

Development and evaluation of an on-demand sustainability tool in Flanders

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Abstract

Tools for assessing sustainable farming may serve various goals and meet with a range of requirements. This paper focusses on the development of an on-demand tool, a term that is assigned to tools that are initiated by the end users. Furthermore, they are often pro-active and flexible to external changes. As the research and development process leading to a sustainability assessment tool has an important influence on the final outcome and final adoption in practice, this paper aims at describing and evaluating the set-up, process and outcome of a participatory tool development process. This process is initiated by the main regional farmers' organization Boerenbond to pro-actively react on increasing sustainability demands from society.. The study is worked out for three different industries: fruit production, greenhouse cultivation and arable farming and evaluates what kind of tool this process generated, which lessons learnt were successfully implemented and which barriers still remain an issue. The evaluation is based on the Blackstock *et al.* (2007) framework to analyze participatory research, adjusted with some lesson learnt from literature on other tool development processes. A multiple data collection method (document analysis, interviews) is applied to provide data on criteria such as leadership, ownership, social learning and transparency. Preliminary results show which criteria or lessons learnt were successfully implemented during this development process and which barriers still remain an issue. It seems that an explicit clarification of goals and requirements throughout the development process is necessary, that both the research and project team play an important role in the development process of the tool and that tool use relies on finding available, correct and compatible data. These and more insights help to revise the original participatory process and to extrapolate to similar processes foreseen for three other industries.

1. Introduction

Facing increasing sustainability demands from society, several initiatives to identify and evaluate sustainable development arise. Integrated assessment tools are developed and used in several domains to improve decision making at policy, program or project level. Sustainability assessment, a specific form of integrated assessment, is viewed as an important aid in the transition towards sustainable development (Pope *et al.*, 2004). Also in agriculture, many sustainable assessment tools have been developed at farm, regional and national level (De Ridder *et al.* 2007; Binder *et al.* 2010). The complexity of agricultural practices and different perceptions on sustainability have led to a development of many different types of tools (De Ridder *et al.* 2007; Binder *et al.* 2010). The goals and requirements of these tools differ. Goals

may range from increasing insights on the sustainability of the complex farming system, over supporting the learning process of the farmer.

Also in Flanders, tool development at farm level progressed during the past decennium. First, MOTIFS was designed as an expert based tool (Meul et al. 2008). Although this tool was designed profoundly and the first implementations were very promising, it lacked a broad uptake in practice. Therefore, De Mey et al. (2010), Marchand et al. (xxxx) and Triste et al. (xxxx) studied this tool, the development and implementation process to express recommendations for future tool design and its implementation. Also other authors, experienced with tool development (Weaver and Rotmans 2006, Reed 2008, Bell et al. 2012, Pülzl et al. 2012), identified that the research and development process leading to the tool has an important influence on the success of the outcome. Lessons learnt are inventoried in the following literature review. Lessons learnt are based on for example the role of the researchers, creation of ownership in the process, the multi-functionality of the tool, data availability, correctness and compatibility, transparency, active role of the stakeholders, the user-friendliness of the tool, its effectiveness, the tool as a communication aid and the attitude of the model users.

This paper focusses on a tool, initiated by Boerenbond, a major farmers' organization in Flanders, which enables Boerenbond to react pro-actively towards various demanding parties (consumers, retailers,...). They believe that the sustainable development of an industry finds its origin in sustainable strategies at farm level. Therefore the farmers' organization asked to develop a scan tool for the assessment of sustainable development at farm level. The tool aims at increasing the insights on the sustainability of multiple farm aspects. Through this first goal, a second objective is to support the learning process of the farmer. As the Boerenbond initiated the tool development process, we refer to the tool as an on-demand scan tool.

During the participatory development process of the tool, we try to take into account previous lessons learnt from the development process of MOTIFS (Triste et al., in press). The aim of this paper is to describe and evaluate this participatory development process. We start with a literature review to overview evaluation criteria and lessons learnt for tool development. Second, the set-up of a participatory development process for three different industries (fruit production, greenhouse cultivation and arable farming) will be described and evaluated. In the discussion section, we focus on the main research questions: i) What lessons were successfully implemented during this development process? ii) which barriers still remain an issue? iii) What kind of tool did this process generate and does the tool meet the initial objectives of the project? and end with the new lessons learnt.

2. Literature review

In literature many evaluation criteria and lessons learnt are described, an overview is given in Table 1.

Table 1: evaluation criteria and lessons learnt from the literature

Criteria	Description	Source
Effectiveness of management	refers to leadership within the management, transparency within the management (design, generalizations, decisions) as well as towards participants and observers of the process (generalizations, translation of input to results, reasoning behind results, cause of results and interpretation of the results) and the regularity of reflection on goals and the set-up of the instrument. Refers also to the effectiveness of the communication towards	(Blackstock et al. 2007; de Mey et al, 2011; Hermans et al. 2011; Neef and Neubert, 2010; Triste et al, 2013;)

	participants. Also the accountability and the capacity to develop a shared vision are important. The accountability is the extent to which the representative's core constituencies are satisfied, including expectations. A shared vision (objectives and goals) needs to be defined for the tool development process and the project itself (the end-goal and how it is achieved, needs to be clear to everyone)	
Capacity to influence and to participate	referring to the participant's ability to influence the process (being heard, competencies in technical and process techniques, influence on others), their ability to value different points of view and the opportunities for an active stakeholder role within the process	Blackstock et al., 2007; Hermans et al, 2011; Neef and Neubert, 2010; Triste et al., 2013
Ownership in process and outcome	referring to the recognition and acceptance of farmers that they have a responsibility in achieving a more sustainable agricultural practice and the extent to which there is an enduring and widely supported outcome	Blackstock et al., 2007; Hermans et al 2011; Triste et al., 2013
On-demand	driven from the needs of the industry, farmers,...	Triste et al., 2013
Access to resources	the provision of support which is available to allow participants to engage and meet expectations for their roles	Blackstock et al, 2007
Context	political, social, cultural, historical and environmental context in which the project occurs	Blackstock et al., 2007; Burgess & Chilvers 2006; Neef and Neubert, 2010; Triste et al., 2011
Capacity building	developing relationships and skills to enable participants to take part in future projects	Blackstock et al., 2007; Neef & Neubert, 2010
Recognised impacts	referring to whether participants perceive that changes occur as a result of the participatory tool development process	Blackstock et al., 2007
Social learning	referring to the way that collaboration has changed individual values and behavior, in turn influencing collective culture and norms; importance of a social setting in which the instrument is used	Blackstock et al., 2007; de Mey et al.,2011; Hermans et al, 2011; Triste et al., 2013
Emergent knowledge	referring to the influence of local knowledge on the outcome of the research	Blackstock et al., 2007
Legitimacy	referring to whether the outcomes and process are accepted as authoritative and valid	Blackstock et al., 2007
Tool characteristics	refers to the multifunctional characteristic of the tool, its user-friendliness, flexibility and the communication aid of the tool. The first refers to the different functions a tool can comprise (monitoring, communication, learning, management and certification (Marchand <i>et al.</i> , xxxx)). The second and third refer to the extent to which the tool is flexible and easy to use. This is related to the graphical design, ease of assessment and calculation, workload, etc. The last refers to the use of the tool in discussion sessions and its ability to support discussions on sustainability. Both communication aid of the model itself as communication through using it in farmer groups are included	Binder et al., 2010; de Mey et al.,2011; Triste et al., 2013
Validation in practice	the validation of the tool in practice for example to reveal barriers in the design, calculations,...	Triste et al., 2013
Availability, correctness & compatibility of required data for tool use	Data availability necessary for indicator calculation, the correctness/quality of the data used to calculate the indicators and the extent to which the design and the proposed use of the tool is compatible with the data systems and institutional structure of other accountancy/consultancy agencies	Blackstock et al., 2007; de Mey et al., 2011; Triste et al., 2013
Effectiveness	extent to which the tool is perceived as being relevant to use and implement. Extent to which the tool meets with the initiate goal of	de Mey et al., 2011

	the project	
Attitude of model users	values and beliefs of the model users (advisors and farmers) regarding sustainability issues	de Mey et al., 2011

3. Methodology

3.1. Framework for evaluation

To characterize and evaluate the participatory development process for three different industries (fruit production, greenhouse cultivation and arable farming), we performed a case study based on the framework of Blackstock et al. (2007). This framework is built on three distinct literatures: participatory research, sustainability science and evaluation of partnership processes. We upgraded this framework with criteria and lessons learnt based on a profound literature review and/or emerging from the data. The outline of the evaluation is presented in Figure 1. The framework starts with describing the objective of the evaluation with the following aspects: (i) bounding; (ii) focus; (iii) timing and (iv) purpose. It continues with the selection of evaluation criteria and the choice of a methodology to gather and analyze data. The arrows in Figure 1 emphasize the link between research outcomes, research design and process, and the research context (Blackstock et al. 2007).

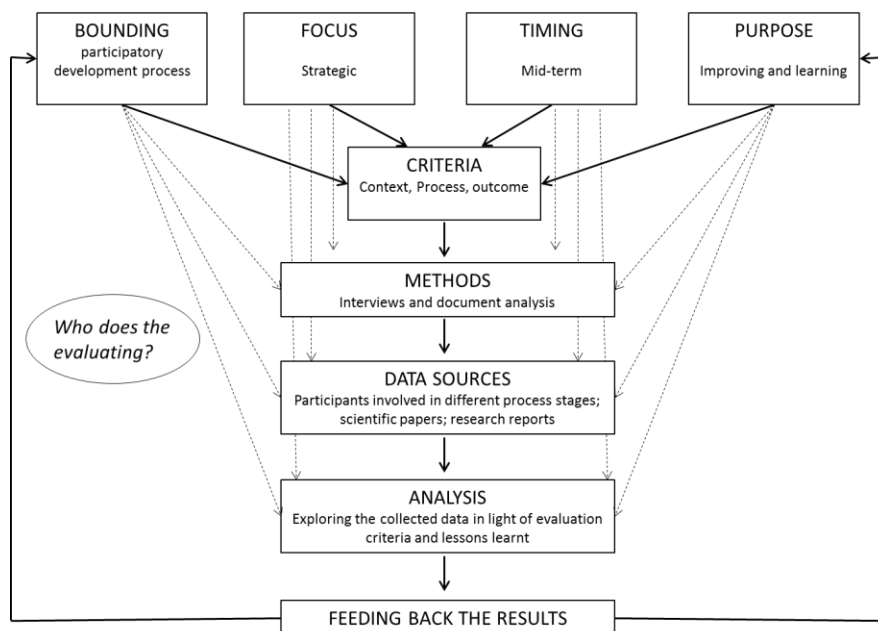


Figure 1: framework for evaluating participatory research (Source: Blackstock et al., 2007)

Bounding, focus, timing and purpose

Bounding clearly defines the objective of the participatory research as well as the objective of the evaluation itself. The objective of the participatory research is to develop an on-demand scan tool, which aims at increasing the insights on the sustainability of multiple farm aspects, and derived from this, to support the learning process of the farmer. Also the objective of the evaluation is double, with first, a review of the tool development process based on lessons learnt from previous studies. Questions which can arise are for example, what lessons were successfully implemented during this development process and which barriers still remain an issue? A second evaluation objective is a review of the process' outcome, the on-demand scan tool. What kind of tool did this process generate and did it meet with the initial objectives of the project? The focus of the

evaluation is strategic, since the objective of the evaluation is to investigate if the process achieves the intended results outlined by the project. As three other industries (dairy farming, pig farming and horticulture) still need to be set-up in the future, the timing of the evaluation is in the middle of the project. We want to reflect on the successes and the barriers of the tool development processes of three industries, which could able us to improve the processes of the remaining industries. Therefore, the central purpose can be described as improving and learning.

Evaluation criteria

The evaluation criteria, necessary for every evaluation process, are selected with taking into account the type of the evaluation and its objectives (Blackstock et al. 2007). Blackstock et al. (2007) mentioned that there are often no acceptable, valid and reliable quantitative measures for variables of interest. They proposed possible criteria from a literature review for evaluating the process, context and outcome. To guide the evaluation a number of criteria are selected from this list. Other criteria are the successes and barriers from the lessons learnt of the development process of the MOTIFS tool. To prevent us from overlooking criteria which might be important for the analysis, we left room for criteria to reveal grounded in our data. The list of pre-selected criteria are highlighted in Table 1.

Data gathering and analysis

The case study uses qualitative data combining multiple sources of evidence such as literature analysis, own experiences and stakeholders' feedback on the tool use in practice. At this stage of the research we are able to analyze reports of the meetings, reported data and built on our own experience within the project. The reports and reported data are analyzed (i) to identify what lessons were successfully implemented during this development process and which barriers still remain an issue and (ii) to see what kind of tool this process generated and if it meets the initial objectives of the project. Interviews will be conducted in a further stage of the evaluation, which enables us to exclude some criteria or implement new ones.

The data will be analyzed based on the selected evaluation criteria defined in Table 1. The criteria are ranked by (i) inappropriate to rank; (ii) unknown; (iii) adequate; (iv) inadequate and (v) mixed. Inappropriate to rank is used when a criteria is fixed. This means that an improvement from for example inadequate to adequate is not possible through a change in research methods. Unknown indicates that more research is necessary (e.g. interviews). Mixed indicates that some aspects of a criterion are adequate and others inadequate

4. Results

4.1 Evaluation criteria

The results based on the evaluation criteria are shown in Table 2.

Table 2: Evaluation results of the participatory development process

Criteria	Evaluation results
Effectiveness of management	Mixed/Unknown: Leadership changed within the project team due to a reorganization within the Boerenbond organization. This led to the absence of a leader and a lack of support and communication within Boerenbond during a certain period of time. Inadequate development of a shared vision, due to this vacuum between two leaders. This resulted in many different views on the end-goal and overall vision of project between project team members and consultants. The leadership within the research team was adequate. The accountability is unknown and within project team reflection isn't done regularly, especially when change in leadership occurred. Adequate transparency during the process occurred through reports of meetings. The different stakeholder meetings and meetings with consultants also gave the opportunity to receive feedback on progress and decisions. An extended manual is provided to explain all the data that needs to be filled in, eventual gaps and how to interpret some

	indicators. The research team started a reflection when the support towards the project decreased, the project goal was unclear and consultants were not well informed. However, information on how the benchmarks are calculated is not included in the manual. Communication and transparency between stakeholder meetings should have been more frequent.
Capacity to influence and to participate	Unknown participants were given the opportunity to influence the process during stakeholder meetings, interviews need to confirm if participants felt heard, were able to participate,...
Ownership in process and outcome	Unknown at this time
On-demand	Mixed: on-demand of farmers organization Boerenbond, however within the organization not all the members are in favor of and thus a demanding party for a sustainability assessment
Context	Inappropriate to rank: there is a general context in which the Boerenbond organization occurs, but differences between the three industries are noticeable. The industries all deal with different challenges regarding demands from society and environmental, social and economic issues
Capacity building	Unknown at this time
Recognized impacts	Unknown at this time
Social learning	Unknown at this time
Emergent knowledge	Adequate: knowledge of farmers, consultants and experts is seen as valuable knowledge during the development of the on-demand scan tool.
Legitimacy	Unknown at this time
Tool characteristics	Mixed: the function of the tool is to support the learning process of the farmer, which implies a specific set of indicators. During the process there were difficulties to maintain this goal, since stakeholders weren't informed well enough about the goal of the project. The user-friendliness, flexibility and communication aid are adequate. The scan tool is designed to give a relatively quick look at sustainability at farm level. Where full scans need one or more days (Marchand et al. 2012), this scan needs 2 hours preparation by the consultant and 2 hours' work filling in the tool with the farmer. The tool visually integrates the sustainability themes, which makes it possible to have a quick overview of the positive and negative scores of the indicators. The themes can be handled separately in discussion groups according to present needs
Validation in practice	Unknown at this time
Availability, correctness & compatibility of required data for tool use	Mixed: data availability for economic data was sufficient for most indicators and is perceived through the accountancy data of the farmer. Correctness of these data is secured. Availability of environmental data was rather low and not present in most of the accountancy data of the farmers.
Effectiveness	Unknown at this time
Attitude of model users	Mixed: the attitude of model users differs between the industries. The fruit production farmers as well as their consultants are more positive towards sustainability as well as the greenhouse cultivation farmers and consultants. The arable farmers are more opposed to sustainability measures, also the consultants are more reserved towards sustainability.

4.2 Outcome

The developed scan tool is an indicator-based sustainability assessment tool with a focus on learning. Sustainability themes, determined during stakeholder meetings with farmers and experts, are visualized in an adapted radar graph and shown in Figure 2. These themes differ per industry, since only important sustainability issues within an industry are taken into account. Each theme consists of a set of relevant indicators and the indicator scores lie between 0 (least sustainable) and 100 (most sustainable). The purpose of the scan is not to give one final score on sustainability, but to give an overview of the scores of each theme. This overview quickly shows the sustainability issues on farm level (lower scores) and gives the opportunity to think on

improvement strategies. It also gives the opportunity to address each theme separately for example in discussion groups with farmers. Farmers are then able to compare their results, their farming practices and their strategies to improve on that issue in relation to overall sustainability. The overall aim is to learn in depth.

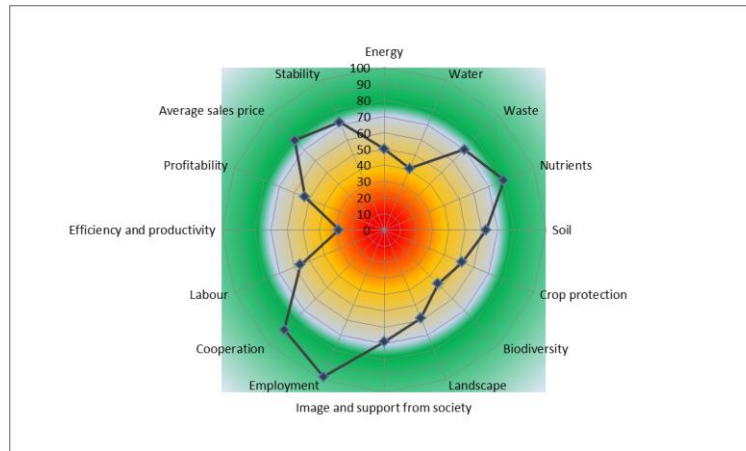


Figure 2: Result scan tool with sustainability themes and matching scores

5. Discussion

5.1 What lessons were successfully implemented during this development process?

As the active role of a stakeholder plays an important role in the success of a development process (Hermans et al. 2011; Neef and Neubert, 2010; Triste et al, in press), participation was ensured from the start. The first step in the tool development process was setting up a sustainability framework with farmers, experts and consultants. The framework consists of a set of sustainability themes, important for determining the sustainability of an industry. The same group of farmers, experts and consultants was also present in the following steps, where indicators needed to be validated. Towards the validation of the scan itself, farmers and consultants were informed and asked for feedback. Frequent stakeholder involvement increases learning, stakeholder commitment and support for outcomes and identification with the final end product. (Bohunovsky and Jäger, 2008; Hermans et al., 2011, Reed et al., 2008; Voinov and Bousquet, 2010). All these advantages of stakeholder involvement can be linked with selected criteria such as ownership of the process and outcome, capacity building, capacity to influence/participate, recognized impacts and social learning. We tried to enhance ownership of the process and outcome by stakeholder participation and by putting the emphasis on the improvement of the livelihood of farmers on the long term and not on sustainability. Participants were given the opportunity to participate and influence the process during stakeholder meetings (capacity to influence and to participate). If these criteria are met, is still unknown and needs to be investigated by further research.

The on-demand development of the scan tool can help develop a suited tool and facilitate the acceptance of the tool during implementation (Triste et al., 2013). However, in this case the need for developing a scan tool was not shared among all members of the Boerenbond organization and the broader group of stakeholders (e.g. farmers). For researchers, it is hard to deal with this gap between members of the Boerenbond organization and the project developers/team. The project team consists of the initiators of the project within the Boerenbond organization. The difference expresses the need for the development of a shared vision throughout the organization. Communication about the goals and objectives are therefore very important. This difference and

the absence of a shared vision between project team and members of the organization can also be linked with ownership of the process and outcome, capacity building and the capacity to influence/participate.

The effectiveness of the management is very important in a project. Neef and Neubert (2011) and Triste et al (in press) emphasize the role of the researcher during the scope of the project. Not only leadership within the team is important, also knowledge and expertise, transparency and reflection are important aspects. The results show that in this case the leadership, transparency and reflection are both adequate and inadequate. This is caused by a clear difference in the actions of the research and project management. This difference will be addressed as a new lesson learnt.

5.2 Which barriers still remain an issue?

A first barrier is the multifunctional characteristic of the tool. In this case, creating a clear understanding of the ultimate goal of the tool played an important role. The project team, as well as the research team, is responsible for communication towards stakeholders. The research team profoundly explained the goal of the tool during stakeholder meetings. Yet, this seemed not adequate enough, since stakeholders struggled with keeping the goal in mind. Their focus was often communicating about the sustainability of their industry towards other parties. This has led to different sets of indicators. Validation of the scan and further research needs to clarify if the goal of the tool is met. The project team also played an important role in the communication about the goal of the tool. Consultants of the Boerenbond were not informed enough about the project and therefore they did not know the meaning and goal of the project and tool. The change of leadership as a basis of this lack of communication within the project team will be addressed as a new lesson learnt.

A second barrier which remains an issue is finding available, correct and compatible data for tool use. Economic data were available for most indicators, because accountancy data of the farmer were used. Compatibility between accountancy systems is however not always possible, because these systems use different calculations and terms. Insight in these different calculations is therefore necessary. The availability of environmental data was rather low and not present in most of the accountancy data of the farmer. We tried to solve this problem by using other types of data which were readily available for the farmer and without extra calculations.

5.3 What kind of tool did this process generate and does the tool meet with the initial objectives of the project?

Important lessons learnt which address the tool characteristics are the effectiveness of the tool, its user-friendliness, flexibility and the communication aid of the tool. The effectiveness of the tool is unknown at this time. Implementation of the scan and interviews with tool users need to confirm if the scan is effective. The user-friendliness, flexibility and the communication aid of the scan are explained in the results and are all adequate.

One of the goals of the tool is supporting the learning process of the farmer. If the tool meets with this objective is still unknown. Hermans et al. (2011) mention that measuring outcomes of participatory processes is very difficult. Therefore a thorough methodology on how to measure learning needs to be developed.

5.4 New lessons learnt

The discussion above shows that the project team plays an important role in the development of the on-demand scan tool and the progress of the project. The importance of leadership,

transparency and reflection within the project team is a first lesson learnt. A shift in leadership occurred and has led to a decrease of support within the Boerenbond organization towards both the research team and the project itself. During stakeholder meetings consultants of Boerenbond did not know about the project and they were not informed that their organization was demanding party for the development of an on-demand scan tool. The development of a shared vision was therefore also obstructed. A possible solution is more frequent communication and transparency about the project and its goal towards the consultants. Also helpful in solving this problem are frequent reflections on how the project is proceeding within the Boerenbond organization. In this way, actions can be adjusted and specified for the three different industries.

A second lesson learnt is the inability to change the context in which the project occurs. At the level of the project, the research team could not change the shift in leadership within the Boerenbond organization. At the level of the industries, the results show that the attitude of model users differs between industries. This specific context of each industry cannot be altered. Researchers have to deal with this kind of specificity and the context in which the scan needs to be developed. Therefore every industry needs to be approached differently. To help the researcher understand this specificity, the project team and members of Boerenbond can sketch the specific context of an industry, its problems and strengths.

6. Conclusion

The evaluation of the participatory tool development process resulted in some successes, barriers and new lessons learnt. New lessons learnt are the importance of a well communicating project team with a clear division of tasks within the team, their ability to create a shared vision and find support within their organization. Also the lesson learnt regarding to the context in which a project occurs is very important. To understand and deal with this context and differences between industries is not always easy for a research team. Therefore close collaboration and communication with the project team is necessary to understand this context.

To be able to learn more from this evaluation and therefore improve the development process of three other industries (dairy farming, pig farming and horticulture) further research is necessary, since many criteria are unknown at this moment.

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