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COLLABORATIVE FOOD PRODUCTION AS A TOOL FOR SUSTAINABLE BEHAVIOUR

Investigating ocean literacy in blue community gardens

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Abstract

To make people be able to effectively be able to make decisions to save the ocean from overexploitation, researchers are calling for strategies to make individuals more ocean literate. An Ocean Literacy Framework has been developed to increase public knowledge about the ocean and the relationship between humans and the ocean, but the framework does not yet address how the newly gained knowledge can be transformed into sustainable behaviours that benefit the state of the ocean. This study investigates blue community gardens as one possible solution to this problem. Members of blue community gardens pick up sustainable behaviours and gain ocean-related knowledge through farming their own seafood. While several factors can be seen to influence members' behaviours, two stand out especially. The first is social identity – members build strong connections to each other and to the activities at the garden because they spend a lot of time together. Another important factor are people's existing habits, even those that are not related to sustainability. Many members are part of their garden not primarily because they want to act sustainably but because they like to be active in their community, but they still pick up sustainable behaviours. The activities at blue community gardens can be categorized as serious leisure, therefore the results of this study indicate that future incentives to increase ocean literacy should consider approaching the topic from a "serious leisure" angle, not from an "interest in sustainability" one.

Popular Scientific Summary

The oceans are under enormous pressures caused by humans, such as overfishing. To help protect the ocean, every individual person needs to take responsibility and play their part. Researchers call this ocean literacy. Ocean literacy is defined by three aspects; to be considered ocean literate one needs to have a certain level of knowledge about the ocean, be able to communicate that knowledge to other people and to behave sustainably and for the benefit of the ocean. Blue community gardens are an example of spaces where people can become more ocean literate by educating themselves about the ocean and picking up new sustainable habits. Here, people can farm their own mussels, seaweed and sometimes oysters. This study finds that members of blue community gardens become more ocean literate by participating in these leisure activities.

Through analysing documents and interviews with members of blue community gardens, factors influencing new sustainable behaviours were identified. Among them were personal factors, such as values, emotions and the previously mentioned knowledge and external factors. External factors were either socio-cultural, such as culture, lifestyles and social identity, or economic, such as infrastructure and availability of sustainable products. In addition, the factor habits was found to be neither strictly personal nor external and therefore characterized as a third factor group. Habits and social factors, especially social identity were the most influential factors for changing the behaviour of the participants. The participants already had existing habits that eased the transition into new ones: most already ate mussels and all paid attention to purchasing organic local foods before joining their garden. Further, the participants developed strong social identities connected to their blue community gardens. This is because they spend a lot of time with other members. Members usually farm the seafood together in small working groups. On top of that, they often get together at events the garden organises to cook and eat the seafood they harvested. New members learn scientific and practical knowledge by watching older members. The socialisation is key aspect of the gardens and causes strong connections between members, which then makes them want to behave like everyone else around them.

After joining a blue community garden people have stopped buying mussels that might have been wild caught, some have started to eat less meat, spend more time outside and educate themselves on other marine issues in their free time. On the other hand, others have less time for other sustainable hobbies like gardening. Every participant also started talking about their blue community garden with friends and family. These results show that blue community gardens facilitate all three areas of ocean literacy, knowledge gain, behaviour and ability to communicate. To expand the framework, educators should therefore try to find strategies that combine learning theoretical knowledge with behaviour straight away instead of increasing knowledge first and hoping people will pick up new behaviours by themselves.

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1. Introduction

With ever-increasing exploitation of the ocean, it is the responsibility of each individual to be aware of marine issues, hold themselves accountable for their actions and recognize when to change their behaviour to benefit the oceans. This concept has been described as ocean literacy in recent years (Cava et al., 2005). Ways to effectively make the public more ocean literate are urgently needed, and the newly established blue community gardens currently found along the coast of Denmark could prove to be one effective solution.

The world's oceans provide humans with essential ecosystem services ranging from the provision of raw materials and food to coastal protection, carbon sequestration and tourism and recreation (Barbier et al., 2011). Human pressures are increasing with the need for more wind farms, aquaculture, transport of goods and the emergence of more maritime sectors, like under the EU strategy for blue growth (Brennan et al., 2019). As a result, there are no areas unaffected by human influence left (Halpern et al., 2008). The importance of engaging the individual in environmental matters concerning the ocean therefore cannot be understated (Owens, 2000).

Through the concept of ocean literacy, scholars are hoping to strategically measure and increase people's involvement in ocean-related matters. Per definition, an ocean-literate person understands the importance of the ocean to humankind, can communicate about the ocean in a meaningful way and is able to make informed and responsible decisions regarding the ocean and its resources (Brennan, Ashley & Molloy, 2019). So far though, research has focussed on the first part of the definition, knowledge gain. The Ocean Literacy Framework, first published in 2005 and refined in 2013, offers guidelines as to what the public needs to know, and especially what students need to learn in school, to be considered ocean literate. The main points address not only how the ocean provides for life on Earth and influences things like the climate but also how humans and the ocean are interconnected and how humans affect the state of the ocean (National Oceanic and Atmospheric Administration (NOAA), 2013). Current developments in research on ocean literacy are trying to find a way to measure the level of knowledge about the oceans around the world, but research on how to transform this knowledge into actions and behaviours that benefit the state of the oceans on the other hand is missing from the framework so far (Fauville et al., 2019).

To find drivers for ocean related behaviour changes it might therefore be helpful to approach the topic not from an ocean literacy standpoint but from a behavioural science one. Here we find food consumption as a large research field for pro-environmental and sustainable behaviour. Reducing the consumption of meat to lower GHG emissions is slowly becoming

more important to the public (Pohjolainen et al., 2016) and yet while studies have been establishing different drivers encouraging and hindering such behaviour, comprehensive solutions to change people's diets still need to be investigated (Hartmann & Siegrist, 2017; Stoll-Kleemann & Schmidt, 2017) . Less talked about but not less important (York & Gossard, 2004) is the consumption of fish that has lead overfishing, causing the degradation of ecosystems (Jackson et al., 2001) and a drastic depletion of fish stocks that will impact food security (Pauly et al., 2005). While increased ocean literacy will help to bring the issues with fish consumption to the public eye, awareness alone is not enough to change dietary habits. Eco-labels can be a way to communicate sustainability to consumers, but so far their effectivity is hindered by a lack of knowledge on the consumers side (Hallstein & Villas-Boas, 2013; Jonell et al., 2016). Even if eco-labels were designed to inform the consumer better, the act of choosing one product over another at a grocery store might not be active enough of an effort to make the behaviour into a habit. If instead, the intended sustainable behaviour was practiced more regularly and would connect knowledge gain directly to a behaviour, ocean literacy could be increased much more effectively. Simply buying local organic food is proven to make people more engaged in its production and consumption (Kerton & Sinclair, 2010). Producing it oneself, or self-provisioning, leads to more sustainability and more resilience towards ecological, social and economic changes (Smith & Jehlička, 2013).

Land-based community gardens where people are able to grow their own food have already been proven to bring many benefits to the community. Members gain knowledge on local ecosystems (Bendt et al., 2013) and in turn pick up behaviours that protect the environment (Andersson et al., 2007). People who join land-based community gardens profit from a strong, cohesive group environment where members educate each other and find companionship. To bring these assets to a marine environment, the concept of blue community gardens has been developed. Here members can farm their own seafood as a leisure activity as opposed to commercial aquaculture facilities. So far mostly mussels, but also seaweed and oysters can be harvested. In an initial project in Denmark, different actors among a local community came together to share their knowledge to improve the marine environment and increase profits for the members (Network, 2011). Social learning plays a big role in land-based community gardens (Kim, 2017) and based on the results of the first blue community garden project it might do so in this context as well.

The purpose of this study is to explore whether and how members of blue community gardens become more ocean literate, and specifically what sustainable behaviour changes are inspired by the participation in a blue community garden. Considering existing research on land-based

community gardens, a special focus will be on the way the social interaction is utilized to motivate members to join the garden, learn new things and develop new habits. To achieve this, the study aims to answer the following research questions:

RQ1: How do blue community gardens facilitate sustainable behaviour changes in their members?

RQ2: What factors influence people to behave sustainably in the context of blue community gardens?

RQ3: What sustainable behaviours do members of blue community gardens acquire?

2. Theoretical background

2.1 Factors influencing environmental behaviour in ocean related contexts

A literature review by Stoll-Kleemann (2019) investigating ocean-related behaviour change found that most literature on the topic describes knowledge and awareness as a necessity for sustainable behaviour. Most literature on ocean-related behaviour change is connected to the concept of ocean literacy, but nearly all of this literature on ocean literacy is primarily concerned with the increase of knowledge and awareness (Brennan et al., 2019; Kopke et al., 2019; McCauley et al., 2019) and not behaviour. The definition of ocean literacy emphasizes the importance of the three aspects understanding, communication and decision-making equally, but the research field is still relatively young. Knowledge is easier to define and measure than behaviour and, going by the definition of ocean literacy, can be seen as the base for sustainable behaviour regarding ocean-related issues (Fauville et al., 2019). Studies in different countries have proven a lack of public understanding of ocean-related issues (Fletcher et al., 2009; McCauley et al., 2019; Steel et al., 2005). When addressing this issue to build a good base for behaviour change it is important to make individuals understand how their lives are interconnected with the ocean and how they affect it (Fletcher & Potts, 2007).

It is important to note that behavioural science research has long established that knowledge is not a central factor for behaviour change in non-ocean-related contexts, and its influence is even seen as overblown (Stoll-Kleemann, 2019). In fact, “only a small fraction of pro-environmental behaviour can be directly linked to environmental knowledge and environmental awareness” (Kollmuss & Agyeman, 2002, p.250) and the majority of environmental behaviours is motivated by situational factors, for example saving energy at home due to family budgeting (Barreto et al., 2014). Stoll-Kleemann considers knowledge as one of multiple personal factors

that influence an individual's ocean-related behaviour. They explain, based on Kollmuss and Agyeman's (2002) earlier theory, that factors influencing behaviour can be characterized as either personal or external factors. Personal factors affect external factors as well as the other way around, but different kinds of personal factors also affect each other. Knowledge therefore stands in close connection to, among others, personality traits, values and attitudes, habits and comfort, and emotions (Figure 1).

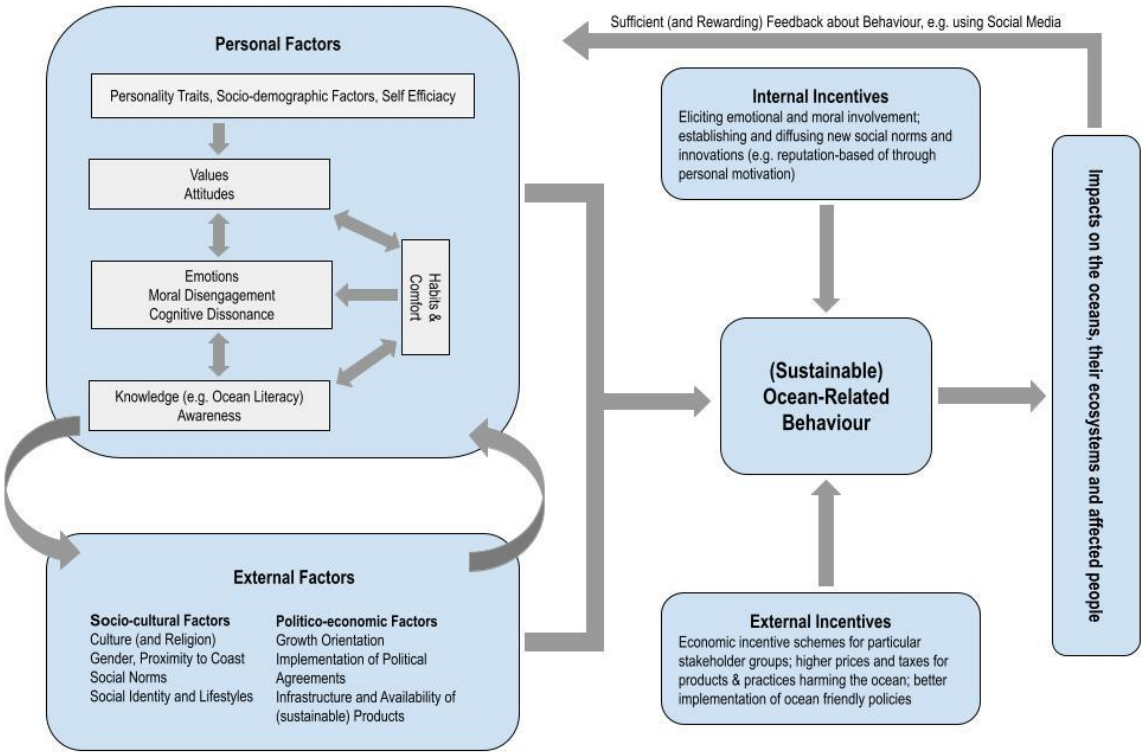

Figure 1: simplified model taken from Stoll-Kleemann (2019)

Individuals behave in a certain way in anticipation of rewards that can be connected to making them feel better, giving or taking from them financial or other resources, or pertaining to the correctness of their behaviour (Steg et al., 2014). It is therefore important that people possess or learn positive values regarding the ocean to act as guarding principles so they are able to address their personal responsibility for the ocean (Stoll-Kleemann, 2019). On top of that, an individual's values can be cooperatively operated, meaning they prioritized gains that are joint between them and others, or individualistically oriented with a focus on personal gains (Steg et al., 2014), and some people might therefore not be interested in sacrificing their own time, money or convenience for the benefit of the environment. People can be influenced in their ocean-related behaviour by the presence of other people in situations where they adopt new behaviours (Stoll-Kleemann, 2019), this point is closely connected to social norms as well.

Further, people might be hindered or helped in their choice of new sustainable behaviours by already existing habits. Habits are automated behaviours triggered by contextual cues, like locations or the presence of particular people. A behaviour that might have been attitude-based and therefore deliberately chosen can become a habit if it is repeated often enough (Schwanen et al., 2012). Stoll-Kleemann (2019) names the consumption of unsustainably caught fish out of convenience as an example. The continued positive reinforcement that comes with convenience overrides the intentions that make an individual choose whether to find another source for their fish (Schwanen et al., 2012). Some factors make habit formation easier, such as life changes, for example a recent move, penalties, incentives and "making it easy" (White et al., 2019). Penalties could for example refer to fines for the wrong disposal of waste (Fullerton & Thomas, 1995). Incentives could be rewards, gifts or discounts, for example tokens that can be exchanged for goods as a reward for riding the bus (Everett et al., 1974). An example of making it easy for people is to offer renewable energy as the default option (Pichert & Katsikopoulos, 2008) - removing any difficulties that could stand in the way of sustainable behaviour.

Finally, emotional involvement is addressed as an important factor for behaviour change by Stoll-Kleeman (2019). Ideally, an individual reacts positively when experiencing the ocean in a good way and negatively when faced with the detrimental effects of human use of the ocean. The stronger the emotional reaction the likelier a person will change their behaviour (Kollmuss & Agyeman, 2002). Connecting the learning process in an ocean literacy context with emotions could lead to "deep learning" where people understand ocean related issues better and hold onto the knowledge more (Fletcher & Potts, 2007).

External factors influencing behaviour can be characterized as either politico-economic or socio-cultural. In terms of politico-economic factors, Stoll-Kleemann (2019) names government actions, for example to address global issues like climate change as important. Overconsumption caused by the capitalistic system is another big issue (Stoll-Kleemann, 2019) but some solutions, like economic incentives for fishers to keep catches sustainable (Lubchenco et al., 2016) have shown to be a step in the right direction.

Socio-cultural factors like culture, religion and social identities all influence behaviour as well. Different groups can have different perceptions of the ocean, influenced for example by age, social values of proximity to the coast which is why the frequency/willingness of sustainable behaviours can differ from coastal to non-coastal areas and from country to country, underlining the importance of the cultural context when investigating ocean-related behaviour (Jefferson et

al., 2015). Social norms are one of the most mentioned (Stoll-Kleemann, 2019) and seen by many as the most influential driver of sustainable behaviour (Dowd & Burke, 2013; Eker et al., 2019; Lubchenco et al., 2016; Peattie, 2010). People also build social identities based on the feeling of belonging to a group and are more likely to behave sustainably if other members of their group are too (White et al., 2019) to the point where they adopt sustainable local lifestyles (Dobernig & Stagl, 2015).

Social identity appears to be an especially relevant factor in the context of blue community gardens where the interaction with a group is a central point. Tajfel and Turner established social identity theory after a number of different studies in which they investigated how social context affects intergroup relations. Concretely, a range of experiments revealed that people favour members of the group they belong to – even if the groups are created randomly and they do not know the other group members (Hornsey, 2008). Tajfel and Turner then demonstrated that people interact with others on a spectrum ranging from interpersonal to intergroup level. Based on this spectrum, one's concept of oneself also changes: the interpersonal end is characterized by personal attitudes, memories and emotions, or 'personal identity' whereas the intergroup end is characterized by the social categories one belongs to, or 'social identity'. Tajfel and Turner argue that human interaction generally happens more on an intergroup basis than a purely interpersonal one, meaning people see themselves more as representatives of their groups rather than as individuals (Tajfel & Turner, 1986).

This theory has been proven in many studies to apply to sustainable behaviour as well. Social identity is a key driver for environmental behaviour (Van der Werff et al., 2013) and people are more likely to behave sustainably if other group members are as well (White et al., 2019). A study looking at the reuse of towels in hotel rooms found that guests were more likely to reuse their towels – therefore behaving sustainably – when they were exposed to norms that addressed their role as a citizen than when they were exposed to a standard environmental message (Goldstein et al., 2008). People are also more receptive to environmental information when received from members of the same group (Schultz & Fielding, 2014). Regarding sustainable food consumption, people who identified as "green consumers" were more likely to purchase organic products (Bartels & Onwezen, 2014) and the purchase of organic food is highly motivated by wanting to follow the behaviour of a reference person around them (Welsch & Kühling, 2009).

2.2 Sustainable behaviour change in the context of community gardening

To find an approach to best investigate the drivers of behaviour change in blue community gardens, it can help to see what research into land-based community gardens has brought about. Community gardens are often collectively managed (Bendt et al., 2013) and successful land-based community gardens are often characterized by a bottom-up approach, where the community members are in control of the process from the beginning, with as little influence from external actors as possible (Holland, 2004). The structure of land-based community gardens fosters the cohesion of community groups (De Zeeuw et al., 1999) to the point where some communities experience the development of devoted production-based lifestyle movements (Dobernig & Stagl, 2015).

The benefits of community gardens cannot be understated, and participation can lead to many different sustainable behaviour changes. Community gardens promote environmental awareness and sustainable gardening practices such as the prohibition of pesticides (Andersson et al., 2007; Bendt et al., 2013) as well as encouraging sustainable food consumption (Kim, 2017). They cultivate not only environmental, but also social and economic sustainability. Land-based community gardens boost food security and offset food expenses (Ackerman et al., 2014), support a healthier diet (Nova et al., 2020) and alleviate social alienation (Van Averbeke, 2007). Urban community gardeners even take up other environmental practices like recycling and taking a bike/walking over using a car (Nova et al., 2020).

In community gardens, experiential and social learning are combined to build an effective base for sustainable behaviour change (Kim, 2017). The level of environmental learning is described as high quality due to the active information sharing among members as well as the high degree of decision making each individual possesses (Bendt et al., 2013). The most in-depth ecological knowledge is found in gardens that have existed for a long time due to established connections between a few experienced, long-term members, but these existing dynamics serve as a barrier when recruiting new members (Bendt et al., 2013). On the other hand, community gardens that combine their operations with other, unrelated projects manage to attract many people that would otherwise not be interested in gardening activities. Bendt et al. (2013) mention art projects, political activities and business developments as examples. The cost of recruiting many members like this is that the level of learning of these members is often not as deep as with more engaged members. The emotional connection to the garden and the local ecosystems plays a big part in the participation for many members. Bendt et al. describe this as a “sense-of-place” (2013, p. 28) and a belonging to the nature around them. Many members of

community gardens also participate not just because of their connection to their local environment but out of a feeling of responsibility for society where they grow food by themselves as a challenge to industrial agriculture and current consumerist practices. This sentiment leads to the development of a strong identity with the gardening activities and the personal projects connected to them and especially their social significance (Dobernig & Stagl, 2015).

2.3 Serious leisure and sustainability

The literature on community gardens offers an interesting perspective on the value and purpose of the activities there for the individual. While community gardens are not meant to be a job and sole source of income for their members, there is a level of commitment required to maintain participation, like an annual membership fee. Once people have joined they often stay around for many years (Bendt et al., 2013). The same can be said for blue community gardens that are based on this model. Evaluating how attached blue community gardeners are to their efforts at the gardens can help to judge the importance of blue community gardens for increasing ocean literacy.

The concept to describe leisure activities that are neither work nor casual leisure, which involves an element of "play", is serious leisure (Stebbins, 1982). Stebbins names six criteria to differentiate serious from casual leisure. Firstly, people need to persevere at serious leisure on occasion, for example through fatigue or injury. Further, many people have careers related to their serious leisure endeavours. A third criteria is that people pursuing serious leisure put a significant personal effort based on knowledge, training or skill, for example people volunteering to be umpires at sporting events who need training on rules and handling interactions with athletes (Phillips & Fairley, 2014). Serious leisure has eight durable benefits: "self-actualization, self-enrichment, recreation or renewal of self, feelings of accomplishment, enhancement of self-image, self-expression, social interaction and belonginess, and lasting physical products of the activity" (Stebbins, 1982, p. 257). People pursuing serious leisure develop a unique ethos around the activity, including special beliefs, norms and values. An example for this are serious tourists, that are proven to make more contributions to the economic development of indigenous communities because they value their culture more than casual tourists (Wu et al., 2017). Finally, people identify strongly with their chosen pursuits and they often speak about them with other people.

A few activities related to blue community gardens have been proven to be, or have the potential to be serious leisure, among them the hobby of gourmet cooking (Hartel, 2010), gardening among older adults (Cheng et al., 2017) and citizen participation in community initiatives (Arai & Pedlar, 1997). On the other hand, the concept of serious leisure has rarely been connected to sustainability so far. The engagement in local food systems can be considered serious leisure, both on the side of the farmer and the side of the consumer (Farmer, 2012). The farmers partake in serious leisure as long as they produce on a small-scale and not as their primary career, and consumers who put a significant emphasis on only buying and consuming local food fit Stebbins' (1982) characteristics as well. This kind of consumer goes further than others who consume local foods, as they are deeply engaged with the local food system, and they spend more time buying, cooking and eating their food (Farmer, 2012). Another study finds that engaging in pro-environmental behaviours and environmental sustainability itself can be considered serious leisure (Miller, 2018). Miller's study among older citizens finds strong connections to Stebbins' characteristics, like gaining specific knowledge, socializing with likeminded people and having a strong self-identity, and describes "[the] hobby was intellectually, physically and emotionally demanding and, sometimes, socially-isolating" (p. 217). Further, the participants of the study acknowledged that they could pursue sustainability in this ardent manner because they are retired and had the time to do so, indicating 1) that there is the potential to attract other older people to become more involved in sustainability and 2) older people are in a great position to become educators for the newer generations on topics like environmental sustainability and climate change (Miller, 2018).

3. Methods

3.1 Context of the study

Blue community gardens offer a great opportunity to study sustainable behaviour change in an ocean related context as they provide facilities and demand new members to pick up behaviours they might not even have access to as members of the public. The concept has first been introduced in 2011, when a blue community garden was set up in the harbour of Ebeltoft, Denmark, inspired by the concept of land-based allotment gardens (Fisheries Areas Network (FARNET), 2011). With equipment provided by a voluntary association overseeing the activities, community members were free to grow their own mussels and seaweed however they wanted in their designated part of the garden. After an initial trial period the garden was able to maintain a stable number of members and many communities along the Danish coast created

their own blue community gardens with the help of the pioneers from Ebeltoft. In the following years, the self-governing organisation Havhøst has been established to coordinate efforts to establish more blue community gardens as well as educate the public about the cultivation of marine resources (Havhøst, 2019). With the rapid growth of the individual communities and the spread of the gardens throughout the whole of Denmark, the concept is likely to advance to other countries in the future. Projects in development can currently be found in both Sweden and Norway.

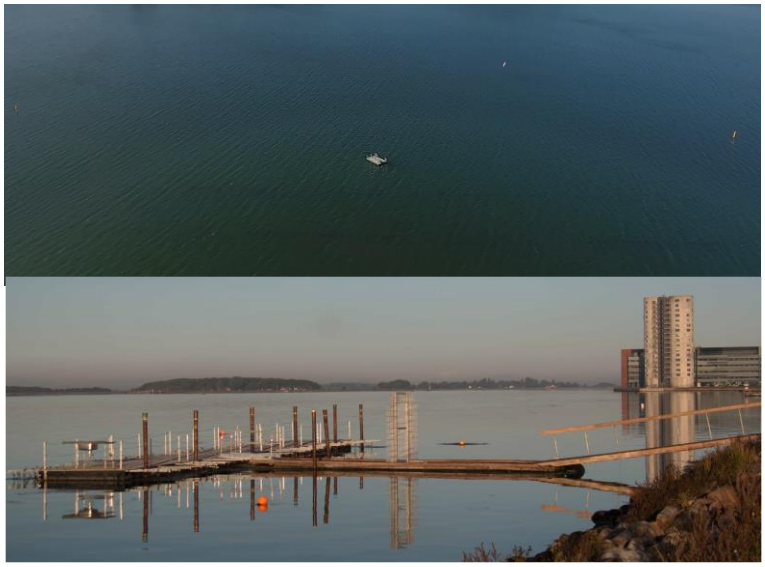

Figure 2: Longline facility at the top, platform at the bottom, taken from Limfjordsrådet (2017b)

While they are in contact with each other for general issues, blue community gardens in Denmark are structured and operate differently from each other. Depending on the available location, the gardens are either designed as longline facilities in the open water or platforms on the shore (Limfjordsrådet, 2017b). Platform facilities are easier to access and do not require buoys, but they are at greater risk of water pollution, as they are located closer to the port. Longline facilities on the other hand require a boat. Gardens that operate with longline facilities have a boat available that can be used by all members as needed. The most cultivated species in blue community gardens are blue mussels and seaweed, while oysters are found less commonly, but many gardens are looking to expand their operations once they have gained enough experience.

Blue community gardens offer a great opportunity to study sustainable behaviour changes as every member habitually acts sustainably whenever they partake in activities at the garden. Growing mussels, seaweed and oysters has many positive effects on the marine ecosystem, such as the removal of nitrogen and phosphorus from the water and reducing the risk of algae blooms and oxygen depletion (Havhaven Ebeltoft, 2021a). In addition, other behaviours might be picked up while working or learning something new. Considering blue community gardens have been modelled after land community gardens, it is expected that group interactions are intended as a central aspect by the founders (Van Averbeke, 2007) and have an influence on the individual members' experiences and behaviours (Bendt et al., 2013).

3.2 Methodology

To find strategies to motivate sustainable behaviour change in ocean-related contexts as well as investigating the potential of blue community gardens as spaces where such changes can be stimulated, a qualitative approach was chosen. The phenomenon of blue community gardens is new enough that scientific literature on it does not exist to a large extent yet. In this situation it makes sense to approach the topic though a qualitative study, as it gives an opportunity for the exploration and the description of the subject (van Thiel, 2014). Further, a qualitative study offers the researcher the 'contextual sensitivity' to explain how participants construct a phenomenon (Silverman, 2006).

Semi-structured interviews are a good method to receive data that cannot be accessed by a formal questionnaire, such as attitudes and values (Silverman, 2006). They give the participants of the study the opportunity to put an emphasis on what they feel is important, which in turn means the researcher is able to adjust their focus from any initial assumptions (Bryman & Bell, 2011). Data from the interviews is supplemented with an analysis of different documents, such as the websites of different blue community gardens and organisational documents. The benefit of documents as a data source is that they were not created for the purpose of the study and under the influence of a possible bias of the researcher, therefore they are non-reactive (Bryman & Bell, 2011). An exploratory study with a focus on the participants' views and experiences will provide a base to continue more standardized quantitative research on ocean-related behaviour change and/or blue community gardens in the future.

3.3 Data Collection

The online presence of multiple Danish blue community gardens as well as any other available information on them on the internet was investigated for data relevant to the study. The websites of four blue community garden organisations were chosen as data sources to represent non-reactive sources. The organisations themselves are referred to as O1-O4 and the corresponding website as T1-T4 (see Table 1 below). One of the chosen organisations consists of four separate blue community gardens located in the Limfjord established together in the project "Fjordhaver i Limfjordens havne", or "Fjord gardens in the harbours of the Limfjord" by the regional environmental council "Limfjordsrådet". The blue community gardens operate independently but they share a website coordinated by the council. While each of the four blue community gardens provides different information on themselves on the website, they are grouped together

in this study as one data source (O2). The council also provides other information on the blue community gardens on different websites, such as a handbook that is supposed to serve as introductory information on the gardens, referred to as T5 and an evaluation report on the first three years of the "Fjordhaver" project, referred to as T6. Some of the interviewees are members of one of those four blue community gardens, which is why the specific garden is referred to as O2.1 when relevant.

Participants for the interviews were found by first approaching the Danish national organisation for blue community gardens and receiving recommendations for specific blue community gardens in different locations that have many members, are well organised and able to communicate in English. The associations contacted were established in 2014 and 2015, allowing for participants that have multiple years of experience to talk about. Two of the participants were able to answer questions not only in their role as members of the blue community garden but also in their roles as current chairwoman and member of the board respectively. Interviews were conducted via the online platform "zoom" and via the phone, recorded with the participant's consent. An interview guide was followed to make sure the data is comparable and reproducible. The interview guide can be found in Appendix I. In some cases, the interview guide was spread among the members of the blue community garden and answered in written form to help overcome the language barrier. When possible, respondents were contacted to answer follow-up questions either through "zoom" or the phone, or in written form via e-mail. As some of the respondents have similar professional backgrounds, all respondents are referred to by a characterizing trait that was mentioned in the interviews (see Table 1). The respondents of this study were three men and three women, of which two are currently working, three retired around the time they joined the garden and one had already been retired for longer when they joined. *Sailor* is a museum guide and *chairwoman* is the chairwoman of her community sea garden. *Conservationist, diver* and *politician* are retired biologists. *Vegetarian* did not give information about their past profession. *Politician* used to be a member of the environmental council Limfjordsrådet when they were active as a politician, and *conservationist* currently is a board member for a Danish nature conservation group after retirement.

Data Collection	Data Source	Organisation
Interview and/or written answers to the interview guide	P1: *sailor;* member of board	O1
	P2: *chairwoman;* chairwoman	O2.1
	P3: *politician;* member	O2.1
	P4: *conservationist;* member	O2.1
	P5: *vegetarian;* member	O2.1
	P6: *diver;* member	O2.1
Observation of online data	T1: website (Kerteminde Maritime Haver, 2021)	O1
	T2: website (Fjordhaver Limfjorden, 2021)	O2
	T3: website (Havhaven Ebeltoft, 2021b)	O3
	T4: website (Grønsund Havhave, 2021)	O4
	T5: handbook (Limfjordsrådet, 2017b)	O2
	T6: evaluation report (Limfjordsrådet, 2017a)	O2

Table 1: Data Collection

3.4 Data Analysis

All interviews have been transcribed so the data can be analysed alongside the text documents. To structure the data, all texts were read thoroughly to identify separate units of information. These units are assigned codes through the interpretation of the researcher so that they can be categorized and compared to each other (Bryman & Bell, 2011). One unit of information can be ascribed as many codes as applicable. The codes are designed to answer the research questions going from an outside perspective that can be observed without interacting with the data source to a more inside perspective that is based on the interactions of the researcher with the data source. That means beginning with how blue community gardens are devised to operate, what their goals are and how they recruit new members. Instead of looking at the personal feelings of the participants, text documents with more descriptive contents are the main focus. The identified code is: operations. Then, the study addresses how the gardens have designed group interactions between members and the process of knowledge sharing and how the members themselves engage in social learning. For this part, both data sources are considered equally. The identified codes are: group, knowledge. Finally, the interviewees' answers were investigated to find out about their personal experiences and possible behaviour changes caused by their activity in blue community gardens, as well as their attitudes about sustainability in general and how those are connected. The identified codes are: personal factors, behaviour and identity.

Each code is put in context with Stoll-Kleemann's, and Tajfel and Turner's theories where applicable and throughout the discussion. After an analysis of the individual codes, the connections between them are looked at more closely. First, individual factors for sustainable

behaviour change that became apparent during coding are compared with each other and with Stoll-Kleemann's model. Possible new contributions to the model are considered based on the findings. Finally, the results are being discussed with the perspective of serious leisure and connections of the codes to Stebbins' (1982) six criteria are summarized in one place to evaluate how serious leisure fits into future strategies to address sustainable behaviour change in the context of ocean literacy.

3.5 Limitations

The language barrier between researcher and participants proved to be a big hinderance during the study. Some participants were uncomfortable speaking in English and either only agreed to written correspondence or had trouble expressing themselves during the interviews. Many answers turned out short and not in-depth despite follow up questions. To counter this issue, the participants were provided the interview guide beforehand to be able to prepare their answers and look up some terminology beforehand.

In addition, the Covid-19 pandemic has at this point in time been going on for a year, affecting the participants' everyday lives, their attitudes and their lifestyles. A year is a significant amount of time of their participation in the blue community gardens, during which events and group activities have been limited and group dynamics have been different from the normal situation. All participants were able to share their experiences during the "normal" operation of the blue community gardens in the years prior, though at least one had to scale back their activities at the garden significantly during the pandemic and had less opportunities for new experiences and knowledge to be shared. The effects of the pandemic on the blue gardener's behaviour and the blue gardens' operations and plans will not be addressed in detail in this study.

4. Findings

4.1 Operations of blue community gardens

Existing research on land-based community gardens proves the influence of the organisational structure on knowledge gain, knowledge sharing and the interest level of new members (Bendt et al., 2013), which is why the operational strategies of blue community gardens can provide insight on the value of different factors named by Stoll-Kleemann (2019) to them. All studied gardens provide purpose statements on their websites that demonstrate different priorities for

their operations. All four gardens mention the sustainable production of raw marine resources or cultivation of seafood as a goal; in the case of T1, T3 and T4 it is named first in the statement. This point refers to both the operation of the garden as well as the seafood itself as an environmentally friendly protein source. This point can be directly connected to the increase of ocean literacy, as the goal is to elicit habits to benefit the ocean, while benefiting the individual at the same time. Habits are one of Stoll- Kleemann's (2019) factors for sustainable behaviour change, therefore creating sustainable habit of "cultivating sustainable seafood" in individuals here could lead them to pick up other sustainable habits in the future. The role of the garden in the community on the other hand seems to be different in each case.

In the case of O3, the garden is a part of the cultural and economic landscape of the harbour and the activities happen in close cooperation with other local institutions. The preservation of the city's maritime cultural heritage is one goal mentioned in T3. The development of the harbour in both the economic and the cultural sense is meant to benefit the members of the garden, the city's broader population, business and tourism. Here, cultural and economic factors seem to weigh in equally on why members participate in the garden (Stoll-Kleemann, 2019). The statement also mentions the development of a circle of members with knowledge as a goal.

T4 also mentions the development of marine recreational areas for both locals and tourists and knowledge gain of the members regarding the sustainable utilization of marine resources as goals of O4 and adds the gardens contribution to a clean marine environment. T1 declares the same points and goes further: scientific research is pointed out as an explicit goal of the garden and the knowledge and experience gained are supposed to be made available for everyone as a result. The focus on scientific research in this case is likely to be caused by the collaboration with a university that shares the facilities. T1 further states that O1 wants to offer the possibility for its members to start their own businesses based in the garden in the future, and *sailor* confirms that they already helped one of the members do so. Interestingly, O3 ruled out the option to make the operations commercially relevant from the start, making it a purely hobby project. At the case of O1 it becomes apparent how knowledge and economic factors (Stoll-Kleemann, 2019) influence each other: members might join for leisure activities, gain more knowledge on sustainable seafood and be lead to start a commercial production of sustainable seafood for their own profit.

The approach of O2 differs yet again. The first goal stated in T2's purpose statement is the influence of the blue community gardens on "The good life" and the lifestyles of the members, a point not brought up in any other statements. The gardens of O2 are to repurpose areas of the

harbours that are no longer in use for the cultivation of seafood. Further, the gardens are supposed to increase the interest in seafood and "provide space for social activities that require nothing more than interest and commitment", a goal that differs strongly from the scientific aspirations found in T1 and other mentions of economic benefits. Individuals who decide to join O2 are most strongly influenced by social factors, lifestyles and social identity (Stoll-Kleemann, 2019). Knowledge or economic factors on the other hand seem to not be as relevant in this case. At the same time, living "the good life" can certainly be connected to personal factors like attitudes and emotions (Stoll-Kleemann, 2019), and the participation in the garden is framed as a more spiritual affair and connected to self-fulfilment, at least based on the written purpose statement.

It should be noted that *sailor* expressed O1's plans to set up opportunities for educating the public, especially children, at their facilities during the interview. This is a point not expressed in T1's the purpose statement, meaning the real operation of the gardens can differ from the goals and focus points set in the articles of association. Overall though, the responses from *sailor* as a member of the board of O1 and *chairwoman* of O2.1 support the emphases set in the purpose statements. All the gardens show the strong influence of external factors (Stoll-Kleemann, 2019) on the members, social, cultural, and in some cases economic, but personal factors like knowledge were also identified.

The social influence on the members can be seen very well with how they found out about the gardens. While representation of blue community gardens in the media is sparse, the outreach happens on a local and personal level. *Chairwoman* and *sailor* read about O2 through the local paper. In addition, a web presence of both a website and a Facebook page are the most common among the studied gardens. The amount of information available on the websites and Facebook pages differs greatly between the gardens though, and Facebook appears to be mainly used for communication between members rather than a way to reach out to interested parties.

Potential new members are approached in person too. *Vegetarian* states that they were invited to the garden by people at the market when they were selling vegetables themselves. *Sailor* says that O1 is present at town-wide events around the sea and the harbour and have gained many members by talking to the public like that. O2.1 has established a club house in collaboration with various environmental groups and the city's school service to have events targeted at the public. *Politician* also states that O2.1 is present at the city's annual sustainability event to serve mussel soup and talk about the garden.

Finally, some respondents of this study state that they found out about their local garden by word of mouth. *Diver* first heard about it because a member of their diving club was involved in the founding of their local garden. *Conservationist* says that a colleague recommended the garden to them as a new past time when they retired. *Politician* heard about their local garden when they were a part of the environmental council:

> "I was a member of Limfjordsrådet, where we [were] recommended a proposal from Nordea Bank funding fjord gardens initiatives. I was living nearby and [decided that I would] like to be a part of it."

Sailor also mentions that one of their friends decided to join their local garden after talking to them about it. These direct interactions emphasise the huge influence of Stoll-Kleemann's (2019) social factors, the connection to other people in the community is a drive for people to join, and for the gardens to develop themselves.

Main Findings - Operations
▪ Main objective: sustainable food production – creation of sustainable habits ▪ Different gardens take cultural, scientific and/or social approach in operations ▪ Most members are recruited in person, either at public events or through personal connections ▪ Factors influencing behaviour: socio-cultural and economic factors, habits, knowledge, emotions and attitudes

4.2 Social learning

4.2.1 Group

The social recruitment is an indicator to a key aspect to the operation of blue community gardens: the group dynamic. Social activities like the ones at blue community gardens will lead to a strong identification with a group (Tajfel & Turner, 1986), making it likely that members will behave sustainably to fit in (White et al., 2019). Many gardens see socialisation over group work and consumption of the farmed seafood as the most central part of their gardens. All respondents of the study stated that whenever they work at the garden, either on a platform at O2.1 or on a boat at O1, they do so together with other members. At O3, a monthly schedule is established at a meeting on the first Monday of the month according to *T3*. Any member interested can then choose what tasks to participate in throughout the following month. These

bigger fixed monthly meetings also give the opportunity for more members to attend and talk to each other. Members at O1 and O4 organise themselves in working groups. According to *sailor*, members are asked to join at least one group when joining O1; they are free to participate in more than one and switch between them. These working groups also meet once a month, and twice a year all members are invited to join working days where the mussel stockings are sorted, harvested and re-stocked. *Chairwoman* usually posts on the gardens Facebook page when hands are needed at O2.1 and states that members meet once a week when they have time. While *sailor* as a member of O1 and multiple working groups spends a lot of time attending the regular meetings of their working group, the regular members of O2.1 all state that they go to work at their garden whenever they can rather than following a regular schedule. *Vegetarian* shared that they usually stay at home during the winter and otherwise bad weather. These results underline the previous findings, in which the social factors (Stoll-Kleemann, 2019) appear to be the main influence on people not just to join the gardens but stay involved as well. Culture and social norms among the group members can have a big effect on individuals' actions if all time at the gardens is spent together. This also supports the development of social identities (Tajfel & Turner, 1986) of the members around the garden. The stronger the connection to the garden and the other members, the stronger the individuals will display the identity to the outside world as well.

All respondents participate in the farming of mussels, *chairwoman* additionally is involved in the maintenance of the facilities and *sailor* also takes care of the seaweed farming and the vegetable garden. Other activities, according to *T1*, are the maintenance and operation of the boat, communication and PR, and event-planning which are all attended to in the monthly meetings. In addition to these farming related activities, blue community gardens regularly organise meetings and events where the farmed seafood is cooked and eaten together by the members. O1 even established a land allotment garden at the facility specifically to farm ingredients for the community cooking events. *Chairwoman*, *conservationist*, *sailor* and *diver* answered that they regularly attend the cooking events. The same respondents also attend other events organised by their garden, like lectures to learn more about topics related to seafood farming and the ocean.

Members attend the meetings to socialise and enjoy the food. *Sailor* mentions that the membership of O1 drastically increased when the garden started to organise the regular cooking events. When asked why, they responded:

> "Because people like to get out and meet and over food its always a sure hit whenever food is involved. So it brings life to the organisation."

According to T6, most members of the blue community gardens in O2 are participating in their garden by themselves, even if they have a partner and/or children that also enjoy the seafood they bring home. The mentioned group meetings therefore serve as an opportunity for the members to spend time and exchange experiences with the other sea gardeners, not as a family activity. Contrary, *T3* suggests that at O3, there are multiple events a year designed for the members of the garden to spend time with other members of the public such as "blue garden days" and "harbor partys" that happen alternating with the member focussed cooking events. This might be because the gardens activities are closer connected to other activities in the harbour, as mentioned earlier. The desire to socialize displayed by the members is a confirmation of social identity theory (Tajfel & Turner, 1986). People highly identify with the other group members and want to connect based on that. It is interesting to see that the connection here is not related to sustainability but primarily appears to be over food.

Main Findings – Group
▪ Work is usually done in groups ▪ Some gardens have designated work groups where the same members work together every time ▪ Meetings and events for all members: cooking together or lecture-style presentations ▪ Factors influencing behaviour: social factors - social identity

4.2.2 Knowledge

Knowledge gain is one of the main goals of blue community gardens, and with the activities advertised as a social leisure activity and a way to learn about local culture and food, there is the potential for learning a variety of new things, all possibly increasing ocean literacy. Knowledge is an important and well discussed factor influencing sustainable behaviour, but arguably not a necessity for behaviour change (Stoll-Kleemann, 2019). The results of this study firm this assessment: while half of the respondents had extensive knowledge of marine ecosystems before joining, the other half had no previous knowledge at all. All participants, no matter the level of knowledge before joining, answered that they were able to learn new things by working at the gardens. The main areas of knowledge that come with the activities at the

gardens are scientific knowledge, practical know-how, abilities related to handling and cooking seafood and general awareness of marine issues.

Sailor, *vegetarian* and *chairwoman* say that they had no knowledge of how to farm seafood before they became members, though *sailor* was aware that mussels were grown in the area. The three former biologists *diver*, *politician* and *conservationist* on the other hand brought a high level of general awareness of marine issues when they joined and say that they were and are eager to teach other members of their garden. *Diver* explains that they had no knowledge of mussels specifically, other than a general interest. *Politician* could offer scientific knowledge on different kinds of marine species including both mussels and seaweed, but no practical know-how. Finally, *conservationist* was very familiar with working with mussels before and could bring both scientific knowledge and practical know-how, but they had not worked with seaweed previously. In terms of cooking-related knowledge, every respondent apart from *vegetarian* was familiar with cooking and eating mussels before joining the garden, though *vegetarian* was very motivated to learn. It therefore seems like interest in seafood is the only prerequisite to join a blue community garden and lack of knowledge is not a hinderance. On the other hand, the concept attracts a number of highly qualified prospects that can assume a teaching role.

Information provided by the organisations differs from garden to garden. O2 published a comprehensive handbook, T5, after the first successful years of the Fjordhaver project that provides explanations starting from how to find a suitable location to how to set up facilities, benefits, risks and challenges, safety information as well as scientific information on mussels, oysters and seaweed. T2 and T3 provide schedules that explain in which month members can expect to do which activities. T4 gives scientific information on the target species of the garden, mussels and seaweed and T3 explains how the facilities work in more detail, for example by providing a sketch of the longline facility in the water (Figure 4). T1 and T2 provide flyer-type documents with information on the garden for interested parties to download. In T1 and T5, the gardens provide links to other organisations that are relevant to the activities, such as other blue community gardens, research institutions and the Danish organisation tasked with the monitoring of water quality and toxins in wild mussels. All observed websites link to their Facebook pages as a communication tool and all websites also provide at least one recipe of each farmed species as cooking inspiration for the members. T4 even provides a regular blog that also provides an instruction on how to handle the seafood safely from the platform to the kitchen. The information the gardens give on the internet is directed at members and interested

parties equally, though the practical know-how is supposed to be learned while working at the gardens, not by reading up on it.

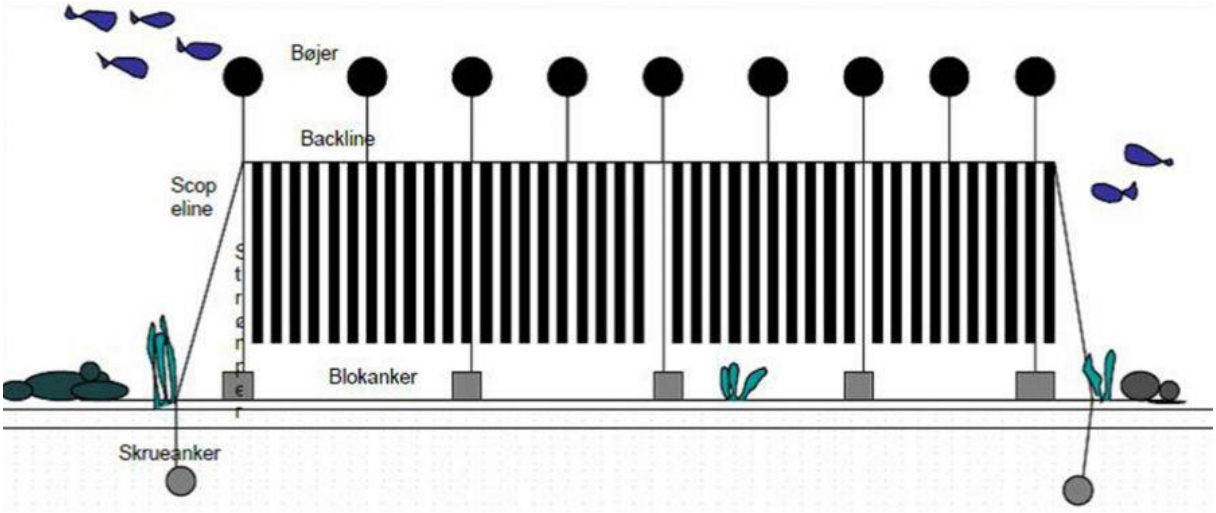

Figure 3: Longline facility at O3, taken from T3 (Havhaven Ebeltoft, 2021a)

Sailor explains that at O1, members are supposed to pick up practical know-how and scientific knowledge by just watching and learning older members. Considering people are more likely to keep environmental information they received from members of the same group (Schultz & Fielding, 2014), this makes for an effective strategy to teach new members. The working groups make it possible for members to choose what they are interested in so that they regularly and actively participate. According to *sailor's* judgement, the practical work is not very difficult to learn, and keep up with. At the same time, there is always the possibility to learn something new:

> "I think with mussels it is pretty much just working. There's not much new in that area. But with the seaweed it's still quite new for us, so we're learning about that all the time. How it grows and how fast and for instance where in the water column should it grow, how far down in terms of how much light and all that. We're experimenting with that, with different types of seaweed."

Every member is able to learn to the level that they want and therefore the range of knowledge the respondents gained while participating is wide. When asked to name something the respondent learned while farming their own seafood, these were some of the responses:

> "[I] always work together with others to pick the mussels, sort out the stockings, out smaller mussels into new stockings." – *Vegetarian*

> "I have learned about seaweed and different small animals in the [water surface]" – *Chairwoman*

> "I have learned that a collection of mussels makes room for a lot of other organisms [such as] polychaetes, ascidians, balanidae [and] bryozoa [commonly known as bristle worms, sea squirts, barnacles and moss animals]." – *Politician*
>
> "Mussels in the sea-farm not only filter the water but also produce waste that accumulates beneath them if not in a place with strong currents in the water." – *Diver*

O2.1 also organises lectures on a variety of issues encompassing all four previously mentioned areas of knowledge, such as information on the farming of seafood, environmental issues and presentations on marine species. On top of that, members of the gardens meet regularly to cook together and learn new recipes and processing new species like seaweed from each other. These bigger events also make it possible for members to meet other members that are a part of a different working group who can share experiences on different species and activities.

Yet another way to gain knowledge, especially for members of a newly established blue community garden is the exchange with other gardens. The gardens communicate with each other and plan meetings together occasionally according to *politician*. *Sailor* talks about regular "study trips" where groups interested in establishing their own garden visit existing ones and gardens that grow a species another garden is interested in welcome members to learn from their experiences. These exchanges and the spread connections between the gardens are the reason the concept spreads so rapidly throughout the country. The close connections here can also be explained by social identity theory (Tajfel & Turner, 1986). The members of one blue garden are not just in a group with the other people at their own garden, instead every member of every garden is seen as a familiar who will receive support for the sake of the whole wider group.

The one area of knowledge that is rarely touched upon in the group activities and events is general awareness of marine issues. Apart from problems directly related to the farming of seafood and food production, problems like sustainable ocean use or pollution are not talked about a lot. *Sailor* says they got inspired after joining their garden and now read a lot about environmental issues and the state of the sea in general in their free time. In their perception though, other members do not seem to care about these topics and conversations at group meetings revolve more around the farming activities, cooking and private matters. Broader marine issues are not a concern the gardens are looking to address, though motivated members can always look into that in their free time. The infrastructure to educate on these topics is already in place, the gardens could add a few more lectures to their schedule for example. With a shift towards more education at the gardens, such as what O1 is planning, this could be

addressed, but whether a member that joined the garden to get some sustainable food out of it will consequently start caring about broader issues of sustainability is unclear.

On the other hand, it has to be said that members gain a lot of knowledge in areas that are more directly related to behaviour with practical know-how and abilities related to handling and cooking seafood. If blue community gardens were to actively target an increase of ocean literacy, both in terms of knowledge and the resulting behaviour change, it is a good sign that practical knowledge is so easily and willingly picked up. It further shows that knowledge increase does not have to precede the wanted behaviour, but the behaviour can cause the knowledge gain. If knowledge increase does not necessarily lead to behaviour change but behaviour, in this case behaviour that has become a habit, leads to knowledge increase, maybe ocean literacy incentives should focus more on motivating behaviour with different factors of the Stoll-Kleemann model (2019), such as habits to address knowledge gain and behaviour change at the same time.

Main Findings - Knowledge
▪ Prior knowledge is not important and not a deciding factor for joining the garden ▪ New members learn from older ones ▪ New gardens learn from established ones ▪ Four areas of knowledge: scientific knowledge, practical know-how, abilities related to handling and cooking seafood and general awareness of marine issues ▪ General awareness of marine issues is least discussed among participants

4.3 Participants' experiences

4.3.1 Personal factors

Stoll-Kleemann addresses not just many different personal factors in their model for sustainable behaviour change. The study finds that personal factors were very closely connected to each other throughout the participants' experiences and choices. Based on the participants' answers, they can be categorized into one or multiple of three interest groups, those interested in food, nature in general and the ocean. The main reason overall seems to be an interest in healthy and sustainable food sources. While all respondents enjoy and consume a lot of their farmed mussels, *vegetarian, sailor* and *chairwoman* are the most suited for this category. *Vegetarian,* who had been a vegetarian most of their live, decided to start eating fish and seafood for a

healthier diet and appreciated the consistent supply of organic seafood the garden provides. *Sailor* enjoys cooking and eating good food and likes to try new things. *Chairwoman* on the other hand grew up eating seafood and her mother's mussel dishes hold a sentimental value for her. Many personal factors (Stoll-Kleemann, 2019) interact with each other here, such as habits, emotions, self-efficacy and attitudes towards seafood.

The second group displays a general interest in spending time in nature. *Chairwoman* answers that she likes growing food outside and picking food in nature, *politician* supplements: "I am a biologist and like the thought of finding the shortest way from natural grown food to the table". *Sailor*, who likes spending time in the vegetable garden of O1 and likes going sailing, also fits this category. With this group, habits play a big role in their decision making, and the positive emotions connected to nature have an influence as well. Finally, the third group has a special interest in the state of the oceans and the role the farmed seafood has in connection to that. The three former biologists *politician*, *diver* and *conservationist* fit into this category. *Conservationist* has worked with coastal protection and mussels before and *politician* likes "the sustainability of eating seafood from the lower end of the food chain". Here, knowledge and self-efficacy can be seen as the most important factors.

Though not explicitly addressed by most respondents, it is clear that sustainable consumption is important to all of them. All of them have similar values and attitudes (Stoll-Kleemann, 2019) towards organic food, the environment and the ocean, even if some aspects are more pronounced in some members. *Diver* summarises the benefits the blue community garden offers to its members well:

> "I do this because I feel it is satisfying to eat something I have harvested myself and is locally and sustainably produced and it is interesting to learn about the mussel's biology and life in the fjord."

Diver joined because their youngest son developed a taste in mussels. Sustainable food consumption clearly is connected to social structures like family and a topic of emotional value and being able to source seafood sustainably is rewarding on a level beyond practicability. *Sailor* says that they were raised to be environmentally conscious and when asked why they care about sustainability simply responds: "Because it makes sense". In addition, for the group of former biologists, environmental issues are not just important on a personal level but also interesting on a professional one. The topic is familiar to them, which is likely why they took up a membership when looking for new things to do after retirement. The interviews with the

participants demonstrate the ways in which different personal factors can influence each other as argued by Stoll-Kleemann (2019).

Main Findings – Personal Factors
▪ Main areas of interest are food, nature and the state of the ocean ▪ Habits, emotions, values, attitudes, self-efficacy, knowledge all influence each other

4.3.2 Identity

Based on the participants answers it is possible to see how the respondents have made their blue community garden a part of their identity. All respondents consider themselves green consumers, so consumers who make decisions based on the impact their consumption makes on the environment, due to their actions and environmental considerations unrelated to the garden. While they act that way with the state of the environment in mind, they also find the benefits of sustainable consumption for themselves, for example *vegetarian's* health reasons, for their families, such as *diver's* intentions to raise their children in a mindful way, or for society as a whole, as in *sailor's* case to do right by everyone. Bartels & Onwezen (2014) already proved, based on social identity theory, that green consumers are more likely to purchase organic products, and this study continues the results to include producing their own organic food as well. Social factors (Stoll-Kleemann, 2019) are identified as the most relevant ones based on the answers the respondents gave, though knowledge and awareness (ibid.) were more apparent during the discussions on sustainability in general than during the parts of the interview concerned with the blue community gardens. It does not appear that the membership of the garden has influenced any respondents' views or attitudes towards sustainable consumption significantly, but rather that joining the newly established blue community garden is the logical step for a green consumer that has access to one.

At the same time, it can be said that all respondents identify with their garden rather strongly, supporting social identity theory (Tajfel & Turner, 1986). All of them like to talk about it with their friends and family and spend a lot of time there. Many represent the garden towards the public during city- or harbourwide events or at scientific conferences, proving the point that people like to identify as a member of a group more than identifying as an individual (ibid.). They feel connected to the other members of the garden and take opportunities to socialise while working and learning about seafood and outside the farming activities during regular

meet ups. The one respondent that answered not to attend the garden as regularly as the others, *vegetarian*, is limited in doing so due to age and mobility issues. Even then, other members of O2.1 usually offer to deliver some of the harvest to their house after big working days. With a large percentage of members that are retired, this is likely to occur at times and the actions show how well connected the members are among each other. On top of that, all respondents describe that they get more than enough mussels for their own use out of their efforts, so sharing the harvest only seems natural. This is again a strong argument for the huge social influence on the members from their own group members (Stoll-Kleemann, 2019).

Despite some respondents only being members of their garden for as little as three years, and the Covid-19 pandemic limiting opportunities to meet in person and socialize for most of the previous year, it can be said that the members of blue community gardens are able to strongly identify as members of this group on a personal level, proving Tajfel and Turner (1986) in that people have the desire to identify with a group and the surroundings at blue community gardens provide the perfect environment for that. Another possibility is that since blue community gardens are still in their early years of development and still a niche concept in wider society, the founding members especially, but maybe all members that have joined so far feel a special connection to their gardens as some sort of pioneers of the concept. They could feel pride in being the first people to be a part of such a sustainable and future-oriented project and witness the success they are having. This would add an extra level of connectedness and emotional involvement between the members.

Main Findings - Identity
▪ Strong identity connected to the garden and the other members, due to a lot of time spent at the garden ▪ Identity as a blue community gardener is very compatible to existing identity as a green consumer

4.3.3 Behaviour

Finally, RQ3 was addressed during the interviews to investigate which sustainable behaviours and behaviour changes the participants possess. The central behaviour of course is the sustainable cultivation of seafood, which has become a habit for all respondents considering they have been visiting the garden regularly for multiple years. Connected to that, all

respondents answered to eat a lot more mussels than before, while *sailor* was the only one interested in seaweed. Everyone participates in the farming activities at their gardens regularly and whenever they have time, *chairwoman* up to once a week, and *sailor* with increasing frequency being involved in more and more working groups and a vegetable garden they can access without the need of a boat. The mussel consumption and the visits to the garden can therefore be considered a habit as they happen frequently and are expected to happen as the standard behaviour choice (Schwanen et al., 2012; White et al., 2019). Apart from *vegetarian,* all members of O2.1 attend presentations and lectures often and every respondent enjoys going to cooking events. Everyone indicated that they enjoy socializing with other members and made new friends at their gardens. The attendance at these regular but special events cannot be considered a habit necessarily, considering that members will usually consciously decide which event interests them and the participation is not an automated action (Schwanen et al., 2012).

How much more mussels are being consumed depends on the amount of mussels the member decides to take home. *Vegetarian* went from not eating mussels at all to eating mussels regularly. *Chairwoman* says she has no need to buy mussels at the store anymore, and she incorporates mussels in as many dishes as she can, including reusing the leftover juice after steaming in broth for other soups. *Diver* grows enough mussels to feed his whole family and still has enough left to keep them in the freezer. As a result, *diver* was the only one to answer that they and their family eat less meat. It is likely that other members also replace other forms of meat with mussels without taking notice of it, while some, like *sailor* and *chairwoman*, seem to have eaten mussels a lot previously and therefore did not noticeably change their diet.

Outside the consumption changes, *sailor* and *diver* say that they spend a significant amount of free time at their blue community garden. *Diver* has less time for other hobbies as a result and spends less time working in their own garden. This shows that existing habits can prove to be a hinderance in terms of commitment to the garden (Stoll-Kleemann, 2019), as well as the garden influencing other possibly sustainable habits. It is possible that the new habit of seafood farming replaces other comparable sustainable habits instead of replacing unsustainable ones, because the benefits between working in their own garden and working at the blue community garden are so similar, only increased at the latter due to the reward with mussels. Replacing an unsustainable behaviour with a sustainable one requires a level of moral disengagement that can hinder the process (Stoll-Kleemann, 2019), whereas replacing a sustainable habit with another sustainable one might be less of a moral and emotional effort. *Sailor* on the other hand did not indicate to spend less time on specific other hobbies and instead works at the vegetable

garden at O1, even though they were not too interested in gardening work beforehand. In cases like this it will be easier to develop sustainable habits because existing ones are not in the way.

It must be said that even though most respondents only showed small changes in their consumption, all of them made an effort to live sustainably before joining their blue community garden. Five respondents say that they only or mainly buy organic food at the grocery store and three also grow food in their own gardens. *Diver* makes a point to pay attention to animal welfare when buying animal products and sailor is a part of the slow food movement. Other behaviours mentioned were recycling waste, saving energy at home, buying clothes and furniture either second-hand or made from recycled materials and one explained they are driving a hybrid car. All participants proved to have multiple sustainable habits already, making the integration new sustainable habits into their daily lives easier (Stoll-Kleemann, 2019). While no one showed a particular care towards the ocean and marine issues, all respondents are very aware of the impacts of their consumption and make an effort towards eating and producing sustainable food, which is where their interest in the blue community garden starts and, in most cases, ends, not paying much attention to broader marine issues they could have an influence on.

All respondents further answered that they talk to their friends and family about their work in the garden often. This behaviour is strongly influenced by social factors like culture and lifestyle (Stoll-Kleemann, 2019). *Vegetarian* and *diver* only mention it to people they know are interested in the garden or seafood, whereas *chairwoman* shares her experiences whenever she can and often invites people to visit or taste the mussels she farms. *Sailor* is known in their surroundings to be involved in their garden and a friend has approached them before to get some information before joining as well. This aspect is important as the willingness and ability to talk about marine issues is a part of ocean literacy and seeing how all members of blue community gardens are enthusiastic about sharing their experiences and the benefits of the gardens, the concept has great potential to spread and educate people. The fact that members learn in such a social context makes it much more likely that individuals know how to communicate it to other people, compared to situations where people learn through lectures or reading up on issues by themselves.

Main Findings - Behaviour
▪ All participants behaved sustainably before joining the garden ▪ All participate regularly, eat more mussels and talk about the garden with non-members

- Singularly named changes: less-meat consumption, more fish consumption, less time for other (sustainable) activities, more time spent outdoors

4.4 Discussion

4.4.1 Changes to the existing model on sustainable behaviour change

The results of this study suggest that the theory model suggested by Stoll-Kleemann (2019) should be altered to include "habits" or as an individual category of factors that influence sustainable ocean related behaviour, equal to "personal factors" and "external factors". While they are influenced by personal factors like values, knowledge and personal interests, a few points indicate that habits differ from these factors. Habits identified within this study could be categorized for example as consumption patterns, like eating seafood, buying organic food or saving energy, and leisure activities or hobbies, such as sailing, cooking or diving. Some habits identified in the study require less effort, like recycling household waste with the recycling structure already in place or choosing organic food over others at the supermarket. Here, people seem to have profited from other parties "making it easy" for them to act sustainably (White et al., 2019). Other habits, like the different leisure activities described by the participants demand stronger intentions. Going diving, sailing, gathering foods from the forest and farming seafood at the gardens requires time, people need to travel to and from the location, activities outdoors and by the water can become uncomfortable depending on the weather. Also, even though it is not too extensive, there is physical labour involved working at the gardens. This on the other hand leads to the members receiving a reward, in the form of food, that motivates them to keep the habit (Everett et al., 1974). Habits are something an individual must choose to actively perform (Schwanen et al., 2012). Therefore, they are not a part of one's personality, but at the same time not an external factor the individual has no influence on.

It can be argued that habits are influenced by personal factors and external factors equally. The connection to personal factors has already been proven by Stoll-Kleemann (2019), but the results of this study emphasise the influence that external factors, especially socio-cultural ones have on habits as well. Not just the newly acquired sustainable ocean-related behaviours were influenced by social dynamics, but many existing habits were formed because of family relationships, the upbringing by parents or the raising of the respondents' own children, or by professional environments, such as *diver's* background as a biologist. Culture has a big influence on habits as well (Jefferson et al., 2015), as such someone from a coastal town is more

likely to be interested in sailing or diving. Other than personal factors, habits can be perceived by other people and individuals can easily pick up other people's habits, which can influence them in taking up or not taking up a certain behaviour (Stoll-Kleemann, 2019).

Most habits mentioned by the respondents were connected to the environment or sustainability somehow, indicating that people with many sustainable habits are likely to pick up more sustainable behaviours. Whether the habits were related to the ocean did not seem to be relevant. On the other hand, some habits were not connected to sustainability at all, but they had an influence in acquiring new behaviours. Socializing, in this case talking and eating together with friends was a huge motivator for many respondents to join and continue actively participating in the garden.

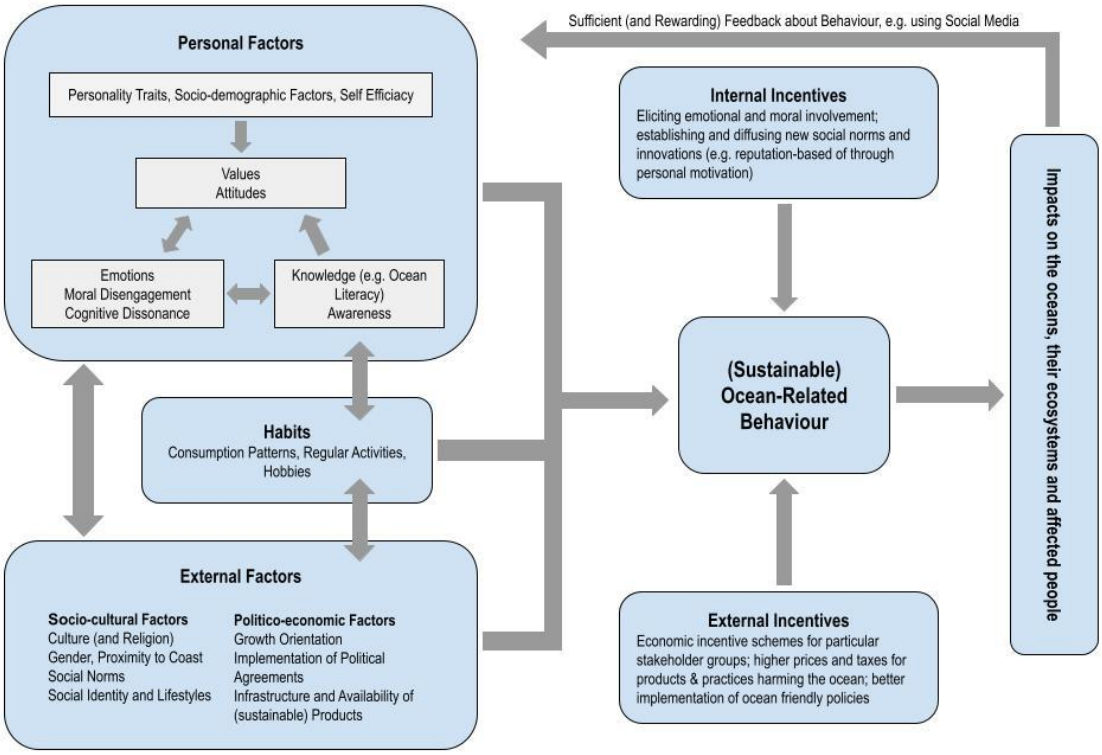

Figure 4, proposed changes to the model by Stoll-Kleemann (2019)

4.4.2 Blue community garden as sustainable serious leisure

To be able to effectively use the results of the study it can be helpful to categorize the activities at blue community gardens into a type of work or leisure. Describing them as serious leisure seems appropriate since all of Stebbins' (1982) six categories were found at least to some degree during the interviews. Identity and unique ethos have been addressed in the findings already, participants stated that they like to talk about the garden when they can and they have developed

a certain ethos around the garden, through the consumption of mussels instead of other meat for example. Another big argument for the categorization as serious leisure is the fact that members acquire specific knowledge and skills related to the activities, such as knowledge on marine ecosystems and species and skills regarding the successful cultivation of seaweed. Further, all participants displayed at least some of the eight benefits Stebbins describes, such as self-enrichment for *sailor* who found an exciting new pastime. Further, all participants gained a feeling of belonginess and physical products as a result of the activity. Half of the participants answered to have had a related career before retirement, the fact that they were already retired when joining likely enhances the benefits for them as they are unable to find similar fulfilment during professional work anymore. Finally, it can be argued that members have to persevere to some extent, seeing that *vegetarian* has to scale down their involvement during the winter and the work at the garden is often dependent on the weather, especially if a boat is involved. All these factors speak for the fact that blue community gardens should be considered serious leisure.

The concept of serious leisure could make for a good strategy for future projects addressing ocean literacy. By definition, serious leisure demands the performer to act based on specific topical knowledge and/or skills (Stebbins, 1982), which is what ocean literacy is looking to increase (Cava et al., 2005). Serious leisure demands a certain commitment from the performer to stick with the activity "through thick and thin" (Stebbins, 1982, p. 256), which then leads to involvement for longer periods of time. In the case of blue community gardens, not enough time has passed to be able to judge this point definitively. Instead, some of the participants supported the garden during the difficult first steps, through and right after the establishment. As pioneers, these people can be argued to have a strong commitment to their gardens through difficult times. People can be rewarded with a multitude of personal benefits, in this case seafood, as well as contributing to the community (Stebbins, 1982) for activities that can be purely for the sake of the environment (Miller, 2018), but do not have to be, by providing a space to socialize but also learn about ecosystems and food. This gives a great opportunity for sustainable behaviours and habits to be engrained into people whether initially planned to or not. Also, the fact that so many blue community gardeners have a related professional background might be a coincidence in this study due to the very small sample size but could be considered when developing other projects on ocean literacy. The results of this study are very similar to that of Miller (2018), where they argued that older citizens and retirees have the potential to be champions of environmental advocacy and can educate younger generations through the social interactions similar projects could provide.

4.4.3 The (non-)importance of sustainable intentions for sustainable behaviour

Interestingly, the fact that with the harvest people gain a physical benefit makes this study differ from other studies investigating sustainable behaviour change. Sustainability is not a main factor and instead seen by most as a positive side-effect or in some cases not even considered at all before joining. Other sustainable behaviours that were acquired after joining can also be considered involuntary, for example eating less meat, not because meat is less sustainable but because so many mussels are harvested at the garden and need to be eaten first. In the long term, this point can and arguably already has led to habit formation for most members and the families that consume the seafood. As Schwanen et al. (2012) explain, the intention of the behaviour ceases to matter once the behaviour has been automated and become a habit. Whether people stop consuming meat out of a commitment to sustainability is irrelevant if the sustainable habit is upheld. As long as the person stays a member of the garden, the habit is likely to continue.

Regularly talking about the garden to other people can also be seen as a sustainable behaviour, as it educates and inspires other people, but in some cases the experiences from the garden could simply be shared to keep close friends up to date with ones live and not with the intention to convert them to join. Again, the reason for the behaviour is not sustainability but the social interaction with the person's environment. On the one hand, if a member is not too involved with the sustainability aspect of the garden, they are less inclined to spread this important aspect of the gardens in their surroundings. On the other hand though, the factor needed to encourage behaviour change is already present in the person, it just needs to be utilized better. Considering people tend to behave more sustainably if their peers are too (White et al., 2019), members do not need to be made to communicate more, they just need to change the topic of their conversations.

While at first glance the comparatively small interest in general awareness of marine issues seems to be a hinderance to an encompassing ocean literacy, the mentioned circumstances might make it possible to engage far more people in sustainable behaviour than strategies targeted at sustainability for the sake of sustainability. The results of this study are comparable to studies on land-based community gardens (Bendt et al., 2013), where gardens that engage with people who have little prior knowledge become interested for a reason unrelated to the environment, like cultural community activities. In the case of blue community gardens, people who like seafood and people who like to socialize might become members based on an initial interest in the regular cooking events. If they have no awareness of sustainable consumption at all, that makes the potential for knowledge gain even higher, and it happens subconsciously.

Many studies on land-based community gardens already prove that an increase in awareness is to be expected in members of community gardens (Andersson et al., 2007; Bendt et al., 2013; Kim, 2017). The fact that people are rewarded with seafood that cannot simply be grown in one's own garden adds another incentive. This means that institutions or organisations that want to increase ocean literacy do not have to market their projects around being sustainable, as long as the behaviours learned are sustainable regardless. People that are interested in sustainability are going to participate anyway and people that are not might still find an interest in the activity for other reasons. If they realise they benefit from acting sustainably for the sake of sustainability as well as a result, they might want to pursue that motivation in the future and if they do not they will still have acted sustainably, so the environment benefits either way.

5. Conclusion

5.1 Reflections on the research questions

The purpose of this study was to explore whether and how participation in blue community gardens makes members become more ocean literate. The focus regarding ocean literacy was on sustainable behaviour changes of the participants and what factors influenced them. Comparing the results of the study to Stoll-Kleemann's (2019) model of factors influencing ocean-related behaviour change, factors of all their designated factor categories have been validated in this study to influence the participants' behaviours. The recognized factors were self-efficacy, values and attitudes, emotions, knowledge and awareness, habits, socio-cultural factors like culture, social identity and lifestyles and economic factors. Following Stoll-Kleemann's (2019) model, all factors were found to impact each other. The most influential factors among the participants were social identity and the interaction of existing habits with each other and potential new ones. Habits were shown to not just be influenced by personal factors but very strongly connected to external factors as well, therefore they should be considered as a third group of factors rather than a personal factor in a model on sustainable behaviour change such as Stoll-Kleemann's (2019).

Several newly acquired behaviours were identified in the study. One behaviour, which has become a habit for all participants, is the farming work, sorting and harvesting of the mussels. Further, most participants regularly attend events at the garden to socialize and educate themselves. As these are the key aspects of the garden it becomes clear why the factors habits and social identity are influencing member behaviour the most. New sustainable behaviours

that extend to the lives of the participants outside the gardens are less common. On the other hand, most of those new sustainable behaviours were not related to the ocean, such as reduced meat consumption or increased involvement in a community vegetable garden. This shows how the involvement in blue community gardens is not only connected to the members' consciousness of the ocean, but their sustainable consumer behaviour and care for sustainability in general. Also, since many participants were already mindful of their consumption before joining the garden, sustainable behaviours were already present and there was not much space for new behaviours do be added through the experiences at the blue community gardens.

5.2 Implications for ocean literacy

Blue community gardens are providing their members with a source of sustainable seafood, but they also offer a great opportunity to advance ocean literacy. Per definition, ocean literacy means to know things about the ocean, being able to talk about it and to act sustainable towards the ocean. This study has found that members of blue community gardens do all three. Knowledge on different ocean-related topics is gained through the farming activities, cooking together and occasionally lecture-style presentations. Since members learn practical and much theoretical knowledge through hands-on work together with other members, they learn to communicate their insights to others automatically, and do so both towards newer members of the garden and other people in their surroundings that may or may not decide to join the garden as well. Finally, all members behave sustainably towards the ocean habitually for at least as long as they are active members of their gardens. Their actions benefit the local ecosystems around the gardens and the stocks of wild mussels that might not be caught as a result. So far though, wider ocean-related issues are rarely addressed at the gardens and sustainable ocean-related behaviour that is not directly related to the farming of seafood and therefore the members' own profit has only been observed in one participant who started to inform themselves in their free time and participates in scientific conferences on behalf of the garden.

5.3 Future developments of blue community gardens

While it can be said that members of blue community gardens become more ocean literate effectively due to social learning and habitual hands-on work, the educational structure at the gardens is still rather unorganised. The learning generally does not exceed the direct issues of the garden and the farming activities. Some gardens indicate to target a wider audience with

educational programs, such as school classes and other visitors that do not want or cannot join the garden as a member, like tourists. To be able to increase the ocean literacy of the public, gardens should be aware of their status as serious leisure and the benefits gained from that. People that display multiple of Stebbins' (1982) criteria can be targeted directly, such as those with careers in a related field, those who already have an identity or a unique ethos around sustainable or marine activities, those that find self-fulfilment or already have knowledge or skills in related activities. Even if those visitors chose not to join the garden, they might keep the experience close and find a similar activity more suited to them that will still increase their ocean literacy. The concept of serious leisure should also be considered by educators not involved with blue community gardens to find strategies for increasing ocean literacy and encouraging sustainable behaviour change.

It is important to acknowledge that the concept of blue community gardens is still very young, meaning their perception among the public but also the members is likely to change as the concept spreads and becomes more normalised. Attitudes and norms regarding blue community gardens are likely to develop more strongly should this way of producing one's own seafood become the mainstream, or as common as land-based community gardens. Those changes will affect not only those people interested to join but also those that choose not to for a multitude of reasons. As of now, it can be said that most members of blue community gardens are passionate and very engaged in their work there. With more and more members, it is possible that identities at the gardens change and many new members will not connect as strongly. The results of this study, especially regarding the group connections and social identity might therefore be found to be watered-down in future research.

5.4 Further research

Connected to this, it will be interesting to see how experiences, knowledge gain and maybe even identities change and develop once the gardens become places for the general public to spend time at, for example school classes or tourists that only visit the gardens for short periods of time. Do they gain knowledge in the same areas as the members – practical know how and scientific knowledge – or does the outreach to the general public focus more on general marine issues and abilities related to the cooking and handling of seafood, as those areas of knowledge might be more relevant to people that do not have regular access to their own blue community garden?

Another starting point for research could be the fact that the average age of the members seems to be high, and members in their 20s and 30s are rare. Most of the respondents belonging to O2.1 were retired, even though the garden is located in a university city. Maybe there is a reason so many retirees are interested in blue community gardens, while few young people are. Also, the garden communities are still quite small, the biggest ones around 90 members, and the number of members does not seem to relate to the size of the city the garden is located in. Future research could clarify if it is ecologically reasonable to expand the gardens so that even in a bigger city all people interested can harvest enough seafood for themselves and if significantly larger garden communities still offer the same connection and group identity, or even knowledge gain for all members.

Finally, as the concept is expected to spread to other countries outside Denmark, this gives the opportunity to look into cultural contexts, attitudes and values around seafood and community and group dynamics and social learning. It is possible that the way the gardens operate and the way the members benefit from it would need to be modified in other countries for the concept to be successful and would be compelling to monitor these developments as they happen as the concept it taken up in other countries.

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Appendix I – Interview Guide

1. How long have you been a part of your community sea garden?

2. Can you tell me your story of how it started? How did you come across it? Why did you choose to participate?

4. How did you find out how to do farm your own seafood?

- What was your prior knowledge about the topic?

- What kind of introduction or information are provided from the association?

- Do you talk to other gardeners a lot?

- Are there community events? Are those just related to seafood or the ocean in general?

5. Can you tell me something you learned about the ocean while farming your own seafood? How did you learn it?

6. What changes to your daily life did you make since participating in the community sea garden?

- What food did you buy before that you don't now and the other way around?

- Do you talk about the community sea garden and changes in consumption to other people not involved in the garden, like friends or family members? What do you tell them?

7. Why did you start to behave differently?

- Did you pick up anything from the fellow gardeners? What was it?

8. Would you consider yourself a "green consumer" (someone who pays attention to buying sustainable food/ clothes/ furniture/…, saving energy/ using renewable energy, recycling)? Why/ why not?

Additional questions to members of the board:

9. How are you approaching people to join? How are you "marketing" the sea garden?

10. How are you making people learn about farming seafood?

11. What are the social aspects of the garden?

- What events or other opportunities are there to meet outside the farming of seafood itself?