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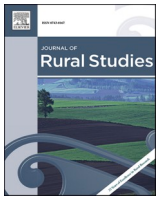

Community-supported agriculture and allotment gardens as collective forms of food production – Investigating the effect of social capital on perceived benefits

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ABSTRACT

Both community-supported agriculture and allotment gardens are collective forms of food production in which members collaborate to provide common goods and services. In addition to improving food self-sufficiency, contributing to members' health and well-being and investing in education and skill development, generating social capital is a major motivational factor for people engaging in collective food production. This is the first study to empirically investigate the effects of social capital on the perceived benefits of members engaged in collective food production in Switzerland. As institutionalised collective and democratic decision-making is central to collective food production, we also considered members' decision-making capacity to be a determinant of perceived benefits, as well as the relationship between decision-making capacity and social capital. For the empirical analyses, we used data from an online survey of members engaged in collective food production (N = 500) conducted in December 2022 and January 2023. We tested for group differences between community-supported agriculture and allotment gardens and between females and males by separately using multivariate analysis of variance and covariance and structural equation modelling. Our results consistently indicated that the relationship between social capital and perceived benefits was statistically significantly positive. However, we found no effect differences between organisational forms and gender. By contrast, we found only marginal evidence that decision-making capacity negatively affects perceived benefits. As social capital plays a vital role in the success of collective food production, it should be strengthened by organising informal activities, such as parties or art exhibitions.

1. Introduction

Consumers are increasingly aware that agricultural production is a major driver of environmental issues, such as climate change (Bennetzen et al., 2016), groundwater pollution (Kurwadkar et al., 2020), biodiversity loss (Ritzel et al., 2025) and soil degradation (Shoshany et al., 2013). Additionally, food safety issues, such as the presence of undesirable agrochemical residues (Wilcock et al., 2004) and food fraud, for example, through falsely labelled products (Charlebois et al., 2016), have led to consumers losing trust in the food industry. Against this background, collective forms of food production in Switzerland, such as community-supported agriculture, have gained momentum in recent years. The first Swiss community-supported agriculture initiatives were founded in the 1970s, and currently, 40 initiatives have either the legal form of a registered association or a cooperative (Siegenthaler, 2016; Solawi, 2023). Community-supported agriculture is based on a cooperative agreement between farmers and members in which the latter pay, for example, a monthly fee in exchange for fresh agricultural products (Pole and Gray, 2013). In some community-supported agriculture initiatives, members are actively involved in the production, packaging and distribution of food, as well as in marketing activities or organising community events (Groh and McFadden, 1997). Traditional forms of collective food production include allotment gardens, which were founded in Germany and the United Kingdom in the late 1700s. Here, members practise gardening activities on individually leased gardening plots (Birky and Strom, 2013). Nowadays, allotment gardens are considered a cultural artefact (King, 2007); however, social minorities, such as young lesbians and bisexuals (Moore et al., 2014), as well as

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young ecologically minded families (Jahrl and Home, 2014), are exhibiting growing interest in allotment gardens. Accordingly, with around 230 registered associations that include a total of 21,000 families and individuals, Swiss allotment gardens continue to enjoy great popularity (Swiss Allotment Federation n.d.).

In collective forms of food production, members collaborate to provide common goods and services (Ritzel et al., 2022). Beyond contributing to food self-sufficiency (Moore et al., 2014; Burgin, 2018), community-supported agriculture and allotment gardens provide multiple benefits for their members. In addition to improving health and well-being (Genter et al., 2015; Vasquez et al., 2017) and investing in education and skill development (Wells et al., 1999; da Silva et al., 2016), generating social capital is a key motivational factor for people engaging in collective food production. Coleman (1990) defines social capital as the structure of relations between individuals. These ties can be strong or weak (Granovetter, 1973). Accordingly, Putnam (2000) introduced the distinction between bonding and bridging social capital. Bonding social capital refers to densely connected homogenous groups with strong ties in which social support is provided to increase solidarity. In contrast, bridging social capital encompasses relationships between heterogeneous groups with weaker ties, enabling the acquisition of a wider range of resources and facilitating the diffusion of information between and within groups. As collective forms of food production may accelerate societal change towards more sustainable configurations of the food system (Dedeurwaerde et al. 2017), social capital plays a vital role in their success.

A study of eight community-supported agriculture initiatives in Switzerland found that participation in administration and fieldwork fostered social interactions and mutual understanding, leading to an increase in social capital (Vaderna et al., 2022). A qualitative study by Furness et al. (2022) focusing on four community-supported initiatives in the UK also highlighted the importance of frequent social interactions for the emergence of bonding social capital. Using a qualitative methodology, Fernandez-Salido et al. (2025) showed that informal networks, trust, reciprocity and shared values amongst allotment gardeners in Valencia (Spain) were important elements of social capital. Qualitative research by Glover et al. (2005) revealed that leisure activities during work enabled gardeners at a community garden in St. Louis (USA) to form strong bonds. A mixed-methods study by Christensen et al. (2018) showed that community gardening in Copenhagen (Denmark) facilitated bridging social capital due to its consistent perception as an inclusive and diverse space. These results also show that the absence of socioeconomic hierarchies creates ties of trust and respect, thereby enabling bonding social capital. Our review of the related literature revealed a strong focus on the factors contributing to the emergence of social capital. However, to the best of our knowledge, the relationship between social capital and the perceived benefits perceived by members engaged in collective food production has not yet been empirically investigated.

Accordingly, the aim of our study was to fill this gap in the scientific literature by empirically investigating the effect of social capital on the perceived benefits of members engaged in collective food production. We used the concept of bonding social capital as defined by Putnam (2000). As institutionalised collective and democratic decision-making is central to collective food pro-duction (Charles, 2011; Bartlomiejski and Kowalewski, 2019), we also considered members' decision-making capacity as a determinant of perceived benefits, as well as the relationship between decision-making capacity and social capital.

We used the grounded theory approach according to Corbin and Strauss (1990) to identify relevant topics. To gather qualitative data, we conducted face-to-face interviews with 15 members engaged in collective food production. We then used the qualitative findings to de-sign an online survey conducted amongst members of community-supported agriculture initiatives, community gardens, allotment gardens and other forms of collective food production in Switzerland. Unfortunately, due to the low number of observations, we had to exclude responses from members of community gardens and other forms of collective food production. Therefore, regarding the proposed effect, we tested for group differences between community-supported agriculture and allotment gardens on the one hand and between females and males on the other. For this purpose, we used multivariate analysis of variance and covariance (MANOVA) and structural equation modelling (SEM). MANOVA was used to identify group differences regarding the observed items forming the latent (unobserved) variables of social capital (i.e. members' decision-making capacity and perceived benefits). SEM enabled us to investigate the relationships between the latent variables with and without considering group differences.

The remainder of this article is organised as follows. In Section 2, we develop our conceptual model capturing the effects of social capital on perceived benefits and of organisational decision-making on perceived benefits and formulate empirically testable hypotheses. In Section 3, the database and the methods used are described. In Section 4, the empirical results are presented and discussed. Finally, in Section 5, we conclude the article and outline the practical implications.

2. Conceptual model and hypotheses

A broad body of literature has investigated the factors contributing to the development of bonding and bridging social capital in collective food production (Glover et al., 2005; Christensen et al., 2018; Furness et al., 2022; Vaderna et al., 2022; Fernandez-Salido et al., 2025). However, the relationship between social capital and the perceived benefits of members engaged in collective food production has not yet been empirically tested. In other research disciplines, however, the positive relationship between the dimensions of social capital and various socioeconomic outcomes has been well studied (Barnes et al., 2016). For example, Tiepoh and Reimer (2004) found a positive connection between social capital and the income levels of individuals and families, resulting in a stronger economic base for communities. Saxton and Benson (2005) showed that political engagement and bridging social capital are positively correlated with the foundation of local non-profit organisations. Social capital is also regarded as essential for the effective management of common-pool resources, such as firewood collected on community-owned forest land: Community members with more bonding social capital are less likely to overuse these resources (Baylis et al., 2018). Against this background, we formulated Hypothesis 1:

H1. Social capital generation increases the perceived benefits of collective food production.

Democratic decision-making is institutionalised through the legal forms (see Hansmann, 1996 for an overview of ownership options and their impact) of community-supported agriculture initiatives and allotment gardens. In Switzerland, the legal form of allotment gardens is exclusively the registered association, while community-supported agriculture initiatives are either registered associations or cooperatives (see Section 1). In allotment associations, decisions are made, for example, regarding the usage of finances, the election of the allotment board and the setting of aims for the upcoming year within the annual general meeting. The general meeting is the highest organ of an allotment association (Breuste and Artmann, 2015). Similarly, community-supported agriculture initiatives with the legal form of a cooperative hold an annual general meeting in which members democratically make strategic decisions about, for example, the food to be grown in the next season and larger investments. In addition, members elect the site group (i.e. the administration), which is responsible for handling day-to-day tasks (Boddenberg et al., 2017; Siegenthaler n.d.). Decisions of minor importance are made spontaneously (Siegenthaler n. d.). Collective decision-making (i.e. agreeing a joint strategy) and observing that collective decisions are followed by most members engenders members to gain trust in one another (Ostrom, 1998). However, the scientific literature on democratic decision-making in

multi-stakeholder organisations, such as cooperatives and registered associations, suggests that decision-making is cumbersome and associated with transaction costs (Pozzobon and Zylbersztajn, 2013; Gonzales, 2017). For example, costs arise because of considerable time investments in obtaining knowledge, attending meetings or resolving conflicts (Iliopoulos and Cook, 2023). Bhuyan and Karantinis (2023), for example, bemoaned the often low organisational effectiveness of cooperatives. Against this background, we advanced Hypothesis 2:

H2. Democratic decision-making capacity decreases the perceived benefits of collective food production.

Research on small and medium-sized enterprises has shown that social capital mediated through the level of confidence and the level of risk acceptance in the decision situation positively impacts decision effectiveness (Jansen et al., 2013). The reverse relationship (without mediating effects) has been tested in the farming context, indicating that women's participation in on-farm decision-making is positively associated with bonding social capital (Po and Hickey, 2020). Accordingly, it is likely that involvement in democratic decision-making promotes members' participation and commitment, thereby strengthening the ties between members (i.e. bonding social capital) and vice versa. This led us to test Hypothesis 3:

H3. Democratic decision-making capacity and social capital are positively correlated.

Fig. 1 illustrates our conceptual model of our three main hypotheses.

Our conceptual model treats collective food production as a monolithic block in which all organisations follow the same dynamics, and it is unlikely that this does justice to the different forms that collective food production may have. We began with the different gender models that community-supported agriculture and allotment gardens pursue. Historically, the allotment was male territory, where wives and children supported weeding and harvesting (Buckingham, 2005). By contrast, especially in the early days, females were the driving force behind the community-supported agriculture movement (DeLind and Ferguson, 1999), an argument for different gender effects in the two organisational forms.

Community-supported agriculture is also an institution founded with the motivation to increase cooperation between actors (Dezsény, 2013). The desire for "direct, cooperative relationships between producers and consumers" (Adam, 2006) remains the focus of many community-supported agriculture initiatives. Thus, this organisational setting has been labelled "commons prosumption" (Ritzel et al., 2022), which implies that common-pool resource management principles are manifested in collective forms of food production (and consumption). On the basis of formal and informal institutions, a limited number of agents (prosumers) may provide (prosume), in addition to food, functions such as community building or ecosystem services. With regard to this definition, allotment gardeners are closer to private prosumers than to common prosumers. Although allotment gardeners also need a certain degree of coordination to define and control joint rules for management (Breuste, 2010; Bartlomiejski and Kowalewski, 2019; Moskalonek et al., 2020), allotment gardens are often considered locations for individual recreation (Dus, 2015; Mokras-Grabowska, 2020) and therefore a purely private location. The lack of a primary motivation to link to and cooperate with others may distinguish allotment gardens from community-supported agriculture. In other words, the cooperative element of the institutional setting may be considered a necessary evil rather than a core constituent.

The potential impact of organisational involvement depends, of course, on the relevance of the organisation in which food production occurs. As the cooperative element is systematically stronger in community-supported agriculture compared to allotment gardens, it is plausible to formulate our next three hypotheses as follows:

H1a. The effect of social capital generation on the perceived benefits of collective food production is stronger for community-supported agriculture than for allotment gardens.

H2a. The effect of decision-making capacity on the perceived benefits of collective food production is stronger for community-supported agriculture than for allotment gardens.

H3a. The positive correlation between decision-making capacity and social capital is stronger for community-supported agriculture than for allotment gardens.

To address the role of gender, we leveraged the statement, "being male is negatively associated with the level of cooperation", originating from Molina et al. (2013), whose findings are consistent with those of Sibley et al. (1968), Tedeschi et al. (1969), Balliet et al. (2011) and Capraro (2018). If this is the case and the cooperative element in food

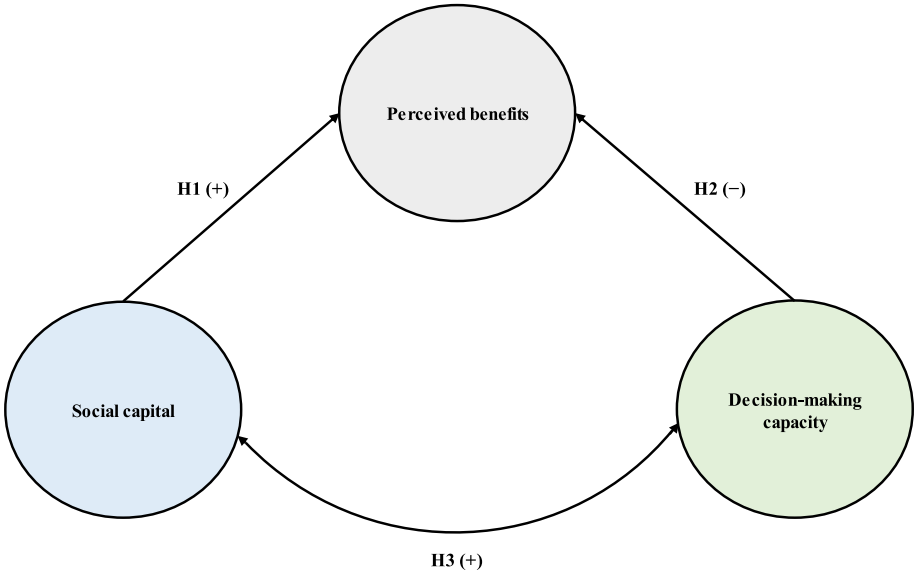

Fig. 1. Conceptual model of (i) the hypothesised positive relationship between social capital and perceived benefits (H1), (ii) the hypothesised negative relationship between members' decision-making capacity and perceived benefits (H2) and (iii) the hypothesised positive correlation between members' decision-making capacity and social capital (H3).

production is more important for females than for males, conclusions analogous to Hypothesis 2 can be drawn, which inevitably leads to the final three hypotheses:

H1b. The effect of social capital generation on the perceived benefits of collective social food production is stronger for females than for males.

H2b. The effect of decision-making capacity on the perceived benefits of collective social food production is stronger for females than for males.

H3b. The positive correlation between decision-making capacity and social capital is stronger for females than for males.

The empirical examination of these nine hypotheses aimed to provide systematic insights into the success factors of collective food production in different settings and for different genders.

3. Database and methods

3.1. Database for the quantitative analyses

The data for our empirical analyses were obtained from an online survey conducted amongst members of Swiss collective food production organisations (i.e. community-supported agriculture, allotment gardens, community gardens and other organisations) during December 2022 and January 2023. For this purpose, we conducted a web search of collective food production organisations in the German-speaking part of Switzerland. We then contacted these organisations through the e-mail addresses published on their websites. Our e-mail contained a brief description of the aim and content of the research project and a question about whether the organisations were interested in participating in the research project by distributing the survey to their members. In some cases, we had a personal exchange through phone calls, during which we provided additional information on the research project. We followed up by sending a letter of intent, which was signed by a contact person responsible for, for example, administrative tasks and/or public relations. Especially in organisations such as community-supported agriculture and community gardens, participation in the research project was a collective and democratic decision amongst the organisation's members. Before designing the online survey, we visited the project's participating organisations and conducted face-to-face interviews with 15 members to identify relevant topics. Finally, the contact person distributed the survey to members of the collective food production organisation through an internal e-mail list.

The online survey contained closed questions on (i) participation in an organisational form (without detailed information on the name and location of the organisation), (ii) perceived benefits, (iii) social capital, (iv) decision-making, (v) personal world views (e.g. on the state of the environment and climate change), (vi) financial motivators, (vii) gardening experience and (viii) socio-demographic characteristics (e.g. age, gender, education and citizenship). In total, 500 respondents participated in the online survey (allotment gardens: n = 197, community gardens: n = 28, community-supported agriculture: n = 242, other organisations: n = 19 and missing value/response: n = 14). Due to the low number of observations from members of community gardens and other organisations, we excluded these responses from the empirical analyses. We also excluded the responses that did not indicate the organisational form. Furthermore, due to the low number of observations, we excluded the responses indicating gender as diverse (n = 3) or with no answer regarding gender (n = 15). The binary gender variable covered 258 females and 163 males. Consequently, the final sample contained 421 observations. Table 1 shows the summary statistics of the variables considered for the empirical analyses.

Social capital was similarly measured based on four items on a 5-point Likert scale (i.e. from 1 = "completely disagree" to 5 = "completely agree"). How we measured social capital was closely related to bonding social capital (i.e. the strength of the ties between the members). Therefore, strong ties existed when (i) members felt well integrated in the organisation (Item 1.1), (ii) members found new friends within the organisation (Item 1.2), (iii) members met other

Table 1
Summary statistics of the variables considered for the empirical analyses.

Variable	Description	Scale	Mean	Std. dev.	Min.	Max.	Obs.
1. Social capital							
Item 1.1	I feel well integrated in my organisation.	From 1 = "completely disagree" to 5 = "completely agree"	4.6	0.7	1.0	5.0	421
Item 1.2	I regularly talk to the members of my organisation.	From 1 = "completely disagree" to 5 = "completely agree"	3.9	1.0	1.0	5.0	421
Item 1.3	I meet members of my organisation outside the organisational context.	From 1 = "completely disagree" to 5 = "completely agree"	2.6	1.4	1.0	5.0	421
Item 1.4	I have made new friends in the organisation.	From 1 = "completely disagree" to 5 = "completely agree"	3.1	1.3	1.0	5.0	421
2. Decision-making capacity							
Item 2.1	I can easily participate in decision-making processes within my organisation.	From 1 = "completely disagree" to 5 = "completely agree"	4.0	0.9	1.0	5.0	421
Item 2.2	I actively participate in the decision-making processes in my organisation.	From 1 = "completely disagree" to 5 = "completely agree"	3.3	1.3	1.0	5.0	421
Item 2.3	My organisation's decisions are transparent.	From 1 = "completely disagree" to 5 = "completely agree"	4.2	0.9	1.0	5.0	421
Item 2.4	My organisation makes decisions for me that I would rather make myself.	From 1 = "completely disagree" to 5 = "completely agree"	2.1	1.1	1.0	5.0	421
3. Perceived benefits							
Item 3.1	How beneficial for your own physical health (e.g. physical exercise) do you perceive your activities at your organisation to be?	From 0 = "non-beneficial" to 100 = "fully beneficial"	79.3	20.2	0.0	100.0	421
Item 3.2	How beneficial for your own mental health (e.g. stress relief) do you perceive your activities at your organisation to be?	From 0 = "non-beneficial" to 100 = "fully beneficial"	84.0	18.5	0.0	100.0	421
Item 3.3	How environmentally friendly do you perceive your gardening-related work at your organisation to be?	From 0 = "non-beneficial" to 100 = "fully beneficial"	89.1	13.7	20.0	100.0	421
Item 3.4	How healthy do you perceive the food you grow in your organisation to be?	From 0 = "non-beneficial" to 100 = "fully beneficial"	92.7	11.0	23.0	100.0	421
Item 3.5	How connected do you feel with nature while engaging in the activities at your organisation?	From 0 = "non-beneficial" to 100 = "fully beneficial"	86.3	15.6	22.0	100.0	421

members outside the organisation (Item 1.3) and (iv) members regularly talked to other members of the organisation (Item 1.4). In this context, it should be noted that we did not explicitly measure the relationships between different organisations (i.e. bridging social capital), nor did we measure shared norms, reciprocity, trust and trustworthiness as results of strong ties (Ostrom and Ahn, 2008).

Members' decision-making capacity was measured based on four items on a 5-point Likert scale (i.e. from 1 = "completely disagree" to 5 = "completely agree"). The four items referred to how easily members could participate in decision-making (Item 2.1), how actively they participated in decision-making (Item 2.2), how transparent the decisions were (Item 2.3) and whether the organisation made decisions for the members that they would rather make themselves (Item 2.4).

The perceived benefits were measured on a continuous scale ranging from 0 "non-beneficial" to 100 "fully beneficial". Technically, within the online survey, the respondents were asked to indicate their responses using a moveable slider. The items reflecting the perceived benefits referred to how beneficial activities within the organisation were for physical health (Item 3.1) and mental health (Item 3.2). Furthermore, the respondents had to indicate how environmentally friendly they perceived their work at the organisation to be (Item 3.3), how healthy they perceived the grown food (Item 3.4) and how connected they felt with nature while engaging in organisational activities (Item 3.5). A description of our sample's socio-demographic characteristics is shown in Table 2.

3.2. Methods

3.2.1. Grounded theory approach and latent variable development

Before designing the online survey, we conducted face-to-face interviews with 15 members of the organisations participating in the project in a grounded theory approach. Grounded theory is a systematic approach to developing an inductively derived theory that focuses on a concrete phenomenon (Corbin and Strauss, 1990). It is constructed based on the systematic analysis of empirical data (Charmaz, 2015). Whereas Corbin and Strauss (1990) consider grounded theory to be a predominantly qualitative research approach, Glaser and Holton (2007) note that any kind of data can be used, even quantitative data. Combining quantitative and qualitative data for triangulation and facilitating the verification of results (Corbin and Strauss, 2008) is a promising approach for potentially enhancing the understanding of relevant topics in collective food production.

A grounded theory approach allowed us to gain deeper insights into the relevant topics of collective food production. We followed the strategy of theoretical sampling suggested by Glaser and Holton (2007). In the interviews, the topic of allotments or community-supported agriculture was approached as broadly as possible without any pre-structured guidelines. This allowed the respondents to raise issues they considered important. In an iterative process, we switched between data collection and analysis until theoretical saturation occurred. To analyse the qualitative data, we used the flexible coding suggested by Deterding and Waters (2021). In general, coding as a qualitative data analysis technique focuses on data reduction by segmenting, categorising, summarising and reconstructing the qualitative data gathered to capture important information (Given, 2008). As flexible coding is a technology-based approach to analysing qualitative data, we used the MAXQDA software. In accordance with the research proposal for this project, the qualitative findings of the grounded theory approach only served to inform the design of the survey for members engaged in collective food production. Consequently, the qualitative findings were unavailable to the authors of this paper when discussing the quantitative results.

Given that we developed new latent (unobserved) variables for this study, we also had to consider their relevance and quality (Taber, 2017). For this purpose, we computed Cronbach's alpha coefficient to assess the internal consistency of the scale of the three latent variables (i.e. social capital, decision-making capacity and perceived benefits) with their underlying items (Table 3).

In principle, the Cronbach's alpha coefficient ranges between 0 and 1. However, when items are negatively correlated with others on the scale, the coefficient can be negative. In the scientific literature, a wide range of alpha coefficient labels exist (e.g. acceptable, sufficient, good, high and fairly high), and there is no common consensus regarding the threshold of alpha coefficient quality (Taber, 2017). For instance, DeVellis (2003) labels a coefficient ranging between 0.65 and 0.7 as "minimally acceptable" and a coefficient ranging between 0.7 and 0.8 as "acceptable". By contrast, according to Streiner (2003), a coefficient greater than or equal to 0.6 and smaller than 0.7 can be labelled "acceptable", whereas a coefficient greater than or equal to 0.7 and smaller than 0.9 can be labelled "good". Accordingly, we considered our three latent variables with their underlying items to be reliable.

3.2.2. Quantitative analyses of the survey data

To identify differences in the mean values of the items presented in Table 1 amongst the groups (i.e. allotment gardens vs. community-supported agriculture and females vs. males), we used Stata's MANOVA command in combination with the multivariate regression command. MANOVA is a generalisation of the analysis of variance and covariance (ANOVA) that allows multiple dependent variables. In this context, all the items presented in Table 1 served as dependent variables, and the binary variables of gender (i.e. female = 1 and male = 2) and organisational form (i.e. allotment gardens = 1 and community-supported agriculture = 2) were the grouping variables. The multivariate regression command was used to display the coefficients, standard errors, *t*-statistics, *p*-values and confidence intervals underlying the previous MANOVA. MANOVA relies on the assumptions that (i) data from all groups have a common variance-covariance matrix (i.e. the homogeneity assumption) and (ii) the residuals are normally distributed (i.e. the normality assumption). By using the multivariate test of means command, we found that both assumptions were violated. Consequently, in line with Konietschke et al. (2015), we estimated the MANOVA with bootstrapped coefficients.

To test the hypotheses related to the overall conceptual model presented in Fig. 1 (i.e. the pooled model) and to identify differences amongst groups simultaneously (i.e. the grouped model variants), we used SEM. This multivariate technique is widely used in the social sciences for theory development and testing (Manhas et al., 2016). In principle, a structural equation model comprises the following two models: The first is a measurement model in which latent or unobserved variables (depicted as circles) are estimated based on the variance and covariance of the observed items (depicted as boxes), whereby single-headed arrows indicate the factor loadings (i.e. the coefficients of the measurement model). The second is a structural model in which the causal relationships (i.e. the paths) between the latent variables are estimated. In this context, single-headed arrows depict the estimated regression coefficients, and double-headed arrows estimate the correlations between the latent variables from the causal structural model (Hair et al., 2021). Consequently, a structural equation model represents theory-based causal relationships between latent variables and between those latent variables and their underlying observed items (Hayduk et al., 2007). According to Ritzel et al., (2020), in SEM, the term "causal structural model" is somewhat misleading. Rather, "causal structural model" captures the intent of the research methodology, which is to hypothesise and specify the interrelatedness of latent variables. Thus, SEM is a confirmatory method aimed at testing the proposed theories.

Fig. 2 shows the applied structural equation model. Perceived benefits represents an endogenous latent variable requiring an error term, whereas decision-making capacity and social capital represent exogenous latent variables. Accordingly, for the relationship between social capital and perceived benefits and for the relationship between decision-making capacity and perceived benefits, we estimated regression coefficients. The relationship between decision-making and social capital

Table 2
Summary statistics of the respondents' socio-demographic characteristics.

Variable	Description	Scale	%	Mean	Std. dev.	Min.	Max.	Obs.
Citizenship		Binary: 1 = Swiss; 0 = other		0.9	0.3	0.0	1.0	421
Age		Continuous		50.4	14.3	24.0	86.0	420
Gender		Binary: 1 = female; 0 = male		0.6	0.5	0.0	1.0	421
Work status		Nominal						418
		1 = employed/self-employed	71.0					
		2 = retired	19.2					
		3 = unemployed	1.7					
		4 = vocational training	0.7					
		5 = study or school without part-time job	0.9					
		6 = study or school with part-time job	2.4					
		7 = other	3.6					
Living conditions		Ordinal						421
		1 = village (up to 5000 inhabitants)	16.6					
		2 = town (5000–20,000 inhabitants)	15.2					
		3 = medium-sized city (20,000–100,000 inhabitants)	20.7					
		4 = large city (above 100,000 inhabitants)	47.5					
Political scale	Where do you place yourself on the left–right political scale?	Continuous: From 0 "left" to 100 "right"		30.4	21.7	0.0	100.0	421
Gardening experience	We would like to know the extent to which you grew up with an access to a garden	Ordinal						
		1 = regular access	66.8					
		2 = sometimes access	15.9					
		3 = rarely access	10.9					
		4 = never access	6.4					

Table 3
Cronbach's alpha coefficients for the three latent variables and their underlying items.

Latent variable and underlying items	Cronbach's alpha coefficient
1 Social capital: Items 1.1–1.4	0.746
2 Decision-making capacity: Items 2.1–2.4	0.684
3 Perceived benefits: Items 3.1–3.5	0.724

represents a correlation. For the interpretation of the strength of the correlation coefficients, we referred to Asuero et al. (2007). We also conducted a sensitivity analysis, in which we controlled for the effects of the respondent's socio-demographic characteristics (i.e. citizenship, age, gender, work status, living conditions, political scale and gardening experience) on perceived benefits. As we were mainly interested in the relationships between the latent variables, we did not interpret and discuss the results for socio-demographic characteristics.

We used Stata's generalised SEM command to fit the applied structural equation model presented in Fig. 2 (StataCorp, 2025). The coefficients of the measurement models and the structural model were estimated based on maximum likelihood with robust standard errors. To identify differences between groups (i.e. allotment gardens vs. community-supported agriculture and females vs. males[1]), we specified the group option and allowed intercepts and coefficients to vary across groups. Therefore, in this multiple-group generalised structural equation model, we fitted the same model for different groups (StataCorp, 2025). To examine whether the coefficients across the groups were equal, we performed the Wald test. The null hypothesis of the Wald test is that the difference between the two coefficients is equal to zero.

In contrast to Stata's SEM command, which only relies on the Gaussian distribution family and the identity function (i.e. linear regression), generalised SEM does not provide standardised coefficients and overall model fit criteria, such as the root mean square error of approximation, comparative fit index and Tucker–Lewis index. These criteria are based on the assumption of the joint normality of the observed items, which is not a reasonable assumption for generalised SEM. Different model variants (i.e. the pooled model without grouping vs. models with grouping) can be compared using comparative model fit criteria, such as Akaike's information criterion (AIC) and Schwarz's Bayesian information criterion (BIC). The empirical analyses were conducted using Stata version 18.

[1] Note: In the grouped model variant of females versus males, the gender variable was not considered as a predictor of perceived benefits.

4. Empirical results and discussion

In Subsection 4.1, we separately present the results of the group differences in the observed items based on the MANOVA (Subsection 4.1.1) and for the relationships between the latent variables based on the SEM (Subsection 4.1.2). In Subsection 4.2, we discuss the empirical results for both the group differences in the observed items (Subsection 4.2.1) and the relationships of the latent variables (Subsection 4.2.2) by bringing them into the context of the related literature.

4.1. Empirical results

4.1.1. Group differences in the observed items

Table 4 presents the results of the mean differences (MDs) for items referring to (1) social capital, (2) decision-making capacity and (3) perceived benefits between allotment gardens and community-supported agriculture based on MANOVA.

For the items measuring social capital, the findings revealed two statistically significant differences in the mean values between the two organisational forms. First, the allotment gardeners showed a lower degree of agreement regarding being well integrated in the organisation than the members of community-supported agriculture initiatives (MD $= -0.3$, $p = 0.000$). Second, the allotment gardeners revealed a higher degree of agreement with regard to making new friends in the organisation than did the members of community-supported agriculture initiatives (MD $= +0.3$, $p = 0.015$). For the two items "regularly talk to members" and "meet members outside the organisation" we found no statistically significant MDs between the two organisational forms.

The MANOVA results revealed that the allotment gardeners showed a lower degree of agreement regarding ease of participation in

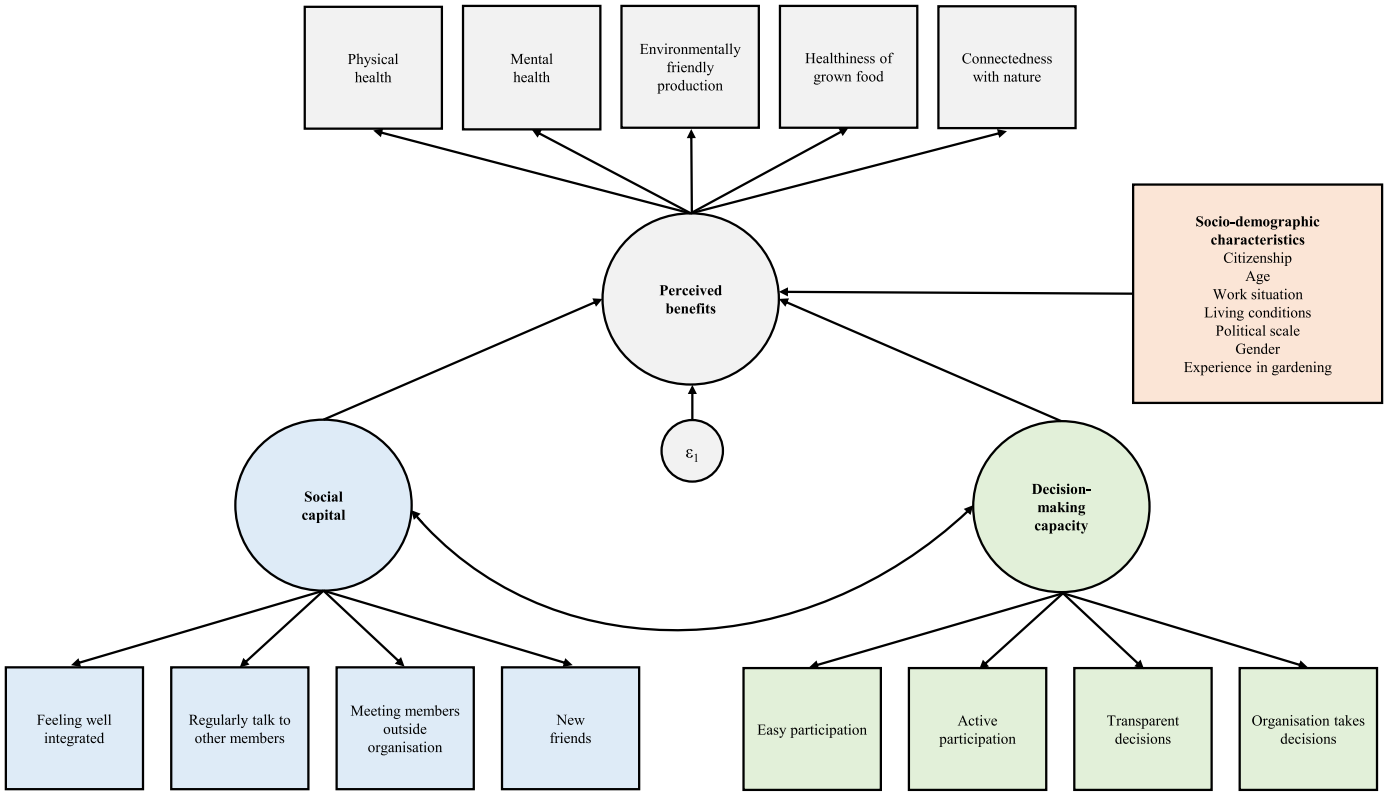

Fig. 2. The applied structural equation model.

Table 4
Results of mean differences for items referring to (1) social capital, (2) decision-making capacity and (3) perceived benefits between allotment gardens and community-supported agriculture based on MANOVA.

Item	Mean value allotment garden members	Mean value community-supported agriculture members	Mean difference	*p*-value
1. Social capital				
1.1 Well integrated	4.4	4.7	−0.3	0.000
1.2 Regularly talk to members	4.0	3.8	+0.2	0.146
1.3 Meet members outside organisation	2.6	2.7	−0.1	0.725
1.4 New friends	3.3	3.0	+0.3	0.015
2. Decision-making capacity				
2.1 Easily participate	3.7	4.3	−0.6	0.000
2.2 Actively participate	3.3	3.3	0.0	0.857
2.3 Transparent decisions	3.8	4.5	−0.7	0.000
2.4 Organisation makes decisions	2.6	1.7	+0.9	0.000
3. Perceived benefits				
3.1 Physical health	85.9	73.9	+12.0	0.000
3.2 Mental health	89.8	79.2	+10.6	0.000
3.3 Environmentally friendly	85.5	92.1	−6.6	0.000
3.4 Healthiness of food	89.6	95.2	−5.6	0.000
3.5 Connection with nature	90.1	83.2	+6.9	0.000

organisational decision-making processes than the members of community-supported agriculture initiatives did (MD = −0.6, p = 0.000). We found no statistically significant difference in the degree of agreement on active participation between the two groups (MD = 0.0, p = 0.857). Regarding the transparency of organisational decisions, the allotment gardeners exhibited a statistically significant lower degree of agreement compared to the members of community-supported agriculture initiatives (MD = −0.7, p = 0.000). For the items on which the respondents were asked to agree whether their organisation made a decision that the members would rather make themselves, the MANOVA results showed a statistically significant positive difference in mean values between the members of allotment gardens and the members of community-supported agriculture organisations (MD = +0.9, p = 0.000).

Regarding the perceived benefits of engagement in organisational activities, the results revealed that the allotment gardeners rated perceived benefits for physical health (MD = +12.0, p = 0.000) and mental health (MD = +10.6, p = 0.000) higher than did the members of community-supported agriculture initiatives. In contrast, the allotment gardeners rated the perceived benefits for the environment of their work as lower than did the members of community-supported agriculture initiatives (MD = −6.6, p = 0.000). Similarly, we observed a statistically significant lower rating by the allotment gardeners regarding the perceived healthiness of the grown food compared to the community-supported agriculture members (MD = −5.6, p = 0.000). Finally, the allotment gardeners recorded a statistically significant higher rating for the item capturing the connection with nature while engaging in organisational activities than did the members of community-supported agriculture (MD = +6.9, p = 0.000).

Table 5 shows the results of the MDs for items referring to (1) social capital, (2) decision-making capacity and (3) perceived benefits between females and males based on MANOVA.

In the realm of social capital, the MD for the item reflecting the degree of agreement regarding being well integrated in the organisation

Table 5
Results of mean differences for items referring to (1) social capital, (2) decision-making capacity and (3) perceived benefits between females and males based on MANOVA.

Item	Mean value females	Mean value males	Mean difference	*p*-value
1. Social capital				
1.1 Well integrated	4.6	4.5	+0.1	0.573
1.2 Regularly talk to members	3.8	4.0	−0.2	0.090
1.3 Meet members outside organisation	2.5	2.9	−0.4	0.000
1.4 New friends	3.1	3.3	−0.2	0.084
2. Decision-making capacity				
2.1 Easily participate	4.0	4.1	−0.1	0.570
2.2 Actively participate	3.3	3.4	−0.1	0.101
2.3 Transparent decisions	4.2	4.1	+0.1	0.371
2.4 Organisation makes decisions	2.0	2.3	−0.3	0.040
3. Perceived benefits				
3.1 Physical health	78.7	80.3	−1.6	0.320
3.2 Mental health	84.7	82.8	+1.9	0.257
3.3 Environmentally friendly	90.1	87.5	+2.6	0.069
3.4 Healthiness of food	93.1	92.1	+1.0	0.353
3.5 Connection with nature	86.7	85.6	+1.1	0.550

was statistically non-significant between the females and males. Compared to the males, the females exhibited a statistically significant lower degree of agreement regarding whether they regularly talked to other members (MD = −0.2, $p = 0.090$). Similarly, the females showed a statistically significant lower degree of agreement for the two items "meet members outside the organisation" (MD = −0.4, $p = 0.000$) and "new friends" (MD = −0.2, $p = 0.084$).

With regard to decision-making capacity, we found statistically non-significant MDs for the items "easily participate", "actively participate", and "transparent decisions". The MANOVA results revealed only a slightly lower degree of agreement amongst the females on whether the organisation made decisions for members that they would rather make themselves compared to the males (MD = −0.3, $p = 0.040$).

Regarding perceived benefits, for four out of five items, the results revealed statistically non-significant MDs between the genders. Only for the perceived benefits of the activity for the environment did we observe a statistically significant higher rating for the females (MD = +2.6, $p = 0.069$).

4.1.2. Relationships between the latent variables

Table 6 presents the results of the applied structural equation model. The pooled model did not consider group differences, whereas the model variant Grouped-1 captured differences in estimated coefficients between the allotment gardens and the community-supported agriculture initiatives, and the model variant Grouped-2 captured differences in estimated coefficients between the females and the males. The comparative model fit criteria AIC and BIC revealed that the model variant Grouped-1 fit our data best. The results of the SEM sensitivity analysis, which also considered the effect of the respondent's socio-demographic characteristics on perceived benefits, can be found in Table A1 in the Appendix. The signs and statistical significance levels of the SEM coefficients were mostly in line with those of the main model presented in Table 6. For four out of five model variants, the relationship between social capital and perceived benefits remained statistically significantly positive. For all model variants, we observed a statistically significant positive correlation between social capital and decision-making capacity. A change in the significance levels of the SEM coefficients in the sensitivity analysis was likely due to a relatively low number of observations and a substantially higher number of model coefficients.

As expected, we found a statistically significant positive effect of social capital on perceived benefits. This implies that the higher the degree of social capital within allotment gardens and community-supported agriculture initiatives, the higher the perceived benefits for, for example, mental and physical health. Accordingly, based on these empirical results, we could not reject H1. We hypothesised a negative relationship between decision-making capacity and perceived benefits. For the pooled results, a statistically significant negative relationship was confirmed. Therefore, we could not reject H2. We observed a moderate and statistically significant positive correlation between decision-making capacity and social capital, implying that both latent variables reinforced each other. In other words, the higher the involvement of allotment gardeners and members of community-supported agriculture in organisational decision-making processes, the stronger the social capital and vice versa. Accordingly, we could not reject H3.

For the model variant that captured differences in the estimated coefficients between allotment gardens and community-supported agriculture initiatives, we found the expected statistically significant positive effect of social capital on perceived benefits. Although at first glance the coefficient magnitudes seemed to differ between allotment gardens and community-supported agriculture, the null hypothesis of the Wald test could not be rejected. Accordingly, as the estimated effect of social capital on perceived benefits was not stronger for community-supported agriculture than for allotment gardens, we rejected H1a. For both organisational forms, we found a statistically non-significant negative effect of decision-making capacity on perceived benefits. For both groups, the estimated coefficients were close to zero. As the null hypothesis of the Wald test could not be rejected, we had to reject H2a. Therefore, as expected, the effect of decision-making capacity on the perceived benefits of collective social food production was not stronger for community-supported agriculture than for allotment gardens. For both organisational forms, the empirical findings revealed a statistically significant positive correlation between decision-making capacity and social capital. Although we observed a high positive correlation between decision-making capacity and social capital for allotment gardens, the correlation between the two latent variables for community-supported agriculture was considered low. Consequently, the null hypothesis of

Table 6
Results of the applied structural equation model.

Path	Pooled	Grouped-1		Grouped-2	
		Allotment gardens	Community-supported agriculture	Females	Males
Social capital → perceived benefits	0.119*** (0.033)	0.040* (0.022)	0.134** (0.065)	0.112*** (0.040)	0.124*** (0.047)
Decision-making capacity → perceived benefits	−0.012* (0.007)	−0.002 (0.010)	−0.004 (0.012)	−0.013 (0.010)	−0.013* (0.008)
Decision-making capacity ↔ social capital	0.508*** (0.064)	0.718*** (0.068)	0.460*** (0.102)	0.445*** (0.088)	0.619*** (0.085)
Observations	421	189	232	258	163
Akaike information criterion	26,250	25,570		26,253	
Bayesian information criterion	26,465	25,986		26,686	

Notes: ***, ** and * denote significance at 1 %, 5 % and 10 % respectively. Robust standard errors are in parentheses.

the Wald test could not be rejected. However, as we expected a stronger positive correlation for community-supported agriculture than for allotment gardens, we rejected H3a.

As expected, for both the females and the males, the effect of social capital on perceived benefits was statistically significantly positive. However, the null hypothesis of the Wald test could not be rejected, as the magnitudes of the group-specific estimators were not statistically significantly different from each other. Therefore, we had to reject H1b. For the males, the results exhibited a statistically significant negative effect of decision-making capacity on perceived benefits. By contrast, for the females, the effect was statistically non-significant. For both groups, the magnitudes of the estimated coefficients were equal; thus, the null hypothesis of the Wald test had to be rejected, which also led to the rejection of H2b. For the females and the males, we found a statistically significant positive correlation between decision-making and social capital. Whereas for the group of females, the positive correlation was considered low, the positive correlation for the group of males was moderate. Owing to differences in the strength of the correlation, the null hypothesis of the Wald test was rejected. However, as we expected a stronger positive correlation between decision-making and social capital for females, we rejected H3b. Based on these findings, H1, H2 and H3 could not be rejected. The other hypotheses were rejected.

4.2. Discussion

4.2.1. Group differences between the observed items

Although the members of the community-supported agriculture organisations surveyed in this study showed a higher agreement with feeling well integrated in the organisation than the allotment gardeners, for both organisational forms, the agreement levels were high. Similarly, communication with other members of the organisation was considered very important. The allotment gardeners seemed to be likelier to find new friends within the organisation than the members of community-supported agriculture organisations, although for both organisational forms, social exchanges took place within the organisational context. For allotment gardens and community-supported agriculture initiatives, social capital and community experience can be considered the main motivational factors for engagement (Brehm and Eisenhauer, 2008; Christensen et al., 2018). However, at least for allotment gardens, it is not a new insight that social exchange does not go beyond system boundaries (Resler et al., 2022).

The MANOVA results indicated that organisational decision-making processes within the community-supported agriculture initiatives opened themselves more for participation than the allotment gardens did and that decisions were more transparent. Moreover, the freedom to make decisions seemed to be greater in the community-supported agriculture initiatives than in the allotment gardens. These findings suggest potential differences in governance structures between community-supported agriculture organisations and allotment gardens. Although community-supported agriculture initiatives are heterogeneous with regard to governance structures, especially within newly evolved forms of community-supported agriculture, democratic self-governance should be considered a central pillar. These forms of community-supported agriculture are organised as cooperatives that guarantee each member one vote (Degens and Lapschieβ, 2023). In contrast, allotment gardens are institutionally administered and tightly organised as associations (Drescher et al., 2006). For instance, Germany has country-wide rules concerning the utilisation of land, behaviour in allotment gardens and estates and community-building activities (Breuste, 2010). Concerning the rating of mental and physical health and connectedness with nature as perceived benefits, we observed substantial differences between the allotment gardens and community-supported agriculture. Here, the results from a meta-analysis underpin the benefits of gardening activities for health outcomes, such as reductions in anxiety, depression and body mass index (Saga et al., 2017). Similarly, connectedness with nature positively impacts people's health (Oh et al., 2022). Moreover, differences in perceived health benefits and connectedness with nature are plausible, as our sample likely covered community-supported agriculture projects in which members were either less involved or not involved in the food production. By contrast, the members of the community-supported agriculture initiatives in our sample perceived their gardening-related work as more environmentally friendly and the food produced as healthier than the allotment gardeners did. These findings might be explained by differences in food production practices. Community-supported agriculture projects mainly practise organic agriculture (Zoll et al., 2023), and in some cases, these agricultural practices exceed basic organic standards (Medici et al., 2021). Due to environmentally friendly production and thereby pesticide residue-free fresh produce, consumers perceive organic foods as healthier than conventional foods (Suciu et al., 2019). In many allotment garden associations, the use of chemical pesticides and fertilisers is prohibited. However, the rules are typically neither followed nor policed (Jahrl and Home, 2014; Haase and Gaeva, 2023).

It is not a radically new insight that, even in modern societies, gender inequalities still exist with regard to, for example, earnings (Bishu and Alkadry, 2017) and holding leadership positions (Hamplová et al., 2022). Interestingly, we found that in collective food production, gender differences largely seemed to be absent. While we aim to carefully discuss the results, it should be noted that we did not include gender-specific items in the survey and that the final sample comprised a higher proportion of females than males (61 % of respondents were female and 39 % were male). The incorporation of gender-specific items and a gender-balanced panel of respondents might have yielded divergent outcomes. Nevertheless, only for 5 out of 13 items did we find gender differences. The males showed a slightly higher degree of agreement regarding the item "My organisation makes decisions for me that I would rather make myself" than the females. Compared to the females, the males exhibited a higher social dominance orientation, implying that they would rather not subordinate themselves to the decisions someone else made (Schmitt and Wirth, 2009).

Surprisingly, the findings from the MANOVA indicated that the males seemed to be slightly more active in creating social capital than the females. However, studies investigating the relationship between gender and social capital creation have revealed that females are often more engaged in informal network-building activities (i.e. social interaction and communication) than males (Healy et al., 2007). Since cooperative institutions provide more of a formal frame for social capital generation than an informal one, it may be a more useful opportunity for males than for females.

In this study, the females perceived their gardening-related work as slightly more environmentally friendly than the males did. A broad variety of research has already demonstrated that females have a stronger preference for adopting and practising pro-environmental behaviours (De Silva and Pownall, 2014; Swim et al., 2020). However, at least in the context of community-supported agriculture, gender stereotypes regarding pro-environmental behaviours seem to be transcendent. This implies that males also adopt care practices, such as reducing or eliminating chemical usage, encouraging or accepting beneficial insects and wildlife, building soil and creating resource management partnerships with shareholder members (Wells and Gradwell, 2001).

4.2.2. Relationships between the latent variables

Studies focusing on collective food production have emphasised the importance of bonding and bridging social capital in terms of their appeal (see e.g. Christensen et al., 2018; Verdena et al., 2022). Informal exchange through, for example, face-to-face interactions during leisure activities and an absence of socioeconomic hierarchies creates bonding social capital, while the perception of society as an inclusive, diverse space facilitates bridging social capital. Social events such as parties, concerts, cooking workshops and art exhibitions enable face-to-face interaction between members, as well as between members and

people potentially interested in joining the organisation. To enhance the visibility of these activities, both inside and outside the organisation, effective and efficient communication strategies are indispensable. In this context, Furness et al. (2022) recommend using a variety of communication channels, such as social media, WhatsApp groups, face-to-face meeting points and volunteering opportunities. Against this background, creating bonding social capital may prevent members from leaving the organisation because the benefits are perceived more positively, whereas fostering bridging social capital may enable the organisation to attract new members. Although extensive research on the factors affecting social capital already exists, the potential positive correlation between social capital and perceived benefits has, surprisingly, not yet been addressed in the scientific literature.

For all model variants, the SEM findings indicated the positive impact of (bonding) social capital on perceived benefits. Our findings are in line with other research revealing a positive link between social capital and perceived benefits (Diedrich et al., 2017; Parker et al., 2022). To understand the mechanism behind this link, we refer to Sarracino (2010), who found a positive impact of social capital on personal well-being (i.e. a satisfactory and desirable state of life). Personal well-being might, in turn, increase the perception of benefits. Although our research did not aim to capture the mediating effect of personal well-being on perceived benefits, future research could empirically investigate its direction and magnitude. For both grouped model variants, the SEM findings indicated that the magnitude of the estimated effect of social capital on perceived benefits did not differ between organisational forms or gender. With regard to differences between organisational forms, these results imply that our sample likely covered community-supported agriculture forms in which the level of cooperation and involvement in collective food production was low or on levels similar to those in allotment gardens. With regard to gender differences, we could not confirm previous findings that males are likelier to exhibit selfish and non-cooperative behaviour (see, e.g. Molina et al., 2013) in these cooperative food production settings.

For the pooled model variant, we found a negative relationship between decision-making capacity and perceived benefits. Being involved in self-organised and democratic decision-making processes was associated with democratic decision-making and influence costs. Democratic costs comprise (i) costs to provide incentives for members to participate in the collective decision-making process, (ii) costs that result from a conflict of interest amongst members and (iii) costs resulting from attempts to manage or prevent these conflicts (Pozzobon and Zylbersztajn, 2013). Influence costs arise, for example, when members engage in lobbying activities or information provision that distort decision-making to their benefits (Iliopoulos and Cook, 2023). This implies that a high decision-making capacity can be associated with high democratic and influence costs, which in turn reduce the perceived benefits of organisational activities. This is close to Ostrom's (2015) distinction between the costs of the time and effort required to devise and agree on new rules, the adoption of new appropriation strategies and the monitoring and maintenance of a self-governing system over time, at least much closer than to Hausmann's (1988) system of costs of market contracting and costs of ownership. The negative effect of decision-making capacity on perceived benefits remained for the two grouped model variants (i.e. allotment gardens vs. community-supported agriculture and females vs. males). However, only for males in the Grouped-2 model variant was the negative effect statistically significantly negative.

The positive correlation between social capital and decision-making capacity can also be explained by the concept of democratic decision-making costs (Pozzobon and Zylbersztajn, 2013). It is likely that the time invested in community building is the background variable. This implies that the more deeply members become involved in the operational and strategic affairs of the collective organisation, the more they will encounter other members. Accordingly, both democratic decision-making costs and social capital reinforce each other. In other words, a high level of social capital might cause conflicts in decision-making processes. Democratic decision-making costs seemed to be higher in the allotment garden associations than in the community-supported agriculture initiatives, causing social capital to increase and vice versa. Again, this result might be considered confirmation that our sample likely covered organisational forms of community-supported agriculture in which the level of cooperation is low. The stronger correlation between social capital and decision-making capacity for the males indicates that they exhibited higher democratic decision-making costs, leading to higher levels of social capital and vice versa.

5. Conclusions and practical implications

The main aim of this study was to investigate how social capital affects the perceived benefits of members engaged in allotment gardens and community-supported agriculture initiatives. However, due to limited data availability, we could not consider other popular forms of collective food production, such as community gardens, which prevented us from providing a broader picture of the collective food production landscape in Switzerland. Nevertheless, our empirical findings unequivocally indicate that the two selected forms of collective food production have rightfully been labelled as such.

For nine out of ten model variants, the relationship between social capital and perceived benefits was statistically significantly positive. Thus, we found strong evidence of a positive relationship between social capital and the perceived benefits of the members. However, we did not find any effect differences between organisational forms or gender. By contrast, we found only marginal evidence that decision-making capacity negatively affects perceived benefits. Only for two model variants was the effect of decision-making capacity on perceived benefits statistically significantly negative. In collective forms of food production, decision-making is associated with democratic and influence costs. Whereas some members may consider democratic decision-making desirable, others may consider it a burden. Accordingly, in cases where decision-making capacity negatively affects perceived benefits, democratic costs should be reduced, especially for those who perceive a reduction in benefits. Members who do not want to participate in decision-making should not be subject to social pressure. Our findings also indicated that social capital and decision-making capacity were positively correlated, which was true for all model variants. Interestingly, the positive correlation was stronger for the allotment gardens than for the community-supported agriculture initiatives and stronger for the males than for the females. These results suggest that, compared to allotment gardens, community-supported agriculture initiatives need to catch up in terms of enriching decision-making events with informal events and that females need to be more involved in these events.

As social capital is an important prerequisite for organisational success, we recommend strengthening both bonding and bridging social capital. Although our empirical approach did not directly address bridging social capital, we recommend sharpening public perceptions of these organisations as inclusive and diverse spaces. This could make participation in collective food production more attractive. We recommend fostering social capital by organising social activities, such as parties, concerts, cooking workshops and art exhibitions, which enable face-to-face interaction. Moreover, these events could attract people not currently involved in collective food production. To achieve this, successful communication strategies must be developed and implemented to enhance visibility. Involving members in democratic decision-making processes could encourage their participation and commitment, thereby strengthening the ties between them. Therefore, we recommend complementing formal events at which decisions are made with informal gatherings, such as aperitif sessions. However, the way in which events that strengthen bonding and bridging social capital are communicated, planned and implemented is context-specific. In other words, what works for community-supported agriculture initiatives may not work for allotment gardens and vice versa. Furthermore, the extent to which

members are involved in planning and implementing community events may impact the development of social capital differently.

Gaining more knowledge regarding the efficiency and effectiveness of communication strategies and community events would be helpful for organisations in attracting people who are not engaged in collective food production and preventing the exit of those who are. Therefore, future research should examine the efficiency and effectiveness of communication strategies and community events in fostering bonding and bridging social capital in the context of collective food production. The more attractive these organisations are, the greater their contribution to the transformation of the food system towards more sustainable configurations.

CRediT authorship contribution statement

Christian Ritzel: Writing – original draft, Software, Investigation, Data curation, Visualization, Project administration, Funding acquisition, Conceptualization, Writing – review & editing, Validation, Methodology, Formal analysis. **Stefan Mann:** Writing – original draft, Investigation, Validation, Conceptualization, Writing – review & editing, Project administration.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix

Table A1
Results of the SEM sensitivity analysis with respondent's socio-demographic characteristics as predictors of perceived benefits.

Path	Pooled	Grouped-1		Grouped-2	
		Allotment gardens	Community-supported agriculture	Females	Males
Social capital → perceived benefits	0.094*** (0.033)	0.019* (0.012)	0.129 (0.093)	0.098** (0.046)	0.073* (0.038)
Decision-making capacity → perceived benefits	−0.009 (0.007)	0.006 (0.007)	−0.020 (0.055)	−0.013 (0.013)	−0.010 (0.010)
Decision-making capacity ↔ social capital	0.514*** (0.071)	0.731*** (0.061)	0.711*** (0.062)	0.479*** (0.102)	0.640*** (0.088)
Socio-demographics → perceived benefits					
Citizenship (1 = Swiss; 0 = other)	0.031 (0.051)	−0.047* (0.027)	0.077 (0.082)	0.091 (0.067)	−0.044 (0.065)
Age	0.003** (0.001)	0.002 (0.001)	0.003 (0.002)	0.004* (0.002)	0.003* (0.002)
Gender (1 = female; 0 = male)	0.062** (0.025)	0.031* (0.017)	0.108** (0.46)		
Work status (Ref.: Employed/self-employed)	0.003 (0.043)	−0.055** (0.026)	0.074 (0.082)	0.013 (0.061)	−0.012 (0.054)
Retired					
Unemployed	0.014 (0.084)	−0.106* (0.059)	0.277 (0.175)	−0.013 (0.072)	0.010 (0.100)
Vocational training	0.118** (0.046)	−0.000 (0.020)	0.125 (0.086)	0.119** (0.048)	
Study or school without part-time job	0.119* (0.064)	−0.041 (0.074)	0.181 (0.144)	0.130 (0.095)	0.025 (0.070)
Study or school with part-time job	0.019 (0.054)	−0.047 (0.047)	0.030 (0.079)	0.043 (0.081)	0.008 (0.049)
Other	−0.165* (0.085)	−0.099** (0.050)	−0.322* (0.184)	−0.227* (0.119)	−0.072 (0.074)
Living conditions (Ref.: Village/rural area)					
Town	0.027 (0.044)	−0.042 (0.040)	0.017 (0.064)	0.012 (0.059)	0.020 (0.066)
Medium-sized city	0.092** (0.037)	−0.040 (0.026)	0.158*** (0.059)	0.136*** (0.049)	0.016 (0.058)
Large city	0.059* (0.036)	−0.004 (0.025)	0.048 (0.059)	−0.049** (0.051)	−0.014 (0.058)
Political scale	0.002*** (0.001)	0.002*** (0.001)	0.001 (0.001)	0.002** (0.001)	0.003*** (0.001)
Gardening experience (Ref.: Regular access)					
Sometimes access	−0.014 (0.027)	−0.005 (0.019)	−0.010 (0.048)	−0.049 (0.038)	0.023 (0.037)
Rarely access	−0.016 (0.042)	−0.052 (0.033)	0.021 (0.058)	−0.019 (0.051)	−0.024 (0.069)
Never access	−0.084 (0.083)	−0.002 (0.036)	−0.127 (0.146)	−0.154 (0.133)	0.30 (0.058)
Observations	418	187	231	255	163
Akaike information criterion	26,046	25,332		26,066	
Bayesian information criterion	26,325	25,877		26,607	

Notes: ***, **, and * denote significance at 1 %, 5 %, and 10 %, respectively. Robust standard errors are in parentheses.

Data availability

The quantitative data and codebook for this study are available at https://zenodo.org/record/14196252.

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