

Lessons learned from a qualitative sustainability assessment method “Farm Talks”.

Evelien M. de Olde ^{a,b}, Petra Derkzen ^c, Frank W. Oudshoorn ^{a,d}, Claus A.G. Sørensen ^a

^a Aarhus University, Department of Engineering, Inge Lehmanns Gade 10, 8000 Aarhus, Denmark

^b Animal Production Systems group, Wageningen University, P.O. Box 338, 6700 AH Wageningen, the Netherlands

^c Stichting Demeter, Diederichsstraat 25d, 3971 PA Driebergen, the Netherlands

^d SEGES, Agro Food Park 15, 8200 Aarhus N., Denmark

Keywords: Sustainable development, farm level, peer review, qualitative, biodynamic agriculture, sustainability assessment tools

Abstract

This paper presents a qualitative peer review “Farm Talks” method which stimulates farmers’ learning beyond existing quantitative sustainability assessment tools. Farm Talks were started in 2008 by the biodynamic farming association and the Demeter organization in the Netherlands as a qualitative alternative to support learning and awareness on sustainability and biodynamic principles. In each Farm Talk, a farm is visited by a small group of colleagues and a facilitator to discuss farming practices and to explore how the farm could develop its sustainability performance. The Farm Talks method presents a novel approach to sustainability assessments in agriculture and enables farmers to define what they consider important for sustainable and biodynamic farming. The development of the method went through several phases of readjustments based on feedback from farmers and facilitators, and experiences from practice. The initial combination of learning and performance functions in Farm Talks caused tensions. Given the focus on individual farm development, the method continued as a learning and process-oriented method. A precondition for such an approach is the willingness of farmers to participate and actively engage. The method enables farmers to define actions for improvement based on their intrinsic motivation.

1. Introduction

The need for a sustainable development of agriculture is widely acknowledged and should encompass economic, environmental and social dimensions (OECD 2001; FAO 2013). A large number of indicator-based sustainability assessment tools has been developed to gain insight into the sustainability performance of farming systems (Schader et al. 2014). Such tools could facilitate farmers and politicians in their decision making towards more sustainable farming systems (Lebacqz et al. 2013).

The development of tools involves a wide array of decisions including the selection of themes, indicators and reference values, system boundary, and scoring and aggregation method (Binder et al. 2010; Bockstaller et al. 2015). These decisions are based on value judgements of the tool developers on what is relevant to assess sustainability and can vary widely between experts (Gasparatos and Scolobig 2012; Thorsøe et al. 2014). A recent study by de Olde et al. (2016a) showed a lack of consensus amongst experts about what matters most in selecting indicators to measure agricultural sustainability. This lack of consensus reflects divergent agendas and differences in context, priorities and value judgements (de Olde et al. 2016a). The different

perspectives on how to assess sustainability results in differences in tools, for example in data, time and budget requirements, output accuracy, transparency, and complexity (Marchand et al. 2014). Based on these characteristics, Marchand et al. (2014) distinguishes two types of tools: rapid and full sustainability assessment tools. Rapid tools use farmer's knowledge and require a limited input of time and budget whereas full assessment tools require a visit of an auditor or expert and makes use of detailed data. Full assessment tools are characterised by a scientifically underpinned output accuracy and high complexity compared to rapid tools. Rapid assessment tools are characterised by a high user-friendliness, high transparency, high compatibility and limited data demand (i.e. high data availability) compared to full assessment tools (Marchand et al. 2014). This makes rapid assessment tools particularly suitable for larger groups of farmers to enhance learning, interest and awareness on sustainability. Farmers committed to monitor their performance more closely can continue learning by adopting full sustainability assessment tools with a more scientifically underpinned overview of the sustainability performance of a farm (Marchand et al. 2014).

Although both types of tools are aimed at improving decision making by farmers in line with the outcome of assessment, adoption of sustainability assessment tools in farming practice is challenging (Lynch et al. 2000; Triste et al. 2014). General aspects such as budget and time requirements, data availability, user-friendliness, language use, and tool accessibility are factors affecting the adoption of tools (Van Meensel et al. 2012; de Olde et al. 2016b). Another important factor for tool adoption, however, is the relevance as perceived by users (Van Meensel et al. 2012). A mismatch between value judgements (e.g. what are relevant sustainability indicators) of tool developers and users affects the perceived relevance of the tool and its results (De Mey et al. 2011; de Olde et al. 2016b). When value judgements embedded in a tool do not reflect those of farmers, results may become irrelevant to a farmer and left unused (Vatn 2005; Gasparatos and Scolobig 2012; de Olde et al. 2016b). This may be one factor of why the implementation of assessment results in practice is a challenge for current sustainability assessments (Binder et al. 2010; Alrøe and Noe 2016). Sustainability assessment tools are generally developed by experts for whom comparative data results can be interesting in themselves. For integration into farm practices, however, proper attention needs to be given to translation from indicator outcome to a meaningful decision for change within a web of options and constrains in a farm system. A possible solution is involving stakeholders in the development of sustainability assessment tools (Reed et al. 2006; De Mey et al. 2011). Stakeholder participation in tool development can contribute to learning, increase awareness, and increase support for assessment results and measures (De Mey et al. 2011; Triste et al. 2014). But also, approaches in which farmers can incorporate their perspectives and values into the sustainability assessment process, and are supported in implementing assessment results, are needed (Binder et al. 2010; Alrøe et al. 2016; de Olde et al. 2016b). These approaches are necessary to facilitate a transition towards sustainable farming systems.

The aim of this study was to describe experiences in the development of a qualitative sustainability assessment method "Farm Talks". This method was selected as it presents an alternative approach to sustainability assessment compared to methods described in literature so-far and it has not been scientifically analysed before. Hence, this paper is the first of its kind, in which we analyse how this relatively long-running method that has been forced to adapt over the years deals with the above-mentioned challenges. We start by introducing our research method and case study. Then, we elaborate on the development of the method and the method in its current form. Finally, we reflect on the findings and discuss the importance of distinguishing learning and performance functions of sustainability assessment tools.

2. Farm Talks – a case study of a qualitative sustainability assessment method

2.1 Method

We used a case study approach to gain insight into the Farm Talk method. We focused on the method as applied in the Netherlands, where it was founded¹. Case studies provide in-depth context-dependent insight and can present a valuable learning experience (Flyvbjerg 2006). The case study research included an analysis of documents (i.e. minutes of the organisations involved, annual reports, evaluation reports, magazine articles and method documentation), scientific literature, and knowledge and experiences of the second author who has been involved in the development of the method since 2013. Triangulation of the findings was established by combing different sources of information and enhanced the reliability of the results (O'Donoghue and Punch 2003).

2.2 Farm Talks

Farm Talks are a form of peer review in which farmers evaluate each other's farm development. The Farm Talks are organized by the Demeter organization and the biodynamic association for all Demeter licensed farmers in the Netherlands. In each Farm Talk, a farmer is visited by a small group of 4 to 5 colleagues from different agricultural sectors, and a facilitator from the biodynamic farming association to facilitate the process. The host discusses strengths and challenges present on the farm and together with colleagues explores opportunities for farm development. Through discussion, participants explore what biodynamic farming and sustainability means to them.

Box 1. Biodynamic agriculture

In search of more sustainable practices, research and farming interest in alternative approaches such as biodynamic farming, is increasing (Turinek et al. 2009; Chalker-Scott 2013; Demeter 2016b). Biodynamic farming is a unique form of organic agriculture, which includes the use of preparations for soil and crop quality, cosmic influences, animal manures, diverse crop rotation, and encourages local production and distribution systems (Turinek et al. 2009). Biodynamic agriculture is inspired on a series of lectures given by the philosopher Rudolf Steiner in 1924. Approximately 5,000 biodynamic farms, with over 160,000 hectares in more than 50 countries are certified according to Demeter standards (Demeter 2016b). Although biodynamic farming has been studied with scepticism and considered as dogmatic by part of the scientific community, the use of a holistic approach towards farming and the value of knowledge exchange and experiences in the biodynamic network of farmers and researchers have been acknowledged (Kirchmann 1994; Turinek et al. 2009). As stated by Turinek et al. (2009): *'A worldwide network of farmers, researchers, advisors, teachers and others interested in BD farming could contribute toward naming and addressing questions from everyday practice in order to make important steps toward a more sustainable, healthy, prosperous and secure future.'*

¹ The method is also used in Germany, and on a smaller scale in the US.

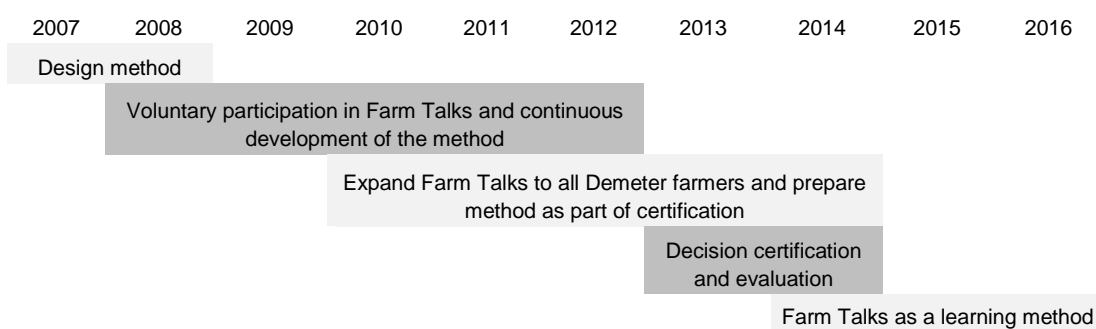
3. Farm Talks method

3.1 The development of the method

Farm Talks were started in 2008 by the biodynamic farming association and the Demeter organization. One of the key founders of the method is Jan Diek van Mansvelt; it was, therefore, initially called “Mansveltscore” (Demeter 2016a). The initiative started in response to discomfort felt around the use of impersonal checklists as the basis for Demeter certification. Instead of rigid certification control, the process of peer review by means of Farm Talks would present a more development oriented alternative to the existing certification system. Certification would be dependent on the outcome of a Farm Talk and open to consider context specific situations at farms. The assumption was that if the results of a Farm Talk could be formulated specific enough, and the development report could be evaluated by the certification committee, the method could partly, or completely, replace the external inspection of the Demeter certification process.

From 2008 onwards, a small section of the farmers participated voluntarily in Farm Talks to help develop the method (Figure 1). The Farm Talk method was regularly evaluated and adjustments were made based on the experiences and feedback of farmers and facilitators (e.g. description of themes, forms and structure of the meetings). Although the Farm Talks were evaluated by farmers as valuable, informative and relevant, the method was increasingly confronted with resistance of both farmers and facilitators. Facilitators feared they could be forced to signal problems, to function as a kind of inspector and farmers were unsure how “the office” would evaluate their performance, downplaying the ambition of their self-chosen development actions just to be sure to reach the results of their commitment. Hence, integrating the results of the Farm Talks (development and learning focus) into the certification process (control and performance focus) was increasingly considered as a contradiction. Openness and trust as a basis for honest reflection and critical discussion of on-farm challenges were key values in the development oriented approach of Farm Talks. The idea of an external certification committee evaluating all that happened by means of an impersonal report was felt as a breach of trust. A focus on control or performance and use of checklists had negative connotations and was perceived as counterproductive. It led not only to pressure on the farmers to evaluate their colleagues positively but also reduced the ambition level of development actions, to make sure the actions were “fulfilled” at the next evaluation round. Moreover, uncertainty about how the results would be used in the certification process, caused discomfort. The committee responsible for certifications shared this unease and decided in 2013 that the results of the Farm Talks were not suitable to be included in the accreditation for Demeter certification. Consequently, the role of Farm Talks for certification purposes had to be reconsidered but the method itself was accepted, now with all Demeter farmers participating.

Figure 1. Timeline of the development of Farm Talks



3.2 The current method

An evaluation of the method in 2014 concluded that Farm Talks contributes to learning and capacity building in biodynamic agriculture (Derkzen 2014). Consequently, Farm Talks are continued as a form of schooling and development for biodynamic farmers. Farm Talks is part of an agreement between the Demeter foundation and each farm (license contract), aimed to encourage lifelong learning. Although Farm Talks would not replace certification, it contributes in its own way to secure the quality of the Demeter brand (Derkzen 2014).

Currently, approximately 130 Dutch biodynamic farmers are participating in the Farm Talks. Each farm is reviewed once in two years in which it is characterized and evaluated in its biodynamic aspects. Farm Talks groups consist of farmers from different sectors to support innovative ideas and insights to develop, and prevent very specific professional discussions between farmers from the same sector (e.g. on the right seed spacing of a seeding machine). The role of the facilitator is to structure the meeting, create a positive atmosphere, prevent too technical discussions, and to raise aspects that were not yet discussed.

In preparation of a Farm Talk, the host prepares the visit by self-evaluating the farm along eight qualities and related themes for sustainable and biodynamic farming. A self-evaluation manual lists each of the qualities with detailed subchapters and sets of questions. Each subchapter asks for the vision of the farmer on this theme, thereby stimulating not just a performance check but also thinking about the “why”. Asking “why” questions are important to connect the results on the indicators to the intrinsic motivation in order to change practices. Figure 2 shows examples of themes within each quality; a farmer can also define his own themes. Next to the self-evaluation, a farmer defines possible development actions for the farm.

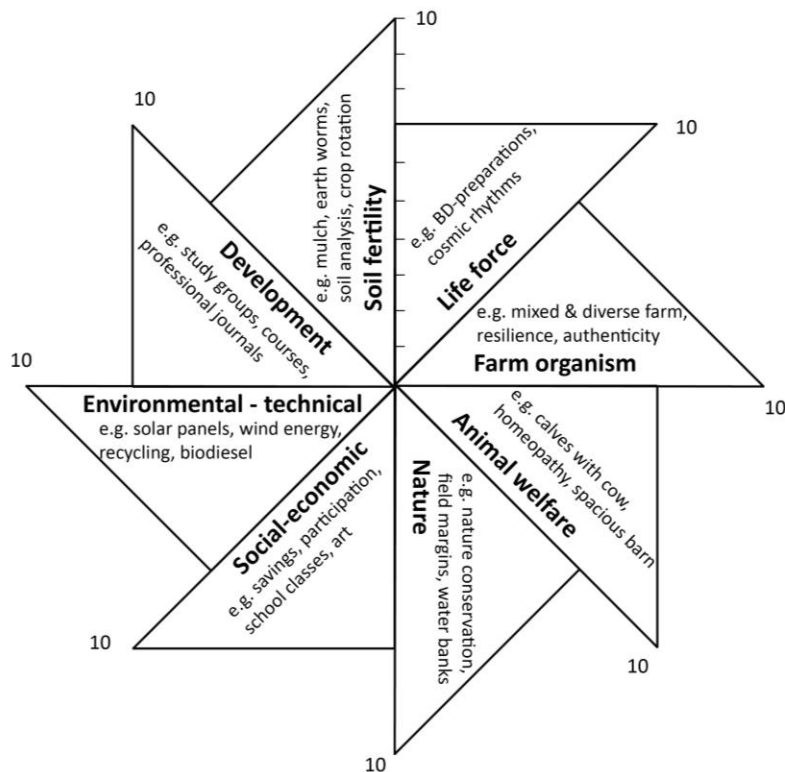


Figure 2. Diagram with eight qualities and examples of themes for self-evaluation. The host self-evaluates his or her own performance (maximum score of 10) on this diagram.

The design of the Farm Talks process is inspired on the method of appreciative inquiry in which the focus is on a positive approach to what is possible rather than what is wrong (Cooperrider and Srivastva 1987; Grant and Humphries 2006). In addition, Theory U (a theory of learning and management) and the concept of “presencing” formed an inspiration for the design of the method (Scharmer 2009; Seifert et al. 2010). Both aspects are integrated in the second phase to include not only rational aspects but also what can be sensed. The farm visit is generally structured in four phases.

1. **Farm tour.** The visit starts with a short tour on the farm in which the farmer introduces the farm and describes the characteristics and challenges while showing different aspects and locations of the farm.
2. **Characterizing.** In this phase, the visiting farmers and facilitator take a moment in silence to ‘characterize’ the farm by visualizing an image, word, or picture representing the essence of the farm and farmer in its current manifestation. This is done before all aspects of the farm are discussed systematically, to let the creative, imaginative side of everyone speak. The images are often very different, yet, with a similar message.

Box 2. Example characterization

“During a farm visit at a care farm images such as a “Rubik’s cube” or a “magician juggling to keep many plates in the air” and “octopus” came to the minds of the farmers present. Everyone was impressed by how the farmer of the care farm organized the farm around people with special needs, taking the person’s liking and capability as his starting point while also trying to deliver orders on time at retailers request and dealing with several different care institutions, various tasks in vegetable and livestock production and, naturally, considering the weather. Although said with admiration, there is a downside to such an image, a possible tension which shows even stronger when all images seem to point to a similar underlying message. Follow up questions can be; “Do you feel such a situation of Rubik’s cube is sustainable for your personal health?” or “Is the complex organization influencing the quality of the produce you deliver?” No easy questions, but within a setting where the group has just shared images, it shows through those images that this tension was already felt and understood. Hence, the farmer feels “seen” by his peers, which opens up the conversation and helps the peer review.”

3. **Peer review.** After the characterization, the colleagues score the performance of the farm on meta-level, using the eight qualities (Figure 3). The host discusses his or her own evaluation in comparison to those of colleagues. The discussion can focus on each quality, or on only those qualities on which the evaluations differ. Differences in the evaluations often form the basis for new insights. The discussion should result in issues to be developed in the future and should be linked to the farmer’s motivation. In the discussion the following aspects are discussed:
 - a. What has been observed?
 - b. How do you evaluate what has been observed?
 - c. How did the farmer evaluate him/herself compared to colleagues?
 - d. What are issues the farmer wants to develop?

Experience with the method indicates that a farmer often tends to score him or herself lower compared to colleagues. Discussion on why this occurs reveals that even though

performance on a particular issue is high, also the ambition of the farmer is an important factor. A farmer may not be satisfied with his or her own performance on a certain theme, while the peers evaluated the performance as high. The idea of the Farm Talks method is that development can be reached on topics where focus, energy and enthusiasm are present. If working on a certain theme is not supported by the motivation of a farmer, results may be low and expectations not met.

4. **Decisions.** Based on the discussion, the farmer decides what to work on and formulates actions as specific as possible. The plan is written down on a form and signed by the visiting farmers. A financial contribution of 75 euro made by the farmer is returned to the farmer after the form with signatures is submitted to Demeter.

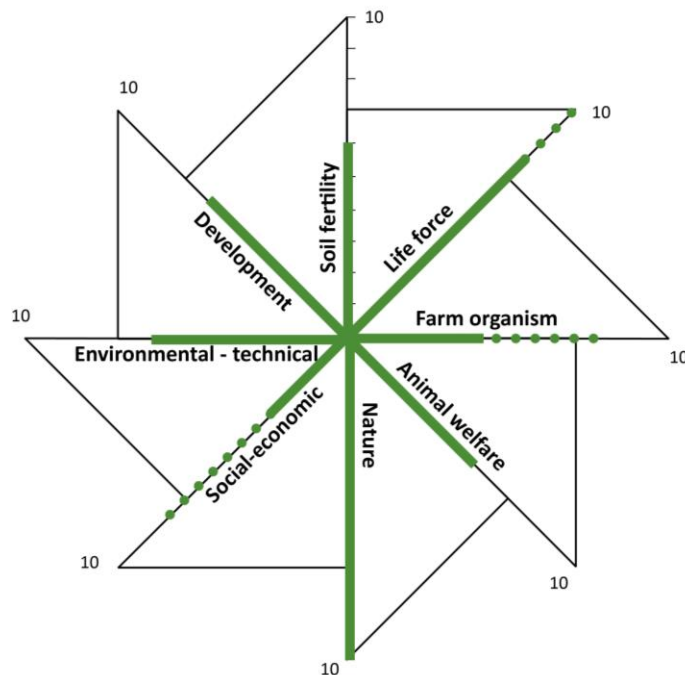


Figure 3. Example of an evaluation and aspects to develop (dotted line). The lines present the current performance of the farm on the qualities, based on peer review. The dotted lines indicate the intended development of the farm.

4. Farm Talks as a rapid sustainability assessment tool

We compared the characteristics of Farm Talks with critical success factors defined by De Mey et al. (2011) and Marchand et al. (2014) for the implementation of sustainability assessment tools (Table 1). The data is predominantly derived from farmer's knowledge and has a high data availability and compatibility (Table 1). The qualitative approach of Farm Talks does not include calculations and is high in user-friendliness and transparency. The output accuracy and data correctness is, however, subjective and not scientifically underpinned (Marchand et al. 2014). The characteristics of Farm Talks are in line with those of rapid sustainability assessment tools (Marchand et al. 2014), except for the method of data gathering which is not only based on a self-evaluation by the farmer but also includes a peer review by colleagues.

Table 1. Critical success factors for the implementation of sustainability assessment tools, and how these factors are addressed in Farm Talks. The critical success factors and their descriptions are adjusted from De Mey et al. (2011) and Marchand et al. (2014).

Critical success factor	Description	Farm Talks
Attitude of model user	Values and beliefs of users regarding sustainability issues	Values and perspectives on eight qualities are discussed during the farm visit.
Compatibility	Compatible with data systems and accountancy	High, no quantitative data input required
Data availability	Availability of data for calculation	High, based on farmer's knowledge and experience
Data correctness	Correctness of data used to calculate indicators	Subjective
Complexity	Degree of complexity of the tool (i.e. complex indicators, calculations and interpretation of results)	Low
User-friendliness	Flexible and easy to use and calculate	High
Transparency	Tool and data are transparent on uncertainty of results	High
Communication aid	Support and use in discussion sessions with farmers	High, the tool is based on discussion among farmers
Organization of discussion sessions	Practical organization of discussion session with farmers	Described in 3.2. Key elements: discussion based on openness and trust; facilitator; transparency in how the results are used
Effectiveness	Relevant to use and implement	Considered relevant for learning and farm development

Rapid sustainability assessment tool like Farm Talks can contribute to dialogue, learning and awareness on sustainability among farmers (Marchand et al. 2014; Triste et al. 2014). This strength was also recognized in the evaluation of the Farm Talks method in 2014. Attempts to integrate a performance function (as part of the certification procedure) in the method had a negative effect on the quality of the process. The Farm Talks method in its current form, therefore, focuses on the learning function. Such a process-oriented focus requires good facilitation, trust and transparency (Ansell and Gash 2008; Triste et al. 2014).

5. Discussion

Although sustainability assessment tools are aimed at learning and supporting decision making, tool adoption in farming practice has been challenging (Triste et al. 2014). Rigby et al. (2000) states: *“Much of the measurement of indicators has, at the end of the day, largely resulted just in the measurement of indicators. The actual operationalisation of indicators to influence or change, for instance, in policy is still in its infancy.”* The perceived relevance by users, in this case, farmers of sustainability assessments is an important factor in the implementation of tool results and requires alignment of values between tool developers and users (Gasparatos 2010; de Olde et al. 2016b). Even when a tool is perceived as relevant, however, the assessment results are not necessarily implemented in practice (de Olde et al. 2016b). An important reason is neglect for the process after the results: the translation process into meaningful practices and other farm decisions. The Farm Talks method addresses these challenges by involving farmers to share their values and perspectives and defining actions for improvement based on their intrinsic motivation.

The Farm Talks method is an example of a bottom-up sustainability assessment tool (Binder et al. 2010). In Farm Talks, the majority of decisions related to tool development (e.g. definition of sustainability and selection of themes, indicators, reference values, weights) are made by the farmers during a farm visit. In other tools these decisions are often made by external experts (Binder et al. 2010; Alrøe and Noe 2016). The Farm Talk method provides a structure for the assessment process (preparation and visit) and eight pre-defined qualities for sustainability of biodynamic farming to focus on. During peer review, farmers discuss these eight qualities and develop a joint and context-specific understanding of each quality and the performance of the farm at that moment. In an implicit manner, they decide what is important in sustainability and biodynamic farming and discuss how this should be evaluated. This active involvement of farmers in the development of the tool can contribute to mutual learning and a sense of ownership (Triste et al. 2014). Farm Talks hereby reduces the risk on a mismatch of value judgements between tool developers and users. Also critical success factors for the adoption of tools are addressed in Farm Talks (Table 1) including the availability of data, limited input of time and budget, user-friendliness as well as language use, tool accessibility and a context-specific approach (Lynch et al. 2000; Van Meensel et al. 2012; Marchand et al. 2014; de Olde et al. 2016b). By jointly formulating actions for improvement during the assessment process, the method supports farmers to apply assessment results in their decision making and turn the assessment into transformation.

Whereas the possibility to incorporate farmer's perspectives and values in sustainability assessments is a strength of the method in terms of joint learning, and a possible solution to the problem of tool adoption, it also presents a weakness as the method is highly malleable and hence, not suitable for performance benchmarking. The qualitative and implicit method enables farmers to define what is important for sustainability of biodynamic farming, however, it is highly subjective and not scientifically underpinned. Assessment results cannot or very limited, be used in comparative analysis of the sector. Here, again, it is important to acknowledge what function the tool is aimed at since unacknowledged tensions between functions may lead to situations in which neither the one nor the other function is fulfilled (neither performance measurement nor learning). Benchmarking in order to rank performance for a general public requires externally validated data whereas tools aimed at learning benefit from a design aimed at "sense making" of outcomes in very specific contexts. Indeed, function confusion was also part the decision to change the method of Farm Talk at a certain point in the method development to focus on learning only.

Each Farm Talk is different as it reflects the frame of reference (knowledge, norms, values, interest and convictions) of the host and visiting farmers (Te Velde et al. 2002). The diverse, qualitative and context-specific results of Farm Talks are not suitable for comparison between farms, benchmarking or certification, as was recognized in 2013. This may present a weakness for more quantitative oriented stakeholders such as food industries, municipalities and banks (Bell and Morse 2001). This issue, the lack of formal recognition at institutional level, was also recognized as a challenge in participatory certification in organic agriculture as introduced by IFOAM (Nelson et al. 2010). At the same time, both quantitative and qualitative approaches to sustainability are inherently subjective and connected to value judgements and diverse perspectives. Transparency in sustainability assessment tools (e.g. on value judgements, assumptions, function and objectives) is important to prevent a mismatch of expectations among those involved.

Experiences with Farm Talks indicate that a combination of a qualitative learning function and a performance-oriented focus (i.e. certification) results in pressure on the dialogue process of the Farm Talk itself which can affect the quality of both the assessment process and its outcomes. Similarly, Nelson et al. (2010) discussed the risk of social and personal conflict resulting from the dependency on peer assessment outcomes as a challenge in participatory certification. This indicates that the functions (learning and performance) involve different priorities and requirements. Separating functions, as suggested by Triste et al. (2014), is therefore needed to reduce the risk on tensions. Moreover, in a learning and process-oriented tool, like Farm Talks, the willingness of farmers to participate and actively engage is a precondition. Although it is self-evident that this willingness is a critical factor for the adoption of the tool, where and on what aspects willingness is present can be seen and strengthened through appreciative inquiry during the assessment process itself, while in more top-down, expert-based tools unaltered and unspecific willingness is often assumed to be there. Linking assessments to the intrinsic motivation and willingness might be critical for the implementation of results of other tools which have less attention for the process of translation. Evaluating how Farm Talks, and other sustainability assessment tools, bring about change is urgently needed.

6. Conclusion

Limited adoption of sustainability assessment tools is seen as a challenge in the transition towards more sustainable farming systems. The Farm Talks method presents a novel approach to sustainability assessments in agriculture by using peer review and enabling farmers to define what they consider important for sustainability and biodynamic farming. It can be categorized as a rapid sustainability assessment tool, and we showed its advantages (i.e. limited investment of time and budget, high data availability, high user friendliness and limited complexity) and disadvantages (i.e. subjective output accuracy and data correctness). The Farm Talks method presents a qualitative and implicit approach to stimulate learning, reflection and awareness among farmers. As the initial combination of learning and performance functions in the method caused tensions, Farm Talks continued as a learning-oriented method. The method enables farmers to define actions for improvement based on their intrinsic motivation, and could hereby support the implementation of assessment results.

Acknowledgements

We are grateful to Dr Jayson Bengé (Agricultural Research Group On Sustainability (ARGOS)) and Emeritus Professor Henrik Møller (CSAFE, University of Otago) for their constructive comments that greatly improved the manuscript. We thank Elze-Lia Visser and Hanne De Witte who provided inspiration and support to write this paper.

References

- Alrøe, H. F., Møller, H., Læssøe, J., & Noe, E. (2016). Opportunities and challenges for multicriteria assessment of food system sustainability. *Ecology and Society*, 21(1), doi:10.5751/ES-08394-210138.
- Alrøe, H. F., & Noe, E. (2016). Sustainability assessment and complementarity. *Ecology and Society*, 21(1), doi:10.5751/ES-08220-210130.
- Ansell, C., & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory*, 18(4), 543-571, doi:10.1093/jopart/mum032.
- Bell, S., & Morse, S. (2001). Breaking through the glass ceiling: Who really cares about sustainability indicators? *Local Environment*, 6(3), 291-309.

- Binder, C. R., Feola, G., & Steinberger, J. K. (2010). Considering the normative, systemic and procedural dimensions in indicator-based sustainability assessments in agriculture. *Environmental Impact Assessment Review*, 30(2), 71-81.
- Bockstaller, C., Feschet, P., & Angevin, F. (2015). Issues in evaluating sustainability of farming systems with indicators. *OCL - Oilseeds and fats, crops and lipids*, 22(1), doi:10.1051/ocl/2014052.
- Chalker-Scott, L. (2013). The Science Behind Biodynamic Preparations: A Literature Review. *HortTechnology*, 23(6), 814-819.
- Cooperrider, D. L., & Srivastva, S. (1987). Appreciative inquiry in organizational life. *Organizational Change and Development*, 1, 129-169.
- De Mey, K., D'Haene, K., Marchand, F., Meul, M., & Lauwers, L. (2011). Learning through stakeholder involvement in the implementation of MOTIFS: An integrated assessment model for sustainable farming in Flanders. *International Journal of Agricultural Sustainability*, 9(2), 350-363.
- de Olde, E. M., Moller, H., Marchand, F., McDowell, R. W., MacLeod, C. J., Sautier, M., et al. (2016a). When experts disagree: the need to rethink indicator selection for assessing sustainability of agriculture. [journal article]. *Environment, Development and Sustainability*, 1-16, doi:10.1007/s10668-016-9803-x.
- de Olde, E. M., Oudshoorn, F. W., Sørensen, C. A. G., Bokkers, E. A. M., & de Boer, I. J. M. (2016b). Assessing sustainability at farm-level: Lessons learned from a comparison of tools in practice. *Ecological Indicators*, 66, 391-404, doi:<http://dx.doi.org/10.1016/j.ecolind.2016.01.047>.
- Demeter (2016a). Collegiale toetsing. <http://www.stichtingdemeter.nl/collegiale-toetsing/>. Accessed 19-05-2016 2016.
- Demeter (2016b). Development of Demeter farms and certified Demeter area of Demeter International. Accessed 03-03-2016 2016.
- Derkzen, P. (2014). Advies Werkgroep Collegiale Toetsing aan Bestuur Stichting Demeter. In B. S. Demeter (Ed.), (pp. 3).
- FAO (2013). Sustainability assessment of food and agriculture systems (SAFA): guidelines, version 3.0. Food and Agricultural Organization of the United Nations.
- Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative inquiry*, 12(2), 219-245.
- Gasparatos, A. (2010). Embedded value systems in sustainability assessment tools and their implications. *Journal of Environmental Management*, 91(8), 1613-1622, doi:<http://dx.doi.org/10.1016/j.jenvman.2010.03.014>.
- Gasparatos, A., & Scolobig, A. (2012). Choosing the most appropriate sustainability assessment tool. *Ecological Economics*, 80(0), 1-7, doi:<http://dx.doi.org/10.1016/j.ecolecon.2012.05.005>.
- Grant, S., & Humphries, M. (2006). Critical evaluation of appreciative inquiry Bridging an apparent paradox. *Action Research*, 4(4), 401-418.
- Kirchmann, H. (1994). Biological dynamic farming — An occult form of alternative agriculture? [journal article]. *Journal of Agricultural and Environmental Ethics*, 7(2), 173-187, doi:10.1007/bf02349036.
- Lebacqz, T., Baret, P. V., & Stilmant, D. (2013). Sustainability indicators for livestock farming. A review. *Agronomy for Sustainable Development*, 33(2), 311-327.
- Lynch, T., Gregor, S., & Midmore, D. (2000). Intelligent support systems in agriculture: how can we do better? *Animal Production Science*, 40(4), 609-620.
- Marchand, F., Debruyne, L., Triste, L., Gerrard, C., Padel, S., & Lauwers, L. (2014). Key characteristics for tool choice in indicator-based sustainability assessment at farm level. *Ecology and Society*, 19(3), doi:10.5751/ES-06876-190346.
- Nelson, E., Tovar, L. G., Rindermann, R. S., & Cruz, M. A. G. (2010). Participatory organic certification in Mexico: an alternative approach to maintaining the integrity of the organic label. *Agriculture and Human Values*, 27(2), 227-237.
- O'Donoghue, T., & Punch, K. (2003). *Qualitative educational research in action: Doing and reflecting*. Routledge.

- OECD (2001). Environmental indicators for agriculture. Methods and results. (Vol. 3). Paris: Organisation for Economic Co-operation and Development.
- Reed, M. S., Fraser, E. D. G., & Dougill, A. J. (2006). An adaptive learning process for developing and applying sustainability indicators with local communities. *Ecological Economics*, 59(4), 406-418.
- Rigby, D., Howlett, D., & Woodhouse, P. (2000). Sustainability Indicators for Natural Resource Management & Policy. Working paper 1. A Review of Indicators of Agricultural and Rural Livelihood Sustainability. In D. f. I. D. Research (Ed.).
- Schader, C., Grenz, J., Meier, M. S., & Stolze, M. (2014). Scope and precision of sustainability assessment approaches to food systems. *Ecology and Society*, 19(3), doi:10.5751/ES-06866-190342.
- Scharmer, C. O. (2009). *Theory U: Learning from the future as it emerges*: Berrett-Koehler Publishers.
- Seifert, H., Buswick, T., Otto Scharmer, C., & Kaeufer, K. (2010). In front of the blank canvas: sensing emerging futures. *Journal of Business Strategy*, 31(4), 21-29.
- Te Velde, H., Aarts, N., & Van Woerkum, C. (2002). Dealing with Ambivalence: Farmers' and Consumers' Perceptions of Animal Welfare in Livestock Breeding. *Journal of Agricultural and Environmental Ethics*, 15(2), 203-219, doi:10.1023/A:1015012403331.
- Thorsøe, M. H., Alrøe, H. F., & Noe, E. (2014). Observing the observers: uncovering the role of values in research assessments of organic food systems. *Ecology and Society*, 19(2), doi:10.5751/ES-06347-190246.
- Triste, L., Marchand, F., Debruyne, L., Meul, M., & Lauwers, L. (2014). Reflection on the development process of a sustainability assessment tool: learning from a Flemish case. *Ecology and Society*, 19(3), doi:10.5751/ES-06789-190347.
- Turinek, M., Grobelnik-Mlakar, S., Bavec, M., & Bavec, F. (2009). Biodynamic agriculture research progress and priorities. *Renewable Agriculture and Food Systems*, 24(02), 146-154, doi:doi:10.1017/S174217050900252X.
- Van Meensel, J., Lauwers, L., Kempen, I., Dessein, J., & Van Huylenbroeck, G. (2012). Effect of a participatory approach on the successful development of agricultural decision support systems: The case of Pigs2win. *Decision Support Systems*, 54(1), 164-172.
- Vatn, A. (2005). Rationality, institutions and environmental policy. *Ecological Economics*, 55(2), 203-217, doi:<http://dx.doi.org/10.1016/j.ecolecon.2004.12.001>.