Article

The Implementation of CSA Model in Aquaculture Management in Poland

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Abstract: Community Supported Agriculture (CSA) is an alternative form of distributing agricultural products, including fish, consistent with the model of food supply chain shortening. It extends beyond the traditional model of profit maximization and aims at strengthening local interactions with food consumers. The purpose of this article is to assess the feasibility of implementing the CSA model in the Polish carp market, representing the dominant aquaculture product. The research focused on the potential identified on the supply and demand sides of the carp market. The source material was collected through a pilot two-track empirical study conducted in 2019 in the Barycz Valley, where the largest complex of carp breeding ponds is located in Poland, and in Europe. We propose that the following CSA model of direct sales can become a source of specific benefits in the economic, social, and environmental dimensions for the key stakeholders of the supply chain, (i.e., carp producers and consumers). The research results show that in the case of carp production in Poland, CSA may turn out a desirable support for the sale of fish in the future; however, the existing conditions are not yet fully favourable for its development.

Keywords: CSA; aquaculture management; carp; Barycz Valley; Poland

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1. Introduction

In 2017, the consumption of fish worldwide amounted to 176.8 million tons and, according to the forecasts, in 2026 it will increase to the level of 194 million tons [1]. In order to meet such market expectations, especially when facing the diminishing fish stocks in seas and oceans [2], it becomes imperative to look for a sustainable alternative. Such an alternative is provided by a rapidly growing aquaculture sector, including the production of freshwater fish. The expansion of this part of the fishery economy is confirmed by FAO (Food and Agriculture Organization of the United Nations. Reference) estimates, according to which in 2030 the share of aquaculture in the global production of fish will amount to approximately 60% [3].

A specific form of aquaculture was developed in Poland, namely the pond carp economy. Among the European Union countries, Poland is the largest producer of carp intended for consumption. In 2018 alone, Poland's yield reached 20.8 thousand tons. Unfortunately, despite the fact that the development of aquaculture remains one of the declared goals of the fishing industry strategy in Poland and throughout the European Union, the domestic carp market recorded a decline, compared to the previous season, by approximately 0.8 thousand tons, (i.e., 4%). This resulted from the decrease in sales of domestic production and carp imports as well. However, the scale of exports remained the same as in the previous years, reaching the value of only 0.5 thousand tons [4].

A major challenge for Polish carp producers is related to the declining sales. In 2018, 20.6% of total production (about 4.3 thousand tons) was not sold. According to Lirski's

research [4], not only did the amount of unsold carp increase, comparing to the previous ten years, but also the share of unsold fish in the total production (Table 1).

Table 1. The volume of unsold carp and its share in total production in the selected years.

Specification	Years					
	2010	2012	2014	2016	2017	2018
Volume of unsold carp (01.01–31.12) (thousand tons)	1	1.9	1.9	1.2	1.5	4.3
Share of unsold carp in total production (%)	5.6	11	9.5	9.4	8	20.6

Source: [4].

Additionally, the situation is complicated by the fact that Poland is not only the major carp producer (for domestic market), but also one of the major importers. In 2017, imports accounted for 15.1% of domestic production (in 2018—14%) and 80% originated from the Czech Republic. The remaining part (20%) was imported from Hungary, Lithuania, and China [5].

Declining sales or imports are not the only challenges faced by the Polish carp breeders. The development of pond carp economy in Poland comes across a number of other obstacles, including mainly those listed below [6].

- Consumption concentration during Christmas (at large farms approximately 90% of carp sale is recorded in this period).
- Short period for generating revenues resulting from the marginal sale of fish outside the peak season.
- Demand fragmentation.
- Relatively poorly developed in-house processing and direct sales channels,
- Low demand generated by institutional consumers: restaurants, educational, and tourist establishments, etc.
- Consumer preferences regarding the consumption of marine fish.
- Noticeable particularism of interests at fish farms.
- Weak negotiating position against large retail chains.
- Negative media publicity addressing the sale of live carp (related to concerns for the welfare of animals which were sold in plastic bags without water).

Therefore, it is vital to investigate solutions facilitating higher profitability of pond farms but also strengthening the pro-social and pro-environmental role of the carp economy. Fishing is of indisputable significance for the socio-economic development of rural areas. The condition of this industry will thus depend on a number of crucial elements (infrastructure, size of the sales market, processing scale, etc.) [7], but also on the non-material ones—the quality and durability of mutual relations between carp producers and consumers. Therefore, it becomes extremely important to develop a formula of direct cooperation which generates specific benefits for both parties: producers—increasing the competing capacity on the market in the times of increasing uncertainty, and consumers—access to specific products and the identification of their source of origin, along with the possibility of learning about the actual reality of carp breeding. Such cooperation patterns can undoubtedly be found in the concept of Community Supported Agriculture (see below) with innovative solutions supporting the development of direct sales.

The purpose of this study was to assess the feasibility of implementing the Community Supported Agriculture model on the Polish carp market. We adopted the hypothesis that this type of direct sales may become a source of specific benefits in the economic, social, and environmental dimensions for the key supply chain stakeholders, (i.e., carp producers and consumers).

Bearing in mind that so far, to our knowledge, the Community Supported Agriculture model was not reflected in aquaculture, the discussion was focused on the potential

identified on the supply and demand side of the carp market. The analysis was conducted from the perspective of a selected group of consumers and local carp producers.

2. Community Supported Agriculture or Community Supported Fisheries, Directions for Aquaculture Development

Currently, the source literature addresses both the Community Supported Agriculture (CSA) model and the Community Supported Fisheries (CSF) model referring to marine fishing. Historically, CSF derives from the model adopted much earlier, i.e., CSA, focused on material and non-material support by the consumers and small-scale farmers (Table 2). The first CSF initiative was taken up as recently as 2007 in the United States in Port Clyde, Maine; however, a number of informal bottom-up initiatives using the local fishing potential had already been undertaken earlier. In a short time, the success of the first CSFs resulted in launching similar programmes in Canada and Europe. They were carried out in response to the growing problems in the area of marine fishing, focused on a more sustainable production of fish and seafood and an alternative way of their distribution [8].

Table 2. The essence and elements of Community Supported Agriculture (CSA) and Community Supported Fisheries (CSF).

Community Supported Agriculture CSA	Community Supported Fishery CSF
A strategy of supporting small farming entities through a system of prepayments and subscriptions in exchange for the supply of healthy, organic, high-quality food. Local partnerships based on cooperation and trust between producers and consumers are established, ensuring mutual benefits in economic, social, and environmental dimensions.	A strategy aimed at developing a direct connection between fishermen and end consumers. It is characterized by a system of prepayments paid by consumers in return for high-quality local products (fish, seafood). Consumers were informed about the specificity of the catch (e.g., type of species, size, and seasonality of catches), and about the traditions and heritage of coastal communities.
Main elements	
<ol style="list-style-type: none"> 1. Identification of the product origin and the control of its path from the production site to the place of consumption (from the field/pond to the table). 2. Increasing access to high-quality local products—developing new healthy eating habits (conscious consumption of high-quality organic products). 3. Providing producers with a fair price for the manufactured products, reflecting the actual production cost. 4. Intentional support for the local economy based on direct relations between consumers and producers. 5. Strengthening and developing short supply chains based on transparent rules in order to maximize benefits, primarily on the side of producers and consumers. 6. Promoting sustainable economy—agriculture, fishing. 7. Developing systems based on innovative solutions (Good Practices). 	

Source: this study is based on published summaries [9,10].

Similarly to Community Supported Agriculture, Community Supported Fisheries, represent a form of sale extending beyond the traditional model of profit maximization and, focusing on strengthening local interactions with food consumers by shortening the supply chain [11]. The essence of both of these concepts is, therefore, to develop lasting relations between producers and consumers of their products, in the economic, social, and environmental dimensions. They can be implemented within CSF and CSA when the parties involved establish partnerships based on mutual trust. In this context, the voluntary participation of the parties remains essential, primarily due to economic reasons. Frequently, the producers are encouraged by the possibility of wider promotion of their products, better recognition on the market, social appreciation or educational activities in the area of economic, social, and environmental importance of agriculture

and fisheries [12]. Consumers' motivations are predominantly driven by the willingness to purchase healthy, organic, high-quality food. They result, to a lesser extent, from altruistic motives in relation to the local producers or the need to support sustainable food production practices [8,12–15].

Developing a specific type of community and “getting to know the producer” through close and informal connections with end consumers is the feature which distinguishes the discussed models from other types of direct sales used for food products. The importance of this community grows as small farms continue to weaken as a result of land ownership concentration causing negative changes in the social sphere [16]. In the case of fisheries, the respective concerns are raised by the increasing globalization of fish trade, for example, which lowers prices, and, consequently, discourages the development of fish processing infrastructure. Therefore, CSF becomes an alternative in the struggle against the competition from large importers of inexpensive fish, thus shifting the consumers' interest to healthy, organic and, above all, local fish and seafood [13].

The nature of the relationship between fish producers and consumers, however, is somewhat different than the one within CSA. The CSF model does not assume full participation of a consumer in the risk. This is inherent in a traditional CSA where the risk associated with the cultivation of food is borne by both parties. Consumers support farmers during periodic crop failures (they are ready to pick up smaller quantities of the ordered products). Thus, they bear some of the production risk (farmers receive at least part of their remuneration in advance) and resign from the choice of products and delivery dates. In turn, in the event of abundant harvest, consumers are rewarded with a surplus. Hence, the final product becomes of superior value for a consumer. Therefore, in CSA, a higher purchase cost of food supplied directly by its producer is accepted, even though it may be significantly above the level of prices offered in retail chains. The price expected by the farmer reflects the actual production cost (the costs chargeable to the end product are eliminated, e.g., by shortening the supply chain). However, a consumer can approach it as a kind of product quality confirmation, resulting from a cost-intensive, organic production process in a small scale.

Within the framework of CSF, consumers also pay in advance for the expected products, thus ensuring that small fish farms are fairly compensated. However, the deliveries are subject to a much greater failure risk due to bad weather conditions preventing them from going to the sea, unpredictable failures of fishing equipment and tightening of the fishing regulations. In addition, CSF functions in different production cycles comparing to CSA. Their implementation time depends, for example, on the conservation periods covering individual fish species or the possibility of cyclical weather phenomena occurrence. Nevertheless, the CSF model generates the following benefits for both parties:

- For fishermen/fish farms, it guarantees relatively stable profits, which is very important in the light of fish resources protections in place (they can earn higher income at a smaller scale of catches).
- For consumers, it is an opportunity, depending on the CSF location, to have access to specific products of the fishing industry, allowing, at the same time, an open dialogue with producers.

Another important factor is the positive impact of CSF on the local economy, not only in the economic and social dimension, but also in the environmental one. In addition to the reduction of carbon footprint, it also assumes limiting the negative impact of fishing, including fish processing waste, on the environment [17,18].

Both of these concepts contribute to the development of local economies by providing consumers with an opportunity to support local food producers primarily through the ongoing purchase of the products they offer. They also humanize the anonymous and impersonal relationships inherent in the mass food sale process typical for large retail chains. Unfortunately, their presence on the market, including the Polish one, is still far from expected.

In Poland, CSF as an innovative form of direct sales is practically unknown. However, there is a wide experience in the development of Polish CSA systems [16,19,20]. Taking into account the features of individual models, it seems that in Polish conditions, in the area of aquaculture, it is necessary to develop cooperation based on the principles of CSA, along with the simultaneous adaptation of solutions to the specificity of carp economy. This is supported by the fact that, unlike marine fishing, in the case of carp fishing, there is no risk of ineffective catches or fish conservation period. The adaptation of CSA assumptions in relation to the pond economy will strengthen the socially and territorially responsible development based on local high-quality products, aimed at increasing the profitability of fishery production. Therefore, in the coming years, it is imperative to maintain the profitability of carp farming, improve the competitiveness of domestic producers through an effective management of the available breeding, organizational and technical resources as well as the potential of tourism and gastronomy related to fishing. It is supported by the growing demand for healthy not mass-produced food, the emerging consumer groups dedicated to the individuals with special nutritional needs, or the interest in both culture and tradition of local communities involved in fishing.

3. Materials and Methods

The source material was collected through a pilot two-track empirical study carried out at the turn of June and July 2019 in the Barycz Valley, where the largest in Europe centre of carp breeding ponds is situated.

The total area of Barycz Valley (Figure 1) covers 8253.45 ha of breeding ponds. The main carp producers in Poland function there, namely Stawy Milickie S.A. and fish farms located in Ruda Żmigrodzka, Przygodzice, and Możdżanów. Fish farming in the above-mentioned farms is their primary source of income.

Figure 1. Research area. Shallow water reservoirs (ponds) are fed by the Barycz River. The largest of them come from the 11th and 12th centuries and have a similar to the natural eutrophic lake characters. This area covers almost a fifth of the total usable area of the breeding ponds in Poland.

The purpose of the study was to identify the possibility of implementing direct sales on the carp market in Poland as part of the community-supported fishery model.

The research results were collected using a questionnaire and direct interviews. It covered two levels, namely: the assessment of economic conditions (the cost of carp pro-

duction and its scale) and also social conditions—the degree of consumers’ and producers’ openness towards “entering” the CSA system.

The selection of respondents was deliberate and resulted from the purpose of the study. The demand side was represented by the consumers: intentionally the researchers from Wrocław University of Environmental and Life Sciences (WUELS) in Wrocław (Figure 1). It was adopted, in line with the assumptions of Raftowicz-Filipkiewicz et al. [21], that firstly—they have a relatively extensive knowledge of the essence and the need for implementing the principles of sustainable development in practice, and secondly—they are aware of the changes occurring on the local food production markets as well as the importance of the consumption of healthy and high-quality products including fish.

The consumer survey (see Appendix A) was conducted using a questionnaire, which was sent to the respondents via electronic means and additionally uploaded on the University internet platform to people who met the abovementioned assumptions. A total of 139 questionnaires were collected (19% of total researchers at WUELS), of which almost 78% (108) were received from the consumers living in Wrocław. The city is the largest urban centre in the Lower Silesia Voivodship and the main market for food manufactured by the local producers (farmers, fishermen) located within 100 km from the city.

The supply side was represented by five key fish farms, in terms of production volume and share in the regional carp market, located in the Barycz Valley (Table 3), with the exception of the largest one—Stawy Milickie (6650 ha in area). This entity was not interested in participating in the research due to 97% of their carp sales being in bulk quantities and so they did not need to implement changes. Farms of less than 10 ha in area were deliberately not covered by the research because in their case the fishing activity was not a dominating one and most of the production was intended for self-supply. The information on the position of carp producers regarding the CSA model on the local market was obtained through a direct interview including a standardized list of questions (see Appendix B).

Table 3. Farm size, water surface area of fish farms, and average annual fish production volume at a farm.

Specification	Farm Size [ha]	Water Surface Area [ha]	Average Annual Fish Production Volume at a Farm [tons]
Farm 1	141	101	70
Farm 2	320	285	160
Farm 3	175	166	53
Farm 4	10	10	35
Farm 5	30	20	100 *

Source: authors’ estimations based on survey studies. * This farm specializes in trading live fish, also imported from other fish farms.

The two-track implementation of the study facilitated assessing the situation on the carp market in the Barycz Valley and, as the next step, determining the possibility of using the CSA to support carp sale. Particular emphasis was placed on the consumers’ “openness” to the formula of direct sales supported by the community. Due to the absence of the CSF systems in Poland, the questions included in the questionnaires addressed a related solution, i.e., the CSA. On this basis, the chances of adapting the CSA to the carp market were presented.

4. Results

The responses collected as part of this study indicated that fish play a very important role in consumers’ eating habits. Out of all respondents, approximately 96% confirmed the positive impact of fish consumption on human health. This perspective was also reflected

in the frequency of fish consumption. Almost half of the respondents (49%) eat fish at least once a week, 37% at least once a month. This confirms the actual demand and market development opportunities on the demand side.

The purchasing preferences of the respondents refer predominantly to marine fish. Almost 86% of 139 respondents declared their consumption, and only approximately 18% the consumption of freshwater fish. Such a low consumption would not benefit the functioning of the carp market, and its seasonality (e.g., Christmas traditions) poses a relatively high risk for producers. According to the results of the study, 63% of the respondents eat carp solely because of the Christmas tradition, where carp is a customary dish on the Christmas Eve table; 21% do not include it in their menu at all, whereas only less than 1% eat it regularly. As a consequence, in the long run, the prices of carp from native fish farms may be less competitive compared to the prices of imported carp.

The scale of carp consumption, regardless of its form, is still unsatisfactory. The estimated demand for carp, determined on the basis of the respondents' answers, amounts to 4.2 kg per year. In the absence of budgetary constraints, this figure could increase up to 8.9 kg per year.

Currently, it can be observed that consumers are willing to pay approx. PLN 16 per 1 kg of carp purchased directly from the producer and approximately PLN 21 for its home delivery. It should be emphasized that the average price determined by the consumers is above the average carp production cost—PLN 8.4/kg and the average market price in retail sales—PLN 14/kg. It is also higher than the prices charged by farmers when selling their fish to hypermarkets, fish mongrels, restaurants, or other intermediaries. When choosing carp, consumers are primarily guided by its freshness and their knowledge about the seller (brand, farm location, fish origin, etc.). Surprisingly, the majority of respondents buy carp in the stores of large retail chains (25%) or discount stores (24%), which do not guarantee full and reliable identification of the producer (the number of intermediaries in supply chains to large recipients blurs the responsibility for the fish source). The respondents buy carp at the market (18%) or directly at the fish farm (14%) much less frequently. In the latter case, over 50% of the respondents are not (or rather not) interested in purchasing carp themselves directly from the producer.

As a result, only 9% of the respondents expressed their willingness to participate in the CSA model, 15%—just some interest in this form. Almost 48% are not (or rather not) willing to join this type of group, and 28.8% remain undecided. It may result from the fact that the decisions made by consumers about the purchase of organic food are, to a small extent only, influenced by social issues [22]. The results of the study allow adopting that 48 people who expressed their readiness to participate in the CSA represent the potential CSA participants, (assuming, obviously, that the most interested in this form of carp sales are the consumers aware of: the principles of sustainable development, the importance of consuming healthy, high-quality products and the need to support local food producers). In the case of these 48 people, it amounts to the total carp consumption at the level of 201.6 kg per year. The average carp production by the farms selected for the study presents the level of 83.6 tons per year (the lowest declared production is 3.5 tons per year). Thus, the potential CSA groups to be developed based on the indicated 48 participants would create the demand for less than 6% of the smallest farm production. In addition, assuming that there are no budget constraints, the demand would cover only slightly more of the carp production, i.e., approximately 12% at the smallest farm, i.e., it would still be of marginal significance in relation to the production scale [6]. When assessing the demand for organic food, it should be noted that despite the increasing interest of consumers in this type of food, the value of organic food market in Poland still does not exceed 0.5% of the total food market (in 2016 it was 0.2–0.3%). In turn, considering the advancement level of the organic food market development in the regional perspective, the Lower Silesia Voivodship is perceived as a rather poorly developed market [23].

The existing demand limitations for carp producers can be compensated for by a higher price, the more so because, as previously indicated, consumers themselves are ready

to pay between PLN 16 and PLN 21 per 1 kg of carp, at an average production cost of PLN 8.36. This is related to the perception of food purchased directly from the producer as being more natural, offering higher nutritional value, thus having a positive effect on health and well-being. It should be noted that the consequence of CSA initiation would be an increase in prices, not dictated by consumer preferences, however, but the need to compensate for the costs associated with the invested greater amount of work and time-consuming activities.

Another key issue related to the CSA implementation is not just the willingness to purchase carp on a regular basis, but also an interest in the conditions and methods of its production, traditions, or values followed by the producer in relation to the consumer. Unfortunately, in the light of the presented study, it is clear that consumers expect healthy, high-quality food produced in a traditional way maintaining respect for the natural environment; however, they hardly see any need to collect information about a given farm or the production process it uses. Out of the total number of the respondents, approximately 40% do not consider visiting a fish farm and, in this way, learning about the production process, even though some of the surveyed farms offer such an opportunity that 14% of the respondents did not express any opinion in this matter. It should also be emphasized that due to the specificity of the activities carried out by fish farms, direct participation of consumers in the production process is not advisable, which is mainly connected with both safety and sanitary requirements. Although the logic of consumer behaviour keeps changing, a specific kind of consumer resistance towards obtaining information about “their seller” may distort the essence of CSA for the promotion of healthy eating habits, organic food, but most of all the revitalization of local fish farms.

5. Discussion

The collected results, although referring to the selected area alone, are likely to be applicable to the entire carp market in Poland. Polish carp producers are struggling with similar problems related to the growing difficulties with selling fish, especially outside the peak season, a poor assortment offer, relatively high production costs, and thus a weak negotiating position on the market.

The very idea of introducing fresh food directly to the market by the local producers is not entirely new, but it became marginalized along with the expansion of large retail chains. The problem reappeared on the occasion of the increasingly noticeable adverse effects of globalization, land concentration, improving the efficiency and standardization of food production, stimulating consumerism in the economic, social, and environmental area, or the promotion of the idea “from farm to fork” by the European Commission [24]. Consumers began seeking answers to a number of questions related to the broadly approached food safety, noticing the degradation of natural and social environment as a result of striving to maximize benefits in agricultural production and as an element of the struggle to win the market by global producers [25].

The reaction to industrial, “anonymous,” low-quality food takes the form of a number of diverse social movements popularizing healthy lifestyle, local food (unprocessed and processed) of known origin. One of them, as highlighted above, is the concept of social support for local agricultural or fish producers (CSA/CSF).

In Poland, the debate addressing these solutions is still difficult, which results from the small number of CSA or the absence of CSF. Nevertheless, although the mainstream is still manifested by industrial agriculture focused on increasing the production level, improving competitiveness, and labour productivity [26], it is possible—more or less successfully, to implement the sustainable agriculture model combining economic, social and environmental goals [27]. The Polish version of the CSA, apart from the economic aspects of utmost importance for Polish small farmers operating locally, does not disregard social issues related to the quality and living conditions of agricultural producers, the development of local communities or the care for cultural and landscape values. Having

such experience, it seems grounded to ask for the justification of undertaking similar projects regarding pond carp economy. The answer, however, is not clear cut.

The application of the CSA solutions in the area of carp production in Poland is not an easy process. The domestic carp market is characterized by its specific production and deeply rooted sale behaviour—sale concentration during Christmas season, the dominance of long supply chains, predominantly to large retail chains, marginal direct sales at a farm or via own food and catering outlets. Another, however, extremely important issue, from the perspective of its modernization, is the openness of consumers and producers to new, non-standard solutions [11]. The current sales structure, dominated by the forms characterized by a relatively low degree of processing—fresh fish, fillet, and carcass is also a problem. The interest in these forms of fish will continue, although its decrease can be expected along with a wider assortment offer. This is largely due to the deeply entrenched tradition of self-preparation of meals based on carp (50% of the respondents indicate that they eat it at home, 25% at their family or friends). However, consumers' purchasing preferences will be increasingly shifting towards less popular forms, such as smoked carp, carp preserves or frozen carp (Table 4). The condition, however, is higher availability of these products. In turn, the tendency to eat carp in gastronomic establishments—restaurants, bars—is declining.

Table 4. Current and potential forms of purchasing carp in the studied group of consumers.

No.	Current Form [%]		Preferred Form [%]	
1.	Fresh fish	51.1	Fresh fish	39.6
2.	Fillet	25.9	Fillet	37.4
3.	Carcass	15.8	Carcass	15.1
4.	Ready-made dishes in a restaurant/bar	2.2	Ready-made dishes in a restaurant/bar	1.4
5.	Smoked carp	1.4	Smoked carp	4.7
6.	Processed carp	0.7	Processed carp	2.9
7.	Frozen carp	0.7	Frozen carp	1.4

Source: authors' estimations based on survey studies.

The development of “carp” CSA will undoubtedly be enhanced by the nutritional reorientation of Polish consumers manifested by the growing demand for healthy, fresh products of high quality and the desired taste advantages [28]. They turn into food chain participants characterised by an increasing awareness, expecting full and reliable information about the product origin, production methods used, and environmental impacts (to a lesser extent about its producer's situation), its nutritional value, etc. [29] In turn, there is also such a market where fish farms are not fully capable of selling their production [11].

It, therefore, becomes logical to combine the consumers' nutritional expectations with the possibilities of carp producers as part of direct sales. However, it seems that such background is not yet sufficient enough for the introduction and development of CSA. The conducted research showed that the potential does exist; however, it is still too weak to expect greater involvement from a consumer than just buying fish straight from the farm or at the market, or via an online shopping basket. The idea of CSA refers, apart from the sale itself, also to the actual and active partnership between a consumer and a producer and the system of prepayments for the ordered products, which allow obtaining specific revenues regardless of the harvest or market price fluctuations.

Moreover, the CSA appears to be more of an addition than a real solution also from an economic perspective. Beyond any doubt, it brings about a number of advantages, e.g., the possibility of selling fish at higher prices acceptable to customers, maintaining financial liquidity by producers, increasing profits, etc. However, referring to the presented research

results, it can be observed that the CSA driving force is capable of “securing” the sale of just a marginal part of the fish farm production, even the smallest farm.

The highlighted in CSA issue of shortening the supply chain and bringing a producer closer to a consumer is not the argument that could currently support effectively any radical change in the behaviour of consumers and producers on the carp market. This, however, should not be underestimated. The convenience of buying and saving time makes them reach out for food (defined as organic) in the popular retail chains. It should not be expected that consumers will totally give up conventional and frequently long distribution channels (wholesalers, large retail chains, fish markets, etc.), especially in relation to the carp market which, in Poland, is characterized by the concentration of supply and large territorial demand dispersion. Therefore, the CSA should rather be discussed in the context of improving the existing sales systems.

Unquestionably, CSA represents an example of a solution that fits into sustainable development and a method to reach local sales markets, increase the recognition of local products, develop and support fisheries sector, including the small-scale or low-impact ones, etc. On the path towards the implementation of CSA advantages on the carp market, however, it is necessary to attract the appropriate number of clients to be able to talk about sales in terms of profitability. And that can be much more difficult than in the case of the classical CSA. Understanding the factors influencing consumer decisions regarding their participation in the CSA is therefore a key issue and a challenge for carp producers and for the organizations supporting their functioning.

6. Conclusions

Concluding, in the light of the presented study, there is a clear need to think about the Polish carp market in the context of alternative forms of sale. So far, it mainly refers to the further development of short supply chains, which are increasingly gaining in popularity. Unfortunately, they are dedicated primarily to the consumers with average or higher income who are aware of their nutritional preferences. In the case of this market, the CSA may exist as a certain improvement of the already functioning short chains rather than an independent concept. The subscription of orders may turn out the crucial barrier to its full implementation. It also seems that the emphasized partnership relations between the consumer and the producer may also be an insufficient premise to undertake more intensive work focused on the CSA implementation on the carp market. Although it is worth noting that in this case the form of the aforementioned relations could be similar to the classical CSA, for safety reasons, consumers still could not actively help fish farms by working in them.

In the case of the discussed carp production in Poland, the CSA may represent a desired sales support, although, the fully favourable conditions for its development were not yet established. In many cases, the transaction costs of the challenges faced by CSA (organization of deliveries to customers, transport, storage, organization of short supply chains, processing, promotion, etc.) are high enough to discourage many producers willing to participate in this type of a sales group. When planning the implementation of CSA in the field of carp production in Polish reality, it is worth taking actions in the following areas:

- Increasing carp availability throughout the year (which is limited due to the need of draining water from the ponds during the catch).
- Promoting both health and taste advantages of other forms of carp (e.g., smoked carp) as well as preserves and dishes based on it as the main ingredient (e.g., carp pate).
- Strengthening the identification of consumers with local producers.
- Propagating knowledge about the traditions, customs, and methods of carp production.
- Highlighting the economic, social, and environmental benefits of CSA.

While the establishment of the CSA model for carp aquaculture may take time, the perspectives of consumers and producers continue to change, with gradual shifts towards

adopting more sustainable and profitable models. By extension, the CSA models, including those related to using aquaculture products in addition to carp, should continue to be explored for the benefit of communities.

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Appendix A. Questionnaire for Consumers

1. Municipality of residence
2. Do you think fish consumption is important to your health?
3. What kind of fish did you eat most often (in the last year)?
4. How often do you eat carp?
5. In what form do you buy carp?
6. In what form would you like to buy carp?
7. Do you think that you should eat fish?
8. Would you be interested to participate in the carp purchasing group (regular deliveries, prepayments)?

Appendix B. Questionnaire for Producers

1. Year of setting up a business.
2. Farm size [ha].
3. Water surface area [ha].
4. Is carp farming your main business?
5. Average annual carp production in the last 3 years [tons].
6. What percentage of annual sales refers to the Christmas period?
7. Do you have knowledge about the economic, social and environmental benefits of implementing short supply chains?
8. Are you planning to implement short supply chains in the future?
9. What would motivate you to increase direct sales?
10. What are the main barriers to increasing sales in short supply chains?
11. Are any other sales channels considered in the future? If yes, what kind?

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