

## Collaboration for a more sustainable agriculture – when does it work?

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### **Abstract:**

Finding and implementing innovative solutions to sustainability problems in agriculture makes collaboration among farmers and other stakeholders indispensable. There has already been much work on conditions influencing success or failure of joint action in different contexts. However, aside from not providing insights specifically for collaboration in the context of sustainable agriculture, much of this research has been based on the investigation of one or few case studies. Other works have investigated more specifically collaboration in the context of sustainable agriculture. Yet, there is a lack of research on collaboration for sustainable agriculture that integrates insights in both internal and external factors for success and that assesses these factors against explicit and comprehensive success criteria. To fill these gaps, this research provides first results of a case survey of case studies of local or regional collaborative interventions in EU-countries that attempt to improve the sustainability of agriculture. The aim of this case survey is to identify which conditions contribute or hamper general success of such interventions. Specifically, the first eight coded case studies were analysed to explore existence and type of causal relations between the (long-lasting) success of an intervention and factors related to group composition and social capital among involved actors on the one hand and factors of organisation and management of these interventions on the other hand. Apart from indicating a range of factors that potentially have an effect on the success of collaborative interventions for a more sustainable agriculture, for a selection of these factors mechanisms were identified through which this influence on success may occur.

### **1. Introduction**

Finding and implementing innovative solutions to sustainability problems in agriculture makes collaboration among farmers and other stakeholders indispensable. On the one hand, cooperation has been identified as an important element of sustainable agriculture (Pretty, 1995; Bowler, 2002; Velten, Leventon, Jager, & Newig, 2015). On the other hand, addressing sustainability problems in agriculture often goes beyond technical fixes and requires systemic change, which includes for example changes in organisations, behaviour, and kinds of relations among stakeholders. Also for fostering such systemic innovations cooperation is a key factor (Cooke, Gomez Uranga, & Etxebarria, 1997). But under which conditions does cooperation lead to successful and long-lasting innovative solutions for sustainability problems in agriculture?

There has already been much research on why and under which circumstances joint action of different actors aiming at the achievement of a set of common goals is successful. Among these are literature on community-based natural resource management (CBNRM) (e.g. Measham & Lumbasi, 2013), collective action (e.g. Agrawal, 2001; Mills et al., 2011; Ramdwar, Ganpat, & Bridgemohan, 2013), social networks (e.g. Newman & Dale, 2007), advocacy coalitions (Schlager, 1995), partnerships (Dyer et al., 2013), and cooperatives (e.g. Azadi, Hoseinina, Zarafshani, Heydari, & Witlox, 2010). However, aside from not providing insights specifically for

collaboration in the context of sustainable agriculture, much of this research has been based on the investigation of one or few case studies. Although small-N case study research allows deep insights into causal mechanisms, it does not allow identifying overall patterns and generalizability of the results remains critical.

Other works have investigated more specifically collaboration in the context of sustainable agriculture. For instance, the SOLINSA project studied 17 Learning and Innovation Networks for Sustainable Agriculture (LINSAs) in Europe and explored how successful LINSAs can be supported effectively and efficiently (Moschitz et al., 2014). Another example is a study of the Sustainable Winegrowing Program (SWP) in Lodi, California, which assessed how effectiveness of this program depended on different social processes (Shaw, Lubell, & Ohmart, 2009). While SOLINSA mainly focusses on how success of LINSAs can be supported from the outside, the study of the SWP concentrates on the influence of internal social processes on the effectiveness of this sustainable partnership. Furthermore, in the SOLINSA project, it remains rather unclear what is considered a successful LINSA, whereas in the study of the SWP success/effectiveness of a sustainable partnership is rather narrowly understood as a positive influence of the partnership on wine growers' attitudes towards and adoption of sustainable practices. Thus, there is a lack of research on collaboration for sustainable agriculture that integrates insights in both internal and external factors for success and that assesses these factors against explicit and comprehensive success criteria.

To fill these gaps, a case survey of a larger number of case studies of local or regional collaborative interventions that attempt to improve the sustainability of agriculture may provide answers as to which internal and external conditions contribute or hamper general success of such interventions. This paper presents first and very preliminary results of such a case survey which compares cases from EU countries. These results are based on the first eight case studies that were analysed for the case survey. They provide insights about the effect of certain factors related to social capital, learning processes and management of innovation networks for sustainable agriculture on the long-lasting success of such networks.

In the following section, the methods used for the analysis are described in more detail followed by the presentation of the results. The subsequent discussion of these results is structured around, first, the question about which role social capital plays in cooperation for innovation for sustainable agriculture and, second, the question of how innovation networks for sustainable agriculture can be managed and which learning process take place within them. In the end, summarizing conclusions are drawn.

## **2. Methods**

This work is part of a greater research project that aims at evaluating which conditions contribute or hamper the success of collaborative interventions on the local and regional level which attempt to improve the sustainability of agriculture in their municipality, region, landscape etc. For the purpose of this project, a case survey is conducted. Case surveys integrate a relatively large number of qualitative case studies by transforming the qualitative into quantitative data and this way make them accessible to methods of quantitative analysis. This transformation is realized through the use of a predefined coding scheme and the expert judgement of coders. "Thus, case surveys draw on the richness of the case material, on different researchers and research designs, and allow for a much wider generalization than from single cases" (Newig & Fritsch, 2009, pp. 4–5).

In following the recommendations of Bullock & Tubbs (1987), Larsson (1993), and Newig & Fritsch (2009) for conducting a case survey, as a first step a definition of what would be considered a case was established in order to define criteria for selecting appropriate cases:

*A case is defined as an intervention (initiative, project, putting a legislation into practice etc.) which is realized on the local or regional level (i.e. any level above farm-level and below national level) and which aims at improving the sustainability of agriculture in the concerned locality or region and is carried out in any EU-country in collaboration of several actors. An intervention is considered to aim at the improvement of the sustainability of agriculture if it seeks simultaneous improvements or maintenance of an already good status quo in each of the sustainability areas (environmental, economic and social). This does not imply that such interventions have to place equal concern on each of these areas but that they must not neglect any of these areas. In other words: Interventions that aim at the improvement of the sustainability of agriculture may focus on only part of the areas but still need to pursue their objectives in these areas in a way that also benefits the remaining, non-focal areas.*

This definition is designed in a rather broad way and thus also allows cases to be included in the analysis that only seek incremental innovations to improve the sustainability of agriculture rather than trying to fully realize sustainable agriculture (which in itself is a highly contested concept). The main reasons for keeping such a broad definition is that “[i]ncremental innovation can be as successful as radical innovation as it is more likely to be adopted more widely at regime level.” (Moschitz et al., 2014, p. 20) As both incremental and radical change can advance the transition to sustainable agriculture, both are considered in this analysis.

Based on this definition, a comprehensive internet-based search for appropriate case studies was conducted using different search strategies, including for example searches in databases and snowballing. In a next step, all found publications were screened for usability in more detail. This procedure led to a final sample of 51 cases that met the case definition and that were described in sufficient detail in the available documents.

For the cross-analysis of these cases, a coding scheme was developed which allows the translation of the qualitative case descriptions into quantitative and statistically analysable data. For this coding scheme, related literature e.g. publications on farmer cooperatives, community based natural resource management, and collective action with relation to agriculture, rural development, or environmental and sustainability issues (see Table A1 in the annex) was reviewed for factors possibly influencing the success of an intervention. All factors found through this review were included in the coding scheme. They were transformed into variables, which ask to which extent a factor was present in a specific case. The answers to these questions are expressed in the form of a numeric code, mostly on an ordinal scale from 0 to 4. Additionally, the degree of reliability of information on which the judgement was based is coded for all variables, ranging from 0 meaning ‘insufficient information available’ to 3 meaning ‘explicit, detailed and reliable information available’.

In order to be able to evaluate if a factor has an effect on the success of a collaborative intervention for a more sustainable agriculture (CIMSA), the concept of success needed to be defined and decomposed and its elements needed to be integrated into the coding scheme (for more detail, see Velten, 2014). In this work, only three of these elements of success are considered. These are (1) the ambitiousness of the objectives of the intervention, (2) the degree of the achievement of the different objectives, and (3) the durability of the achievement of the objectives (which does not only consider for how much time an intervention has *de facto* existed

**Table 1:** Overview over the analysed cases (in the order of decreasing success if both success indicators are combined).

Case name	References	Country	Type of intervention	Level of the intervention	G(i)	D <sub>i</sub>
Gailtal Alp Cheese	Rytkönen & Gratzler, 2010, Borg & Gratzler, 2013; Gratzler, 2013	Austria	Establishment of a PDO	county	4	4
Graig Farm Network	Kirwan, Slee, & Vorley; Marsden & Smith, 2005	United Kingdom	Farmer network for organic meat	Cross-county	3.17	4
Tradice Bílých Karpat	Kučerová, Lošťák, & Zagata, 2007; Tisenkopfs, Kovách, Lošťák, & Šūmane, 2011	Czech Republic	Cooperation to support small-scale fruit growers	Landscape	3.03	4
Upländer Farmer Dairy	Knickel, Schaer, & Sprenger, 2003; Staub, 2008; Strauch, Schaer, Peter, Gountaras, & Knickel	Germany	Organic dairy farmer cooperative	Cross-county	3.39	3.5
Tablehurst and Plaw Hatch Community Farms	Pilley; Ravenscroft & Hanney, 2011; Ravenscroft, Moore, Welch, & Hanney, 2013	United Kingdom	CSA – two biodynamic farms owned by a citizen cooperative	municipality	3.44	3
BioPlus Berlin-Brandenburg	Segert & Zierke, 2004a, 2004b	Germany	Regional organic farming association	Subnational (federal state)	1.57	4
Zeeuwse Vlegel	Boef, de, 2000; Jongerden & Ruivenkamp, 2008; Oerlemans & Assouline, 2004; Wiskerke, 1995, 2003; Wiskerke & Oerlemans, 2004	The Netherlands	initiative for sustainable production and marketing of baking wheat	Subnational (province)	1.84	2.5
Allmende Kontor Tempelhof	Münnich, 2014; Wunder, 2013	Germany	Community garden	sub-municipality	3.25	1

but also includes an estimation of the probability that the intervention and/or its achievements will continue for a long time). However, ambitiousness of the objectives is not analysed separately but rather feeds into the evaluation of the degree of goal achievement in the form of a weighted mean of the goal achievement, i.e. the more ambitious a goal, the more its degree of achievement influences the score of total goal achievement. Thus, here two success indicators, total degree of goal achievement  $G(i)$  and durability of the achievement of the goals  $D_i$ , are applied.

After a pre-test of the coding scheme, the 51 usable case studies were coded in a pre-defined random order. Coding was done by the author and one additional researcher. The case studies were mainly coded by only one of the two coders. Some case studies were coded by both coders to keep understandings of the coding scheme aligned. In these cases the coding results were compared and codes that strongly deviated from each other (i.e. usually a difference of 2 or more between the codes) were discussed and adjusted where appropriate. The final coding values were integrated by taking the mean values.

In this work, very preliminary and tentative results are presented. For this purpose, only the coding results of the first eight coded cases were explored (see Table 1). Furthermore only a subset of 80 variables of the coding scheme was analysed. These were variables related to characteristics of the group of involved actors on the one hand and factors of organization and management of these interventions on the other hand. In a first step, correlation between each of these variables and 1) the degree of achievement of the goals  $G(i)$  and 2) the durability of the achievement of the objectives  $D_i$  was calculated using Spearman's rho. The results of this quantitative analysis were used to indicate which variables possibly have a causal relation with the success of an intervention. Thus, for a selection of those variables that showed a significant correlation with either of the success indicators the existence and nature of the relation was determined in a qualitative way through within-case analysis and counterfactual thinking.

### 3. Results

#### 3.1 Results of the correlation analysis

Table 1 Table 2 shows the correlation coefficients for those variables/factors that have a significant correlation ( $p < 0.1$ ) with either of the two success indicators as well as the kind of relation that literature suggests for these factors with the success of collaborative interventions (see Table A1 in the annex for references for the suggested relations).

**Table 2:** Influencing factors with significant correlations with degree of goal achievement  $G(i)$  or durability of goal achievement  $D_i$

Independent variables / influencing factors	Spearman's rho		Relation suggested in the literature between a factor and the success of an intervention
	Achievement of the goals $G(i)$	Durability of goal achievement $D_i$	
<b>Characteristics of the group of involved actors</b>			
<i>Composition of the group</i>			
Group heterogeneity (change)	-0.8332**	-0.0328	+/-
Group heterogeneity (end)	0.0123	-0.7847**	
Group size (beginning)	0.2857	-0.7042*	+/-

Independent variables / influencing factors	Spearman's rho		Relation suggested in the literature between a factor and the success of an intervention
	Achievement of the goals G(i)	Durability of goal achievement D <sub>i</sub>	
<i>Social Capital</i>			
Pre-existing relations	0.7619**	0.2156	+/-
Shared norms (beginning)	-0.2561	0.7565**	+
<b>Factors related to the management of the intervention</b>			
<i>Rules and objectives</i>			
Explicit and defined objectives	-0.0137	-0.6298*	+
Compatibility of the objectives with the livelihoods and/or usual activities of the involved actors	0.0275	0.8202**	+
Complexity of the objectives	-0.1788	-0.7415**	-
Incentive for the involved actors to pursue the objectives of the intervention	0.2156	0.6351*	+
Incentive for the involved actors to collaborate	0.6274*	0.0145	+
Internal rules of the intervention can be changed by the involved actors	-0.6547*	0.1598	+
<i>Communication and decision-making</i>			
Dialogue (two-way information exchange) in the process of reaching decisions	0.6923*	-0.8738**	+
Mode of participation in decision- making allows the involved actors to contribute all of their relevant skills and expertise	0.1455	-0.7171*	+
Influence of the involved actors on decisions	0.2648	-0.8442**	+
<i>Other management factors</i>			
Clear criteria for eligibility to become a member of the intervention	0.2061	0.6394*	+
Inclusiveness of the intervention	0.7350**	-0.5007	+/-
Monitoring	0.2245	0.7573*	+
Intervention includes efforts to enhance capacities of involved actors	-0.4122	-0.7039*	+
Existence of a core group	-0.1690	-0.7204**	+
Achievement of self-sustenance of the intervention	0.2171	0.7075**	+

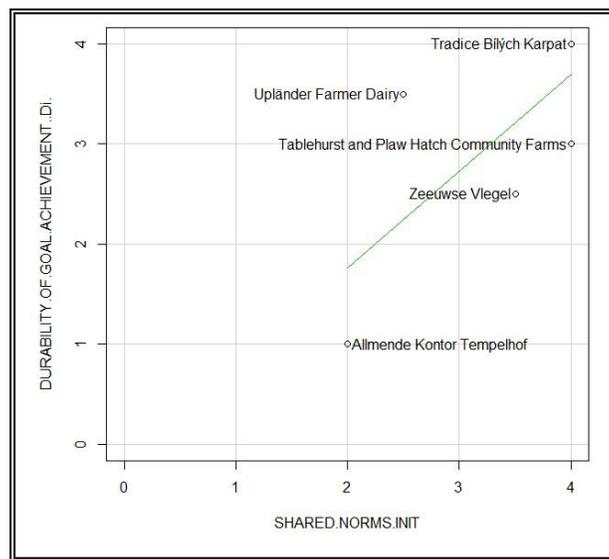
\*p < 0.1, \*\*p < 0.05

Some of these results suggest relations between influencing factor and success of an intervention that are in line with the relations proposed in the literature, some results sharply contradict literature. As these correlations are based on a rather low number of cases, it is questionable whether they are mere artefacts or are indeed backed-up by causal relations. Therefore, their primary use is to indicate the factors for which a more detailed qualitative analysis for causal relations is probably worthwhile. The following section presents such qualitative insights for four of these factors that have a significant correlation with one of the two success indicators: level of norms shared at the outset of an intervention, level of pre-existing relations among the involved actors, level of capacity-building during the intervention, and the level of dialogue in decision-making.

### 3.2 Results of the qualitative analysis of causal relations

#### Relation between initial shared norms and the durability of achievements of an intervention

Correlation analysis indicates a positive relationship between the level of norms shared among the actively involved actors at the outset of a CIMSA and the durability of its achievements (Figure 1). In the cases included in this analysis, two types of mechanisms through which a high level of shared norms at the outset of an intervention may contribute to long-lasting achievements could be identified: First, by being present at the outset of an initiative, the common norms of the involved actors shaped structures and other features of the intervention. Through this process of the intervention epitomising the norms important to a great part of the involved actors, the intervention itself became important to the actors, which incited their commitment and adherence to the intervention. Second, a high degree of shared norms generated a sense of mutual dependence among the involved actors. Thus, initially shared norms tied the actors both to the intervention and to each other.



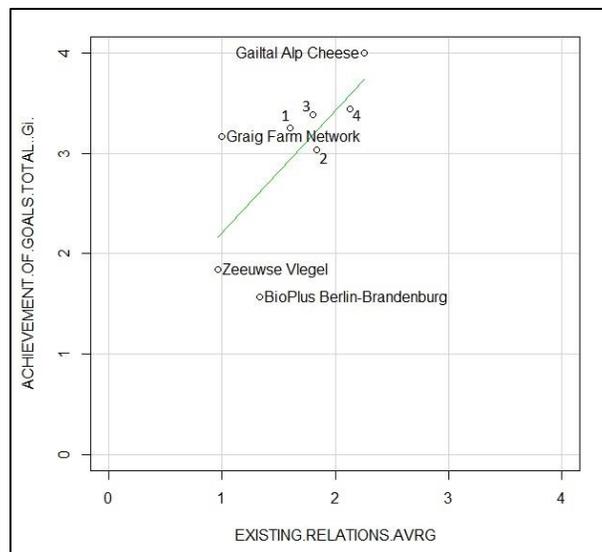
**Figure 1:** Scatterplot showing the relation of initial shared values and the durability of achievements. The data points of *Graig Farm Network* and *BioPlus Berlin-Brandenburg* are in the same place as the data point of *Tradice Bílých Karpat*. There was no data available for initial level of shared norms for *Gailtal Alp Cheese*.

Both of these mechanisms are present in the cases of *Tradice Bílých Karpat* and *BioPlus Berlin-Brandenburg*. The intervention of *Tradice Bílých Karpat* (TBK) started in the early 1990 in the

region of the White Carpathians in the Czech Republic with old local fruit growers and environmental NGOs. Their idea was to protect old local apple varieties and sustain local traditions. In the first years, the intervention was rather informal and was then formalised in 1998 in order to be able to receive a grant from a foundation. However, the old orchard owners did not join this new, formal *TBK*. Apart from this moment, a later value conflict between the idealistic world view of the members of the environmental NGOs and the more realistic stance of the (new) involved organic farmers threatened the continuance of the intervention. Yet, despite an important part of the original, founding members having dropped out of the initiative and the later emerging value conflict, the original shared norms still formed the heart of the intervention as “[t]he structure of the *TBK* o.s. collective [was] rooted in the special worldview: living in harmony with nature” (Kučerová et al., 2007, p. 10). Not only had the intervention come to mirror the norms that were still important to many of the involved actors, the common initial value basis also led to a feeling of mutual dependence, which held the involved actors together: “I feel we need each other because we make common things” (Kučerová et al., 2007, p. 12).

In the case of *BioPlus Berlin-Brandenburg*, a regional branch of an organic farming association in the States of Berlin and Brandenburg, Germany, the main shared norm in the beginning and also later on was one of mutual support in order to be able to farm organically. The norm of mutual support per se created a mutual dependence of the involved actors, which generated cohesion among them. The embodiment of the norm of mutual support in the intervention happened because mutual help in the form of a non-market exchange of resources and services came to be the central form of collaboration of *BioPlus Berlin-Brandenburg* (Segert & Zierke, 2004b).

### Relation between pre-existing relations and the level of achievement of the goals of an intervention



**Figure 2:** Scatterplot showing the relation of pre-existing relations and the level of goal achievement (the numbers in the graphic stand for the following cases: 1 *Allmende Kontor Tempelhof*, 2 *Tradice Bílých Karpat*, 3 *Upländer Farmer Dairy*, 4 *Tablehurst and Plaw Hatch Community Farms*).

The results of the correlation analysis suggest that a high level of pre-existing relations among the involved actors makes it more likely that a CIMS achieves its goals (Figure 2). In the analysed cases, this was the case especially if the pre-existing relationships among involved

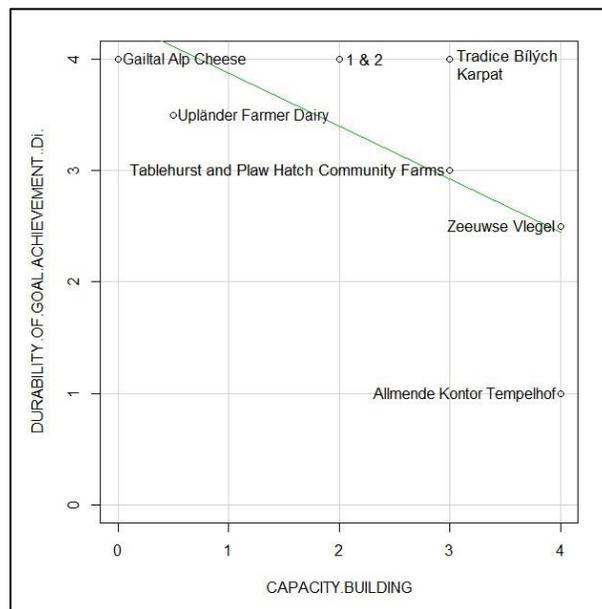
actors included relations to actors in crucial positions. This was most apparent in the cases of the *Allmende Kontor Tempelhof* and *Gailtal Alp Cheese*.

In the case of the *Allmende Kontor Tempelhof*, a community garden established on the area of the former airport Tempelhof in Berlin, a couple of the founding members were especially well-connected to a diversity of actors in Berlin. Through their relations, they were able to get local authorities and an NGO involved in the intervention. Only through these actors did the intervention get access to resources that were necessary to fulfil its goals. For example, these existing relations allowed the *Allmende Kontor Tempelhof* to formally become part of the registered association “Workstation Ideenwerkstatt e.V.”. This step was necessary as one requirement for proposals for pioneer projects on the former Tempelhof airport area was that they be organised in registered associations. Becoming a registered association itself would have been too time-intensive, which is why the “Workstation Ideenwerkstatt” became the project executing organisation. Only this way, the *Allmende Kontor Tempelhof* was able to get access to an area for the establishment of a community garden (Wunder, 2013).

The case of *Gailtal Alp Cheese* was a state-led initiative in the Gailtal valley in Austria to apply for a Protected Denomination of Origin (PDO) for the local traditional cheese. Here, an already existing network among national government and regional authorities and organizations allowed bringing together necessary skills and resources and was “among the reasons why the project is often cited as an example of best practice at the national and international levels” (Borg & Gratzner, 2013, p. 31).

### Relation between presence of capacity-building efforts in an intervention and the durability of its achievements

Surprisingly, correlation analysis suggests that including efforts to increase the capacities of the involved actors of a CIMSA makes the achievements of the intervention last less long (Figure 3).



**Figure 3:** Scatterplot showing the relation of presence of capacity-building efforts in an intervention and the durability of achievements of the intervention (the numbers in the graphic stand for the following cases: 1 *BioPlus Berlin-Brandenburg*, 2 *Graig Farm Network*).

In the investigated cases, two types of relevant capacities were apparent: technical capacities, such as knowledge and skills for agricultural production, and networking skills, which allowed the involved actors to hold involved as well as associated actors together and keep the intervention going. Furthermore, there were two ways through which the necessary capacities were made available to the intervention: Either the intervention included efforts to increase the capacities of the involved actors (*Zeeuwse Vlegel*, *Graig Farm*, *Tradice Bílých Karpat*) or actors that already possessed the necessary capacities became part of the intervention (*Gailtal Alp Cheese*, *Upländer Farmer Dairy*).

A general mechanism through which capacity-building may impair the durability of the achievements of a CIMSAs could not be detected in the investigated case studies. Only the case of the *Zeeuwse Vlegel* provided one example of conditions under which capacity-building efforts can impair the durability of an intervention or its achievements. This case received a medium score for capacity building because the involved actors focused on the enhancement of one capacity type (technical capacities) while the other capacity type (networking capacities) was neglected: Technical capacity building played a central role by enabling the involved actors to grow high quality baking wheat in an environmentally friendly way. Therefore, technical capacity building was indispensable to achieve some of the goals of the intervention. However, “the learning process was focused too much on the technical aspects of sustainable baking-wheat cultivation. Learning about the management of network relations and network building was largely neglected.” (Wiskerke, 2003, p. 445) Together with sales lagging behind expectations, this neglect of network building led to a deterioration of the commitment and sense of collectivity among members, which made many members think that the *Zeeuwse Vlegel* had “had its day and [was] bound to fade away” (Wiskerke & Oerlemans, 2004, p. 248)

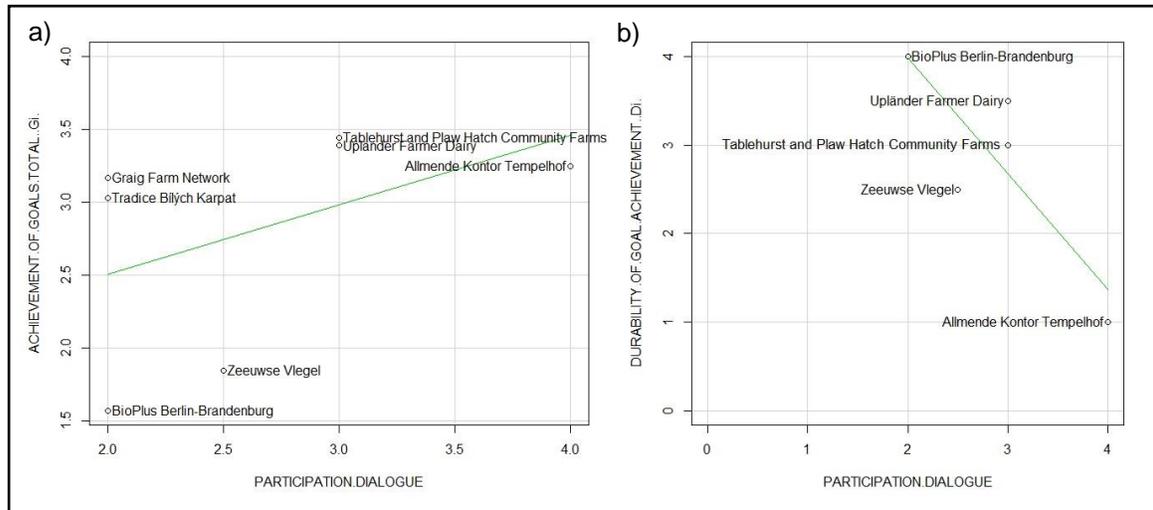
However, it seems that an emphasis on technical capacity building is not necessarily detrimental to the durability of the achievements of a CIMSAs as long as networking capacities are not neglected. Also in the other cases that included capacity building efforts, the focus was on technical capacity building. Yet, in these cases also networking capacities were developed. A very good example for this is the case of the *Allmende Kontor Tempelhof*. Here, the two types of capacities were enhanced jointly: Members were encouraged to form working groups dedicated to specific topics and motivate people to take over responsibility for these working groups (Wunder, 2013). Consequently, members involved in these sub-projects simultaneously obtained technical knowledge and skills related to the topic of the working group and at the same time learned how to manage a group or network of different actors working towards a common goal. (Note: The very low durability score of the *Allmende Kontor Tempelhof* (Figure 3) is mainly attributable to the limited time the area on the Tempelhof area was made available to pioneer projects such as the *Allmende Kontor*.) Thus, when it comes to capacity building efforts, what may impair the durability of a CIMSAs and with that also the durability of its achievements is not so much an emphasis on but the neglect of one capacity type.

As for the effect of the way in which capacities are brought into an intervention – whether through actors with the necessary capacities or through capacity building efforts for the involved actors – it is hard to see clear patterns. Nevertheless, the case of *Gailtal Alp Cheese* shows that the model of making the necessary capacities available does not unavoidably leave the broad range of involved actors incapable and dependent on the actors who have important capacities. In the case of *Gailtal Alp Cheese*, even the contrary happened: This intervention was initiated and led by state actors who had the necessary networking and management capacities. However, after some years, state actors were able to withdraw and hand over all responsibilities to the local

actors (Rytkönen & Gratzner, 2010). Thus, the local actors had obtained the ability to manage and continue the activities of the intervention.

### Relation between the level of dialogue in decision-making and both the degree of goal achievement and durability of the achievements

For the factor of the level of dialogue in decision-making in the sense of two-way exchange among the involved actors, correlation analysis indicates a relation with both success indicators, yet with opposite directions: CIMSA where decision-making includes a high level of dialogue supposedly achieve their goals better (Figure 4a), but are less long-lasting (Figure 4b).



**Figure 4:** Scatterplots showing the relation of the degree of dialogue among involved actors in decision-making with a) the degree of the achievement of the goals of an intervention and b) the durability of the achievements (the data points of the cases *Tradice Bilych Karpat* and *Graig Farm Network* are in the same place as the data point of *BioPlus Berlin-Brandenburg*; no data was available for *Gailtal Alp Cheese*).

In the investigated cases, two ways were found in which dialogic decision-making may contribute to a higher degree of goal achievement. One type was identified in the case of the *Allmende Kontor Tempelhof*. This intervention saw involvement, engagement and communication not only as a means but as an end in itself. Therefore, making decisions in a dialogic way already fulfilled a part of the objectives of the initiative.

The other type of relationship was found in the case of the *Zeeuwse Vlegel*. This intervention mainly fell short on the achievement of its economic goals because it was not able to sell as much *Zeeuwse Vlegel* bread as the involved actors would have liked to. More dialogue between the board and the remaining involved actors could possibly have led to decisions that could have increased sales: In the beginning of the intervention, there was a rather high degree of dialogue: "In the design phase of the *Zeeuwse Vlegel* the bakers were actively involved in the design of the project, in particular in the construction of the bread concept. The product that emerged was the outcome of negotiations between farmers, bakers and environmentalists." (Wiskerke & Oerlemans, 2004, p. 258) However, in later stages the management board became less open towards suggestions from the actors who were not part of the board. This way, the bread concept remained the same although changes of the concept could have boosted its sales and although there were good ideas of how the bread could have been sold better, especially on the part of the bakers. Furthermore, the lack of openness of the board also impaired the commitment and

satisfaction of the involved actors. Also at another instance the closed decision-making of the board resulted in both an impairment of the sales and an increasing resentment of the actors: In ignoring the voices of the broad range of involved actors, the board decided to sell the *Zeeuwse Vlegel* bread not only through bakeries but also through supermarkets. This in turn led to a refusal of the bakers in two large cities to sell the bread, which meant a great setback for the sales (Wiskerke & Oerlemans, 2004). In sum, the continuance of a two-way exchange between the board and the remaining involved actors could, on the one hand, have allowed the initiative to build on a broader set of insights to further develop and improve its products. On the other hand, more dialogue could have made sure that all interests were considered in major decisions so that they would have been acceptable to all involved actors.

While there is some evidence as to how dialogue in decision-making helps CIMsAs to achieve their goals, no mechanisms underlying a negative causal relationship between dialogue in decision-making and the durability of the achievements could be found.

#### **4. Discussion**

The discussion of the results is structured around the following two questions:

1. Which role does social capital play in cooperation for innovation for sustainable agriculture?
2. How can innovation networks for sustainable agriculture be managed and which learning processes are taking place?

##### **4.1 The role of social capital in cooperation for innovation for sustainable agriculture**

It has been stated that cooperation for sustainability innovations in land management is confronted with a dilemma: On the one hand, there is the need to build social capital – especially trust – which takes time. On the other hand such initiatives are supposed to foster rapid innovation cycles for economic purposes in order to compete in a dynamic competition. The question then is how this dilemma can be coped with (Schäfer & Nölting, 2015).

Trust is the first thing one comes to think of when hearing ‘social capital’. Yet, social capital also includes other kinds of relational resources. The analysis conducted in this work identified two other kinds of social capital to support the success of CIMsAs: pre-existing relations and norms shared by the involved actors. A high degree of shared norms contributed to success by increasing the durability of an intervention and therefore of its achievements, especially if it occurred in the early phases of the intervention.

To avoid the above described dilemma, one possibility could thus be to build on these two types of social capital. This would of course require bringing together the “right” actors, meaning that the intervention would have to involve from the start actors whose norms show a great overlap and among whom some relations exist already. Under these preconditions, which are not easily met in practice, these types of social capital would already be available from the beginning of an intervention and would not have to be built first. Additionally, if actors share the same norms and values, they trust each other more easily (Siegrist, Cvetkovich, & Roth, 2000). Thus, apart from directly supporting the success of an intervention, shared norms and pre-existing relations also have the potential to catalyse the formation of trust among the involved actors.

#### 4.1 Management of and learning processes in innovation networks for sustainable agriculture

The correlation analysis indicates that there is a range of different management-related factors that may have an influence on the success of a CIMSA (see section 3.1 Results of the correlation analysis). For the two of these factors – capacity-building efforts and dialogue in decision-making – it was assessed in more detail in which ways they may affect the success of such interventions.

Especially in CIMSAs, technical capacities for agricultural production often play an important role. However, our findings alert that while there does not seem to come any harm from focussing on technical capacities, it can be detrimental if there are solely efforts to enhance technical capacities while networking capacities are completely neglected. A good way to ensure that both capacities are enhanced is to develop them in an integrated way as happened in the case of the *Allmende Kontor Tempelhof* where the involved actors formed self-organizing working groups on specific, often technical topics. These working groups resembled what is called communities of practice. Communities of practice share three characteristics: They have a shared domain of interest; they engage in joint activities and discussions; and they develop a shared repertoire of resources such as experiences, tools, way of addressing problems etc. (Wenger, 2006). Thus, encouraging self-organizing communities of practice within CIMSAs can help to increase both technical and networking capacities at the same time.

Furthermore, two ways in which necessary capacities can be brought into a collaborative intervention were identified: Either the intervention included efforts to increase the capacities of the involved actors or actors that already possess the necessary capacities become part of the intervention. Here, no clear pattern could be detected as to which of these two ways would be more beneficial. However, one case showed that bringing in actors that already have important capacities may lead to a transfer of these capacities to other involved actors. Possibly, this happens through peer-to-peer learning in practical situations that are relevant to the actors involved in a CIMSA. Thus, engaging ‘capable actors’ in the intervention and have them use their capacities in the context of the intervention can be a way of capacity-building alternative or supplementary to usual capacity-building efforts such as training.

A high level of dialogue in internal decision-making processes can support CIMSAs to achieve their goals and therefore be more successful: On the one hand dialogue can be a means to obtain important insights and information from the involved actors. With such an improved information base, more appropriate decisions can be taken (Newig, 2007). On the other hand, a dialogic way of taking decisions in a collaborative intervention can help to first get to know and then consider all interests in major decisions. This way, decisions are likely to be more acceptable to the involved actors. It is suggested that involvement in decision-making processes that are fair and based on mutual communication increases acceptance even if the final decision does not correspond to actors’ expectations (Newig, 2007). A greater acceptance of decisions taken within CIMSAs will likely keep involved more satisfied and motivated to continue to contribute to the intervention.

#### 5. Conclusions

This work provides very preliminary results based on an analysis of the first eight investigated cases studies of a larger case survey. Through statistical analysis of data generated by coding eight case studies, this work identified a range of factors related to characteristics of the group of involved actors and factors of organization and management of CIMSAs that possibly have an influence on the success of these interventions in terms of the degree to which the interventions achieved their goals and the durability of these achievements. For some of these factors (shared

norms, pre-existing relations, capacity-building, and dialogue in decision-making), qualitative analysis revealed a range of mechanisms through which these factors may influence the success of such interventions. This helped shed some light first on the role of social capital in cooperation for sustainable agriculture and second on management of and learning processes in innovation networks for sustainable agriculture. Despite the preliminary nature of these results, they call attention to issues that should be considered in initiating and managing future co-operations seeking innovative and sustainable solutions to challenges in agriculture in order to help these efforts to lead to long-lasting success.

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## Annex

**Table A1:** References for the relations between influencing factors and success of an intervention suggested in the literature

Influencing factor	Type of suggested relation	References
Group heterogeneity	+	Agrawal, 2001; Dyer et al., 2013; Markelova & Mwangi, 2010; Newman & Dale, 2007; Totin et al., 2014
	-	Azadi, Hoseininia, Zarafshani, Heydari, & Witlox, 2010; Ramdwar, Ganpat, & Bridgemohan, 2013
Group size	+	Bhuyan, 2007; Shiferaw, Hellin, & Muricho, 2011; Totin et al., 2014
	-	Agrawal, 2001; Ayer, 1997; Mills et al., 2011; Prager, 2015; Ramdwar et al., 2013; Schlager, 1995; Shiferaw et al., 2011
Pre-existing relations	+	Ingram et al., 2008; Lamprinopoulou, Tregear, & Ness, 2006; Mills et al., 2011; Prager, 2015
	-	Prager, 2015
Shared Norms	+	Agrawal, 2001; Dyer et al., 2013; Markelova & Mwangi, 2010; Mills et al., 2011; Oerlemans & Assouline, 2004; Prager, 2015; Schlager, 1995
Explicit and defined objectives	+	Dyer et al., 2013; Measham & Lumbasi, 2013
Compatibility of the objectives with the livelihoods and/or usual activities of the involved actors	+	Measham & Lumbasi, 2013
Complexity of the objectives	-	Newman & Dale, 2007
Incentive for the involved actors to pursue the objectives of the intervention	+	Measham & Lumbasi, 2013; Prager, 2015
Incentive for the involved actors to collaborate	+	Ayer, 1997; Burandt, Lang, Schrader, & Thiem, 2013; Dyer et al., 2013; Ingram et al., 2008; Newman & Dale, 2007; Prager, 2015; Schlager, 1995; Shiferaw et al., 2011
Internal rules of the intervention can be changed by the involved actors	+	Oerlemans & Assouline, 2004; Ramdwar et al., 2013
Dialogue (two-way information exchange) in the process of reaching decisions	+	Mburu & Wale, 2006; Newman & Dale, 2007; Oerlemans & Assouline, 2004; Schlager, 1995; Shiferaw et al., 2011
Mode of participation in decision allows the involved actors to contribute all of their relevant skills and expertise	+	Dyer et al., 2013
Influence of the involved actors on	+	Bhuyan, 2007

decisions		
Clear criteria for eligibility to become a member of the intervention	+	Agrawal, 2001
Inclusiveness of the intervention	+/-	Dyer et al., 2013; Shiferaw et al., 2011
Monitoring	+	Oerlemans & Assouline, 2004; Prager, 2015; Schlager, 1995; Shiferaw et al., 2011
Intervention includes efforts to enhance capacities of involved actors	+	Burandt et al., 2013; Dyer et al., 2013; Gyau, Takoutsing, & Franzel, 2012; Measham & Lumbasi, 2013; Prager, 2015; Shiferaw et al., 2011
Existence of a core group	+	Ayer, 1997; Clark, 2006; Mills et al., 2011
Achievement of self-sustenance of the intervention	+	Ramdwar et al., 2013

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