity to see the vegetables developing backwards; that is, they could through pictures and see how much, for example, the radishes had grown since the last time they drew them and thereby see a connection between the seed and the final product.

An important part of the gardening project was the development of coarse and fine motor skills development and physical work, the subsequent drawing and painting tasks played a role here. In addition, the language training, including the articulation of dining experiences and new words, was a part of the gardening events. The gardening project was in some cases extended outside the kindergarten to include learning about natural phenomena and searching for wild plants and herbs on forest excursions. An additional extension included a farm2fork project where the children were taken on a farm excursion.

The hands-on food activities were seen to play an important role in the development of social competencies. For instance, in the potato project, the children needed to cooperate. They were grouped in pairs, one from the eldest group and one from the youngest group. This meant that the youngest could learn from the eldest and the eldest were able to learn to help the youngest. Additionally, this partnership also ensured that there was almost always one from the group who could care for a potato bucket, and when they were both present they had to share the responsibilities and tasks.

The vegetable garden developed into a popular place to be, and the children spent a considerable amount of time looking, smelling, and tasting under the guidance of the pedagogues. The garden came to play an important role as a kitchen garden in contributing to the food service. The pedagogues spent time talking about the herbs and vegetables when they went there. They would talk about the importance of watering the plants if it did not rain, and the children would learn about the principles of growing vegetables and the role of sunlight in the biological processes.

In addition, the garden was used as a stage for creating a food language, and children and pedagogues would talk about the vegetables' names, colours, and sizes. The vegetable garden was organized around the seasons and especially the harvesting and collecting of the tangible outputs from the gardens were important events for the children. The digging up of the potatoes in the autumn was a major event where children would compete over which of the potato bins contained the most potatoes and which had the largest potato. In particular, size was generally very important for the children, and the largest squash and beetroot received great admiration. The natural endpoint was the outdoor preparation of the vegetables for a dining session that marked the final step of the gardening project.

DISCUSSION

DISCUSSION OF FINDINGS

The study examines the opportunities as well as constraints related to developing the kindergarten foodscape to an arena for food literacy and food learning. The themes can be viewed as themes that should be taken into account by food systems strategists, urban food strategy planners, food systems advocates and learning and curricular experts when developing strategies for the design of future foodscapes in kindergarten.

The Dagmar study points to the promising opportunities for taking advantage of some of potentials of the kindergarten to develop food literacy by using both the provision as such but also the learning and teaching opportunities that is embedded in the meal provision. By taking the idea of food environments and foodscape as the point of departure it contributes to developing a broader understanding of the kindergarten as both a place for eating - and for learning about eating. The study also contributes to an understanding of professions in this transition to an extended view of the kindergarten foodscape. By examining both the views of the food professionals and the pedagogues as well as the perceptions of the children it attempts to understand the kindergarten as a multi actor space – and provide directions for the future development of kindergarten foodscapes.

The Dagmar study illustrates the diversity and complexity of the food reality in the kindergarten environment. Social practices around the eating at lunchtime blend in with moments of learning and with instances of cooking related to the preparation of the meals for the lunch table. The data indicate that the study case has been changing the way cooking and pedagogical practices work as a result of the Dagmar programme.

The findings suggest that pedagogues and kitcheneurs, in relating to this mesh of a foodscape, would refer not only to how they understand the food reality but also to how it could be understood as a scenario – a desired future in which food, nutrition, and healthier lifestyle issues could be dealt with in new ways in the kindergarten. It is a particular strength of the foodscape metaphor that it is able to handle both the real and the imagined world. By relating to the foodscape as it is, pedagogues and kitcheneurs would make frequent reference to both constraints and hindering factors as well as perspectives and opportunities.

It should be noted that the current paper do not report in quantitative terms measures of food literacy. Rather it tries to understand the phenomena and explain how food literacy might be created using different learning approaches in a kindergarten setting.

DISCUSSION OF CONCEPTUAL FOUNDATION

Conceptually the Dagmar study aims to make a contribution to the emerging research field of foodscape studies. The conceptual understanding of the kindergarten seen as mutually complimentary –scapes has been illustrated in figure 1. It underlines the interrelation between the three important dimensions of food in the kindergarten identified in the study: the social practices of the lunch – the meal scape, another one the learning practices related to the hands-on food activities – the learningscape, and the third is the cooking practices related to preparing meals- the kitchenscape.

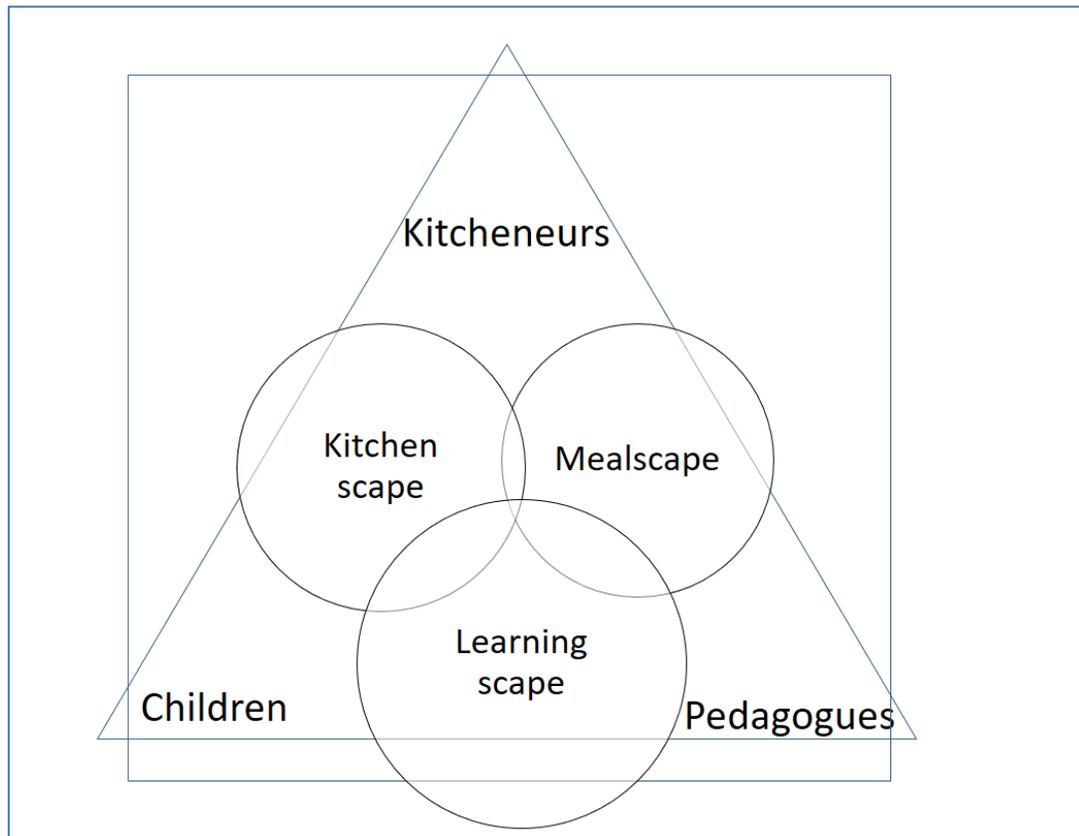


Figure 1. An extended triangular view of the kindergarten foodscape. The figure proposes a way to illustrate three important dimensions of the kindergarten: the kitchenscape, the hands on learningscape and the mealscape. The extended view identifies three important actors and suggests a close interaction between the three: the pedagogues, the kitcheneurs and the children. The triangular view underlines that food in kindergarten should be both about provision of food as well as about learning about food. The outside box illustrates how the kindergarten foodscape can be seen as being in an interplay with both outside actors and structures. The figure finally aims to illustrate that the learningscape in the ideal case expands to cover the meal and kitchen parts of the kindergarten as well as the outside natural environments for instance gardens and other nature-based activities

By looking at the data through the metaphor of foodscapes it becomes clear that the *kitchenscape* has the potential to expand and engage with both the *learning-* as well as with the

mealscape. However, an important precondition is that interdisciplinarity among the two key professions in the kindergarten – the kitcheners and the pedagogues – is developed. It should be noted though that the interviews do not reveal the same level of detail with regard to kitchenscapes as is the case for the mealscapes and the learningscapes. This is partly because kitchenscapes in general play a more backend role compared to the pedagogical space. While the learning- and the mealscape can be said to have a frontend nature in the sense that they are based around very visible social practices, the kitchenscape is more closed in nature due to restrictions in terms of accessibility.

The FAMM approach suggested by Gustafsson et al (2006) argues that the meal can be understood as attached to the room, the social aspects, the food, and the logistics. This way of thinking seems to fit well with the foodscape way of understanding food in the kindergarten. As argued in the literature review by Andersen and Holm (2013), there is a need for a deeper understanding of the food culture in day-care settings and in particular how a pedagogy around the meal can be developed. Andersen and Holm argue that the notions of food literacy and food “bildung” are important as concepts for understanding the added value of serving food in kindergartens. Internationally, more efforts are being made to explore the potential of hands-on food activities, as pointed out by Sandell et al (2016), with the Sapere taste literacy approach being mentioned as a prominent example.

The Dagmar study contributes to the growing number of papers in the emerging field of foodscape studies that is continually evolving. An increasing amount of studies have over recent years been exploring the opportunities for promoting healthier eating and food literacy in kindergarten including the Periscope, the ToyBox and Frida studies (Caroli et al 2011, Nethe et al 2012, Androutsos et al, 2014, Mikkelsen & Mikkelsen, 2016). Conceptually studies have been using either a settings, a food environment or a foodscape approach to better understand the opportunities in food and eating in kindergartens (Story et al 2008, Crawford et al 2008, Lynch 2015, Sandell et al 2016, Dymont et al 2017). All together they can be seen as approaches that put less emphasis on the responsibility for behaviour and more on the “out-thereness” by looking at what “places” can do to influence behaviours and outcomes.

In particular, the outdoor part of the Dagmar intervention contributes to the new field of study that is related to the exploration of Nature Based Solutions (Maes & Jacobs, 2017) and the interest in linking food with nature and biophilia. In a kindergarten/school context such approaches has been studied by Dyg & Mikkelsen (2016) and Uhlmann et al (2018). The study of outdoor food activities studied is an important turn in the studies of outdoor activities in kindergarten. Such studies has mainly been dealing movement and physical activity as their primary objective. But, being outdoor also have obvious links with potentials for learning about wild food, agricultural practices and gardening.

DISCUSSION OF METHODS

In discussing the reach of the findings and their transferability, it is important to note that kindergartens can be different in terms of readiness for change. Like all case studies, the findings will depend on the case selection. Taking a diffusion of innovation approach using Rogers (2003) as inspiration, the Fuglsang kindergarten can be thought of as an early mover – a kindergarten that is not average, that is already prepared for action research, change, and innovation. This also means that the transferability of the Dagmar approach to other kindergarten settings may be limited, since the topic of food and nutrition and its position in the daily life of the kindergarten is still controversial and the subject of much debate.

It should be noted that foodscapes vary significantly with socio-economic position of families in the catchment area of the kindergarten, with the conditions internally in the kindergarten and with the local municipality political climate. In the case of the Dagmar intervention these factors are in favour of a successful intervention outcome. As such there are limitations in terms of the transferability of the findings. Drawing on diffusion theory it can be expected that the more ambitious way to developing the kindergarten foodscape that has been shown to work in the case of the Dagmar intervention eventually will diffuse and influence the current norms of food and eating in other kindergartens.

Also, it should be noted that the studied kindergarten is located in an urban area and that new norms in the food area tends to spread faster in urban areas than in rural ones. And, of course the discourse on and practices related to food and eating in kindergarten are deeply rooted in national food cultures as well as in cultures and practices related to kindergartens. This limits the transferability of the findings to other countries.

It should also be noted, that as a case study the Dagmar study methodologically has some limitations since the study was carried out in one case and in a case with favourable contextual factors. Also it should be noted that the sample size for obvious reasons has been limited and that the study did not have the opportunities to study how a more active involvement of parents might have influenced the findings.

It should also be noted that the Dagmar study focused mainly on the internal food dynamic in the kindergarten and not on the home – kindergarten relations. This is a limitation since the family and the parents have a huge influence on children's' eating patterns and preferences.

DISCUSSION OF POLICY IMPLICATIONS

With regard to the interrelation between the two professions, the study identified an interdisciplinary gap that seems to be present between pedagogues and kitcheneurs. An important constraint as seen by the pedagogues to the further development of the kindergarten foodscape was their perceived lack of knowledge and skills in relation to food topics. The more effective and intentional constraints seemed to be related to the perception of responsibilities in relation to children's' eating habits. Most pedagogues hold the position that feeling responsible for children's' eating behaviour and their food literacy is common sense and should be regarded as an integral part of the profession.

However, creating change in the kindergarten foodscape, as with all change processes, requires capacity building. The study shows that the new opportunities and the extended view of the kindergarten foodscape create a demand for workforce development for the pedagogue profession, since a lack of knowledge and skills among pedagogues was identified as a serious constraint. Similarly, the issue of interdisciplinary cooperation between the two professions was identified as being an important requirement. Both pedagogues and kitcheneurs agree that increased cross-professional cooperation is imperative and that, for instance, joint training activities and workshops for the kitcheneurs and pedagogues could be a good way to achieve workforce development.

The Dagmar contributes to the ongoing international academic debate on how food and eating for the growing for the coming generations can be turned into something more healthy and more sustainable. This rethinking of the food reality in the kindergarten and the potentials for developing new food realities and action possibilities in the kindergarten has been explored in a

number of countries as part of educational and nutrition-related strategies and have at the same time become subject to scientific studies (Hardy et al 2010; Kreichauf et al 2012; Manios 2013). In Denmark, where both parents often work away from home, kindergartens have become an integral part of the welfare state, with 95% of 3–6-year-old children attending such institutions (Moss, 2006). This has created a push towards new types of welfare service provisions, leading to kindergartens increasingly taking on the responsibility for children and their eating. In this context, the present study points to the opportunities for developing the kindergarten foodscape as a space for practice based learning and to apply a learning strategy targeted an increase in food literacy. And according to the results from the Frida kindergarten programme (Mikkelsen & Mikkelsen 2017), there is broad support among parents for the idea of kindergartens playing a more active role in activities related to food and nutrition literacy training.

The Dagmar study feeds into the standing debate that is taking place in Denmark on which measures can be taken to counteract poor eating habits and nutrition related disorders. The food reality in kindergartens is in a state of transition in which important stakeholders seem to be redefining the role that food, nutrition, and healthy lifestyle are playing in the kindergarten environment. Pedagogues and kitcheneurs are the two important professions that are engaged in this process, with the kindergarten manager as a co-player. Findings from the Dagmar programme study show that it is easy for the professions to relate mentally to a space in which food, nutrition, eating, and health are important elements. The study suggests that for both kitcheneurs and pedagogues, the multicomponent view of the foodscape makes sense and that both professions find that they can and should contribute to the formation of food literacy in the foodscapes of the kindergarten.

CONCLUSION

The study shows that it is possible to create a comprehensive pedagogy around the kindergarten foodscape in which food, meals, and eating becomes elements in a learning strategy aimed at developing food literacy among children. The Dagmar intervention proved to be effective in creating a dynamic space around the lunch in a way that combined the serving of food with hands-on food activities for children. Pedagogues and food workers were found to be important carriers of that change. Preferences and likings, knowledge, skills and competencies, as well as the language of children were found to be important aspects of the food reality in kindergarten that needs to be understood and handled by both professions. A trustful cooperation between the two and a mutual understanding of the strengths of each is important. While the pedagogue profession could benefit from a curricular add-on to focusing on food and eating and problem-based learning, the food worker profession – the kitcheneurs – could benefit from learning more about the basic principles of learning and literacy. Here, there seems to be a need for capacity building and workforce development in order to develop the knowledge, skills, and competencies in the borderline between the two professions. The Dagmar programme identified two important areas for action: the social practise around lunch and in-between meals as well as stand-alone pedagogical activities based on a hands-on approach and learning by doing. The study suggests that addressing these determinants is important if the kindergarten foodscapes are to be used to create healthy eating and food literacy. The study provides new insight into the value of hands-on food activities to foster food literacy in the kindergarten. In addition, it suggests a conceptual inspiration from foodscape studies that allows for a better understanding of the complexity of food and eating in kindergarten. The study identifies important action possibilities in the kindergarten

foodscape and suggests that the kindergarten could be an important arena for the promotion of healthier lifestyles and food literacy among kindergarten-aged children.

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Towards sustainable family farming and independent food co-operatives in Cuba?

Possible lessons from Norway

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Abstract.

In the Nordic countries, agricultural co-operatives were important when family farmers organised to get access to the quickly developing markets during industrialisation in the late 1800s and early 1900s. These co-operatives were organised both as credit, insurance, processing and marketing co-operatives. Spreading at first from Denmark to the rest of Northern Europe and later reaching the new settler continent in North America, farmers' co-operatives soon became a key element in private farming in market economies. As many co-operatives became large companies in the capitalist economies, they either became ordinary share companies, or retained their farmer-owned co-operative status like in Norway. After Marxist-inspired revolutions in Russia, China, Eastern Europe and later Vietnam and Cuba, state organised and government-controlled co-operatives were set up in socialist countries. Many of the old forms of agricultural co-operatives in the former Soviet Union and Eastern Europe collapsed when the centrally planned economies were abolished in the early 1990s. However, new forms of food production and distribution cooperation have emerged both in the capitalist and former socialist countries. These co-operatives were organised both among producers and consumers in order to meet the common needs of direct access to foods. While it is assumed that family farming and food markets will have to play a more important role in the Cuban food economy in the future, it will be interesting to see if small farmers in collaboration with wholesale co-operatives will be allowed to develop short and sustainable supply food chains, which could be competitive against state socialist and multinational capitalist agriculture. Cuban agricultural policy must be able to evolve along two strategies: a volume agriculture that delivers high-quality, durable basic foods to the predominantly urban population, but also delivers local traditional food with craftsmanship to tourists and a growing middle class. Both strategies

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will be necessary in order to address a historic challenge of the Cuban socio-economic development: to produce sufficient food and make it available to consumers at affordable prices, thus also saving scarce currency today spent on food imports.

INTRODUCTION

When alternative food movements - like organic food producers, or quality food producers selling directly to consumers and farmers' markets - appeared in Europe as well as in North America and Oceania in the 1980s and 1990s, both the producers themselves and the scholars studying these movements made a clear distinction from mainstream, industrialized agriculture (Goodman 2003; Van der Ploeg 2006; Marsden 2013). At the time, however, little scholarly attention was paid to older social movements among farmers, like agricultural co-operatives and peasant resistance to capitalization and industrialization. These provide an interesting site of comparison for informing our current understanding of agricultural alternatives.

In classical linear Marxist theory, it was common to distinguish between the feudal, capitalist, socialist and communist stages of economic development (Kautsky 1899). In capitalism, the initial peasant economy with small farmers represented an archaic and disappearing form of production, transformed by the market economy into simple commodity production with family farmers. Family farming then would coexist for some time with capitalist enterprises in trade and industry within the capitalist mode of production. However, because of technological development and capitalism's inherent tendency towards capital accumulation, simple commodity production in agriculture would inevitably be swallowed up by capitalist large-scale operations (Bergmann 1977). Some of the farmers would be able to capitalize into large-scale operations, while the majority of farmers would disappear through proletarianization. It must be added that Marxists often disagreed on the role of petty bourgeois commodity production like family farming in socialist society. In USSR there was extensive discussion in the leadership about the role of the family farmer (kulak) in socialism, but after their success during the New Economic Policy (NEP) period (1921-1928), these farms were dissolved and the family farm class eliminated during the Stalinist oppression in the 1930s. If not already clear, this linear model of the development of capitalism into socialism was eventually confirmed to be wrong when the Soviet Union collapsed in 1991.

In socialist countries, as in in the former Soviet Union and their allied socialist countries, farmers' co-operatives and collectives of different types were developed in order to organize and modernize the agricultural production (Bergmann 1975). These co-operatives and collectives were in all cases subordinated to the state command economy under strict Communist Party control, without the ability or possibility to be autonomous economic units like in the market economies of capitalist countries such as Norway.

In socialist Cuba, starting with the second agrarian reform in 1963, farmers' co-operatives both in production, processing and distribution of food were part of the centrally-planned economy of credit, technology and other resources. These "collective co-operatives" were not allowed to pursue accumulation of capital (Bye 2019). After the Soviet bloc collapsed in the early 1990s, and particularly after Raúl Castro took over as President and introduced a significant economic reform programme, family farming has become more predominant and farmers' co-operatives have gained more space in the Cuban economy – but the State and Party is still very reluctant to relinquish its control.

One of the interesting questions in Cuba has been whether small farmers in cooperation with consumers would be allowed to develop short and sustainable supply food chains. In recent years, new forms of cooperation have also emerged in capitalist countries like Norway, and some of these co-operatives are organized by members of the new food movements, producing and marketing quality local foods or organic foods.

In this article we ask if there could be a convergence of these new types of co-operatives in Cuba and Norway and if there is something to learn from a comparison of how these two food regimes have developed. Will there be a hybridization between the previous and new modes of production, or will the previous vertical State and Party control still prevail? Alternatively, will the inroads of capital and extension of market relations lead to a full-scale industrialization and capitalization of Cuban agriculture?

When comparing agriculture in Cuba and Norway, it is important to keep in mind that gross national product per capita in Cuba in 2017 (US \$6580)ⁱ, equals roughly the gross national product per capita in Norway in 1935 (55 000 NOK), which means that the years just before and after WWII are especially interesting for comparison.ⁱⁱ In addition, we know that the Cuban economy until the late 19th century was a sugar economy based on a large class of slaves. Even after the abolition of slavery in 1886, a very similar plantation production system, with sugar as the completely dominant economic sector, prevailed until the 1959 Revolution. The Revolution nationalized the sugar plantations and converted them to state ownership but did little to diversify agriculture. Norwegian farmers, on the other hand, became largely self-owners in the 19th century, after having maintained substantial self-ownership without an oppressive nobility throughout the Middle Ages.

A BRIEF HISTORICAL OUTLINE OF AGRICULTURAL COOPERATION IN NORWAY

The spread of agricultural co-operatives was a key factor in the modernization and industrialization of Norwegian agriculture. Among farmer leaders during the 1900s, agricultural co-operation was seen as the best means of developing industry and winning a share of the growing food markets in the cities (Almås 2004). Co-operatives were built to defend the interests of small farmers, who did not have much economic power individually. During the first part of the 1900s the number of input and output co-operatives grew. The development of co-operatives in neighboring Denmark was seen as a model, where processing and sales co-operatives in meat and dairy production at local level were able to develop nationwide organizations with export branches at the turn of the 19th century.

Milk farmers were particularly efficient local organizers in Norway. The Norwegian Milk Producer Association - as an umbrella organization of dairies - was founded in 1881, but it was only through reorganization in 1921 that it became a real national organization of dairy co-operatives. Purchasing and slaughtering co-operatives emerged from local level activities between 1900 and 1920. In 1917 there were 800 purchasing pools with 26,650 members, and later these pools were merged into 7 regional purchasing co-operatives. A farmers' co-operative bank was also established in 1918. The co-operative committee of the Royal Norwegian Society for Development (Det Kgl. Selskap for Norges Vel) played an important role in the promotion of co-operatives, with idealistic co-operative consultants from the Society travelling throughout the country to set up new co-operatives.

The 1930s was an especially hectic decade, when farm sales co-operatives were set up to stabilize the national food market under the Marketing Act. The background to these actions was

the severe fall in producer income from meat, pork and dairy products during the depression in the late 1920s. World market prices also fell, partly because many countries dumped their surpluses. The price fall hit those farms hardest that were most integrated into the market economy. When their product prices fell, they produced more to get out of their debt squeeze. A tripling in the use of imported concentrated feed in the 1920s made it also possible for farmers to increase production without having more arable land available on their farms. There was also a revolution in transportation with better roads and gasoline cars opening access to city markets for farming communities. The purchasing power of the city dwellers decreased, however, because of bankruptcies, high unemployment, lowering wages and labor conflicts in the 1920s and 1930s.

In 1929, the same year as the New York Stock Exchange crash, the Norwegian milk price fell dramatically to almost one third of the level of 1920. One reason for this severe fall was that most dairies tried to get their milk to town and sell it as fresh milk, which was better paid than butter and cheese. In response to this crisis farmers demanded organizational and political action. Mass meetings were held in the provinces where hundreds of farmers turned out to discuss collective action. Eventually, more and more support built for a joint proposal from the farmer leader Jon Sundby and a professor at the Agricultural University - Rasmus Mork. Their idea was simple but radical: regional milk pools should buy up all milk at a fixed price. The milk would then be sold to the dairies for processing at a higher price for those having the most profitable production (consumption milk) and at a lower price for those producing less profitable products (cheese, butter and dried milk powder). Consequently, competition on the sale of milk for fresh consumption in the largest and most attractive markets was eliminated, and payment to producers of milk was maintained at a common and higher level than would otherwise have been the case. A marketing fee on all milk sold to the pool was introduced to finance exports, information campaigns and issues relating to hygiene and milking equipment.

This Sundby-Mork plan won wide support in farmers' circles, and on June 6th, 1930 the Parliament passed the Marketing Act giving the co-operative pools quasi-public authority to administer the milk market and to impose a variable marketing fee on all milk products. A marketing council with representatives from producer co-operatives, retail business organizations and consumer organizations was set up to determine the marketing fees and to supervise the effects of the Marketing Act. Pool membership was voluntary. The plan won wide support in the Eastern Provinces in the late spring of 1930, and by January 1932 milk farmers in the whole country were organized into 8 milk pools under the reorganized Norwegian Milk Producers' Association. The Marketing Act was the most important step to regulate Norwegian agricultural production in the 1930s, and markets were stabilized as a result of this new system. The Act self-evidently worked to stabilize markets, which gave legitimacy to the national co-operatives, as well as to market regulation of food production. The same story may be told for other products: pork was brought under the Act in 1931, sheep meat in 1934, and beef and veal in 1940. This co-operative marketing system was relatively efficient compared to other public Marketing Boards introduced in other countries at the same time. Giving the farmers responsibility through their co-operatives was very important, especially in times of overproduction. The main features of the Norwegian system of agricultural regulation, based on an alliance between the farmers' co-operatives and the Norwegian state, was consolidated and has survived until this day.

The Norwegian co-operative marketing system was created in an environment which provided numerous foreign examples. In the US, the 'Capper-Volstead Act' referred to as 'the Magna Carta of Co-operative Marketing', was enacted in 1922. The Capper-Volstead Act established the legality of co-operative marketing associations in the US, exempting them from

prosecution under antitrust laws. However, the McNary-Haugen Farm Relief Billⁱⁱⁱ, which was designed to establish a mechanism to determine fair prices, was vetoed by President Calvin Coolidge. This bill, including the selling of the surplus abroad at world prices, financed by an equalization fee to recoup any losses, was in principle close to the Norwegian Marketing Act. Despite attempts in 1924, 1926, 1927, and 1931 to pass the bill, it was vetoed, and not approved. Therefore, a regulatory system based on collaboration between the Government and agricultural co-operatives similar to the Norwegian model was never enacted in the US.

The success of farmer co-operatives in Norway is partly explained by the relatively high educational level of Norwegian farmers. In the late 1920s and early 1930s, most political parties, with the important exception of the Conservative Party, became supportive of co-operative organizations as a means to fight the farm crisis. This strong level of political acceptance was an important factor in obtaining a parliamentary majority for the Marketing Act of 1930. Another driving force was the growth in national food markets during industrialization. Meat and pork markets almost doubled between 1917 and 1939, and the market for fresh milk consumption almost tripled in the same period. After World War II, food markets rapidly expanded. Farmer-owned dairies, cheese factories and butcheries throughout the country were organized in regional co-operatives specialized for their markets (Almås 2002). Part of their strength was given to them by the quasi-public authority to regulate markets under the Marketing Act. This act has been continuously defended by center-left political parties, thus far surviving all attacks from neo-liberal politicians and international trade negotiators pushing for a more liberalized food market in Norway (Almås 2015).

AGRICULTURAL CRISIS AND FARMERS BETWEEN LEFT AND RIGHT

There was an intense political debate as to what to do in order to get farmers out of the debt squeeze in the 1930s. On the one side, the Farmers' Party and the Labor Party wanted to establish a State Lending Agency to assist indebted farmers with direct cash support and cheap loans. The Liberals and the Conservatives opposed the creation of a state institution, and favored public support to pay interest in addition to increased product prices. As the crises dragged on, a debt crisis response movement – *Bygdefolkets Krisehjelp* (The Rural Crisis Help) – emerged across the country. In some areas of the country, this organization was able to block forced sales, and militants from all political parties were recruited. This populist movement put pressure on the parties in Parliament, and in 1932, the Liberal Party switched sides and supported the formation of a State Lending Agency for Farmers.

The Labor Party was the big winner of the election campaign in 1933 under the slogan “Work for everybody”, and received 40 per cent of the votes. For the first time they won substantial support in rural areas, mainly among farm workers, farmers and fishermen. The new winning alliance between the Labor and Farmer parties agreed to increase the portfolio of the State Lending Agency for Farmers in 1934. After the completion of negotiations between the Farmer and Labor parties, crisis grants were given to agriculture, forestry and fishing, as well as to municipalities to fight off unemployment through road building and other public works. Against initial skepticism in the Labor Party, Labor leader Johan Nygaardsvold won majority support for the a historically decisive Crisis Settlement with the Farmers' party. This was one of the most important building blocks in the Norwegian case of the Nordic Model, establishing a social pact between capital and labor in the industrial sector. In 1935, Mr. Nygaardsvold became the first Prime Minister in a Social Democratic Norwegian government, representing a political party that until 1923 had been campaigning for armed proletarian revolution.

Alliance building to fight the farm crisis was not only a Norwegian phenomenon at that time. In 1933 the Swedish Social Democrats struck a deal with the Farmers' Party, and in Denmark the Liberals and the Social Democrats struck an agreement on tariffs and trade policy in the same year. In essence, Social Democratic Party measures in Scandinavia to fight the crisis were of Keynesian type, spending public money to provide employment, keeping the economic wheels turning.

From being the most radical of the Nordic social democratic parties espousing highly revolutionary communist rhetoric, the Norwegian Labour Party became a pragmatic party running for office within the Parliamentary system while accepting the basics of a market economy. Many observers were astonished, as they chose for their first bedfellow the formerly most anti-socialist party: The Farmers' Party. The Crisis Agreement of 1935 was the most important political move in stopping the spread of right-wing populism in the Norwegian Nazi party among Norwegian farmers and the rural poor (Bjørgum, 1983). Under the slogan "Town and land, hand in hand", individuals from new social groups now came into Government positions, formerly mainly filled with people from the upper classes (Furre 2000). In addition to the symbolic function of the Crisis Agreement, a new agricultural regulation system now was in place.

State regulation still has a leading role in the development of Norwegian agriculture. Compared to the deregulated capitalist agricultures of Australia and New Zealand on the one side and the classical socialist mode of production in the former Soviet bloc on the other, the Norwegian model of agriculture may be seen as a hybrid form of regulated market economy. Even though Norwegian farmers now have less influence in the market place because of the increasing power of the large retail chains (Bjørkhaug, Almås and Vik 2015), they do still have a voice. In the market, the farmer-owned agricultural co-operatives are still strong in the meat and milk sector. And the yearly Agricultural Agreement, negotiated between farmer organizations and the State, is still an important institution in the governance of Norwegian agriculture. However, this Norwegian blend of democracy and market economy is under pressure from neo-liberalism, partly because Norwegian politicians on the right are advocating on behalf of global market forces, and partly because Norway is increasingly bound by international agreements.

There has also been a shift from the productionist political orientation that dominated up to the early 1980s, to a sustainable agriculture orientation from the mid-1980s. The explanation for this shift away from productivism was that industrialized agriculture - with its extensive use of fertilizers and pesticides - was faced with increasing criticism for polluting the environment and destroying biodiversity. As we will see below, governmental support for new agri-food movements - like organic farming and the sale of quality foods directly to local consumers - grew from the 1990s onwards.

THE ROLE OF THE NEW AGRI-FOOD MOVEMENTS IN NORWAY

As a reaction to the industrialization of Western agriculture - with increased use of chemicals and fertilizers and associated contamination - an agricultural production crisis emerged in European and other advanced capitalist countries (Ploeg, 2006). Out of this agricultural production crisis, an alternative food movement towards organic agriculture and local food distribution emerged in the 1960s and 1970s. Due to increasingly dominant food chains, there was also a demand for alternatives to bulk commercial products with unclear origin of production: "food from nowhere" (McMichael 2005, Campbell 2009). Initially, this alternative food movement was dispersed, disorganized and very diverse with very low market share. However, the alternative food movement grew and increased its market share in the 1980s and 1990s. This transition process was

described by Goodman (2003) as a paradigmatic change - a shift from productivism to post-productivism.

According to Marsden (2013), “Transitions may be viewed temporally as periods in which opportunity for change opens up within a system (i.e. a socio-technical regime made up of dominant economic, industrial, political and scientific rules and assumptions) to produce something disconnected to earlier supporting structures, as the dominant system struggles to respond to surrounding pressures”. Following Marsden’s approach, Manniche and Sæther (2017) claim that “...transition theories include three interacting societal levels; **production niches (1)** which are the nexus for innovations and new technologies, and the **socio-technical regime (2)** including the dominating technologies, practices and policies, which determine a certain field of social activity. The third level is the **socio-technical landscape (3)** which is the exogenous context including cultures changing only slowly”.

When the new agri-food movement like organic farming and farmer’s markets appeared in the US and Europe in the 1970s, it did not initially spread much to Norway. Norwegian farmers were mainly skeptical, as they were pleased to be served by the well-organized Norwegian agricultural system. Due to low drug use, good animal welfare on mainly small and medium-sized farms and high confidence that Norwegian-produced food was ‘clean’, there has been low demand for organic and alternative food in Norway. Norwegian production of these products has exceeded demand with the exception of vegetables and fruit. However, Norwegian consumers asked for more variety in shop shelves and organic farmers pressured to get more support from the agricultural authorities.

In Norway, the new social movements around local and organic food have played an important role in the agricultural development over the last three decades. These farmer-led social movements have developed closer and direct relationships with consumer groups and at first the traditional agricultural cooperatives like *Tine* and *Nortura* were skeptical, partly because they were afraid of losing market share (Almås 2015). However, later on this skepticism has diminished as it turns out that the development of organic food, locality food, artisanal food, and short-supply food chains to a small extent are in competition with the volume products. In Norway, there are now a number of examples of cooperation between the new forms of agricultural cooperation and the established agricultural cooperatives (Bjørkhaug et al 2015).

As Stræte (2008) has shown, the qualities of food are constructed in relations between different participants along the supply chain, consumers included. Comparative studies in different European countries shows that the development of specialty food chains needs new food networks in order to create other modes of quality than the standard (Stræte 2008). When producers of organic products and local foods of special qualities need to scale up because they achieve increased demand for their products, it is especially important to maintain and strengthen the quality of their products to achieve distinctiveness in more competitive markets. While local food producers are growing, they tend to converge either towards niche markets or mainstream commodity markets, and in the last case they may sacrifice higher quality and value (Münchhausen et al 2017). The most important quality that contributes to distinctiveness and increased value seems to be the traditional handicraft production processes (Kvam et al 2014).

INTERNATIONALIZATION OF NORWEGIAN AGRICULTURE

At the turn of the 20th century, Norwegian agriculture was increasingly internationalized. This internationalization has been a long process, from mechanization in the 1950s, via industrialization and environmentalisation in the 1980s, to liberalization and deregulation pressure from the World

Trade Organization (WTO) in the 1990s. Norwegian agriculture is shaped by its ecological, cultural and socio-political environment, which has unique qualities. Without the catch from fishing and hunting, without the lumber from the forests, without the system of pluri-activity, securing livelihoods from the scarce resources of arable lands, farming for a living in Norway would have been impossible. Grain imports, still necessary in this country despite decades of increasing yields, had to be financed by foreign trade.

Paradoxically, there are both reasons for protection and for keeping an open Norwegian economy. There is a delicate balance in Norwegian politics between those forces, and to date no Government has sold out agricultural interests. A strong co-operative movement and strong farmers' unions may explain why agricultural interests are still influential. It is also important to note that the self-sufficiency of land-based food in Norway is less than 50 percent. However, the level of self-sufficiency is still significantly higher in Norway than in Cuba (now about 30 percent), which is a great paradox, if we compare the respective climate and land resources.

Political regulations have played and are playing an important role in Norwegian agriculture since WWII, including when it comes to the organic food and farmers' markets. These new agri-food movements draw political support from across the whole spectrum of political parties. So far the institutional robustness of the agricultural sector has provided a protective cocoon against further liberalization. At the rural grass roots, as well as in the Norwegian public, there is still broad popular support for a small-scale, multifunctional agriculture all over the county.

The formula of multifunctional agriculture (Almås 2015), which is emphasizing non-trade functions like cultural landscape, biodiversity and rural employment, may not be enough to secure Norwegian farmers a competitive capacity on the home market. Farm subsidies are maintained at a high level and import restrictions with relatively high tariffs are still in place. Despite the highly regulated and subsidized Norwegian agriculture, the number of farms is decreasing by two to three percent each year. Even though the remaining farmers are better off than before, they are worse off than the majority of the population. Despite diversification into niche markets, with local quality foods and export strategies for special products, the home market for standard meat and milk products is essential for Norwegian farmers. The outcome of the present trade negotiations with the Latin-American trading bloc MERCOSUR pushing for agricultural exports of grains and meat, may be the toughest test for Norwegian agriculture so far.

THE INTRODUCTION OF SOCIALIST AGRICULTURE IN CUBA

After Marxist-inspired revolutions in Russia, China, Eastern Europe and later Vietnam and Cuba, state-organized and government-controlled co-operatives were set up in all socialist countries (Bergmann 1985). In Cuba, the traditional family farming sector, which had existed in parallel to plantation agriculture, was diminished by political force after the revolution in 1959. The large-scale sugar plantations and coffee production units were taken over by the state. Tobacco growing remained predominantly in private hands, while marketing and export fell under state control.

Satisfaction of domestic food consumption was among the main objectives of Cuba's 1959 Agrarian Reform Law (Alvarez 2004). This law, and the discussions leading up to it, was considered a pivotal element in the early days of the Cuban Revolution, under heavy influence of Che Guevara. It was based on a recognition that: "[T]he peasants who belonged to our first guerrilla armies came from that section of that social class which most strongly shows love for the land and the possession of it; that is to say, which most perfectly demonstrates the petty-bourgeois spirit. The peasants fought because they wanted land for themselves and their children, to manage and sell it and to enrich themselves through their labor."^{iv}

This first agrarian reform in Cuba was therefore quite moderate compared to the restrictions in private property in other socialist countries. According to the French socialist agro-economist René Dumont, however, incentives even in this phase were not based on relative performance efficiency but on purely ideological criteria (Dumont, 1970 p. 29-31; p. 50-51), providing little incentive for expanded agricultural production. Dumont criticized the Castro-led Government's intention to create large state farms for the entirety of agriculture production and claimed that Castro was excessively influenced by the Soviet *sovkhosy* system of state agricultural property (Thomas, 1971 p. 548).

However, the agriculture policy was soon further radicalized for two main reasons. First, that many private farmers and the rural bourgeoisie were supporting the armed counterrevolutionary forces operating in the country at the time, supported by the CIA and Cuban exiles in Miami. Second, because large farmers were decapitalizing their holdings, probably fearing their potential expropriation by the state (Bye 2019). Therefore, when revolutionary Cuba's agrarian policy entered a second phase with the 1963 Agrarian Reform, it had a much clearer anti-private and pro-collective character.^v The land of most farmers with more than 67 hectares was expropriated, giving the State control over 70% of the land. This particularly affected medium-sized farmers.

Gradually the remaining private peasants and farmers were organized — under quite heavy pressure—into co-operatives with limited autonomy with the purpose of socializing their holdings. Agricultural Production Co-operatives (CPAs) were explicitly based on collective production, whereas Co-operatives of Credit and Services (CCSs) were based on individual property or tenure, with collective access to irrigation, services (including transport) and credits. Neither of these co-operative forms, and not even the remaining individual farmers and peasants, normally had the freedom to decide which crops to produce. In Cuba's centrally planned economy such decisions were taken by the agricultural bureaucracy, which also established production quotas and prices (typically quite low) for sale to the monopoly state purchase agency, *Centro de Acopio*. There were exceptional 'genuine co-operatives', but even CCSs would normally be put under strict state and bureaucratic control.^{vi}

There was a clear tendency that the more collective forms of production received preference (in the following order: state, CPA, CCS, private). The peasants were also—as with other interest groups in Cuba—organized under central and vertical Communist Party control, through the National Association of Small Agriculturalists (ANAP). Fidel Castro later emphasized the importance of promoting “superior forms of production for land socialization”, with the final goal of no longer having any independent peasants (Pampín Balado & Trujillo Rodríguez, n.d). Che Guevara's promise to the peasants that had fought for the Revolution that they and their children would manage their own land, gradually lost its value (Bye 2019).

THE TRANSITION OF SOCIALIST AGRICULTURE IN CUBA

After the collapse of the Soviet Union in 1991, Cuba lost its barter trade market for sugar with the former Eastern Bloc, which was a large shock to the Cuban economy. Imports from the former Soviet Union of oil, cars, tractors, machines and spare parts in exchange for Cuban sugar vanished. Because the sugar industry had problems competing in the world market with low prices due to dumping by the EU and the US, as well as the completely obsolete state of the sugar mills, Cuba had to rely more on their own resources for food and industrial products.

After many years of hardships and adaptation to the new situation, the Cuban economy started a slow recovery. In 2007-2008, further reform of the command economy was initiated in

order to open up to more market mechanisms. The opening up of agriculture to allow more private initiatives has been seen as one of the most crucial aspects of the Cuban economic reforms, also in terms of potential political effects. It is not without reason that Fukuyama (2011) puts a primary emphasis on the role of peasants in his metaphor of “*getting to Denmark*”. The economic and social reform *Guidelines* approved by the 6th Party Congress (2011), established the goal (in point 177): “...achieve that this sector (agriculture) will progressively contribute to the country’s balance of payments, in order to cease being a net importer of food”. This goal can be traced all the way back to the early days of the Cuban revolution, when Fidel Castro, in a September 1959 speech, announced the intention of achieving alimentary independence, going in detail through a long list of agricultural products and specifying what quantities had to be produced and how much this would represent in monetary savings.^{vii}

This goal was never reached. When Raúl Castro initiated his reforms, Cuba was still importing 60-70% of its food, spending up to 2 billion USD annually of its very scarce foreign currency on this, without ever getting rid of chronic food shortages and prices that were far above the purchasing power of ordinary salaries. As argued by most Cuban agricultural economists (García Álvarez & Nova González 2013), only by allowing private peasants and farmers more autonomy to produce and commercialize their products will agricultural productivity rise.

The structural changes in agriculture needed, according to these experts, to include property or user rights, access to production implements and credit, transport, and, not least, freedom to sell products in an open market—wholesale or directly to consumers including to hotels and restaurants (state as well as private). The potential option to venture into industrial processing of food products—for instance through second-degree co-operatives – would give the peasants an extra incentive. This would imply a dramatic shift from state control to market conditions under state regulation, a shift that would also unavoidably have repercussions on the general balance between plan and market in the economy at large.

Most of these criteria were at least partly covered by the Reform Guidelines, but were only half-heartedly implemented. Some important steps have been taken towards more autonomy for agricultural producers. But the evolution of policies has not been very clear and there is no real land reform aimed at extensive privatization of land in view.

The most important change took place in the land tenure structure. Private farmers were allowed to rent land in order to produce and sell food products, both to the state and to consumers. The non-state share of land tenure increased dramatically from under 20% to around 50% of agricultural land from 2007 to 2012, before it started falling again to around 40% in 2016.^{viii} This land is managed by family farmers, either from service and credit co-operatives (CCS), the surviving private peasants, or by peasants leasing land from the state (through what is called *usufructo*). In most cases, all these groups are now organized into CCS. Crops may include all grains, grasses for their milk or meat animals and fruits and vegetables.

The market reforms also resulted in a growing share of *reported* production being sold outside of state channels. The *Acopio* structure, infamous for its inefficiency, was gradually and significantly scaled down (it was actually at one point expected to vanish completely), and the percentage *reported* to be sold through the state fell from about 80% before the reforms were introduced to about 50%, the rest going through non-state channels (Frank, 2013 p. 270).

Early in 2016, however, an anti-market reversal kicked in, supposedly in order to reduce speculation and the black-market economy. Efforts commenced to restore price controls on most basic products, and to restrict the distribution and sale of food products. Privately owned lorries were ordered to unload at state markets instead of retail outlets, and most street vendors – which

had become an important market outlet – lost their licenses or were scared off the street (Wig, 2020). The state’s official share of food sales returned to its previous level or even higher. The main effect of these restrictions may have been the consolidation of two parallel market segments, particularly in Havana: the relatively better off plus private restaurants would find markets where price controls were not respected—in spite of the frequent presence of inspectors—and good quality products were available; whereas lower-income groups could find some basic products at other markets where supply was limited and quality was lower.

The flip-flopping policies in relation to wholesale markets are quite illustrative of how complicated the issue of food sales channels has been, and how difficult it has been to implement this part of the 2011 Guidelines. The first legal and official non-state wholesale markets were opened in 2014, but closed again after a couple of years after heavy criticism in the official press for “legal violations, bad management, corruption, lack of control”.^{ix} With new restrictions against self-employment being announced in 2017 and 2018, a decision was taken that no new permits would be given to sell agricultural products in either wholesale or retail markets.

The lack of wholesale access for agricultural implements represents an even more serious problem. Access to transport has also been a critical factor for non-state producers, going through much of the same zigzagging movement. As a result of all these shortcomings, it has been documented that a significant proportion of agricultural production never reaches the markets: food products are often simply left to rot at the farms.^x

While action was never taken on decisive parts of the reform agenda referred to above, and in first-half 2020 appear to be further away from implementation than ever, things are happening in the *informal Cuban reality*, fast outdistancing legality. Production goods and implements are stolen from the state and traded on the black market; food products are being increasingly sold outside of official state and other legal channels, e.g. to hotels and restaurants (notably to private restaurants, *paladares*). Although the state in most of the country maintains a formal monopoly, informal private wholesale markets have emerged around major urban areas.^{xi} Credit in convertible currency is being frequently obtained by private producers (e.g. through family remittances from relatives abroad), thus permitting farming on a much larger scale than one could expect from formal regulation.

TOWARDS A DUAL-TRACK SYSTEM OF CUBAN AGRICULTURE

“Capital accumulation” and “concentration of wealth” have been prohibited in Cuba for ideological reasons. With the new 2019 Constitution, more emphasis will be on re-distribution through taxation. Yet, there is no doubt that many successful private farmers have managed to accumulate considerable amounts of cash—even in convertible currency—but without the means to convert it to productive purposes.

The government was unwilling to allow more independent and autonomous forms of organization among peasants and farmers, still depending on a highly centralized and strongly Party-loyal ANAP. The reluctance of ANAP to support opportunities for individual farmers was again confirmed when the Obama administration - during the bilateral US-Cuban talks for normalizing relations - opened up the US market for the import of privately-produced coffee and other products. This ideological resistance has also made it impossible for co-operatives to achieve real independence from state and party. Fear of losing political control has effectively impeded the agency of farmers to push the political agenda towards reforms that give them more autonomy and economic opportunities.

On a more general level, it may seem that Cuban agriculture is moving towards a dual-track system: food for the domestic market is increasingly produced on middle-size family farms. The plantation and agro-export economy (historically completely dominated by sugar, later with an important citrus component) is still dominated by large state farms - some of which is under military corporation management - has drastically reduced in importance: sugar production is reduced to under 20% of historic level. There has been an ambition to attract foreign investment to the agro-export sector and/or combining it with bio-energy production; so far with limited success. The exception to this pattern is the production of two export products- coffee and particularly tobacco - both now mostly in the hands of private farmers, while the entire export chain is tightly controlled by the state.

As we have seen, the relatively independent producers dominated by small-scale land holdings increased quite dramatically in relative importance during the first years of the Raúl Castro era (although it dropped again during the last couple of years), also reflecting a strengthening of family farming at the expense of large-scale cash crop production. The continued state resistance to providing agricultural producers with more autonomy and incentives, however, has not permitted family farming to exploit its comparative advantages to drastically increase Cuba's food self-sufficiency, particularly of staple goods.

Cuba is still far from meeting market conditions in agriculture, and the latest statistical information confirms that the modest program of agricultural reforms has failed to boost production. The overall trend during the Raúl Castro era is that levels of production of beans and corn have increased significantly; potatoes, tomatoes and onions have failed miserably; while production levels of rice, milk, cattle meat and egg have been more or less static (Bye 2019, p.159). The following conclusion is unavoidable: Cuban agriculture never took off to reach self-sufficiency before the Raúl Castro reform era, and the last decade of reforms has also failed despite their intentions to take the decisive step toward feeding the Cuban people based on domestic production.

A similarly disappointing trend is that the production failure also has led to constantly rising food prices. It was reported towards the end of 2015 that the price for a basket of the most common food products had increased by 49 per cent between 2010 and early 2015,^{xii} to levels that only the new groups of affluent Cubans could afford. Then-economy Minister Murillo claimed early in 2016—hardly exaggerating—that low income Cubans spend 75% of their salary on food.^{xiii}

It is quite telling that the World Food Programme (WFP), during 2015-2018 has operated a program benefitting 900,000 persons in 43 municipalities and six provinces around Cuba.^{xiv} These negative production and price figures must be very disappointing for the government. This stands in stark contrast to China and Vietnam, where far more consistent market reforms in agriculture have led to impressive success in increasing production.

The amount of hard currency spent on food imports has fluctuated between 1.7 and 2 billion USD, practically at the same level as before the reforms were launched. Up to 70% of domestic food consumption is imported (or, in other words, self-sufficiency stands at only 30%).^{xv} It must therefore be concluded that Cuba's dependence on food imports and the amount the country is spending on these imports, have hardly been reduced during the reform period.

This fact becomes particularly paradoxical if we compare the prices paid by the state to what the state has to pay when importing the same products: when taking the distorted Cuban currency rates into account, the state pays the domestic producers only around 45% of the price for imported beans, 30% for rice and 20% for milk.^{xvi} *So the big question is: why is the state not willing to pay*

better prices to domestic producers, and generally incentivize domestic production more, when such huge amounts of foreign currency are spent on food imports?

In a situation where state-controlled agriculture has failed, and the government maintains its extreme caution against a too far-reaching privatization of the economy, one should think that a robust cooperative sector would be an attractive intermediate alternative, particularly if successful experiences from other countries may be documented. The other intermediate alternative, *usufructo*, also needs to be beefed up with more long-term (inter-generational) security, production autonomy and direct market access for the production to grow.^{xvii} In both cases, the control mania of Party and bureaucracy represents a barrier against the liberalization of productive forces in the agriculture. Access to re-invest profits in mechanization and improved production equipment is as another challenge for Cuban farmers in the present agriculture structure.

A COMPARATIVE ANALYSIS OF AGRICULTURAL COOPERATION IN NORWAY AND CUBA

In Norway, agricultural co-operatives have developed in four waves. In the first wave in the late 1800s and early 1900s, farmers established small dairies and butcheries in their communities. In the late 1920s and early 1930s, during the big economic crisis in Norway and elsewhere in the capitalist world, milk and meat prices fell very significantly, many fell into debt and the number of bankruptcies in agriculture increased dramatically. As a political solution to that income and debt crisis in agriculture, the farmer-controlled co-operatives organized national co-operative pools which were given quasi-public authority under governmental law to regulate food markets. During this second wave, most agricultural products were brought under state regulation, and prices to farmers were stabilized.

After World War II, because of new transport and cooling technology and increasing urbanization, there was a third wave of agricultural co-operation, where local dairies and butcheries merged into larger, regional units. During this third phase of co-operative development, most farmers all over the country joined milk, meat, input and sales co-operatives at the regional level. In the 1990s, the Norwegian agricultural co-operative movement went through a fourth wave of organizational and industrial development, where the regional co-operatives were merged into national units which developed their own market brands. The large Norwegian co-operatives in dairy and meat (*Tine* and *Nortura*) are now some of the largest food companies in Norway still controlled by family farmers through democratic procedures. *Tine* has a market share of 85 percent of the total dairy product market, while *Nortura* has an average market share of 56 percent of the meat markets.^{xviii}

If we compare the Cuban situation with the transformation of Norwegian agricultural co-operatives from local via regional to national food companies, there are four factors to be observed:

1. According to the first principle of co-operativism^{xix}, which states that membership in a co-operative is open and voluntary, farmers in Norway were allowed to form co-operatives without governmental interference (Almås 2004).
2. Norwegian agricultural co-operation was built stone by stone from the local to national level, with many setbacks. The financial settlement to farmers for their delivered products took the form of a yearly dividend paid to the members in relation to their sales. This principle was important to retain the farmers' loyalty to the co-operatives.
3. The co-operative principle of one-farm-one-vote was maintained. In the 1990s, two votes were given to each farm so that the women had the right to vote alongside men.

4. As the Norwegian economy developed into a full scale industrial and later service capitalist economy, the original local co-operatives developed into second-order nationwide co-operatives.

The state's involvement in the establishment and operation of the co-operatives in Cuba has delayed the development of cooperatives as an independent economic sector in Cuba. Co-operatives have largely been considered to be part of the centrally planned state economy, under strict political control by the Communist Party. While the economic reform programme of 2011 seemed to identify more co-operative independence (with second degree co-operatives, non-state wholesales, new urban co-operatives) as a crucial part of economic rehabilitation, this principle was never really implemented. The international co-operativist principles were for the first time introduced in a training manual authorized by the Ministry of Agriculture in 2013, prepared by UNDP and financed by the EU.^{xx} But resistance against its active use proved too strong, in spite of the obvious success of the more independent-minded co-operatives.^{xxi} In 2020, "co-operatives" are still seen by most Cubans as just another form of state property, although there are recent signals that a comprehensive and more far-reaching co-operative law will finally be introduced.

LIKELY TRANSITIONS IN CUBAN POLITICS AND AGRICULTURE

Cuba has had its first post-Castro President since April 2018. Miguel Díaz-Canel is a 59-year old civilian with a life-long career climbing through the Communist Party structure from local and provincial to central level. He had a record as a rather liberal and popular leader, but in his new position he has so far vowed to stick faithfully to the old line. Raúl Castro continues as Party leader, and the Politburo is still dominated by men in their eighties: the generation that made the Revolution in 1959 and the hardliners behind the counter-reforms. Díaz-Canel has hardly any power base on his own, independent from the old men that handpicked him. The inevitable generational change has only carefully started, supposedly to culminate with the 2021 Party Congress when the old guard – many of whom are approaching 90 years of age – has no other alternative than leaving all formal positions to party apparatchiks of Díaz-Canel's generation. Cuba now finds itself in a *critical juncture*, with a deep economic crisis and a political crisis of legitimacy, further aggravated by the crisis in Venezuela and the Trump administration's appetite to finish off the Cuban revolution as a by-product of regime change in Venezuela (see Bye 2019ⁱⁱ). Sooner rather than later, a change of paradigm will have to take place, probably starting with the economy but probably also with political impacts.

Given the critical state of food provisions and the bleeding effect this has on foreign currency, agricultural policies may become a starting point for deeper economic and political reforms. There is reason to believe that this situation will only strengthen the need to return to Raúl Castro's original reform agenda, and perhaps bring it several steps further. That would imply giving the peasants and farmers more autonomy and participation in decision-making over the entire production-distribution-sales cycle in agriculture, pulling the state out of wholesale on the input as well as the output side and opening this space for non-state actors, allowing producers to organize as an interest group independent of state and party control, and not least giving the co-operatives real autonomy and a strong say in agricultural markets including through second-degree co-operatives.

When Cuba comes to this turning point, we suggest that the historical evolution of agricultural policies in Norway may become a very interesting reference case, as an example of a socialist-capitalist compromise. Compared to its pre-revolutionary agricultural structure, there is

today no landowner class in Cuba, the plantation economy is radically reduced, and most producers are peasants and small farmers. Cuba's agriculture is increasingly dominated by what we may call family farmers producing staple food for the domestic market, with a potential and indeed a need to increase productivity quite dramatically. This is quite similar to the situation in Norway one hundred years ago. We imagine that Cuban agriculture could have a lot to learn from the Norwegian experiences when it comes to how family farmers started to cooperate along the value chain in the late 1800s and first half of the 1900s. Also experiences from recent development of value chains of local, regional and organic food production may be helpful in the present modernization of Cuban agriculture, perhaps in this case with a particular view to selling to the tourist market as well as export market niches for instance among the Cuban diaspora in Europe and North America.

The sticking point is obviously political. The Leninist linear ideological heritage retains a deep concern about independent farmers constituting some kind of a counter-revolutionary *kulak* class. With reasonable public policies and regulation and given the class composition of the present agricultural population, this danger will in our view be minimal. One could rather imagine that the danger would be to push the rural population towards reactionary positions if they continue to experience the complete exercise of control by the agricultural bureaucracy and centralist political power. By allowing co-operatives real autonomy, and not least by building second degree structures as permitted in the 2011 Guidelines, the agricultural economy could become a pioneer in the development of a strong mixed economy, and as a basis for the rehabilitation of a welfare state. Not least, a strong co-operative sector could allow for a more efficient wholesale function for implements as well as food products, and even for a certain level of industrialization of agricultural products. It would also be a laboratory for democratic practices in the country. A major challenge is that the food distribution system in Cuba is mostly local and outdated. There is no cooling chain from producer to consumer and logistics are hampered by a lack of storage facilities and effective means of transportation. There are no formal wholesale dealers and the retail sector is mostly run by the state or private dealers selling what they produce themselves on the street (Bye & Hoel 2014).

Cuba's low self-sufficiency level can be seen in contrast to expectations in the early days of the Revolution. The French rural development economist Rene Dumont assumed then that Cuban natural resources should be sufficient to feed four times the present population of 11,5 million people (Bergmann 1975).

The major part of the agricultural production in Cuba may be called organic (Carolan 2016), mostly because fertilizers and pesticides are in short supply. However, Cuban consumers do not appreciate the social status of organic food, only segments of foreign eco-tourists do. Farmers and farmers' co-operatives in Cuba are currently producing "organic food", but these foods are not certified as organic. However, all kinds of tourism have increased rapidly in Cuba during the last years, and eco-tourism to rural mountainous and coastal areas are no exception. Family farming and local food markets play an important role in the Cuban food economy today, and it will be interesting to see if the government will allow the small farmers to develop sustainable food supply chains together with urban consumers. However, the state socialist sector is still controlling most of the formal investment opportunities and the government controls all food imports (as well as exports).

The government also decides internal consumer prices in local Cuban peso (CUP). Many necessary staple food articles, like milk and grains, are rationed and the consumer prices on these products are set to a low, subsidized price. The major part of products from private farmers must

be sold to the state at a fixed price. However, the farmers may sell surplus out of a fixed quota directly to consumers in Cuban convertible peso (CUC), which is twenty-four times more valuable than the CUP. In reality, the black market plays a much more dominant role than what official statistics tell.

THE FUTURE POTENTIAL OF COOPERATION TO CONTRIBUTE TO MODERNIZATION AND CHANGE IN THE AGRICULTURAL SECTOR

According to Nova (2006) the officially defined agricultural sector provides approximately 35 to 40 percent of calories and 35 to 37 percent of total daily protein consumed by the Cuban population. Agriculture employs close to one-fifth of the economically active population (ONEI, 2017), and it is estimated that four million Cubans depend directly on agricultural activity to maintain their standard of living (Nova, 2008).

The agricultural co-operatives in Cuba cannot exploit their full productive and innovative potential unless they are given greater freedom to design their own development. They must be ensured stable and predictable access to credit and the opportunity to set aside funds for further development. Co-operatives must also be able to access – and not least to prepare the heavily *marabú*-infested agricultural land in their vicinity so that they can expand their production. They must also be ensured delivery of spare parts and machinery and equipment from the state sector or via imports.

In Norway, new forms of agricultural co-operation have been established in the last ten to fifteen years within local food production and farmers' markets. These are smaller co-operatives originating among small-scale producers who have established direct sales to consumers or grocery chains. These farmers and food manufacturers often build on local traditional foods or raw materials of special geographical origin. Especially when it comes to cheese making, Norwegian small-scale cheese producers have won international fame in recent years with the title “the world’s best cheese” in two of the last three years.^{xxii} Some of those producers prefer to be independent, while others take part in new forms of co-operatives to exchange skills, build logistics chains and market their products. Co-operation with the tourist industry is also prevalent among Norwegian local food producers.

In Cuba we also see that local producer and service co-operatives start developing local food products and serve them along with entertainment for tourists. As Nova and Galia show, Cuban agriculture has great potential for producing organic and agro-ecological products. “However, because of limited supply, demand continues to be unmet, and this has prevented the emergence of a domestic market for organic and/or agro-ecological production” (Nova & Galia 2018 p. 11). So far, agro-ecological products have mostly emerged as a spontaneous and unintended consequence of economic hardship and lack of access to agrochemicals. The high environmental and climate consciousness among Cubans – due to the country’s heavy climatic vulnerability – could be turned into more systematic policies in this direction, in production as well as marketing, towards foreign tourists as well as international markets. But this requires a stable delivery capacity that second-degree cooperatives could provide.

From the literature linking the food sovereignty movement and agroecology with family farming and the development of cooperatives within Latin American countries (Altieri 1999), several lessons can be drawn that are valid for Cuba. According to Altieri (2009), “the science of agroecology—the application of ecological concepts and principles to the design and management of sustainable agricultural ecosystems—provides a framework to assess the complexity of agroecosystems”. In an assessment of various grassroots initiatives in Latin America, Altieri and

Toledo (2011) shows that the application of the agro-ecological paradigm can bring significant environmental, economic and political benefits to small farmers and rural communities as well as urban populations in the region. They argue that “an emerging threefold ‘agro-ecological revolution’, namely, epistemological, technical and social, is creating new and unexpected changes directed at restoring local self-reliance, conserving and regenerating natural resource agrobiodiversity, producing healthy foods with low inputs, and empowering peasant organizations” (Altieri and Toledo 2011).

According to Rosset et al (2011) agroecology played a key role in helping Cuba survive the crisis caused by the collapse of the socialist bloc in Europe and the tightening of the US trade embargo. “Cuban peasants were able to boost food production without scarce and expensive imported agricultural chemicals by first substituting more ecological inputs for the no longer available imports, and then by making a transition to more agro-ecologically integrated and diverse farming systems. This was possible.... because of the Campesino-a-Campesino (CAC) social process methodology that the National Association of Small Farmers (ANAP) used to build a grassroots agroecology movement” (Rosset et al 2011). As described by Rosset et al the spread of agroecology was rapid, largely due to the social process methodology and social movement dynamics which enabled the farmers to contribute significantly to increased production by the peasant sector. However, as Loconto and Fouilleux (2019) point out, based on experiences from the Global Dialogue on Agroecology directed by UN Food and Agriculture Organization (FAO) in different cities around the world, the spread of agroecology must be influenced by local civil society actors as ‘experts’ in order to institutionalize agroecology.

It may also be the case that small farms are more resilient to climate change than larger private enterprises and state farms. Many rural communities and traditional farming households seem able to cope with climatic extremes despite weather fluctuations. Many farmers “...prepare for climate change, minimizing crop failure through increased use of drought tolerant local varieties, water harvesting, extensive planting, mixed cropping, agroforestry, opportunistic weeding, wild plant gathering, and a series of other traditional farming system techniques” (Altieri 2009).

As the demand for local products with special origins and organic products grows in Cuba, we see an increasing need for training, consulting and supply of funds such as cooling technology and capital. It can even open up opportunities for export of organic products for obtaining hard-currency income from international markets. However, new forms of co-operative and private initiatives are hampered by a lack of resources and support from public officials at local and regional level. A key issue is the separation of government’s state functions from business functions (Mulet Concepción, 2015). As proposed by Nova & Galia, the creation of producer associations could be a way of promoting interaction among local production entities (CCSs, CPAs, UBPCs, small farms and new landholders with usufruct rights). In the present political situation, these are in reality completely state-controlled. “New forms of inter-cooperation are needed that can function independently of the Ministry of Agriculture’s top-down system of relations.... producers’ associations.... would promote horizontal relations of economic collaboration (and) could be an important step in the process of separating state management from strictly business management” (Nova & Galia, 2018, p 10).

CONCLUSIONS

Family farming and independent co-operatives and second level co-operative associations will need to play an increasing role in the Cuban food production in the years to come. Small farmers

are developing organic farming, local processing and short supply food chains at a slow pace, mostly because they lack capital for their investments and reliable logistics and a well-functioning cold chain. The main problem in Cuban agriculture is that too little food is produced for its own population, considering the country's resources. In addition, the produced food does not come to the consumers as fresh and good as it should have been. As Nova & Galia (2018, p 7) writes: "Despite the measures implemented since 2007, agricultural production output is insufficient..., showing that the productive forces (meaning the means of production plus human labor) in that sector remain at a standstill". Agricultural co-operatives, both existing and new forms of cooperation, could to a large extent contribute to solving the challenges in food production, given that they were "released" in the sense that they were given the opportunity to function as a real third sector in addition to the state sector and the private sector.

Today's agriculture in Cuba faces two basic challenges: How can this country that is so rich in resources produce more food for its own population to reduce some of its imports and how can the alternative food networks, which also have some advantages with today's low consumption of fertilizers and pesticides, be developed to meet the demand that largely comes from tourists (and international markets)? Cuban agricultural policy must be able to evolve along two strategies that are in part different: a volume agriculture that delivers high-quality, durable basic foods to the predominantly urban population, but also delivers local traditional food with craftsmanship to tourists and a growing Cuban middle class. The first strategy requires significant state effort with capital, transport, technology, training and guidance for family farmers and genuine cooperatives who want to develop their food business. The second strategy calls for the release of farmers and cooperatives that supply local food markets and foreign tourists traveling around Cuba. Both strategies require that the pricing mechanism be used flexibly to give farmers and cooperatives incentives to produce more of what is demanded, as we see today in China and Vietnam. This may be called a hybrid state-family farmer model, which could be a convergence of the Norwegian co-operative model and Cuban state controlled model. However, it is still unclear whether today's Cuban authorities are willing to and dare to take this middle route between command economy and state-regulated market economy.

As the old guard revolutionary leaders soon will disappear from decision-making positions, there is reason to hope that pragmatism gradually will trump ideology. Business as usual is no longer an option for a Cuban society in a deep economic crisis and with the legitimacy of the Castro generation gone. A new Constitution maintaining the overall Leninist political structure but with interesting reform potential in some aspects was approved in 2019. However, there is not yet any willingness to let go of the old ideological dogmas of a vertical and centralist society, representing the structural impediment for the emergence of more horizontal economic and social structures like an autonomous co-operative movement. The agricultural economy may become a decisive arena for the necessary paradigmatic disruption of these dogmas.

Since 2012, Cuba also started experimentation with non-agricultural co-operatives (CNAs). It was widely believed that the co-operative sector could become a leading economic force, binding rural and urban economies together. Ritter (2016) speculated that this sector could employ as much as one third of Cuba's workforce, in a scenario he termed a "*mixed economy with intensified cooperativization*". This would imply permitting co-operatives in all areas, including professional activities; encouraging grass-roots, bottom-up ventures; providing import and export rights; and improving credit and wholesaling systems for coops. So far, however, the government has been over-cautious with the approval of CNAs, leaving them to struggle with similar problems as the rest of the non-state economy (lack of access to implements and marketing channels, lack

of horizontal representation, etc.), and so far providing very little employment (Piñeiro & Ojeda 2017). The work of getting a non-agricultural co-operative approved is laborious and unnecessarily complicated: “Before a proposal for a co-operative can be approved, it must be submitted to both the municipal and provincial bodies of the People’s Power, to the Central State Administration body that corresponds to the co-operative’s proposed activities, and to the Standing Committee for the Implementation and Development of “*Los Lineamientos*” (Nova & Galia 2018, p 4).

As Cuba is going through its critical juncture, the main economic challenge is to provide people with livable employment, food on the table and a revival of what used to be Latin America’s only welfare state. Deng Xiaoping understood when he started the dramatic post-Mao turnaround, that the survival of the Chinese revolution “would depend on legitimacy, which could no longer rest on ideology but would be based on their (the leaders’) performance in governing the country” (Fukuyama 2014 p. 383). The same will soon have to be realized among the younger Cuban leaders. A strong and independent co-operative sector, in agriculture as well as the urban economy, may be a crucial tool to achieve this.

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i GDP Cuba (according to World Bank estimate): <https://www.worldometers.info/gdp/cuba-gdp/>

ii GDP Norway: See <https://www.ssb.no/a/histstat/aarbok/ht-0901-bnp.html>

iii Hardly a coincidence that the bill was co-sponsored by a son of a Norwegian immigrant: Gilbert N. Haugen (R-lowa)

iv Speech by Che Guevara on 9 April 1961: Cuba: Historical Exception or Vanguard in the Anticolonial Struggle?: <https://www.marxists.org/archive/guevara/1961/04/09.htm>

v Ibid

vi René Dumont, generally very critical of the centralist and collective-oriented policy, praised some examples of such 'genuine co-operatives', where presidents were apparently freely elected, and elected councils could freely establish production plans.

vii "Premier seeks Mobilization of Savings by Cubans to Insure Growth", *New York Times*, 19.09.59.

viii What we mean by «non-state share» here includes credit and service co-operatives (CCS), land in usufruct (leased by the state) plus privately-owned land. Directly state-controlled co-operatives (CPAs and UBPCs) are not included (ref. Bye 2020, Table 6.1)

ix 14ymedio, 16.05.16, quoting Cuba debate.

x See for instance reports by the well-informed Uruguayan journalist Fernando Ravsberg, who has been living in Cuba for several decades: “What Cuba Loses Because of its Incompetent Farm Bureaucracy”, *Cartas desde Cuba*, 19.10.17: <http://cartasdesdecuba.com/what-cuba-loses-because-of-its-incompetent-farm-bureaucracy/>

xi These dynamics have been studied on the ground and described in detail in a forthcoming PhD dissertation (Wig, 2020)

xii According to an article in the official newspaper *Juventud Rebelde*, quoted by Marc Frank in a *Reuters* article right after the 7th Party Congress in April 2016.

xiii Information based on news cable from *Thomsonreuter*, Havana, 21 January 2016:” In a reversal, Cuba tries price controls to tame food inflation.”

xiv *Prensa Latina*, 27.01.18.

xv *ONEI* 2016, Table 8.10 for the period 2011-2016; for 2017: Omar Everleny Pérez: ”Retos y resultados para Cuba desde 2017”, *Pregreso Semanal Weekly* 5.01.18, reprinted in *AsceNews* No. 786). For 2017, it is estimated that the value of food imports will ascend to 2 billion USD, and food is representing an increasing share of Cuba’s total import value—17.3% in 2016 (Armando Nova: “La alimentación en Cuba una variable estratégica no resuelta. El pronosticado estancamiento de la producción agropecuaria al finalizar 2017 tendrá un impacto desfavorable en la economía nacional”, in *Camino al andar*, 13.11.17)

xvi Nova (2013i:152), Table 5.

xvii In most cases, *usufructuarios* are organized in cooperatives. So these two forms overlap.

xviii Mat og industri Norsk institutt for bioøkonomi (NIBIO) 2018 https://www.nibio.no/nyheter/tretti-prosent-av-norske-industriinvesteringer-bygger-pa-tillit-til-norsk-matpolitikk/_attachment/inline/81ba0ffb-3515-4d87-816a-4c6c2576fe9b:40740fb310f1b5ebb54c6586f2679d60b6619dab/Mat%20og%20industri%202018%20presentasjon%20i%20pdf.pdf

xix The seven principles of co-operation, see: <https://www.ica.coop/en/co-operatives/co-operative-identity#co-operative-principles>

xx Ministerio de Agricultura (2013): *Gestión Integral Cooperativa: Guía para formadores y facilitadores* (La Habana)

xxi Fernando Ravsberg’s blog www.cartasdesdecuba.com, 13.07.17: «Peligro! Las cooperativas son demasiado eficientes»

xxii <https://gff.co.uk/norwegian-gouda-named-2018-world-cheese-awards-champion/>



Creating value(s) by integrating local and extra-local resources in cereal production in the Swiss Alps

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Abstract.

This paper explores the long-term prospect of alternative, local food initiatives, taking a particular interest in the development of the embedded local values, understood as economic as well as cultural values. Analysing the case of a cooperative of mountain cereal farmers in Switzerland, we show that sustaining local values-based quality is a dynamic process of linking local and extra-local resources. Our results first show the importance of both proximity and place in constructing the ‘local’ by the cooperative. Second, product flow, knowledge and information exchange, quality control, and innovation are governed by both horizontal and vertical relationships between local and extra-local resources, and these multiple relationships build trust in the network and beyond. This, thirdly, enables the cooperative to continuously reproduce its values by weaving them into a cycle of quality creation. We conclude that we need to understand the characteristic values-based quality of the cooperative’s products as the result of a recurring cycle of local and extra-local knowledge creation and resource exchange.

Key words: local; extra-local; value chains; values; proximity; place; rural development;

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INTRODUCTION

Local and alternative food initiatives have been put forward as a way of increasing farmer income and contributing to rural development of marginalized areas, opposing the predominant neoliberal system (Goodman et al., 2012, Meybeck and Redfern, 2016, Schmid et al., 2004, van der Ploeg et al., 2008). Such initiatives often build on particular values that are closely attached to a specific place or mode of production and stand in opposition to the conventional, mainstream food system. Drawing on the work of Rokeach(1979) and Williams Jr. (1979), we understand values as “core conceptions of the desirable within every individual and society [...] [that serve as] criteria to guide not only action but also judgement, choice, attitude, evaluation, argument, exhortation, rationalization” (Rokeach, 1979, p.2). Values embedded in alternative food initiatives not only include economic values, such as farm income, but also (socio-) cultural values. Cultural values, as for example traditional products or artisanal ways of producing develop through social relations of sharing values and practices among people in agri-food networks (Hubeau et al., 2019).

When local initiatives grow in size and try to expand to a market outside their immediate environment, requirements and standards of the predominant market structure can potentially challenge the embedded values (Hubeau et al., 2019). E.g. for organic farming, Guthman (1998) started a debate on the so-called conventionalization of the sector, which would, among others, lead to diluting organic values. This debate was not least fuelled by the increasing importance of large retailers selling organic produce. These retailers are nowadays engaging in marketing local food, which also can cause some tension between the embedded values and market requirements (DeLind, 2011). Investigating a local olive oil initiative in Spain, Moragues-Faus and Sonnino (2012) show that the definition of what is “local” became increasingly blurry with the enlargement of the initiative. Bui et al. (2019) have observed that local food sold in large retailers often only supports the dominant agro-industrial system when it is too small a niche (controlled by the retailer) to create a stronger impact. They conclude that an impact or change can only be achieved if established market structures open up to systematically include ethics (Bui et al., 2019).

All the same, there is no simple dualism between (“good”) local and (“bad”) global food (Brunori et al., 2016). Using socio-economic indicators, Le Velly et al. (2016) could show that when niche innovations grow larger, they do not necessarily show signs of so-called conventionalization, becoming less alternative. Remarkably, there are very few studies that actually look in-depth into long-term development of local alternative food initiatives of farmers. Often, the focus remains on farm-based impacts of short food supply chain developments, which may be positive in terms of value added, but in how far a positive impact on rural development can be sustained and developed over time remains unclear (Marsden et al., 2000).

This paper explores the long-term prospect of alternative, local food initiatives, taking a particular interest in the development of the embedded local values, understood as economic as well as cultural values. Analysing the case of a cooperative of mountain cereal farmers in Switzerland, we will show that sustaining local values-based quality is a dynamic process of linking local and extra-local resources.

LOCAL VALUES AND THEIR RELATIONSHIP WITH THE EXTRA-LOCAL

The recollection of the ‘local’ is often seen as a response, a countertrend, to the growing globalization of agri-food chains (Winter, 2004). By focussing on endogenous resources attached to a specific territory, added (economic) value is created and maintained, and cultural capital increased in a particular region (Ray, 2006). Local food is assigned some potential for transforming the predominant food system (Cucco and Fonte, 2015), but this potential depends not least on the political interests and power in the processes involved in food systems (Hinrichs, 2015). Bowen and Mutersbaugh (2014) distinguish two main schools of thought and approaches in alternative food research: the franco-mediterranean perspective of local agrifood systems, with a strong focus on territoriality, and the alternative food networks literature looking mainly into distribution systems. Combining both perspectives can lead to a multidimensional understanding of the ‘local’ as “practice, know-how, governance, and discourse” (Bowen and Mutersbaugh, 2014, p.209). In these discourses and practices we find different understandings of the ‘local’, which can be grouped into the concepts of proximity and place (Feagan, 2007; Cucco and Fonte, 2015; Hinrichs, 2003). In the following, we disentangle these different meanings to better understand the implications and the potential of the ‘local’.

The local as proximity

Eriksen (2013) interprets local food in terms of proximity, and distinguishes three “domains of proximity”: geography, relations, and values. Geographical proximity refers to what perhaps most of the consumers would intuitively define as local, in that it refers to either a defined radius for the provenance of the food or the places of production, or to a clearly delimited geographical region, defined by administrative borders or a natural physical space (e.g. watershed, valley). Often, such local food is equalled both in colloquial chats as in scientific literature with being better than non-local food (Hinrichs, 2003), although geographical proximity does not tell us anything about particular quality features (Brunori et al., 2016; Ermann, 2006; Schmitt et al., 2017). Food can be produced in a highly unsustainable way in the local environment of the place of consumption, e.g. if the local ecosystem’s carrying capacity is exceeded (such as in a region of high intensive livestock production (Stolze et al., 2019)). At the same time, the concept of ‘local’ can be used defensively to draw borders between the local and the non-local (Hinrichs, 2003). The definition of actually *what* is local becomes critical and Hinrichs calls for some modesty in assessing the potential of localized food for sustainable development. So we should be careful not to fall into the “local trap” (Born and Purcell, 2006), but to address geographical proximity with some caution. However, with no doubt, the geographical domain of proximity is one relevant aspect and the basis for re-territorialization of food (Horlings and Marsden, 2014), as will be discussed in the section on ‘local as place’ below. The social relations enabled by local food production and close links to the place of consumption are another vital aspect of proximity (Eriksen, 2013). Direct relationships are the basis for trustful and meaningful exchange between producers and consumers, which distinguishes local food from conventional food in an anonymous market (Hinrichs, 2015). Local food opens up spaces where producers and consumers, along with other value chain actors, can meet and experiment with ideas

about production and consumption, and potential transformations of the food system (Cucco and Fonte, 2015). Social relations thus enable social learning, which in this way become part of the definition of the ‘local’ (Favilli et al., 2015). Reproducing social relations through such learning processes increases trust between individuals, which in turn is the basis for cooperation and collective action. In this way, relationships going beyond market relationships of buying and selling in a value chain to including exchange of ideas and knowledge, contribute to building social capital of a region (Chiffolleau et al., 2019; Ray, 2006).

Fonte (2008) discusses how local knowledge is embedded in local food. She distinguishes between tacit knowledge, which is unconsciously acquired and not codified, and lay knowledge, seen as a more technical knowledge acquired through experience and learning. In contrast to scientific knowledge (which is regarded as non-local), lay knowledge is much less standardized and formalized, and “refers to the technical knowledge utilized by farmers and producers to grow or to prepare food in the specific agri-ecological context in which they operate” (Fonte, 2008). During the process of industrialization of agriculture, such traditional knowledge has increasingly given way to scientific knowledge as the only accepted knowledge base and nowadays tends to be considered inferior to so-called scientific knowledge (Lowe et al., 2019). As part of a countertrend to the conventional food system, local knowledge becomes relevant for creating and defining local food (Fonte, 2008). While local actors will often apply scientific knowledge in their daily business of producing or processing food, learned in established institutions, the point here is that part of the differentiation of local food from conventional food actually lies in the use of local lay knowledge. As an important part of human capital, it can then act as a basis for the (re-)valorization of the patrimony of European rural areas, whereby the challenge remains to mobilize local lay knowledge in farmers and other actors for local food valorization (Fonte, 2008; Šūmane et al., 2018).

In sum, the geographical and relational dimension of proximity refers to the territorial, social and human capital of a particular region as a resource for creating ‘the local’. What is more, these forms of capital can be reinforced and further developed by values creation through local products. It is these values that create a particular alterity of local food in comparison to conventional food, with specific unique features. With this understanding of terms, the ‘values’ domain of proximity (Eriksen, 2013) links to the interpretation of local as ‘place’, which we will discuss in the following.

The local as place

The perspective of local food as place-based food builds on the concept of a territory, which includes not only a particular biophysical setting, but also socio-economic and cultural specificities of a particular region (Hinrichs, 2015). When marketing such place-based products, proximity to this region is not necessarily involved. Much discussed place-based products include the geographical indications that link a specialty product to a clearly defined region and prescribed production processes (Bowen, 2011). The EU offers a registration of such products under the quality label scheme PDO (Protected designation of origin) which allows a strong link to the place

of production; examples are Parmigiano Reggiano cheese or Kalamata olive oil, etc. (Maye et al., 2016). Place-based food is becoming increasingly visible on the market, and is an important asset of alternative food networks. They have developed in response to globalization of the conventional food system with its wide-ranging disconnection between (places of) production and consumption (McMichael, 2009; Wiskerke, 2009). Challenging the predominant food regime, place-based food constructs identities linked to particular rural areas and modes of production, in this way re-territorializing food (Horlings and Marsden, 2014; Ilbery and Maye, 2005). A characteristic of this food is a higher heterogeneity reflecting different places and nature in comparison to the mainstream highly standardized food (Winter, 2004). The underlying qualities of place-based food are thus not only its ingredients or nutritional content, but also a characteristic (multifunctional) agriculture and landscape.

This particular landscape also contributes to and is the result of a high degree of cultural identity (Ray, 1998). Cultural identity and the role of territory have been the main drivers for new approaches to rural development in the 1990s. Ray (1998) explains this by three developments: a growing self-consciousness of regions and regional agents, in particular to capitalize on the values of their region; a particular European policy supporting such development, and even promoting territorial, regional approaches to strengthening rural and remote areas (LEADER); finally, a general trend in Europe to regionalization with a growing focus on smaller territories than nation states. As the core of cultural identity and capital, place provides the basis for endogenous development (Ray, 2006, Bosworth et al., 2015). It is the interplay between people in a particular region and the assets of that region that create values (Hinrichs, 2015). From the perspective of local as place-making, the particular value is created by embedding the social (trust and collective action) in the spatial (Moragues-Faus and Sonnino, 2012; Renting et al., 2003). A value that is typical and can be marketed as such to consumers in and outside the region, which in turn reinforces cultural identification with the region.

Linking the local with the extra-local

The identification of the local as something place-specific is a prerequisite for marketing local products in particular to distant consumers valuing the specific local quality. This relationship between local and extra-local plays a particular role for rural development and has been framed, among others, with the concept of the ‘rural web’. This concept conceives of rural development as an ongoing process involving “interrelations, interactions, exchanges, and mutual externalities within rural societies” (van der Ploeg et al., 2008). It emphasizes the need for locally embedded and rooted resources, which are translated into qualification strategies and economic activities that then span out of the region. The valorization of local resources often happens by linking them to resources outside the particular locality (Moragues-Faus and Sonnino, 2012). These links are on the one hand realized in concrete tangible interactions, such as knowledge exchange and market relations. On the other hand, they can take the form of a political-administrative framework that influences how local resources can be valorized.

The way how local products are marketed has been the focus of concepts of ‘short food supply chains’. They address “(the interrelations between) actors who are directly involved in the production, processing, distribution, and consumption of new food products” (Renting et al., 2003). Renting et al. (2003) distinguish three different types of interrelations, extending in distance between producers and consumers: from face-to-face marketing, such as farm shops, to proximity marketing, e.g. on farmers markets or via community supported agriculture, to marketing in distant markets that ensure transparency via certification and labels. The strength of this concept is that it shows the continuity between local and extra-local, with the producer (and processor) as the local and the consumer as the extra-local. The concept of ‘short food supply chains’ also builds on the above discussed variety of definitions of ‘the local’ in that it covers proximity as well as place-related traceability. These different market configurations lead to new market governance structures, in which new institutions and associations play a major role (Renting et al., 2003). In this line of argument, Moragues-Faus & Sonnino (2012) found that products from a more or less artificially defined region which were marketed in distant markets with high demand, led to a higher production in the area, while the definition of ‘local’ became more flexible. If this is combined with rather artificial administrative boundaries of some quality label, such as the PDO designation, they argue, the relations and governance models tend to be more hierarchical, and build on requirements of external certification (Moragues-Faus and Sonnino, 2012). Certification is indeed often a prerequisite for marketing local products to consumers in distant places, as a way to secure the local quality and ensure transparency about places and modes of production, thereby reconnecting producers and consumers (Fonte, 2008). However, certification also means a codification of recently uncodified local knowledge, which involves the question of power of who defines what is legitimate knowledge (Tovey, 2008). The relationship between local and extra-local knowledge is thus also a question of power, putting extra-local consumers, certifiers and others in a position to define what is locally produced and how. Yet, combining extra-local and local knowledge can also foster new ideas and approaches to rural problems and thus revitalize endogenous forces (Bock, 2016). The relationship between local and extra-local resources, embodied in market relations and knowledge exchange is thus strongly connected to questions of power, while at the same time representing a large potential for endogenous rural development (Rossi et al., 2019).

The concept of neo-endogenous development sheds light on the role of the political-administrative context for local rural development (Ray, 2006). While there is a strong focus on endogenous potential and resources, the ‘neo’ part relates to the impact of policy: “*Neo-endogenous development retains a bottom-up core in that local territories and actors are understood as having the potential for (mediated) agency, yet understands that extralocal factors, inevitably and crucially, impact on – and are exploitable by – the local level*” (Ray, 2006). This theory is largely inspired by European rural development policies, such as the LEADER initiative. In such rural development programmes, policy often acts as facilitator or initiator of change by providing incentives for local action. Thus, although some of these programs carry bottom-up elements in them, the fact that they are higher-level policy programs providing financial support

for pre-defined fields of actions clearly represents a top-down approach. The neo-endogenous rural development concept has helped our understanding of the role of the state as a facilitator of local development: it facilitates change by providing positive signals (policy programs, incentives) for local actors to respond to. What is not considered so much in this approach is that local actors might also react to economic pressures and challenging policy signals, and proactively engage in developing alternatives to prevent economic loss. In this sense, policy change can act as an important driver for endogenous development: not only as a facilitator, but as sending out negative signals.

Building on the concepts of ‘local’, as well as the interrelations between the ‘local’ and the ‘extra-local’, this paper explores how an alternative food initiative created values through processes linking local and external resources, and in how far these values can be sustained over time. The remainder of this article first describes the case studied and methods applied, before presenting the results of our analysis, disentangling the different aspects of ‘local’ and ‘extra-local’. We then discuss how the results contribute to answering the research questions, followed by a brief conclusion.

THE CASE STUDY

The case study approach

To address the research questions of how values in an alternative food network develop over time, and what the role of local and non-local resources is in this, we applied an explorative case-study approach (Ridder, 2017). As case, we chose a more than 30 years old farmers’ cooperative, with strong statements on local value(s) creation in a clearly defined geographical region, selling local products to consumers outside that region: Gran Alpin, in the canton of Grisons in Eastern Switzerland. Historically grown, the canton is at the same time an administrative unit and a defined region well known across Switzerland for its diverse and unique alpine landscapes and culture. Data was collected and analysed from four different sources: First, we analysed scientific literature available on the topic. We furthermore considered grey literature and information from websites, including the cooperative’s website, as well as websites of value chain partners, regional development organizations, and administrative bodies. Third, the movie “Biobergackerbau hat Zukunft” from Wissensmanagement Umwelt GmbH (2013) brings valuable insights into the life and work of four farmers of Gran Alpin, and describes their experiences with growing cereals in the mountains. Finally, we conducted nine interviews with key experts spread across the canton of Grisons: three with current and previous general managers and board members from Gran Alpin, three farmers (of which one is also a board member), one miller, one brewer, and one baker. The interviews were carried out by one or two researchers in March 2016, and lasted between 45 and 90 minutes. The relevant parts were transcribed and the content analyzed for the mentioning of place and proximity, and related values.

Cereal production in Grisons and the role of Gran Alpin

Until the mid-1980s, many farmers in the mountain zone¹ of the canton of Grisons produced cereals, at least in small quantities. When federal subsidies for the cereal market expired in the late 1980s, cereal production declined considerably, and farmers turned to livestock (mainly dairy) production. To address the increasingly narrow focus of farmers on grassland and dairy production, in 1987, a group of two organic farmers and one veterinarian founded a cooperative for farmers producing cereals in mountainous areas in the canton: Gran Alpin. 15-20 farmers joined immediately, although nobody knew where to mill and sell the product(s). The first years were marked by a learning-by-doing attitude, using whatever local resources were available for transport, milling and further processing of the cereals, produced in small quantities of heterogeneous quality. The general managers of this period combined multiple roles on themselves, including management, milling, transport, as well as farm advice.

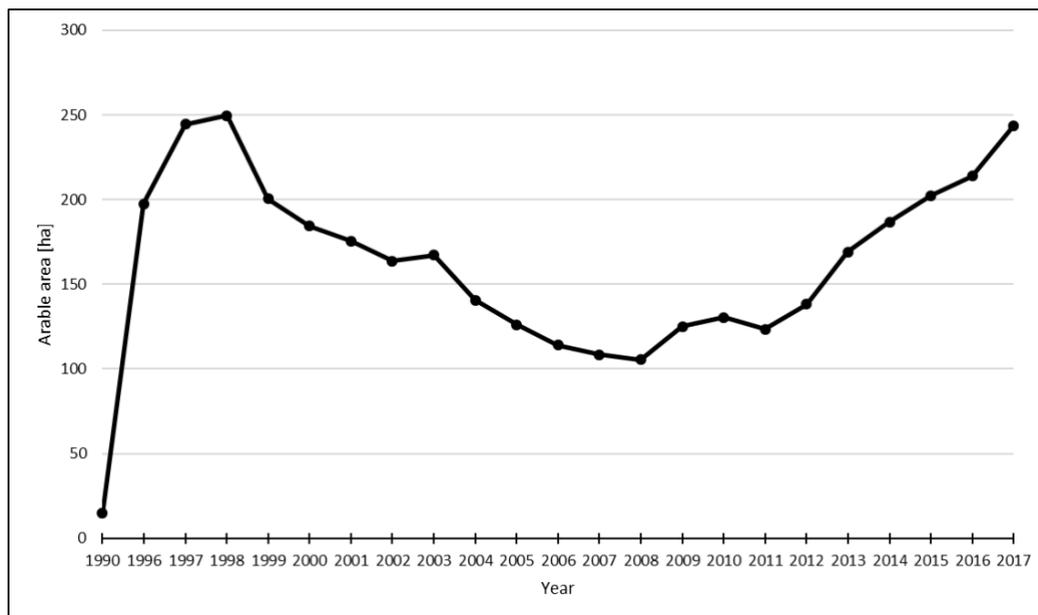


Figure 1: Production of organic cereal in the mountain zones of Grisons 1990-2017

In 2008, the cooperative decided to employ a new general manager, who had not been involved so far, and who is still in place today. She focussed on the core function of management: organising and controlling production quantities and qualities, building up relationships with downstream partners in the value chain, caring for overall communication and financial security. As a further step in professionalizing the cooperative, the general manager established close links with the

¹ The mountain zone is one of the production zones defined by the government, which takes into account altitude, inclination of slopes, and accessibility; the other production zones are the valley zone, and the hilly zone. 93% of the agricultural land in the canton of Grisons are assigned to the mountain zone (Landwirtschaftliche Strukturerhebung 2015)

cantonal advisory service and the cantonal department of agriculture, to ensure high-quality farm advice. This professionalization is reflected in the development of cereal production in the mountain zone of Grisons, as shown in figure 1: after a lean period, the area on which cereal is produced grew from 2008 and in 2017 reached the level of 1997.

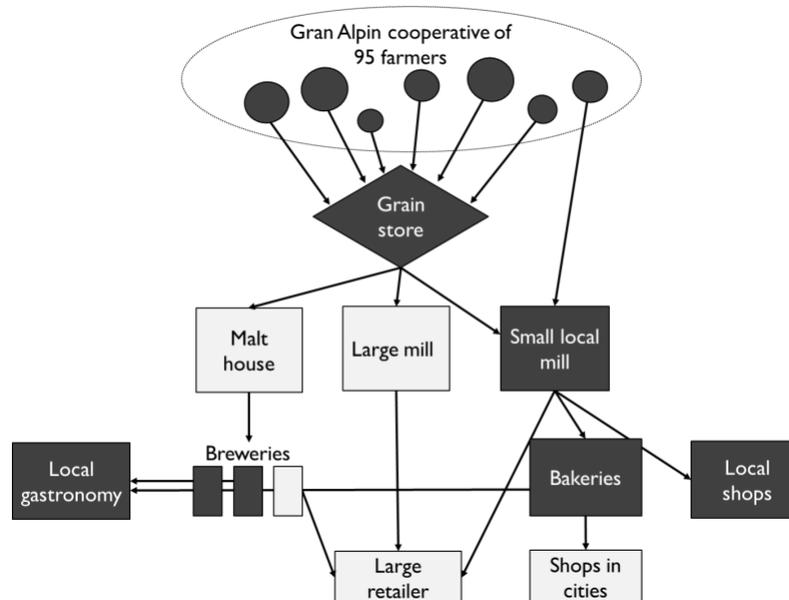
Organization and value statements of Gran Alpin

At the time of research (2018), the cooperative consists of 95 mountain-zone farmers spread across different valleys of the canton, producing around 500t of cereal on a total surface of around 160ha. The main products are flours from wheat, rye, and barley; brewing barley, and rolled barley, and the turnover is more than 1Mio Swiss Francs. While producer guidelines had always prohibited the use of pesticides, the cooperative converted to certified organic production in 1996. Today, Gran Alpin products are multiply certified and labelled: as Gran Alpin; as organic; as mountain product; and partly as originating “from Grisons”, or from a regional nature park (Park Ela).

Gran Alpin’s core values are laid down in its statutes – unchanged since the beginnings:

- Support of mountain arable farming
- Maintaining the cultural/traditional landscape
- Reasonable prices for farmers – better than normal organic prices
- Additional income for farmers, contribution to farm resilience
- Supply the region with products

Downstream value chain actors are closely linked to the cooperative via contracts and product flows (see figure 2). They include: the regional grain store for collecting cereals; a local mill in a small village in the canton (milling about one third of the cooperative’s cereal) and a large mill outside the canton (processing about two thirds); two bakers using a relevant amount of flour and several using small quantities; a mid-size brewery outside the canton, as well as two local micro-breweries in the region. The general manager of Gran Alpin organizes the logistics of Figure 2: Value



chain and product flow of Gran Alpin, showing the main actors. Dark shaded boxes represent local actors, light boxes extra-local actors; of the three breweries, the largest is extra-local, two are local the product flow through the value chain. Almost all farmers deliver the cereal to the central grain store, where it is cleaned and packaged, and then supplied to the other partners in the value chain. Malting barley is malted outside the region, and then partly brought back in again to two microbreweries. The largest share of Gran Alpin products reaches the consumers via shops of one large retailer in major cities of Switzerland. Other points of sale include local bakeries, gastronomy, and specialty shops across the whole country.

As the focus of this study is on the 'local', figure 2 highlights the local value chain actors. We will later discuss how they contribute to building the 'local' values of Gran Alpin on the basis of proximity and place. As a longstanding initiative deliberately bridging the dichotomy of local and global food supply chains while strongly building on values of localness and culture, Gran Alpin represents an interesting case to study how values are created locally and develop over time in interaction with the non-local.

RESULTS - CONSTRUCTING 'THE LOCAL' AND RELATIONSHIP WITH THE EXTRA-LOCAL

Our analysis of Gran Alpin revealed several qualities and ways of enacting the local and the relationships to the extra-local, which we present in the following. We analyse how the cooperative constructs the 'local', by the concepts of proximity and place.

How Gran Alpin constructs the local 1: aspects of proximity

The geographical dimension of proximity is highly visible in the value chain of Gran Alpin, aiming at keeping as much value as possible within in the canton of Grisons. The interviewees identified both the provenance from the alpine region and from Grisons to be relevant when marketing the cereal products outside the region. They emphasized the importance of keeping production and processing as far as possible within the canton, as this quote from the miller shows, when he explains how he joined Gran Alpin: *"By chance, I read a newspaper article [about Gran Alpin] 20 years ago. And then I wrote to the president that we also have a mill here. Because it said that they [Gran Alpin] have their cereal processed in another mill, not even a mill in Grisons. And so we slowly came into contact..."*

Regarding economic value creation, the interviewed farmers estimated the share of income generated from cereal production between 15 and 30% of their total agricultural income, including indirect income in the form of state subsidies for cereal production. Besides generating a new source of income, cereal production and marketing is an opportunity to diversify farming activities, increasing resilience of the farms in the region. In what concerns processors, Gran Alpin is the most important customer of the local mill in economic terms: cereal processed for Gran Alpin

makes up about 70% of the mill's yearly processed quantity. The miller concluded that they could survive in the peripheral valley as a very small mill, because offering and filling a niche (whereas medium-sized mills in more central valleys lost to large mills). With Gran Alpin products, the miller enlarged his market: "*We mainly supplied the Bergell [the local valley], in former times exclusively. [...] And now with Gran Alpin, we also cross the Julier*²." Further users of Gran Alpin cereal products are bakers and local breweries. Out of 15 local bakers using Gran Alpin flour, only two hold an important role in the network. One of them runs a local bakery and coffee shop/restaurant with 23 employees, and thus is a relevant employer in the small village in which it is situated. This baker established a strong link to the locality of production, e.g. explicitly looking for naked oats grown in the vicinity of the village to avoid transports to a dehulling mill outside the region. He emphasized "*[...] in the [local cookies], there is also honey from the valley, and the oats are also from the valley.*", and in another part of the interview went on

"[...] We can present this here. If it's about the oat flakes or the eggs – I can show you. We can tell you from which farmer. We know where the raw products come from."

Here, the short geographical distance to input suppliers overlaps with social relations, the second important dimension of proximity.

Much of the general manager's work in Gran Alpin focuses on building and maintaining relationships, going beyond market relations to information and knowledge exchange. As one farmer said: "*And the general manager you know, you have the most to do with her. [...] She usually comes to the farm once a year. Mostly not alone, sometimes one of the board members joins her, or [the breeding expert].*" By organizing yearly field days, the manager facilitates direct encounters between farmers, and thus enables effective knowledge exchange. These regular exchange meetings build up trust in the cooperative, which in turn supports collective decisions on its further development, including the specific quality requirements of the entire value chain. An example is the decision in 1996 to convert from pesticide free to organic production. This was widely discussed and finally agreed with all Gran Alpin members, with only a few dropouts of farmers who did not want to convert to organic. Today, the organic mode of production and processing is generally accepted and no longer part of the negotiation processes in the local network. Moreover, the cooperative continuously invested in the development of product quality, and the local network successfully ensures maintenance of this quality, which in turn is crucial for marketing the product (as will be shown below). The baker summarizes the importance of the function of the network around Gran Alpin as quality assurance:

"Primarily it's that we are happy that we can use a local raw material at all, in a way that it complies with the norms. So we are of course happy that Gran Alpin exists.

[...]

Yes, that's why. That's why Gran Alpin. 'Cause we don't have a mill here. We don't have a mill here [...]. In the situation that we're in, we're of course happy that it

² "*cross the Julier*" means that the products leave the region via the mountain pass of the Julier (the fastest way to the cities in the lowlands of Switzerland).

works with Gran Alpin. [...] Thanks to them, we can continue to purchase the raw material that we [want to] sell to [our] customers. Well, for us, it would be a disaster if this would not work anymore"

Closely linked to quality are the particular skills, the experience and local knowledge needed to grow cereals in mountain areas and to use the raw material in the further production process – the third dimension of proximity. The interviewees emphasized that these experiences, skills and knowledge are not available everywhere, but are a particularity of Gran Alpin members and the wider network. The local knowledge cannot only be found in the ways of cereal production, but also in processing – be it as miller dealing with non-standardized specialty produce or as a baker dealing with raw material in varying qualities, and not pre-prepared baking mixtures. As the miller reckoned:

“As far as Gran Alpin products are concerned, they have a biologist. [...] He can inform us about the varieties of the different cereals...with technical problems, we are experts ourselves, we have learned that.”

Combining different local knowledges and skills leads to creating socio-technical innovations, involving both new technologies (e.g. processing techniques or new varieties) and new forms of organization or exchange between market partners. For example, bakers work with farmers to develop new products based on special cereals, which first have to be tested in cultivation, and the breeding expert is experimenting with new varieties together with farmers. Many of the interviewed persons referred to the innovative nature of cultivating and processing mountain cereals. While one farmer emphasized that thanks to his training as a conventional farmer he was open to *"modern production techniques"*, and thus also to new varieties, the miller and the baker referred to the family history as innovative companies.

The relations between value chain actors created through Gran Alpin and facilitated by the proximity to each other are thus constantly used to jointly innovate products and production processes and to create a distinct quality. And while producing, the value chain actors weave the particularities of the region into the products, thus creating a product strongly linked to a defined place. We therefore now turn to the aspects of place-making in our case.

How Gran Alpin constructs the local 2: aspects of place-making

The geographical territory in which Gran Alpin operates is the canton of Grisons; so it coincides with a politically-administratively defined region in Switzerland. Yet, the canton presents itself as a culturally distinct region in Switzerland, and emphasizes its uniqueness in combining different cultures on its territory; cultural diversity indeed functions as a unifying identification of the canton (<https://www.gr.ch/EN/grisons>). This diversity is created by the topography dividing the canton into a number of different valleys and regions, in which two different languages (German and Italian) and five Rhaeto-Romanic idioms are spoken.

The cooperative's clear reference to the canton is the basis for place-making, visible already in its name: “Gran Alpin”. This name carries the notion of mountain origin (“alpin”), but

also the relation to the canton of Grisons: “Gran” is an artificial word, derived from the different idioms of Rhaeto-Romanic language, meaning cereal. This illustrates the strong identification with the region and its characteristics of mountains, tradition, and heritage. Thereby, “tradition” goes beyond the place of production to also include landscape and production and processing methods. In fact, we can follow place-making in Gran Alpin through the whole value chain. It starts with the varieties used, which build on traditional knowledge and in that way contribute to cultural value and identity. The breeding expert of the cooperative, who had been working as its general manager for some time in the 1980s/90s had tested several different cereal varieties for their use in mountainous environment, and finally a traditional breed of rye was selected as most suitable; it is still cultivated today. Resuming the cultivation of old arable land preserves and in part redesigns the traditional historical cultural landscape (in German: “Kulturlandschaft”). As one producer in the film “Bergackerbau” summarized: *“We’re not here to produce as much as possible, but to practice agriculture and take care that the landscape stays intact”*. So aesthetics is important to them, connected to a diverse landscape as a counterpart to the “grassland monoculture” (an interviewed expert). At the processing stage, place-making as the interlinkage of people and territorial assets (Hinrichs, 2015) becomes apparent in the use of traditional milling and baking technologies. They are closely linked to the actual place of production, which can be seen at the example of the mill that operates in the 9th and 10th generation of a family, and has been using the power from the local river ever since. Moreover, all interviewed processors established a clear connection between their processing activities and the effects of cereal production on the landscape. Responding to the question whether the local brewery had used Gran Alpin barley from the beginning, the manager of the brewery replied that:

“Yes, that was quite clear... Now, of course, this has the additional aspect that the old terraced fields here are revived a bit. These were really terraces in [the villages here], which had practically no more cereal cultivation, and through Gran Alpin there was more cereal again, and the brewery certainly helped a bit that there [are] still some [farmers] who produce cereal now.”

Our analysis showed that place and proximity are interlinked: the identification with and construction of place in Gran Alpin is continuously re-produced through personal ties between different market partners, and in that way place-based innovation is the result of collaboration between proximate value chain actors. This is illustrated by one farmer explaining:

“Rye production of course started also because the baker here makes rye bread. [... This] valley used to be a rye growing area. And then there were perhaps 10 to 20 years, in which no more rye was cultivated. And the baker then bought rye from anywhere. And then it was him who came up to me for the rye, that’s how it was.”

Also when selling the product within the region, proximity and place are intertwined. One farmer explained that the flour’s quality, which is not as refined as the mainstream products in supermarkets, is appreciated by elder local people as being “as it used to be” in former times. So, according to the interviewees, local consumers are not so much interested in whether the locally

produced cereal is organic or not, but appreciate the close link of the product with their place (and landscape) of living.

The link between place-making and proximity is furthermore established by the general manager summarizing that

“... fields belong to a mountain landscape in the same way as do meadows. 50 to 100 years ago, there were umpteen times more fields here. Well, the old terraced landscapes still are witnesses of that. [...] And Gran Alpin has set itself the goal of promoting mountain cereal production; that cereal is cultivated, that knowledge doesn't get lost, also that infrastructure is not totally lost; that this can continue to exist.”

She sees the marketing of Gran Alpin products as instrumental to reaching these goals. In this sense, place-making and local knowledge are closely interlinked and place-based marketing outside the local region is used to reproduce traditional quality and knowledge, as well as cultural identity and values – an observation that we will look into in more depth in the discussion section.

How Gran Alpin links local to extra-local

The visible link between the local and the extra-local is in marketing: the large majority of the locally produced products of Gran Alpin are marketed outside the canton in supermarkets and specialty shops, certified as organic and as mountain product. In addition, products sold by the retailer COOP carry the retailer's private label "Pro Montagna", indicating products from mountains³. Attached to this is a specific idea of consumers about tradition and preserving original culture. Producers and processors are clear about the selective range of consumers interested in their products, but they are happy with working and marketing in this niche, preserving the local value(s) of the product:

“We target customers that value [our particular quality]. [...] If you explain that this comes from our valley, and this is regional, then... they really want to buy that. If someone comes and tells us ‘that's too expensive’ then we say ‘well then you have to go to [a retailer] and buy the cheap [...] cake’.” (baker)

These market relationships involving standards and certification carry some characteristics of hierarchical structure (Moragues-Faus and Sonnino, 2012). The labels are used as a way for communicating the local characteristics to consumers outside the region, in distant markets in larger cities of Switzerland. In this sense, the retailer holds some power in defining the ‘local’ values of Gran Alpin, implemented by sales relationships and certification, potentially affecting the cooperative's autonomy. Yet, this seems a deliberate choice, and producers and processors were realistic about the interest of the retailer to include these products in their offer for marketing

³ Pro Montagna is a label of COOP indicating products from Swiss mountain regions. For each item bought, a small amount of money goes to the so-called “COOP sponsorship for mountain regions”, which supports mountain farmers and other value chain actors in need, e.g. supporting investments into infrastructure.

reasons, as they tend to attract certain customers, who then continue shopping at this point of sale. At the same time, all mentioned that they felt that COOP was not engaging in these specialty products merely out of marketing reasons, but felt a good partnership and real interest in supporting mountain farming. The importance of a trust-based relationship with the retailer (i.e. with the relevant persons in charge) is illustrated by the description of the brewer how he first met the responsible person from COOP:

“...It took a while until I found the right building, it was so huge. Then I entered, and then Mr. [the responsible person from COOP] came to greet me, and when I saw that he wore this [typical traditional] belt, I knew that I would get along with him. And that’s how it was...”

Apart from pure market relations, our analysis shows that the links between the local and the extra-local in Gran Alpin are also visible in the recurring innovation processes. In this way, our observation goes beyond the argument made by Moragues-Faus and Sonnino (2012) and Fonte (2008) that the relationship between the local and extra-local is predominantly defined by the mechanisms of certification, and in that way highly institutionalized and influenced by the power of certifiers. Our analysis revealed other aspects how knowledge sources outside the local perimeter are important for and impact on the development of the ‘local’ product: In the founding period, the initiators got inspired by the example of a successful local specialty food production (in this case, herbs) in another region and transferred that to their own project idea. At the same time, one of the founders reported on his longstanding professional relationship with state research institutions, for which he would carry out field experiments and testing of new varieties. This enabled him to build up a network with research much beyond the local region. Another early link to extra-local knowledge was with a breeding expert coming from outside who became the general manager of the cooperative for a while, and now acts as an expert and advisor. He brought in-depth knowledge about the characteristics of cereal varieties, including old varieties, and he still conducts several experiments searching for varieties that are best suited to the harsh conditions in the mountains. All these sources of production-oriented knowledge stemming from outside the particular locality have helped (and still help) the continuous development of the local product(s). In sum, the relationship between the local and the extra-local includes market-based relationships as well as knowledge exchange, and both build on trust. From the perspective of power relationships, we could say that strong horizontal ties built on trust, knowledge and common values counterbalance the hierarchical relationships of certification and marketing by a large retailer.

DISCUSSION

Based on the results of our case study analysis, we will now discuss how the values embedded in an alternative food network are created and develop over time. The cooperative Gran Alpin builds upon the core values of ‘local’, interpreted as support of agriculture in a clearly defined region (mountain areas of the canton of Grisons), producing according to organic standards, maintaining local (cultural) landscape, and generating (additional) income for local farmers, processors and

local points of sale. The cooperative thus creates ‘local values’ in a broad sense, including economic, ecological and cultural values. Looking into the underlying processes of values creation leads to three observations: First, their foundations are close proximity-based relationships that enable place-making. Second, the values creation processes are supported by the hybrid governance structure of horizontal and hierarchical relations within Gran Alpin, and between the cooperative and its value chain partners. Finally, the cooperative continuously reproduces its values by weaving them into a cycle of quality creation that integrates local and extra-local resources. Let us now look deeper into these arguments.

Our first observation is that in Gran Alpin both perspectives and aspects of ‘the local’ are important and intertwined: the local resources, created and reproduced through proximity relations, form the basis for place-making. Place, in turn, enables successful marketing of the Gran Alpin products outside the region. Proximity lies at the core of Gran Alpin’s business model; already its statutes include the goal of keeping as much value added in the region as possible. In fact, the cooperative of *local* farmers is the basic condition for the miller, the baker and the brewer(s) to create *local* products strongly linked to the actual place of production. The local economic value creation thus expands to value chain actors beyond the cooperative, and enables place-making by all actors connected to Gran Alpin. This relevance of local (and organic) production is confirmed by Bardsley & Bardsley (2014), who found in a survey among Gran Alpin farmers that their main motivations to participate in the cooperative were “to sell ecological products”, and “supporting the local community”. Economic value creation is linked with the (re-)production of cultural values, in that the economic activity maintains the cultural techniques of cereal growing and processing, and shapes the cultural landscape. We can therefore conclude that founding Gran Alpin maintained and partly brought back cereal production in the alpine regions of the canton Grisons. The local (proximity) market relations continuously reproduce culture and tradition, which are truly embodied by the different actors in the value chain and network around Gran Alpin. The case of Gran Alpin thus spans across dichotomies of proximity and place (Hinrichs, 2015), and of territorial and distributional foci (Bowen, 2011), and illustrates how place-making based on proximate relationships is used when distributing a local product in a (partly) extra-local market. Economic and cultural values creation within and outside the region are intertwined and reinforce each other.

Our second observation addresses how the relationships within the cooperative and between Gran Alpin and its extra-local partners are governed. This is linked to questions of power of who knows and who decides, in other words, what is relevant and legitimate knowledge and how (local) products are produced (Ray, 2006; Tovey, 2008; van der Ploeg et al., 2008; Bock, 2016, Rossi et al., 2019). When certification is involved, retailers, certifiers or label organizations hold this power, and often hierarchical governance models, involving new institutions, develop (Fonte, 2008; Moragues-Faus and Sonnino, 2012; Renting et al., 2003). Studying cases of olive oil cooperatives in Spain, Moragues-Faus & Sonnino (2012) observed that the relations between the local (production) and the extra-local (consumers) were driven by requirements of external certification, leading to vertical or hierarchical relationships of the market. By contrast, while Gran

Alpin built up new institutions to organize local cereal production and the marketing in distant markets, this did not lead to a hierarchical governance model. Instead, Gran Alpin operates in a market characterized by a hybrid governance model, combining vertical and horizontal relations: Contracts and certification (as organic and mountain product) play a role as formal relationship and enable marketing to distant consumers in large retailers. Yet, these hierarchical (vertical) relationships are counterbalanced by strong trust-based horizontal relationships of knowledge exchange and innovation, based on common values within the cooperative (and with its local value chain partners). An example for this is the decision process to produce according to organic standards: this was collectively decided by the cooperative's members, and not dictated by some external market partner. Although market demand influenced the decision, autonomy, local values and identity were maintained despite the admittedly strong dependency on one large retailer. Gran Alpin's strong horizontal relationships allow a flow of knowledge, advice, and quality control within the cooperative. We can thus confirm the observation of Bowen (2011) that social relations are strengthened by formal rules and institutions. Indeed, formal and informal relationships overlap, and are enacted in the general manager's way of working. For example, when she visits the farms once a year, it is not only to give advice and plan production, but this regular interaction and exchange of expertise between all people involved is crucial for trust building. The hybrid governance of the multiple horizontal and vertical relationships of product flow, knowledge and information exchange, quality control, and innovation build trust. This is the foundation for a longstanding network beyond pure value chain relations; a network reproducing local territorial and cultural identity and values.

Thirdly, we zoom into the process of how the multiple relationships actually 'produce' the specific quality in Gran Alpin. In line with Bock (2016) who stressed how extra-local resources can foster new ideas and revitalize endogenous forces, we found that these relationships evolve around recurring combinations of local and extra-local knowledge. In Gran Alpin, production and market, knowledge, skills and infrastructure relationships are intertwined: Figure 3 illustrates how local values are preserved in a cycle of production and marketing, spanning across the local and the extra-local. Local knowledge and infrastructure foster cereal production, this enables innovations in artisanal processing, and preserves the local traditional cultural landscape. The place-based quality of Gran Alpin products develop on the basis of proximity-based production and processing, and it is this place-based quality that is sold to consumers. Links to them and other external actors open the local cooperative for extra-local knowledge, which in turn supports local production.



Figure 3 The values-based cycle of quality creation through combining local and extra-local resources

In contrast to Fonte (2008), we found that not only local knowledge contributes to ‘localizing’ a product, i.e. producing the ‘local’ quality, but extra-local knowledge makes an important contribution. The case of Gran Alpin shows that while local knowledge is the basic condition for a place-based product, integrating extra-local knowledge into the system widens and strengthens this basis. Knowledge exchange with external actors (such as research, breeding experts, and market actors) contributes to improving organic mountain cereal cultivation, experimenting with new varieties and techniques and developing new products. It is the combination of local and external knowledge, artisanship and the preservation of the cultural landscape that together constitute the particular quality of Gran Alpin products, which can then be marketed to consumers. And by marketing the products to consumers the local economic, ecological and cultural values are continuously reproduced and innovation encouraged.

CONCLUSION

Our research has shown how relations to institutions and people outside a particular region can enlarge the knowledge base available for further development of a local product or a whole region. By disentangling the various roles of local and extra-local resources, as well as of the relevance of proximity and place, the in-depth analysis of this case has deepened our understanding of the potential for (economic and cultural) value(s) creation in rural areas, and for sustaining these values over time. Gran Alpin follows a strategy of reinforcing local values and resources through recurring interaction and exchange with extra-local resources. Thereby they do not perceive of the extra-local ‘other’ as an enemy against which to defend local ‘own’ values, but work with them in a synergistic way. In view of possible generalizations and transfer to other cases, we found that the role of the general manager is pivotal. All actors involved in producing a local product or giving advice need to be open to share experience and values, but the general manager is the person to keep the process running: building trust, integrating different local resources, linking

production, processing, and marketing, as well as networking beyond the boundaries of the local. While this case shows that economics and good marketing opportunities are crucial, they are more than an end in itself. Only when they are concurrently used to reproduce cultural and ecologic values, local alternative food initiatives remain viable in the long term.

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“If I need to put more armor on, I can’t carry more guns”: the collective action problem of breeding for productivity in the California strawberry industry

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Abstract.

Facing the appearance of novel soil-borne plant diseases as well as increasing restrictions on the chemical fumigants that have long been used to treat them, developing disease resistant cultivars is one strategy among several that the California strawberry industry is supporting. Yet, under the assumption that growers most desire high yielding varieties, university strawberry breeders continue to emphasize productivity, despite knowing the difficulty of breeding for multiple diseases, much less for the array of qualities that consumers, intermediaries, and growers differentially want.. They make this assumption even as industry per acre productivity reached an all-time high in 2018 while prices continued to slip, a dynamic predicted by Willard Cochrane’s famous technology treadmill. This paper explores if and why growers want yield over disease resistant varieties, to assess if there are ways to slow or stop the treadmill. Based on twenty in-depth interviews with strawberry growers, we found that growers want yield to remain individually competitive, even as they largely recognize that prioritizing yield over other qualities can be self-defeating for the industry. We additionally found that this desire is being augmented by buyer-grower contractual relationships, conditions of land access and rising land values, and practices of labor remuneration. Given that those structural forces are not easily addressed, we also consider the role that university scientists play in constructing this desire for yield. On this question we draw on work in science and technology studies as it relates to university agricultural science to suggest that farmers’ needs and desires are a reflection of what university research and extension can offer and conclude that university breeders are best positioned to level the playing field by ceasing to breed for productivity.

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“IF I NEED TO PUT MORE ARMOR ON, I CAN’T CARRY MORE GUNS”: THE COLLECTIVE ACTION PROBLEM OF BREEDING FOR PRODUCTIVITY IN THE CALIFORNIA STRAWBERRY INDUSTRY

In summer of 2018 first author Guthman attended a field day held at a strawberry field in Castroville, California. Castroville is situated in one of California’s prime strawberry-growing regions - in a state that grows nearly 90% of US strawberries. The event showcased the new cultivars being developed by the University of California’s (UC) breeding team, cultivars that have since been released for commercial use. Many industry bigwigs were there to witness UC’s renewed commitment to plant breeding on behalf of the strawberry industry after somewhat of a hiatus.¹ In discussing the new varieties and comparing them to previously released varieties, team members certainly mentioned qualities of disease resistance, a renewed emphasis of breeding. But they primarily focused on productivity, providing data that showed how well these new varieties would perform relative to existing ones. Mingling among attendees, I overheard several question why UC was continuing to breed for productivity when the year had seen such huge gluts and concomitant low prices. Others averred that yield remained important to growers and suggested that the breeding team was appropriately responding to growers’ needs. Months later, when I was interviewing growers about cultivar choice, I learned that indeed most growers prioritize yield, even though this priority is almost always entangled with other qualities of concern such as size, flavor and shippability, and, in some instances, disease resistance.

Writing in 1958, agricultural economist Willard Cochrane first brought attention to a phenomenon he characterized as a technology treadmill. He noted the tendency of farmers to adopt technologies that bring higher yield because early adopters initially make greater-than-normal profits, while those who do not adopt go out of business. However, as he also noted, such yields eventually negatively affect crop prices because other farmers join in and price competition ensues – a dynamic that may benefit consumers but decidedly not farmers. In the case of the contemporary strawberry industry, this long-acknowledged problem has taken on new urgency. This is an industry challenged in multiple spheres, not least of which is the appearance of novel soil-borne diseases, coupled with the increasing restriction of the chemical fumigants that have historically been used to treat them (Guthman 2019, Koike et al. 2013, Tourte et al. 2016). There is even a possibility that pre-plant fumigation could be phased out altogether, making breeding for disease resistance an important direction among a suite of proposed alternatives to soil fumigation (Department of Pesticide Regulation 2013). It is in this context that in 2017, with strong stakeholder support, the USDA funded a major collaborative project, the objectives of which were to identify natural sources of resistance to pathogens affecting strawberries in particular and to accelerate the development of commercial cultivars resistant to a broad spectrum of soil-borne and above-ground pathogens.

The research reported herein is a subset of that project, designed to support development of a long-term strategy for disease management and cultivar adoption in strawberries by better understanding how growers’ cultivar choices are shaped. Based on in-depth interviews, in this paper we explore why growers continue to want high-yielding cultivars, despite the dual threats of soil disease and increased regulation on fumigants. In a nutshell, growers want to stay competitive – and do not yet feel completely pressured by these threats. Nevertheless, in the current predicament of the strawberry industry, prioritizing yield is a highly questionable and possibly irrational path, especially since it is very difficult to breed for multiple diseases, much less for the

¹ The hiatus was related to protracted legal battles following the departure of the previous breeding team.

array of qualities that consumers, shippers, retailers, and growers differentially want. Therefore, it is important to dig into growers' desires for highly productive plants to assess if there are ways to slow or stop the treadmill. Here we build on scholarship in the sociology of agriculture to show that the desire for yield reflects a collective action problem, which is being augmented by buyer-grower contractual relationships, conditions of land access and rising land values, and practices of labor remuneration not heretofore theorized as playing into the treadmill. Given that those shaping forces are not easily addressed, it is also important to dig into the role that university scientists play in constructing this desire for yield. On this question we draw on work in science and technology studies as it relates to university agricultural science to suggest that farmers' needs and desires are a reflection of what university research and extension can offer. So if, indeed, the strawberry industry is serious about meeting the dual challenges of novel pathogens and a more restrictive regulatory environment for soil fumigation, those super-industry actors might be better positioned than growers to address the collective action problem of the productivity treadmill.

THE TECHNOLOGY TREADMILL REVISITED

Agricultural social scientists (and many agricultural practitioners) have long recognized the phenomenon of the technology treadmill (Archer et al. 2008, Gillespie and Buttel 1989, Lehmann and Pengue 2000, Ramey 2010, Röling 2009, Stone and Flachs 2018). It is however most attributed to the work of agriculture economist Willard Cochrane, who first discussed it in 1958 and then expanded on it in *The Development of American Agriculture*. As he explained in the second edition (1993), "early-bird" farmers who adopt a new and improved technology see a reduction in per unit costs (427). At first, the increased output of a few farmers has a negligible effect on prices, but as more farmers adopt the technology, the supply on the market increases, causing prices to fall. With widespread adoption, prices eventually fall to the point that all gains are eliminated. And "laggard" farmers, those who do not adopt, experience losses, as their expenses end up surpassing existing prices. At this point, the only group to benefit are consumers who see lower prices (428). But then, as laggard farmers go out of business, the more aggressive farmers are able to snatch up their productive assets, increasing the latter's wealth or market share (428). Consolidation can then have an opposite effect on consumer prices: fewer sellers in the market allows them to be price setters. It is worth noting here that with plant breeding the treadmill works somewhat differently. A higher-yield cultivar does not so much reduce per unit costs as increase the number of sellable units with the same fixed costs (Dexter 1977). At the same time, increasing the amount of harvestable units may raise the variable costs of something like harvest labor.

The technology treadmill identified by Cochrane is in effect a collective action problem. As first described by the economist Mancur Olson in his widely cited *Logic of Collective Action* (1965), a collective action problem exists when it is in the group's long term interest to act collectively, but those interests are undermined by individual actors who can benefit by acting on their own. Olson specifically noted the behavior of competitive firms. A collective of firms can withhold output to shore up higher prices, but each individual firm has an individual interest in selling as much as they can by increasing their own output, but in effect lowering prices for all. Those writing on the technology treadmill in agriculture have suggested that this dynamic is all

the worse for farmers with their abiding adherence to ideologies of individualism and self-sufficiency (Levins 2001, Ramey 2010). But it is not only farmers who contribute to the treadmill.

In 1996, Cochrane revisited the theory with Levins and amended it to include land dynamics (Levins and Cochrane 1996). Noting that government price supports have kept farmers in business even when technologies have been widely adopted, they argued that price supports have given rise to what they call the “land market treadmill” (550). In this dynamic, government price supports incentivize farmers to obtain more land, resulting in rising land prices. Here it is high land prices rather than low sales prices which diminish profits and threaten least productive farmers. It must now be said that specialty crops like strawberries are rarely supported with government subsidy programs. Yet, as Guthman (2004) has argued, specialty crop farming contributes to what is effectively a land market treadmill in another way. High value crops raise the expectations of how much revenue can be obtained from a piece of land, which is then imputed into land values. Increasing the productivity of those high value crops with breeding would then augment this effect.

An additional land dynamic raised by the 1996 piece by Cochrane and Levins is about the difference between farmers who own land and farmers who rent. Land owners may find they can make more money renting their land and chose to leave farming to let others run on the treadmill (550-551). As it happens, this is also a dynamic that has been salient in California where “farming farmers” has become quite lucrative (FitzSimmons 1986). Farmers who continue to farm not only lease their land but, in the words of Cochrane and Levins, are “continually thwarted” by rising land values here taking the form of higher rents (551).

Scholars have also speculated on the role that agribusiness plays in driving the productivity treadmill. While most agree that because of the intense competition they face it is farmers who set it into motion, agribusiness certainly benefits from it (Levins 2001, Ramey 2010, Röling 2009). Although the sectors of agribusiness that sell farmers technologies clearly stand to gain (Goodman et al. 1987), here the suggestion is that the sectors of agribusiness that buy from farmers benefit as well. Certainly those buyers involved in value-added processing benefit from having cheap inputs, and they may encourage competition among farmers (Ramey 2010, Winders 2009). The value that agribusiness extracts from farmers is commonly recognized as a squeeze (Mooney 1983).

Yet farmers do not adopt technology from nowhere – someone has to develop and provide it to them – and not all technologies come from private sector organizations. To be sure, agricultural scientists affiliated with the U.S. land grant universities have long been in the business of creating and disseminating applicable technologies. With farmers as the primary clientele of research and extension, the agenda for agricultural science has nominally been set with farmers’ interests in mind, and scientific findings have been translated in ways that are applicable to farmers (Buttel 2001, Henke 2008).

At the same time, land grant agricultural scientists in some sense have to produce expectations that what they can provide is needed (Borup et al. 2006). As explained by historian of agricultural science Christopher Henke (2008), land grant university research and extension has been much better at producing and disseminating technologies that increase yields – here he includes crop protection – than dealing with the inevitable gluts from such productivity. As such, “these combined forces - economics and technology - form a powerful discourse about the inevitability of one kind of agricultural future and not others” (172). What he is suggesting is that

the advice of university extension is performative, less about responding to what farmers want than creating desire for what it can provide – which is primarily yield. That said, not all farmers take on those desires. Some studies have suggested that farmers are skeptical of technological innovation coming from the land grant universities precisely because of the impact on prices resulting from the treadmill (Buttel and Busch 1988, Gillespie and Buttel 1989).

A focus on the yield that farmers are guided to want has additional drawbacks besides the contribution to declining prices. University science has tended to develop simple, easy to take-up solutions, whether chemical pest control or high yielding varieties. Historian of science Frank Uekötter's (2014) work on the fate of biological approaches to soil fertility in postwar Germany is illustrative of the problem with such easy solutions. As he argues, integrated approaches produce uncertain results, and scientists investigating these approaches face stiff competition from agrichemical industries and their advisors (130). As for farmers, they embrace the easy fix of agro-chemistry, absolving scientists of further investigation into the multiple and interacting causes of various production problems. The issue here is one of path dependence – once “yield” becomes the thing of value, it can lead to knowledge erosion on the part of both agricultural advisors and farmers regarding other potential solutions, many of which address the complexity needed for something like soil disease (Sassenrath et al. 2008, Stone and Flachs 2018). And this is precisely the situation with the California strawberry industry: a focus on productivity comes at new costs besides market fluctuations and a secular decline in prices. Sustaining an interest in yield in some sense is relieving farmers from dealing with the complexity of soil disease in ways that may be crucial for the future. Or, as Lloyd and Gordon (2016) seem to suggest in relation to the fate of the industry, were scientists and farmers to prioritize an integrated approach to soil disease, they might at least be able to sustain current yields. A brief history of how this situation came to be is in order.

PATHOGENS, BREEDING, AND FUMIGATION IN THE CALIFORNIA STRAWBERRY INDUSTRY

Until the 1930s, strawberry breeding was conducted by private plant breeders, in California and elsewhere. However, a set of scourges affecting California's nascent strawberry industry in the early part of the twentieth century eventually pushed the industry to call on UC to understand the nature of the diseases afflicting the industry and to do something about it. UC scientists were able to determine that the pathogen causing many strawberry plants to wilt and die was the soil-borne fungus *Verticillium dahliae*, and one of the first orders of business was to develop a plant breeding program that would develop varieties suitable for local conditions and that would be resistant to diseases (Wilhelm and Sagen 1974). The result of experiments launched in 1929 was the release of five new varieties in 1945, only one of which, the Sierra, showed particular resistance to *Verticillium* disease (Darrow 1966). Despite the original rationale for the plant-breeding program – to combat disease – growers opted for productivity in their cultivars, as opposed to disease resistance. Hence, it was the Lassen and Shasta varieties that were responsible for the tremendous expansion in acreage, yield, production, and farm value. By 1955, 95% percent of the California acreage was planted to with these new varieties, and the value of the California crop rose from about \$2 million to over more than \$30 million annually (Wilhelm and Sagen 1974, 227-228).

The years that immediately followed saw a reversal of fortune, however, and growers again began to experience crop loss (Baum 2005). This time the day was saved by the development of underground fumigation, also a product of UC agricultural science. A combination of the fire retardant methyl bromide and the tear gas chloropicrin turned out to be particularly efficacious in controlling soil-borne pathogens, as well as weeds and nematodes. By the end of the 1960s growers had widely adopted the practice. Industry-wide productivity increased sharply and consistently. Yields of three to five tons per acre of years prior increased to twenty to thirty tons per acre (Wilhelm et al. 1974). With chemical fumigants controlling diseases, breeders now could give even greater focus to other desired qualities – not only yield for growers, including cultivars that could bear for long periods, thereby increasing the length of seasons, but sturdiness for shippers, taste, shape and color for consumers, and, as it happens, size for workers.

Things changed again when methyl bromide became subject to the international Montreal Protocol on Ozone Depleting Substances in 1991. Following years of successful efforts by the US to delay the mandated phase-out by obtaining Critical Use Exemptions (Gareau 2008), the chemical was finally banned in 2016, except for in nursery uses. Meanwhile, another chemical fumigant, chloropicrin, was designated a toxic air contaminant, and 1,3D (Telone), was deemed a carcinogen, precipitating more stringent application protocols, taking the form of larger buffer zones and township caps, for example. A 2013 report issued by the California Department of Pesticide Regulation (2013) suggested that additional restrictions were not out of the question, especially given the increase in urban development near strawberry fields, both of which fare well within a few miles of the California coast and the natural air-conditioning of the Pacific Ocean. Concurrent with these increased restrictions, two “novel” soil pathogens, *Macrophomina phaseolina* and *Fusarium oxysporum sp. fragariae*, began regularly appearing in growers’ fields, precipitating growing fears of significant die off (Koike et al. 2013, Tourte et al. 2016).

It is in this context that the industry began to double down in supporting research which would augment the efficacy of existing tools or otherwise develop alternative means of controlling these pathogens. As noted in that 2013 report, without a magic bullet disease management would be more complex, and strawberry growers would likely need to incorporate a combination of complementary methods and technologies. Among several areas of research emphasis, one identified was of particular importance: plant breeding for disease resistance, a breeding priority that was minimized when methyl bromide was available (Department of Pesticide Regulation 2013). The project of which this study is a part was a response to that public imperative. In July 2019, UC released five new cultivars (the ones introduced at that field day). An announcement of their release claimed that all five would be less susceptible to soil diseases, two could reduce labor costs by sprouting fewer runners, but two *would increase yield by up to 29 percent* (Nelson 2019).

In those same years between 2013 and 2019, the industry underwent significant restructuring, a product of both internally and externally generated forces. Many growers went out of business or reduced acreage. According to the U.S. Agricultural Census, the total number of California strawberry growers shrunk from 995 in 2012 to 676 in 2017. Subtracting farms (or patches, more accurately) of less than five acres, better reflecting the number of commercial growers, these numbers declined from 375 to 241 (United States Bureau of the Census 2012, United States Bureau of the Census 2017). Some shippers cut back their operations as well. Dole left the strawberry industry as did Eclipse/Success Valley, and WellPict allegedly dropped some

contract growers. Some of these growers, however, were apparently grabbed up by Driscoll's, and another large operation hired previously independent growers as staff (interview data). Those years also saw significant decline in acres, especially in the southern part of the state, with acres planted dropping from an all-time high of 40,816 in 2013 to 32,957 in 2019 (California Strawberry Commission 2013, California Strawberry Commission 2019a). This was only in part due to expansion of acres in Mexico. Here it is important to understand that Mexico production mainly takes place in winter, as it does in southern California, although the length of the growing season in Mexico has been expanding with the acquisition of higher elevation land, with cooler climates suitable for strawberry production. This acreage contraction was also an outcome of the hardships of the strawberry industry more generally, including tighter regulation, disease related to plant stress, and labor shortages. And yet, per acre productivity grew from 43,001 pounds to at an all-time high of 58,708 pounds by 2018 (the year of the field day observation), with typical strawberry growers harvesting 6,634 trays an acre, and total production exceeding 2,020,423,185 pounds even with the drop in acres (California Strawberry Commission 2019b). That represents a 37% increase in yield per acre over five years!

During this same period, expenses have been rising considerably, especially labor costs related to increases in minimum wages and the elimination of exemptions on overtime for agricultural workers. Importantly, strawberry production is one of the most labor intensive endeavors in California agriculture, with harvest labor representing no less than 60% of total costs (Tourte et al. 2016). Promises (or threats) of robotics notwithstanding, currently virtually all California strawberries are picked by hand. Meanwhile, prices, though always volatile, have slightly declined over this same period (California Strawberry Commission 2019b). As a result, many growers are barely breaking even and, again, many are exiting the business. In these conditions, increasing productivity may be the only thing keeping growers in business. The question is how far that can go.

COMPETING BREEDING IMPERATIVES

The findings of the study must be viewed in recognition of the challenges of breeding strawberries. At the most basic level, genetic material can be directed to only a limited number of functions, limiting the array of qualities for which strawberries can be bred. Moreover, unlike undifferentiated commodity crops upon which arguments about the technology treadmill are based, specialty crops are designed to appeal to different markets and have variable aesthetic and production qualities. That breeding is subject to competing imperatives has been borne out by a series of studies conducted by the RosBREED project, which focuses on developing new Rosaceous family cultivars: Consumers may most value flavor but they balance that with price and shelf life (Wang et al. 2017). Market intermediaries who both ship and sell berries want what is attractive to consumers, long shelf life, and especially value firmness (Gallardo et al. 2015). Producers rank flavor as most important, with the critical exception of those in California and Florida who happen to grow the vast majority of United States strawberries and do so for national and international markets rather than for local markets (Yue et al. 2014). In these regions production qualities such as yield and harvest ease may be more important. As for breeders, RosBREED researchers have found that they generally rate market-related factors highly, with

another critical exception: university and federal breeding programs are more closely tied to growers’ organizations, conduct field trials with growers, and therefore are most attuned to grower preferences and their predilection for production qualities (Yue et al. 2012).

In addition, plant-breeding requires significant investments of time and funding (Yue et al. 2017). With strawberries, it takes a long time to identify an acceptable cultivar, and tens of thousands of seedlings are propagated and tested to find a few that might work. Once a useful cultivar is identified and registered, it takes three to four years to propagate enough plant material from clones of the varietal to make it available commercially. With luck, it is about ten years between discovery and use. Adding to this temporal problem, the lifespan of a plant patent begins at the time of discovery and registration and not when first planted commercially. This means most commercial varieties are under patent protection for only 12-15 years. Of course it is possible for growers to use non-patented varieties, and growers save a lot of money by doing so, but it may be less easy to get a nursery to propagate a varietal with little demand. Also, for some inexplicable reason, some of these cultivars lose their vigor, and growers lose their interest in them, a phenomenon also noted by Stone and Flachs (2018). To earn returns on their inventions, breeders, including UC breeders who share royalties with the university, have to get it right and breed varieties that growers will want to adopt.

Although the California industry has long enjoyed strawberries bred for yield and long seasons for producers, sturdiness and firmness for shippers, and size, shape, and to some degree flavor for consumers, emphasis in one area has most definitely come at the expense of another. Of currently favored varieties, for example, the Fronteras and Cabrillo are the highest yielding, producing in a recent trial an average cumulative marketable fruit weight of about 11,000 grams per plot. But they lack flavor. In contrast, the Albion has by far the best flavor, but yields are about 40% lower. They are thus primarily of interest to growers who market directly, or simply care about flavor. The Monterey is a fairly high yielder, in that same trial yielding about 9,500 grams per plot, but it balances other qualities to make quite popular among those growing in wholesale markets. None of the most popular cultivars show a great deal of resistance to soil disease, except the San Andreas which shows some tolerance to *Fusarium* outbreaks. It yields only slightly more than the Albion (Cole et al. 2018). Further complicating things, varieties that show tolerance to some diseases may have nearly inverse reactions to others. For example, in trials conducted at the Cal Poly Strawberry Center, the Sweet Ann, a proprietary variety bred to be resistant to *Verticillium* showed an average mortality of 6.6% in a field infested with the disease, but showed a 57.5% average mortality in a field infested with *Macrophomina* (Ivors et al. 2018a, Ivors et al. 2018b).

STUDYING CULTIVAR CHOICE

As qualitative social scientists we sought to understand the factors and institutions that guide growers’ cultivar choice in the context of today’s challenges. A survey conducted in 2018 showed that growers as a whole prioritized yield above all else, with marketability (e.g., size, shape, and to some degree flavor) and disease resistance being secondary priorities (Guthman in press). With a low response rate to the survey and a dearth of answers to open-ended questions, this piece of the study was developed to delve further into the question of why yield in the face of

what would seem to be other, competing imperatives. The research involved in-depth interviews with twenty growers, conducted in 2018-2019.

With contact information very hard to come by and a research population increasingly elusive to journalists and social science scholars, we sought out informants who had participated in a prior study conducted by the first author and who had explicitly welcomed additional follow-up. As such, this study was necessarily biased toward those willing to engage with researchers, and all who were reached agreed to participate. Still, the population of potential interviewees was reduced because, significantly, many growers interviewed in the previous project were not reachable and/or had gone out of business, and even three interviewed for this study had retired or all but exited strawberry production, corroborating evidence of the industry's restructuring. As with the previous study, we interviewed growers from all four of the major strawberry fruit-growing counties in California: Santa Cruz, Monterey, Santa Barbara and Ventura, and interviewees were a mix of white, Japanese, and Latinx growers, generally reflecting the research population. In deciding whom to contact for interviews, we did emphasize growers who primarily use university-developed varieties (n=15) and therefore presumably exercise more choice in what cultivars they grow, although not to the exclusion of those who only use proprietary cultivars (n = 5) by dint of their shippers.² Wanting to understand the influence of different buyers, we also focused almost exclusively on growers who sold to shippers. Only two interviewed growers engaged in direct sales. Most of the growers interviewed therefore had (or once had) significant commercial operations of at least 50 acres. As it happens, this small, somewhat stratified sample worked well and, indeed, we reached saturation before completing interviews, such that additional interviews neither produced more themes, nor differences across grower characteristics, nor deepened understanding (Crouch and McKenzie 2006, Hennink et al. 2016).

All but two interviews took place at growers' farms or offices; the others by phone. Interviews generally lasted 30 – 45 minutes. Since the goal for the interviews was to achieve depth rather than establish statistically significant patterns, these were open-ended interviews, guided by just a small set of pre-determined questions. We transcribed and coded interview data with NVivo qualitative research software, identifying both themes identified through the research questions, as well as some surprises that were revealed through open coding.

FINDINGS: WHAT GROWERS WANT

Nuancing evidence collected in the previous survey, sixteen out of twenty interviewed said yield or productivity was *an* important quality of a cultivar but much fewer were willing to say it was *the* most important quality. More significantly, many began the interview complaining about the current conditions of the industry, including pervasive over-supply. In what follows, we examine grower rationales for both wanting yield, as well as their skepticism that high yielding cultivars are best for the industry.

² Some shippers require that growers use proprietary varieties associated with the brand name, while other shippers generally allow growers to choose whatever varietal they want. They thus tend to use what are called university varieties. License fees for proprietary varieties tend to be much higher than those for university varieties.

Growers want yield

Many growers with whom we spoke were implicated in the competitive dynamic theorized as the productivity treadmill. They recognize that if they choose a lesser yielding variety they will lose out.

We’re in a competitive environment. We like to say we don’t grow a commodity but there are commodity-like characteristics. So if you have a variety and neighbor selling into the same market, if he’s more productive he will have an edge.

Likewise suggested by the literature cited, the treadmill effect is augmented by low market prices and increasing expenses.

As an individual, you have to have the units because the fixed costs are so high and you grow every year. Everybody has to have a certain minimum amount to break even. And if you want to stay in business a long time you’ve got to have something to feed the program.

Some growers say that were market prices higher, they would be willing to forego yield for other qualities. Yet other growers say there is an imperative to keep prices low for consumers.

Growers also corroborate the roles played by land markets and agribusiness in contributing to the treadmill. Regarding land, growers complain of high land rents related to the scarcity of good strawberry land, and note that both factors incentivize productivity. As for the role of agribusiness, growers note that buyers are chipping away at their profits. Driscoll’s well-known practices of charging an 18% commission in addition to fees for supplies and equipment, puts pressure on that treadmill, as do its much higher cull rates. Growers who work with Driscoll’s note they receive higher prices but they also leave up to 30% of the berries they pick in the fields. Yet, growers who work with shippers that do not require them to grow proprietary varieties also feel the pressure of the productivity treadmill, as these (lower cost) shippers do not receive high market prices and thus cannot pay as well.

In addition to these widely understood dynamics, growers want yield for another reason, very specific to the strawberry industry, having to do with its labor intensity. Historically, California strawberry growers have enjoyed labor surpluses and paid harvest workers on piece rates (or a combination of piece rates and hourly wages) in order to ensure labor productivity and keep overall labor costs down (Wells 1996). With significant tightening of the US-Mexico border and better jobs elsewhere, the industry has seen increasing labor shortages, putting growers in the position of competing for workers (Guthman 2017). Growers claim that growing large berries, abundant on the vine and easy to pick, for longer growing seasons helps attract these piece rate workers who can pick more volume per hour than they could with sparse vines.

As put by one grower,

If they can make 25 cents an hour somewhere else they leave. If you can hold up with a fairly decent variety they will stay with you 'til the end of the season. That's super important. So size is one thing, you know enough productivity to try to cover your costs is part of that factor.

Somewhat paradoxically, growers also speak of the need to improve yield because of increasing variable costs related to labor.

Every single one of our costs is going up in the state of California with all the laws that are being passed, like on the labor with the 40 hour. I mean our costs are going through the roof. The only way we can bring some of the costs down is through yield.

We will return to this paradox below.

Growers want other qualities, too

In our discussion, we learned that many growers recognize the importance of other cultivar qualities besides productivity. For some growers flavor and beauty remain especially important. They recognize that growing strawberries that people do not want to eat can be bad for the industry. One grower who spoke at length about costs pressures went on to say:

I would say quality is actually first [priority] It's gotta taste decent, right? Maybe it doesn't have to be THE sweetest but it has to be where people want to eat it. And eat it again.

One often discussed reason growers say quality cannot be neglected is that once mid-summer comes along, strawberries are competing with other fruits for supermarket space and consumer interest. They want consumers to remember that the last strawberry tasted better than the cherries, peaches, or grapes they might otherwise choose.

Industry concerns about flavor notwithstanding, the way that contracts with buyers are structured may mitigate against growers choosing more flavorful varieties. Companies such as Driscoll's and WellPict require growers to select from their own proprietary varieties. In the case of Driscoll's, the company's breeding apparatus has allegedly focused on disease resistance for some time, although more important has been a flavor profile and size that maintains the company's brand image. Independent growers who choose to contract with Driscoll's – Driscoll's does not produce berries – do so because they believe they will get a better price overall because of Driscoll's branding.

So you can pick a berry for resistance because you know they have already provided you with choices they know will be sellable. This is what I am going to say about Driscoll's, and I know others feel this way too. There is no other company I will survive in, even if they take a lot of money and play by their rules, they have better marketing. There is more culling, more standards.

With a limited menu of choices and choices dictated by other company priorities growers then understandably choose productivity, although this often is presented as a berry that works best with their local conditions. Growers who work with lower cost shippers such as Giant or Naturipe, who tend to use university varieties, have a wider range of options but have other reasons to neglect flavor in their choices. As long as they meet basic grading standards, growers do not have the responsibility of marketing a berry that might be less tasty. When shippers set prices for berries in advance and do not stipulate which cultivar to grow, as most do not, it would be folly for a grower not to adopt the most productive varietal.

For a few growers we interviewed, however, yield comes at a great sacrifice to berry quality. A grower who lamented opting to move into a higher yield variety after years of selling what he saw as a much tastier variety said this:

I wanted the good tasting berries coming out of my land and that’s not what the ballgame is about. The ballgame is about production...That’s exactly what is happening and that’s why I stuck with the Albion because, I thought, I wanted a good tasting berry coming here, but when it comes down to it, a crate of berries is a crate of berries. . . . Because they look at their margins at what are they going to get per box, and it’s all about money. And so get their berry at a cheap price, they would rather just take it and throw it on the market and make the margin. It’s all about money; it’s not about having a great product out there, it’s not about having a real juicy, ripe tasting berry.

As for disease resistance, growers of course would not mind having it, but surprisingly few would prioritize it over other qualities. The salient exceptions are those who have lost large amounts of acreage to disease who already tend to opt for disease resistant varieties. After losing large percentages of production to disease over two years, one grower moved to the San Andreas, which he says, “has a bad reputation in quality, but it is very resistant.” Small losses, however, do not necessarily change the calculus because growers have their eyes on what they see as marketable yield. A high yielding variety that loses some plants to disease may still be more profitable than a lower yield disease resistant variety. Disease resistance becomes just part of the mix:

I: What’s a good cultivar?

G: It’s something that I can produce, whether it tastes good or it’s disease resistant or it’s a high yielding variety, or it ships good. It’s all of that goes into being able to be profitable so, sometimes I’m willing to give up one thing for the other so long as I can be profitable.

A critical reason that disease resistance has thus far taken lower priority is that growers have found other ways to deal with disease. Most find that existing allowable fumigants are effective enough at managing soil disease and will continue to use them unless they are completely restricted. Those experimenting with organics, many because of market conditions, are having moderate success with alternative methods of disease control, such as anaerobic soil disinfestation, and thus far see price premiums that allow them to make up for losses or additional costs. Growers game their use of land, as well, a strategy that works particularly well for lessors. They take up leases on land that has been in pasture and shows no sign of disease. They let go of the leases on

diseased land. But since they do this in a tight land market, this is in itself a collective action problem, potentially fobbing off diseased land to an unknowing grower.

Growers want to stay in business – and are actually skeptical of yield

When pushed, most growers admit that the dynamics of the treadmill are not good for the industry as a whole and can amount to a beggar-thy-neighbor strategy. For one, there is the problem of diminishing returns. They know that prices decline with every extra unit on the market.

So we want these varieties to give out more numbers and last longer but it's hurting us in the long run. We need to find a happy medium where this is our threshold this is where we're going to be more efficient and make more money and we're not finding that. It seems like people think that if I plant 100 acres and make such amount of dollars, if I put 200 acres in, I'm going to make double that and it don't work that way.

One grower specifically invoked the notion of the treadmill.

Well it's a self-fulfilling prophecy because the retailers want it cheap and the consumer wants it cheap. Every time I give a speech I have this saying I like to say: "Do any of you go to the grocery store and demand to pay a higher price?" And of course nobody does. You're kind of on a hamstrung treadmill. The yield on these strawberries isn't infinite, at some point you're going to hit a [wall].... Going into business in California isn't inexpensive to begin with. The only thing that has made up for that is yield. That's not a good business model. And this is true in all of ag. You can't raise the price because people won't pay for it. But secondly, you get on the hamster wheel and you're just trying to outdo each other with yield. I don't know if that's a good business model. I don't know what the end result is.

Another even gave an account of the collective action problem at work.

It's rough . . . market price is being driven by oversupply. And as we try to convince each other as an industry to reduce acres We've been somewhat successful in doing that but newer varieties are so much more productive, techniques are so much more productive, that the total volume has not really decreased very much. So we are hurting ourselves with the overproduction . . . We all KNOW there's an oversupply. We all are thinking about cutting back, but historically, for generations, farmers have always said yea let's all cut back, what they really mean is, I want YOU to cut back. We've been through this in cycles since I've been farming, so here comes the bloodbath and the only way anybody makes any money is if it rains or hails or freezes on somebody else.

Instructively, several growers noted the folly of choosing productive cultivars as a means to address the labor shortage.

You have to be able to manage the farm, if you get by with two people an acre and all of a sudden you need six, there’s no way you can get the work force. So that creates a problem with keeping up with the pick, quality of the fruit that’s being harvested. It just adds to a lot of problems. I don’t understand what some of these growers are thinking when they go so heavy in one variety that they couldn’t keep up with the year before.

Labor is of course a variable cost, so having more fruit to harvest in effect can raise, not lower costs as the grower quoted earlier suggested. With a dearth of pickers to harvest the fruit it also raises labor costs, if indeed labor can be found. As put by one grower who had left production and was now leasing his owned land.

Another reason why I didn’t plant the Monterey was because when the Monterey would come in there would be too much berries and I didn’t have the personnel to pick it. Being a small farmer I couldn’t pay the wages that these bigger guys were paying.

Which brings us to the final point. As predicted by Cochrane, the productivity treadmill is indeed driving growers out of business.

Right, I don’t know what the answer is because there’s more people going out of business than there are going into business. In our area, really, there’s no independence left. You’re either affiliated with Driscoll or WellPict or Naturipe - those type of guys. There’s no mom and pop out there like there used to be.

Oh I know a lot of people who have [gone out of business]. And a lot of people continue to. But it’s still a catch because we keep dropping acres, we’re dropping acres this way but our volumes are going up. So we’re not losing anything. We’re still at the same place of too much volume.

We know that the market will only do so much, we can really hurt ourselves by overproducing, and yet the drivers for farmers and the drivers for the coolers are to maximize, NOT optimize, maximize the productivity. How can you get from maximum to optimum, is tricky. It’s gonna be painful for somebody. Because to make money somebody has to get hurt, leave, drop out, not play the game or something.

What remains to be seen is whether the shake-out will go so far as to eliminate over-production and raise berry prices that way. There are those in the business who would welcome it precisely for that possibility. The question is whether those acting on behalf of the entire industry should be encouraging it.

ADDRESSING THE COLLECTIVE ACTION PROBLEM

To sum up so far, there are several factors that contribute to strawberry growers' desires for high-yielding cultivars despite some recognition that it is self-defeating for the industry. Growers know that if they do not choose a higher yielding variety, others will, and out-compete them on volume. Growers feel squeezed by the price of land and the prices they receive from shippers. The way that many contracts are set up further incentivizes the choice of high-yielding cultivars. Finally, growers' abiding practices of labor remuneration in the form of piece rates appears to incentivize higher yielding varieties as a way to attract workers – although having more fruit to pick may worsen the problem. All of these contribute to declining prices and further consolidation, as fully predicted by theories of the treadmill.

With those as abiding concerns, those who have identified the productivity treadmill as a collective action problem have implied that farmers ought to be marketing cooperatively (e.g., Levins 2001, Levins and Cochrane 1996). But two things make the case discussed here a different sort of collective action problem. One is that strawberries are not undifferentiated commodity crops that can be easily pooled together and sold. As are many specialty crops, strawberries are bred for a variety of qualities and qualities that matter for different sorts of markets. The other speaks to the larger study's concern: that the strawberry industry is not fully readying itself for increasing problems with soil disease in a potentially stricter regulatory environment on fumigants by prioritizing yield over disease resistance.

That being the case, it is important to turn to those actors and factors that induce farmers to get on the treadmill. Yet, many of the augmenting factors involve broader structural conditions that are very hard to address at the industry level, particularly those related to land and labor. In the coastal areas of California, where strawberries do best, crop value is not the only determinant of agricultural land values. Strawberry land is largely coterminous with suburban development, making it unlikely that declines in productivity will lead to declines in land values. To the contrary, developers may be waiting in the wings to scoop up land no longer profitable. In that context, land owners cannot be counted to be concerned with industry fate, which is one of the reasons that land-owning growers have largely rejected efforts to maintain these lands for agricultural uses.

As for labor, growers are using field conditions to attract workers at a time of labor shortage because they feel they are unable to pay higher wages and stay in business. They see a worsening situation with the state-specific increase in minimum wage to \$15/hour and the end of exemptions for overtime work for agricultural workers. Although reverting to the use of hourly wages rather than piece rates would dis-incentivize growers' use of high-yielding cultivars to attract workers – and might be desirable from a social justice standpoint, it is unclear that it would improve the problems with profitability that drives the treadmill. Addressing wages in any meaningful way while keeping farmers in business would take a policy response heretofore unprecedented.

Perhaps, then, it is shippers who might best be positioned to slow the treadmill. They certainly have a stake in these issues, as evidenced by nearly across the board stakeholder support for the project on which this article reports. But, as with land owners (or wage laborers, for that matter), their interests do not really align with growers (Levins 2001, Mooney 1983). If strawberry growers over-produce and need to move their crops, that is beneficial for shippers. Indeed their ability to set prices which growers have little choice but to take is a key force in keeping the treadmill revolving.

Given these “contradictory class positions” between growers and rentiers, growers and laborers, and growers and shippers, slowing or stopping the treadmill may require the action of a body that explicitly acts on behalf of growers. The California Strawberry Commission (CSC) is one such body. Established in 1955, it supports the industry with both marketing promotion and research. The commission is supported by a “check-off” program, meaning that growers and other industry actors pay required assessments to support its work. Given its charge, it could probably do more to forge agreements among growers to address the problem of overproduction, even as it has already invested in substantial research to address solutions to soil disease.

Ultimately, though, the institutions that are in the best place to address the specificity of this particular technology treadmill problem are those that are producing the technologies in the first place, and especially those that are producing them as a public service. In the case of the California strawberry industry, these are the research and extension arms of Cal Poly and UC, both of which are public institutions that exist in part to serve agricultural interests. Their breeding facilities are most directly responsible for putting out the varieties that they do and, equally importantly, putting out the ideas that shape growers’ desires. To be sure, the field day discussed in the opening paragraph is not the only one we attended where we witnessed UC researchers emphasizing that their varieties would be high-yielding. Yes, these institutions want and need to be responsive to growers, but following Borup et al. (2006) and Henke (2008) and their attention to performativity, university breeders may not be entirely attuned to the power they have in setting expectations about what it is that growers want, to which they can then respond with what they are willing and able to provide. What we are suggesting, in short, is that public breeders may be best positioned to address this collective action problem, specifically by changing expectations of what they could and should provide in the context of growing disease pressure and stricter regulations on fumigation.

CONCLUSION: WHY BREEDING FOR PRODUCTIVITY CONTINUES

It is incontrovertible that the productivity treadmill is spinning briskly in the California strawberry industry. While per acre yields continue to increase, acreage in production is down, prices are flat, expenses are high, and, predictably, growers are going out of business. It would seem also incontrovertible that more attention should be given to discovery about and implementation of techniques and technologies that will address the growing problem with soil disease. Without it, many more growers will get hurt and consumers may no longer enjoy the nearly year-round availability of strawberries at reasonable prices. And breeding for disease resistance seems to be an important part of that package that ought to take paramount priority. As trained geneticists, university breeders are acutely aware that breeding for yield may work at cross purposes for breeding for disease resistance – especially to the *multiple* diseases that currently plague the strawberry industry. As put by one public breeder precisely in relationship to the yield-productivity trade-off, “if I need to put more armor on, I can’t be carrying more guns.”

It is nevertheless understandable why public breeders would be reticent to let go of breeding for productivity. For one, these public institutions face structural conditions of their own that incentivize them to develop higher yielding varieties. They make royalties on volume sold. With the increasing pressure of universities to make programs revenue-generating, these royalties are all but an imperative (Rudy et al. 2007). Among other things that puts university

breeders in some competition with proprietary breeders who also want grower business and who may be equally tempted to breed for yield. UC is in a particularly tricky situation both because of a protracted series of lawsuits between UC and the CSC over the alleged abandonment of its breeding program (see e.g., Filmer 2017) and because they sell to low cost producers who make money on margin, to the extent they make it at all. So UC agricultural scientists want to make good on their mission to support their clientele. Yet, as we have shown, this same clientele recognizes the collective action problem of planting high yield varieties, and many hint that they would prioritize other qualities of the strawberry *were the playing field leveled* regarding productivity. And that is what public institutions are in a position to do, with the support of other super-industry actors like the CSC. They could help change the discourse about yield while ceasing to put out ever higher-yielding varieties.

That they do not and that growers do not demand it may well be because the problem is not urgent enough. As long as fumigants are allowable, and the pathogens reasonably controllable with fumigation, most growers do not feel the pain of soil disease. And as long as productivity is whipped high they can abandon land that is diseased and yield more per acre on existing land. Take those conditions away, and needs might change. Hopefully, it will not be too late, given the lengthy time it takes to develop, test, and propagate new varieties.

The implications here go beyond the California strawberry industry, as volatile as it is. Other specialty crops grown around the world are prone to over-production, share the multiple imperatives of breeding in order to sustain markets, and are susceptible to manifold diseases. As with strawberries, breeding for productivity can work at cross purposes for both farmer prices (and farmer livelihoods) as well as plant health. As with strawberries, agricultural scientists have important roles to play in adjusting expectations of what should be done and how to do it.

Understanding the collective action problem of productivity is thus of renewed importance in a world where the drive toward productivity has created problems beyond the decline in farmer prices – where indeed the technologies of heightened productivity, in this case certain pesticides, have contributed to pest virulence and have also engendered public push back against their use. Building on classic and largely theoretical renditions of the technology treadmill, here we have shown, through farmer accounts, the dynamics that lead them to choose high yielding varieties while recognizing that doing so may hurt them in the long run. Yet, as we have also suggested, farmers' choices are not only shaped by abiding structural conditions of agriculture. They are also shaped by the imagined imperatives of university scientists and extension agents to give farmers what they want, even though what they want, as science and technology studies scholarship suggests, has been conditioned by what university applied science has been able to give – technologies aimed at productivity. Drawing on such insights, we have thus suggested that sociologists of agriculture should consider the performative role of university scientists in agricultural contexts that are increasingly and irrevocably fraught.

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