The role of action research (AR) in environmental research projects:

Learning from a project on local organic food and farming

By Hillevi Helmfrid, Andrew Haden and Magnus Ljung

I. Introduction

As the environmental challenges facing global society become more pressing, an increasing amount of research is being undertaken with the goal of generating knowledge about how human actions impact the environment. Ostensibly, this research is carried out so that society can be informed of environmental harm and make changes to mitigate it. However, in practice, much of the new knowledge generated by scientific inquiry ends up adding to the collective databank of facts that point out what is going wrong. Rarely do the results of science lead to direct action in the problem area. What is failing to occur, as evidenced by the worsening of many environmental problems, is a process whereby members of society internalise this knowledge and act to make changes accordingly.

Recognition of this fact has lead funding agencies to demand actionable results from research, and science has been called upon to not only identify problems, but to recommend and implement changes in society as well (Ravetz 2004). Due to the complex nature of environmental problems, this process often draws together the academic, political and business spheres, and in so doing, many of the traditional roles held by actors within these formerly distinct spheres have become less well-defined (De Marchi and Ravetz 1999). This orientation of environmental research towards societal results has lead to a new demand for Action Research (AR) and has made AR enter into new contexts.

In this paper we reflect on our role as action researchers within an interdisciplinary European Agro-Environmental Research Project (EAERP) that held the goal of not only creating scientific knowledge regarding the sustainable development of food systems, but had the simultaneous goal of implementing change in the studied systems. We use Checkland and Holwell's FMA model (Checkland and Holwell 1998) to discern between different kinds of research all of which were represented in the EAERP. Based on our experience in the project, we formulate an expanded FMA model to highlight the role that normative goals and facilitation process competence play in Action Research. In the last section we present our conclusions in two parts: A. Reflections of project design: The relation between AR and other kind of research when in the same project. B. Reflections on preconditions for participatory processes to happen.

About the Authors

The first author (Helmfrid) has a background as a consultant in change processes linked to sustainability. For many years she has reflected upon, and experimented with, how change is brought about in social settings. Before becoming a consultant she worked with the design of an interdisciplinary and action oriented research project on local sustainable development at the Swedish University of Agricultural Sciences. She has a MSc in Agronomy. For her work

in the project described in this paper, she envisioned creating environments and situations where collaborative learning could happen. She hoped to be able to play this role both among actors, between actors and researchers, as well as between the researchers in the project. She also had an interest in extractive research on the level of 'meta-learning' or 'learning about learning', and this paper is in one sense an expression of this interest.

The second author (Haden) has studied Action Research in the context of the agricultural and rural development and has worked with local food system innovation in both the US and Sweden. He is currently a Ph.D. student focusing on organizational innovation in the context of local food systems, and this project forms one portion of his research. He joined the project because it offered a chance to work with a local food system that is environmentally sustainable and well advanced in terms of its integration with the rest of the surrounding society. Furthermore, the chance to develop knowledge of social change processes related to agriculture was a primary consideration in choosing to work with the project.

The third author (Ljung) is extension officer, researcher and teacher at Swedish University of Agricultural Sciences. He gained a doctoral degree in 2001, based on action-oriented studies on collaborative learning and decision making for sustainable development of Swedish agriculture. Since then he has been designing, facilitating and evaluating several environmental programs and projects, trying to bridge the gap between science and practice. Ljung joined the research process at a later stage, mainly contributing with experiences from other research projects, theory and with critical reflections on the analysis. The involvement gave him an opportunity to learn more about the dilemmas facing action researchers when bridging between epistemic cultures (science vs. practice), as well as participative presence (action) and reflective distance (research).

It should also be said that all authors share the *explicit* general normative goals of the project, that is, we feel it is desirable to work towards the sustainable development of local food systems. However as we will show in this paper we did not entirely share the *implicit* norms in the project plan regarding the social dimension of research and action research.

II. European Agro-Environmental Research Project (EAERP)

The European Agro-Environmental Research Project (EAERP) upon which this paper was based is international in scope, with over 30 researchers employed part and full-time in 8 countries around the Baltic Sea (Sweden, Finland, Estonia, Lithuania, Latvia, Poland, Denmark and Germany). The goal of the EAERP was to "develop a knowledge base regarding possible means of significantly decreasing consumption of non-renewable energy and other limited resources, and of reducing the negative environmental impacts of production, distribution, processing, and consumption of food" (excerpt from project application). The project's goals were to be carried out through "case studies, complemented with scenarios and consequence analyses, of ongoing practical, local ecological initiatives to promote local food supply cooperation between consumers and ecological producers (organic farmers, local food processors and distributors) in rural villages in the countries around the Baltic Sea, with the aim of learning about and promoting more sustainable food supply systems and lifestyles." The total budget for the three year project was just over 2,300,000 €.

Project Design – Possibilities and Constraints

The design of the EAERP centred around five 'work packages' or 'WPs', each of which were performed to greater or lesser depth by separate teams in each country. WP1 - the action research (AR) part of the project - was the WP for which the two main authors were hired to work in Sweden. WP 2 dealt with ecological evaluation of food and agricultural systems and used Life Cycle Analysis (LCA) (Carlsson-Kanyama et al. 2003) to measure energy use, nutrient requirements, emissions to air and water, etc. based on a sample of 32 organic farms around the Baltic Sea. In addition WP 2 compared the environmental effects of dietary choices, using the variables of transport distance, organic versus conventional production methods, etc. as the basis for comparison; WP 3 dealt with the economical evaluation of local food systems considering the effects of various future development scenarios on the economic sustainability of both individual farms and rural communities; and WP 4 dealt with the sociological implications of local food system development scenarios. The activities in WP 2-4 are based on traditional natural and social science. The role of the fifth WP 5 is to translate the research findings from the work of WPs 2-4 of the project to various actors, both domestic and international.

The Action Research Setting

The community chosen for the EAERP lies on the outskirts of a small Swedish town (pop. 7500) near Stockholm. The community is unique in that existing there is a constellation of businesses and social activities that are all in some way connected to the humanistic spiritual science known as Anthroposophy. Anthroposophy is based on the life work of Rudolph Steiner (1861-1925). Anthroposophy seeks to integrate many aspects of human life and includes recommendations for education, agriculture, medicine, art, music and spiritual practice. In the community, over 30 companies, not-for-profit foundations, primary and secondary schools and alternative health care institutions currently operate, all based in some way on Anthroposophist principles. Most of the farms that comprise the production base of the local organic food system in the community practice biodynamic agriculture which is the form of agriculture associated with Anthroposophy.

Although the community has an unique concentration of biodynamic farms, a diversity of local small scale processing and a high concentration of quality-conscious consumers in one place, it does import considerable quantities of food from both other parts of Sweden, Europe and the rest of the world. The goal of the AR part of the project (WP 1) was to promote further local integration of production, processing and consumption in the food system. The favourable preconditions were recognized as a potential for this further development.

III. Conceptual Framework - FMA

Action research (AR) has many roots and reasons for originating as an alternative research strategy (Reason and Bradbury 2001). One is as a response to dominating views on what counts as valid knowledge in real-life settings and what methods are needed if one is to understand social change. Another reason has a pedagogic viewpoint with its roots in Dewey, Freire, and other researchers that wanted to "free the mind" of the public through joint learning and new research-roles (refs.). The latter was strongly based in assumptions about human sociality, learning-by-doing, and democratisation of society, etc. A key potential of AR is that it can be a means of combining knowledge creation with the facilitation of change.

The purview of AR is quite large, based on a body of literature spanning many decades, with application in many fields (Reason and Bradbury 2001). While there are many different definitions of AR (Whyte 1991, Callo and Packham 1999, Reason and Bradbury 2001) we have found a useful mental model of the essence of AR in the work of Checkland and Holwell (1998). In this paper, we use their model as a starting point for our discussion but also make substantial amendments to it. Because the role of AR is two-fold, encompassing both the generation of knowledge and the facilitation of change, we set out here to outline our perceptions of these two processes.

Ways to Facilitate Change

The idea that society should be informed of, and act according to, the latest and most accurate scientific information is not new. Indeed, 'extension science', the field most directly related to the influence of science in implementing changes in agricultural systems, has been a distinct field of study since the beginning of the twentieth century (Röling 1988). In its early years, extension science could be thought of as the systematic dissolution of barriers to induced change. Beginning with the Transfer of Technology (TOT) model before the 1960's, extension was largely a matter of transferring technologies developed by agricultural scientists to individual farmers for the expressed purpose of increasing agricultural productivity. In the 1960's this approach transformed into the "Diffusion of Innovation" model of extension by the application of learning psychology and marketing research (Rogers 1962, Röling 1988). Both of these models are decidedly top-down in nature, with a one-way communication pathway from the sender (expert) to the receiver (farmer). In effect, this method can be thought of as change promotion by transfer of information, where the receivers are expected to change their behaviour in accordance with the message sent (figure 1). To achieve this, the sender must carefully choose the channel for the message and also pay close attention to the characteristics of the target group. Although criticised, this model is most often implicitly presumed when the dissemination of environmental research findings is discussed.
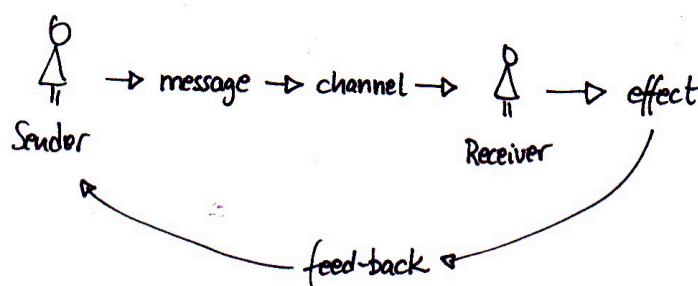

Figure 1. Information flow in traditional models of extension (Nitsch 1999).

The traditional extension model has been criticised on the following points, among others (Leeuwis and van den Ban 2004):

1. Because 'receivers' of information tend to carry values and tacit attitudes that consciously or subconsciously select what kinds of messages are received, information dissemination activities and campaigns based on the classical extension model often fail to give the desired effect in behaviour.

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2. The model begins with the notion of experts as knowledgeable and practical actors as being more or less ignorant. While working with sustainability and other complex issues it is more likely that 'experts' and practical actors have *different* knowledge. In some situations this different knowledge resembles pieces of one puzzle, in other situations there are also different perceptions of reality. For change to happen in this situation, it is more fruitful to create a climate of dialogue, listening and collaboration than putting effort into a one way transfer of information.

3. The model fails to recognize the needs of individuals to feel empowered in their actions. That is, to feel that any changes they make in their behaviour are personal choices carried out under the power of their own will.

The model does work in certain situations. It works when (1) the message is in line with the prevailing paradigm (Berkes et al. 2003) the expected effect or behaviour is not expected to last long and has a low behavioural change threshold (Berkes), and when the sender has large financial resources. The situation in sustainable development work rarely meets any of these criteria. Sustainable development work is often performed with limited financial resources in relation to the size of the task, we see a need for changes in behaviour and transformation of the respective systems that have relatively high behavioural change thresholds, and the message often runs 'against the stream' of the prevailing paradigm, as well as higher order economic trends. Therefore, in sustainable development work we need to look for other methods of facilitating change.

Leeuwis and van den Ban (2004) argue that the basic rationale for extension and development work in agriculture is changing. Supporting horizontal knowledge exchange, generating desirable, feasible and robust innovations, conflict management, capacity building, and initiating processes of social learning are some examples. New demands, both from society and local communities or individuals, result in innovative responses. But interactive innovation processes have not only a technical, but also an important social dimension. We know that people seldom go from knowing to doing. This has been shown by research from many different perspectives (Lindén 1994, Sjödén 1994, Biel 1996, Dietz and Stern 2002). Therefore we also need to develop the way in which we chose to work with people. This is very much a pedagogic and communicative challenge.

Here we are reminded of the work of Marilyn Mehlmann, a consultant on change processes in relation to sustainable development, who has synthesized her many decades of experience into an action model called the 'Circle of Empowerment' (figure 2) (Fonseca and Mehlmann 2001).
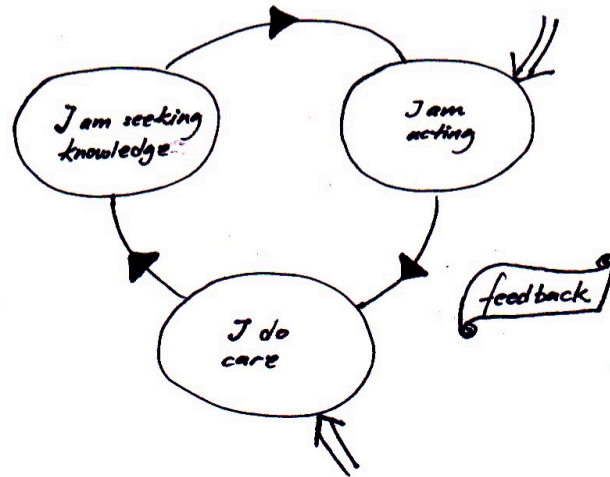
Figure 2. The circle of empowerment (Fonseca and Mehlmann 2001). People enter into the positive spiral of empowerment either through caring or action, not through knowledge.

Experience from projects working with empowerment show that people can enter into the Circle of Empowerment only either through doing or by caring. For a person or organisation that has entered into the positive spiral of empowerment, knowledge seeking will be specific and demand-driven. When this occurs, coaches and facilitators are more needed than teachers. The challenge for the facilitator of change according to the Empowerment model is to 1) create a caring climate (meetings where participants feel respected, participate on equal terms, are asked about their own goals, truly own the process and are really cared about, will more likely lead to action), and 2) offer possibilities for taking action that gives direct feedback with a low-commitment-threshold. (The feeling of "We did it, and it worked" empowers individuals to care more deeply, seek more knowledge and engage in more action.)

Ways of Generating Knowledge

According to Checkland and Holwell (1998) a basic task of traditional scientific research is to generate new knowledge, through application of the scientific method to some area of concern. Requisite to this method of knowledge creation are an hypothesis and a method of testing the hypothesis that is repeatable. Quoting directly from Checkland and Holwell (1998), we offer their diagram of how this process works in general terms, in order to lay the groundwork for a later discussion in which we compare this process with other potential methods of knowledge creation.
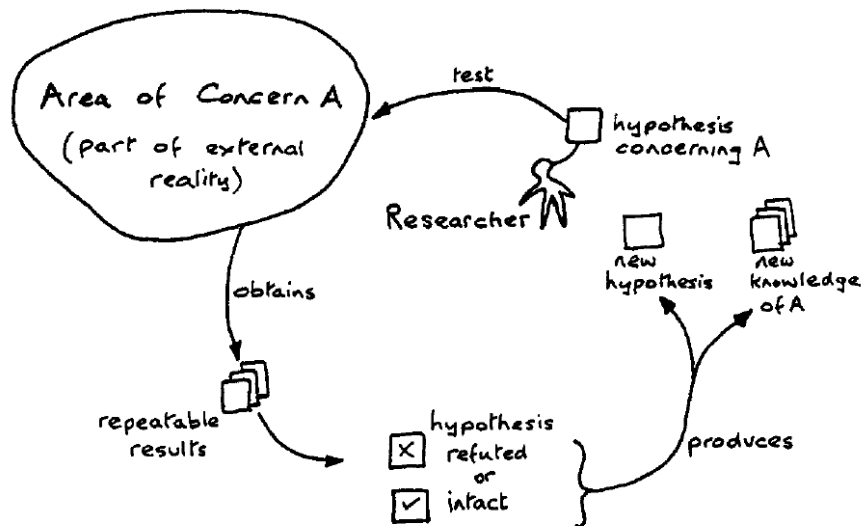
Figure 3. The hypothesis testing research process of natural science (from Checkland and Holwell, 1998)

In the model presented in Figure 3 the researcher begins with a hypothesis related to A and, through experimentation, obtains repeatable results that either confirm or refute the hypothesis. If refuted, this leads to a new process of hypothesis formulation, which starts the researcher around the cycle once more. If the hypothesis is confirmed and can be confirmed by other scientists then it becomes 'fact', and is added to the store of universally applicable collective knowledge.

While many of us are familiar with the type of research depicted in Figure 3, it is possible to distil from this model the more basic and fundamental elements which are common to any process of inquiry. In Figure 4, also taken from Checkland and Holwell (1998), we see depicted a general process of inquiry, which provides the platform from which we can compare AR and other kinds of knowledge creation.
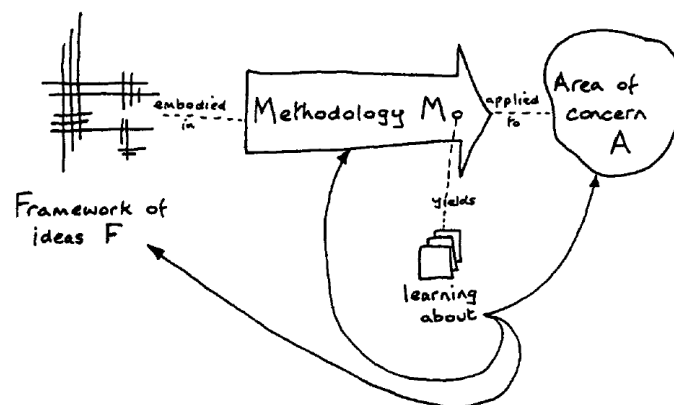

Figure 4. Elements relevant to any piece of research (from Checkland and Holwell, 1998)

Any research contains a pre-existent framework of ideas (F) which is embodied in a methodology (M) and applied to an area of concern (A). The learning/findings can be about all three elements F, M and A. Later, we will expand upon this basic depiction.

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Creating Knowledge while Facilitating Change: the Purpose of Action Research (AR)

A key potential of AR is that it can be a means of combining knowledge creation with the facilitation of change. We use Checkland and Holwell's (1998) conceptualisation of the research process as a base model upon which to add those elements that our experience from AR indicates enrich the model further. Figure 5 is the depiction of the cycle of AR from Checkland and Holwell (1998). In the depiction, a researcher begins with a research theme related to a real world problem situation, or area of concern (A). Before entering, the researcher should clarify what framework of ideas (F) from which they are acting, and also establish what methodology (M) they will utilize. Basic cognitive frameworks are quite often subconscious or taken for granted. Making them explicit is an important process of self-inquiry that has implications for the research process. Having done this, the researcher enters the real world problem situation (A). Moving through the process will enable the researcher to reflect on the involvement which in turn leads to findings, (regarding F, M and A), which can be recorded and shared and stimulates the development of new research themes.
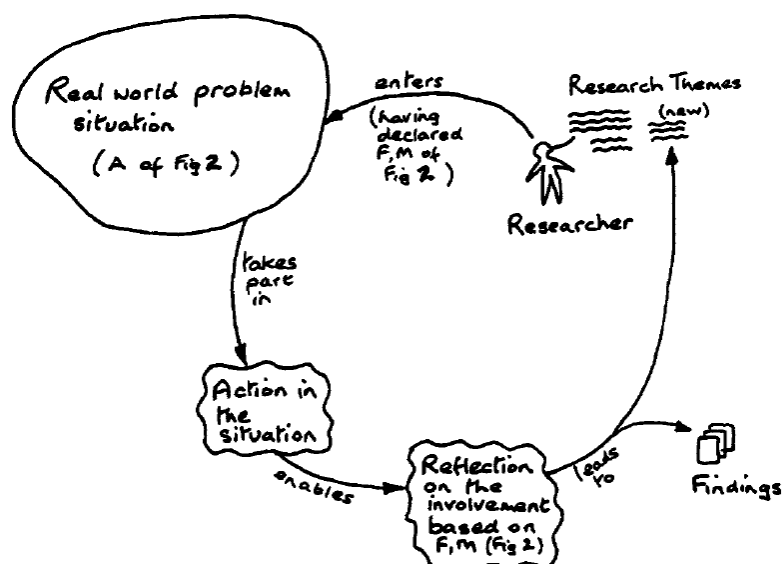

Figure 5. The cycle of action research according to the FMA model. (from Checkland and Holwell, 1998).

Our Activities in the EAERP

Framework (F)

Looking back we see that there were different frameworks and methodologies being employed in the EAERP. Because they were not made explicit from the outset, they became a source of some confusion.

EAERP Framework

The EAERP project plan had a framework based largely on environmental concern. It stresses the urgency of knowledge from the natural sciences being integrated into decision-making (from small-scale actors in local food systems to EU agricultural and environmental policy boards) with the final goal of saving the Baltic Sea from ecological collapse. There was an

hypothesis in the project that local integration of food systems together with the development of an agriculture with high levels of nutrient recycling would offer a major solution to the eutrophication problems of the Baltic Sea. The design of the project had an inbuilt paradox: the hypothesis to be tested in the scientific parts (WPs 2-4) of the project were also largely presupposed as being confirmed and ready to be implemented in the action-oriented parts of the project (WPs 1,5).

A crucial question for the project was how the purely scientific parts of the project should interact with the more action oriented parts. In the project plan, this interaction was designed to be mainly "top-down": researchers were labelled as experts and people in the local community (in the case of WP 1), or decision makers (in the case of WP 5), were labelled as actors. The role of the expert was to evaluate the actor's activities, while the actors were expected to in some way alter their life, work and decisions in accordance to researchers' findings.

Our Framework

We entered into the project with a rather different framework. While sharing the overall environmental concern and believing in the importance of local integration of food systems as well as recycling agriculture, we had our focus on how change can be facilitated. We understood change as dynamic, open and systemic. Furthermore, working in a social setting with the motive of enabling change has moral implications. According to our view we as researchers have to be aware and open to discuss our own role and the consequences of ours and others actions. We would argue that any form of communication is action: each interaction becomes part of the whole process of change, a process which is reciprocal by its very nature. Consequently, we not only question top-down research approaches for failing to create robust and relevant knowledge for practitioners, we also question the basic assumptions behind such an approach from an epistemological and ethical point of view. As researchers, we have to be open to new opportunities, to change our objectives and directions, and be willing to change our own assumptions and beliefs. These principles guided our work as facilitators and our analysis of our experience. In practice, we understood that our task as facilitators was to create a climate of dialogue where participants were asked about their own goals, to give them chance to own the process and the agenda, as well as to offer possibilities for low threshold actions.

Helmfrid's principal sources of inspiration were The Empowerment Model (Fonseca and Mehlmann 2001), Enspirited Envisioning (Ziegler 1994), Open Space Technology (Owen 1997), Four Rooms of Change (Janssen 1996) and Appreciative Inquiry (Cooperrider and Whitney 1999). Common for all these approaches is the understanding of change as a human process where the most fundamental occurrence is to "turn the light on"; only when people feel commitment, concern, and passion in relation to an issue will something happen. The challenge of the facilitator of change is how to create a climate were this occurs. When the "light is turned on" *awareness* is the key word. The role of the facilitator is to cultivate awareness about his/her own role and give the collaborators the opportunity to cultivate their own awareness and learning. The following have been shown to be important qualities for this facilitation:
- Being open about content (no foregone conclusions) and be clear about process and boarders (Owen 1997).
- Being authentic (Janssen 1996).

- Approaching people with care and respect as subjects of their own life and work (Fonseca and Mehlmann 2001).
- Focusing on the positive core of the past, present and future (Cooperrider and Whitney 1999).
- Uncovering to the essence of issues (Ziegler 1994).
- Trusting human processes.

Our M (methodology, attitude, role)

As there were different frameworks operating parallel in the EAERP, sometimes pronounced and sometimes not, at each step in the our work we chose a methodology that was a compromise between the goals and framework of the project plan and our own understanding of good action research.

What follows is an overview of the methodologies (M1-4) that we utilized in our work.

M1 - A modified version of Appreciative Inquiry

Appreciative Inquiry (AI) is a methodology of positive change that moves though the four phases of *discovery*, *dreams*, *design* and *destiny*.

In this project we have used only the first phase of AI. In the discovery phase the mapping of the situation is done in dialogue between the participants. Instead of focusing on problems, as we so often do, the focus lies on moments of innovation and breakthrough. The rational for this is the observation that human systems move in the direction of what we most persistently ask questions about. Traditionally we use to think of documentation as a neutral act and of the act of inquiry and analysis as being separate from change, but as Cooperrider puts it "The seeds of change are planted in the very first question that we ask." (Creelman 2001)

The essence of Appreciative Inquiry is that rapid change can be facilitated by "creating a connection between every member of a human system and *the positive core of the past, present and future*" (Creelman 2001). As people start to highlight moments of innovation and breakthrough, appreciating the human forces behind these moments, a process of positive change is already started.

M2 - Open Space Technology (OST)

OST (Owen 1997) is a meeting form that combines the freedom and creativity of coffee breaks with the overview and structure of traditional conferences. In an OST meeting, the participants themselves (with the help of a simple time-schedule technique) create the conference program. There is enough time and space for everybody to stress his/her concerns and to form groups to develop them. Reports are written by the groups and in the end of the conference every participant gets a written report from all the parallel sessions. The participants are free and responsible to participate where they think their participation is most worthwhile. Facilitation of an OST meeting is free from preconceptions about desired outcomes. It recognises everyone as an expert on our common future. One of the greatest strengths with OST is that an authentic invitation to an OST meeting will generate an authentic outcome. People will only commit to what they truly feel committed to.

M3 – Group/ Collaborative Reflection

Various activities performed during the project were carried out in groups formed with the facilitation of the authors. These group activities were coordinated by the authors and in the process, the participants, including the authors, would work through any problems encountered in the group work through dialogue and collaborative reflection. No specific methodology was used beyond the general skills required of collaborative work in which people gather together to work towards commonly identified goals. We employed this type of methodology in our work with community members, researchers from other parts of the project as well as work with the project's reference group.

M4 - Semi-Structured Interviews

The semi-structured interview (Kvale 1996) was utilized for the documentation activities within the project. This methodology was employed because we were interested to find out about a specific aspect of the community member's activities, but also to leave space for uncovering other interesting information that could be of use for both the AR portion of the project, as well as the work of other WP's.

Actions Taken

WP1 was given three tasks: Task 1) documentation of ongoing activities and analysis of bottlenecks for improvement of the local food system, Task 2) to use AR to implement identified desirable changes and promote system improvements, and Task 3) to disseminate the knowledge generated in WPs 2-4 to the actors for the improvement of their work. Although the end goals of the work of WP1 were explicit in the project design, the methods to be used to perform the tasks were not explicit, with the exception of the documentation work. The following section outlines the activities undertaken in our project work (WP1).

Activity 1 (A1): First actor meeting

Format:	A first actor meeting was held on June 16th 2003.
Background:	Before this meeting, the project coordinators had held two[1] meetings where they informed the actors about the project.
Invitation:	The persons were chosen by the project coordinator representing producers, processors, distributors and consumers.
Objective:	To get started with Tasks 1 and 2 in a synergetic way.
Methodology:	We consciously chose not to follow the methodology proposed in the project plan for the documentation (Task 1). Our focus was to start a fruitful process in the community (Task 2) and we saw a possibility to start the process with the actors by doing the documentation of the actual situation together with them, using a modified version of Appreciative Inquiry (Cooperrider 2003). Focusing on the moments of innovation and breakthrough, we aimed to better understand the creative forces in the community and through this, to hopefully empower the participants.

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[1] Being only half of the number of actors present on the first meeting a second meeting was organised for the other half.

Results/learning: Out of eight actors invited only two participated during the whole meeting together with six persons from the research team (including the two authors of this paper). In spite of this, the meeting was carried out as planned. The participants seemed to appreciate the design of the meeting and showed concern and commitment in the dialogue. The authors experienced the joint preparation of the coming Open Space meeting as fruitful and effective. However, the low representation of actors led to a picture of the creative forces in the community highly coloured by the participating researchers (three of whom were also residents of the community).

Activity 2 (A2): Documentation

Format: Our documentation work is now in a published report (Haden and Helmfrid 2004)

Objective: To fulfil Task 1.

Methodology: Our idea from the outset was to make a simple documentation primarily for the sake of the collaborative learning process with the community, for our own use and for the international colleagues in the project. However, little by little, we conformed to the requirements of the project to create a traditional report for an external public. To fulfil the task, we had to combine the information gathered at the meetings (Activity 1 and 3) with 13 semi structured interviews of farmers, processors and consumers in the community.

Results/learning: We have come to feel that our work with the documentation became somewhat counterproductive to our AR efforts, due to the project's requirements for traditional documentation. Through our experience in the community we learned there was a limit to how many times we could approach community members, only asking questions, before they lost interest in the interaction. This use of traditional research techniques may have hindered our later interaction with the community.

Activity 3 (A3): Open Space meeting

Format: An Open Space meeting was held on the 1st of October 2003. The meeting lasted one full day and was attended by 34 persons. Nine of these were from the researcher's team (including the two authors of this paper). Some of the actors attended only part of the day.

The theme for the day was: *Can we eat our way to a better environment? – Local and organic food as a possible future model.*

Objective: The objective was to get a broader base for Task 2 (getting people together, working out a common agenda and promoting improvement of the food system) and to do this in an empowering way.

Invitation: Approximately 600 people were invited to the conference. Additionally, there was an invitation in the local newspaper the week before the conference which resulted in a handful of phone calls and a couple of extra participants.

Methodology: Open Space Technology (OST) was used. (Owen 1997)

Results: The atmosphere of the meeting was good. Participants expressed that it was fruitful to meet people they would not meet otherwise and they felt empowered and committed in relation to the theme of the day. They also expressed positive surprise in relation to the effectiveness of the methodology.

Nineteen themes were discussed and reported (Haden and Helmfrid 2004). From the participants comments in the final circle we summarized four main themes for us to go on working with:

- School project (local organic food in the local schools)
- Food in winter (year-round storage systems for local organic food)
- Forms for alternative financing of farming and food processing
- Pedagogy for raising awareness about the relation between food, environment, health, and quality of life.

It is important here to notice that these four themes are a result of a synthesis that *we* made as facilitators.

Learning:	Looking back we recognize an important failure in the meeting design. For an OST meeting to bring about a process of change, *at least* one and a half days are required (could be up to three days). It is in the second (or third) day that action groups are formed. Only then it becomes clear as to what people are willing to commit to. One-day Open Space meetings are excellent when the objective is restricted to exchange of experiences. But when the objective is a change process more time is required. The compromise that we made, using OST for a consultative meeting should be avoided because many of the inherent values of OST are lost. Among them, we lose the information about who is authentically concerned about an issue.

Activity 4 (A4): Reference group meeting

Format	A Reference group meeting was held on 19th of January.
Background/ Invitation	After the first Actor meeting (Activity 1), eight community members and four researchers were asked (by mail) if they were willing to take part in a reference group for WP 1. If they were not interested to participate in the meetings they were asked to appoint another person in their organisation that we could contact.
Objective	By transforming the "actor meeting" into a "reference group" we envisioned that we would get a broadly representative group willing to enter into the dialogue of prioritisations and design of our work. This group would work parallel to working groups on special issues.
Methodology	The meeting was designed as follows:

1. Reflection on the Open Space meeting, what happened since the meeting and what failed to happen. (circle where everyone contributed)
2. Open discussion about the problems and possibilities linked to Activity 6.
3. Collective brainstorming on ideas for WP5.
4. Open floor.

The meeting was documented in a protocol which was sent out to everyone who had been invited.

Results/Learning	Out of eight actors invited, only three attended the meeting. This fact was discussed at the Open floor the end of the meeting. Proposals were made that the location of the meetings could be changed and that personal contacts would be necessary to get people coming to the meetings.

The actors present also expressed that they felt unsure about what role they were expected to play in the project and what use they could expect from the project.

After this meeting we started to understand that something that we had taken for given did not exist. We had thought of ourselves as facilitators of a change process |

driven by the actors. Now we realised that the actors understanding was different. Those who came to the meetings attended due to their personal interest, but also out of politeness.

Activity 5 (A5): The school project

Background: Present at the Open Space meeting was a representative of the local school district who was responsible for procurement of food for the local school kitchens. For three years prior to the Open Space meeting, this participant and her colleagues had been having difficulties to organize a local food procurement system. In addition to this activity they had intended to begin a project that would integrate on-farm pedagogy into students' basic curriculum. Both efforts had failed to succeed. During the Open Space, Haden offered assistance in facilitating a renewed project, which was accepted.

Objective: The objective was to support a continuation of the original project idea, which was to combine local food procurement with on-farm education for students attending primary schools in the community.

Contacts made: The project began with a core group of four individuals: the Open Space participant who initiated the project, her colleague from the local school district, a representative of the municipal Agenda 21 office, and one researcher (Haden). More contacts were made as the process unfolded. These are described below.

Methodology: After the Open Space meeting, a subsequent meeting was arranged with the core group of four to discuss the best way to approach the project, paying careful attention to overcome the bottlenecks encountered during the first three years of the project. The author (Haden) suggested that it may be fruitful to start small in order to ensure that the project was able to achieve something tangible in its first year. The new project applied for supplemental funding from the local Agenda 21 office, and the project was continued for 3 years.

At the next meeting, it was decided that we should approach farmers that fit the profile we wanted to support in the project, namely that the farms were based on organic production and had a mix of animal and plant production on the same farm (and thus a high level of nutrient recycling). The next meeting was with four farmers from two chosen farms, and successful agreements were made regarding how the collaboration would function. It was decided that the farmers and the teachers should meet to discuss if there could be a way to cooperate on the curriculum supporting the visits. A meeting with the school staff (teachers and kitchen staff) was held the following week. At this meeting, the enthusiasm for the project was gauged to be high, and the general sentiment was that the plan we had formulated in collaboration was sound.

Results/learning: The project was eventually taken over by the teachers and farmer's themselves, and is continuing as a self-run project. In our opinion, this project has been successful due to the fact that it was based on the true interest of the actors involved; they 'cared' about it, and made space for the researchers to act as facilitators of the process, without need to force the participation of the actors. The fact that there was already a project ongoing, even if it was faltering, allowed for the researchers to infuse the project with new energy and help steer it to a successful outcome.

Activity 6 (A6): Food in winter and alternative forms for financing

Background In the OST meeting, the lack of local organic food in the winter was discussed. The question was raised in the meeting by a representative from a local biodynamic restaurant. In the final circle of the OST, addressing the issue of the availability of

	food in the winter was linked with the issue of alternative financing. The proposal was that consumers could invest in venture capital, or long-term contracts, which would make it easier for producers to do long-term investment and to have a more secure financial situation.
Contacts made	The primary contact made in following up on this idea was with the man who originally suggested the idea at the OST meeting, a chef at a local restaurant. Based on his stated interest, Haden worked to meet with the chef and his main supplier of locally grown produce. After three cancelled meetings, a meeting was held between Haden, the chef and the local produce supplier.
Possibilities discussed:	The problem of sufficient quantity could be solved by adding local organic food from nearby farms to the biodynamic produce in the community (organic and biodymanic are related but distinct production methods).
	A lease contract could make land suitable for root-crops available to a farmer interested in this kind of production. The only land in the community which is suitable for root-crops is today used for grass.
	The local bank could generate the capital for necessary investment for someone who is willing to start production of root-crops and potatoes. There would be a need for storing possibilities if larger quantities were being produced. Peeling and washing on the farm may be a requirement for offering potatoes and root-crops to schools.
Results/Learning	Little materialised through this effort. The market in the community for locally-grown food is very mature, and the community has been organizing on this issue for over 40 years. It is clear to us that values other than simple monetary values are at work in the community, as people were already willing to pay a high price for food that they perceived as being sustainably produced. If a project addressing the availability of local food in the winter were important enough to the actors we felt that it would have happened already, or would happen in the future when the actors felt the need deeply.

IV. Our Learning – Adding to FMA

In this section we will focus on what the activities outlined above have taught us about using the FMA model in the context of the EAERP. While we feel that the model offered by Checkland and Holwell (1998) in figure 5 is a concise representation of AR, we would like to expand on this depiction in two directions, building our project-specific model step by step in order to share our learning from the EAERP (figure 6).

Normative goals, acting and facilitating

As researchers, we do not only have concepts, frameworks and methods. We also carry normative goals, ambitions and visions. It is crucial that these normative elements, which we label 'N', are made conscious and explicit before we enter into A. Once in a given situation, we can act from two different attitudinal stances or roles: that of being an actor, and that of being a facilitator. If we strive to promote a specific change in A, that is, if we have a strong normative goal (N) behind our engagement in a situation, we enter the AR process as actors. If our normative goals are more process-oriented, that is, if we strive to achieve a climate where the actor's visions will be realized, no matter what those visions are, we enter the AR process as facilitators. While there are no hard and fast barriers between these two stances, they can be seen as opposite ends of a single spectrum.
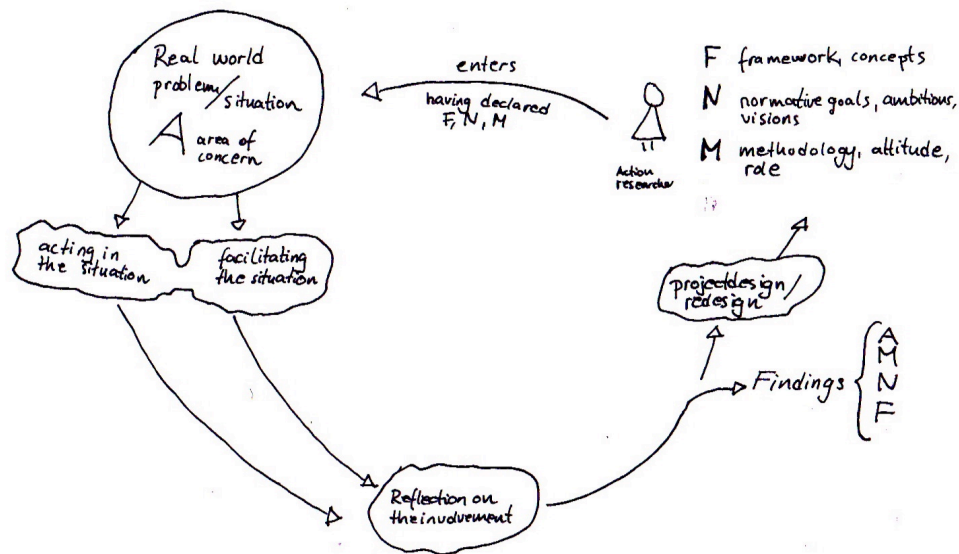
Figure 6. Goals, visions and ambitions ('N') need to be declared before entering into a situation, and the action researcher may choose the role of an actor or a facilitator.

The EAERP-project had strong normative goals (N) related to the area of concern (A). The project's vision was to implement a local recycling model in the food system of the community in order to create a good example for other communities. The authors' ambitions (N), on the other hand, were more linked to process and social interaction. The fact that people who work together in a project carry different Ns and Fs is not intrinsically problematic, but due to lack of time, we were not able to create enough space in the beginning of the project to clarify and examine our F and N in a joint process with all colleagues in the EAERP. Our experience from other situations is that spending time at the initiation phase yields much in return in terms of commitment and 'caring' in relation to the project work, which is crucial for the quality of the project outcomes. Our experience indicates that this learning may be relevant to many large research projects.

'Inner' and 'Middle Loop' Research and Process Competence

In the depiction above (figure 6), as well as in the original FMA model (figure 5) the learning is mainly that of the researchers and the findings are presented mainly to the researcher's colleagues (see also Callo and Packham, 1999). For action research to really facilitate change and generate knowledge at the same time, and in an efficient way, we believe that an interactive learning process in which actors actively participate is required. In figure 7 we therefore make the distinction between 'inner loop' and 'middle loop' processes.

In the inner loop process the reflection is primarily done together with the actors. This kind of AR-process has also been called *interactive* in contrast to the traditional *extractive* approach (Eksvärd 2003)[2]. In the interactive loop the most important outcome is the learning of the participants, while in the extractive approach the main flow of information is from the

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[2] Eksvärd, K., Tillsammans kan vi lära och förändra – deltagardriven forskning för svenskt lantbruk, CUL, Swedish University of Agricultural Sciences.

participants to the academic community. Again, it is not a question of hard and fast barriers between the two approaches, but of the *focus* for the action research.

Our distinction between 'inner' and 'middle' loop AR also relates to the distinction made by West and Stansfield of *consultation* versus *field study* (West and Stansfield 2001). In consultation the need and demand for AR comes from the community/organization. The area of concern (A) is defined by the collaborators and the expectation is that AR can help solve problems which they have defined. In the field study, on the other hand, the need for AR arises with the researcher. The area of concern is formulated by the researcher based on the literature and/or the researchers own experiences (West and Stansfield 2001).
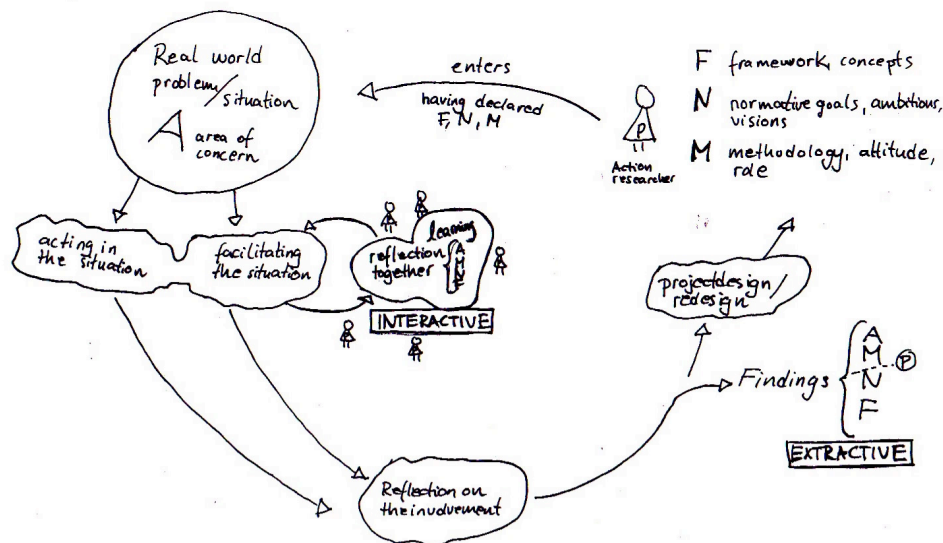

Figure 7. Here we make a distinction between two types of action research, *interactive* and *extractive or consultation* and *field study*. In the inner-loop AR researchers and actors reflect and learn together. While doing this they increase their 'process competence', indicated with a P.

The interactive approach will be easier to apply for the researcher who chooses the attitude of a facilitator than for the one who chooses the attitude of an actor, because if the researcher has specific normative goals (N) in relation to the area of concern (A) s/he will unlikely be able to leave the space open enough for collaborative learning to happen.

Another addition to the model that we feel is necessary is 'process competence', which we have chosen to label 'P' in figure 7. We consider this to be an ability (grounded in practice) rather than a knowledge (based on theory). In the model we have therefore chosen to put the P inside the bodies of the actors as well as the researcher. In a successful interactive learning process both the researcher and the actors have a chance to refine their process competence. In some AR projects, refinement of the researchers' and the collaborators' process competence may be the most important outcome.

AR may also generate extractable learning regarding P, a process of "meta-learning". However, process competence, as well as the "meta-learning", comes only out of real world experiences.

In the case of the EAERP, the area of concern (A) , the persons in the community with whom to work, as well as the agenda of the work was decided on beforehand in the project plan. The approach was a mixture of a field study,and a development project, where the concerns were formulated by the research project and our role was to make the 'actors' enthusiastic and willing to work towards the preset goals. As we have described earlier, the success of this approach was limited. We now understand this failure in the following way:

We entered the project with the attitude of facilitators. This choice was based on our own understanding of good action research. Little by little we realised that there was very little to facilitate, in the way the project intended. There was no request for our facilitation from the 'actors'. In essence we ended up trying to do consultation in a field study/development project design. This made the community members confused, asking "what do you expect from us?", and "what use can we expect from this project?" And in one sense, we had the same questions of the community members.

Traditional Research and the Sharing of Research Results

In figure 8 we introduce a third loop for traditional scientific research, which is based on *observation* of A, reflection on the observation and publication of the findings. In traditional research, researchers do not take action beyond data gathering, which is usually in either the form of interviews and questionnaires or in the form of physical sampling or measurement. The new knowledge generated about A is most often presented as findings within research journals and conferences. This 'outer loop' is an overlay of the research process depicted in figure 3, onto our model.
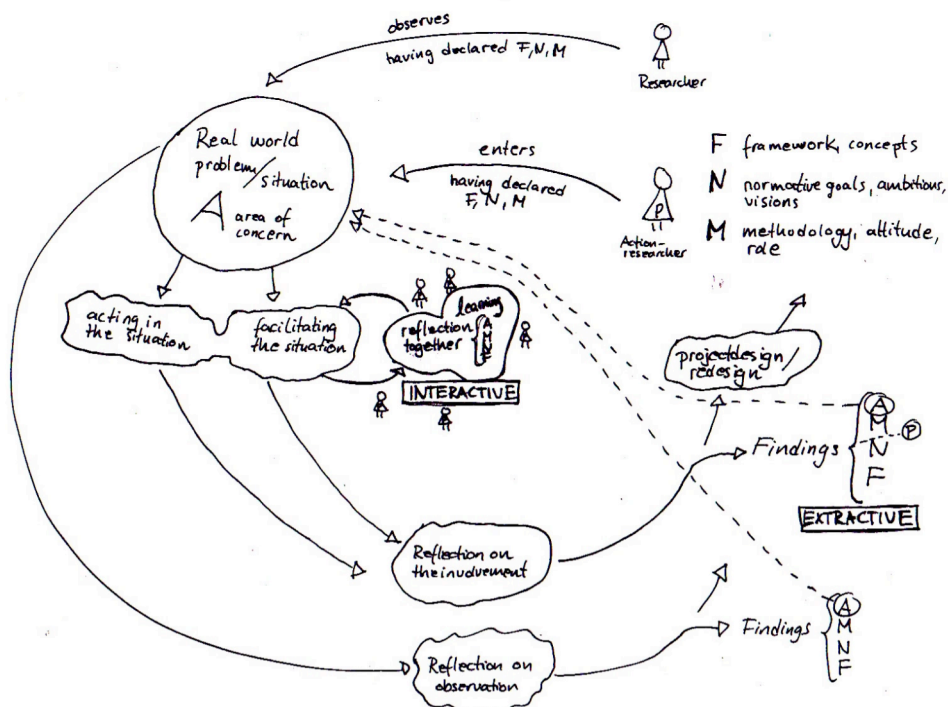

Figure 8. The complete model, with the addition of traditional scientific research,forming an 'outer loop', and the sharing of research findings to the area of concern, implies "a long way back" for the extractive research approaches.

All research processes eventually culminate in the sharing of findings, whether through dialogue, presentations, writing or other means. In figure 8, we depict how this transfer of findings back to the actors in the Area of Concern is usually understood. We introduced this paper stating that results of environmental science rarely lead to action in the problem area, that this is now a major concern of funding agencies of environmental science, and has lead to an increased demand for action research, as well as actionable results.

To summarize, we can suggest that there are basically three research processes that can be conducted regarding a common 'A' that each have their own way of relating to the actors in the area of concern. These can be summarized as follows:

1) Interactive Action Research/Collaborative Learning (Inner Loop)
2) Extractive Participatory Research (Middle Loop)
3) Traditional Science (Outer Loop)

The design of the EAERP upon which this paper is based contained all of these loops. This level of complexity must be handled with great care if the goals of the project are to be reached and both researchers and participants are to be satisfied with the interaction.

In table 1, we outline the characteristics of each kind of research process with relation to each other, and to how they are designed to influence A.

Table 1. **Characteristics of each research process**

Inner Loop	**Middle Loop**	**Outer Loop**
Applicability of the outcomes of the research		
Time/place specific. The process of research leads to changes and learning in the actors, in the researchers and possibly changes in 'A'.	Not generalizable beyond the specific situation. Can give others insight into what occurred and why. Based on the principle of 'recoverability'.	Generalizable according to the principle of repeatability and falsifiability.
How the knowledge created by the research links to change		
Knowledge created with the actors can lead to direct action by the actors within the 'A' if preconditions for real collaborative process are present. This requires focus on 'P'.	Actors may or may not recognize themselves within, nor the utility of, the research output. Changes in A based on the research may or may not occur.	Knowledge can be distributed to the actors in 'A' but requires to be translated. i.e. Needs a Ph.D. to create the knowledge and a P.R. person to disseminate.
What it is that drives the inquiry		
Dictated by the needs of the participants and actors (of which the researcher is one).	Driven by researchers interest, needs and desires, which in the best case coincides with the actors interests, needs and desires.	Driven by researcher's (or scientific community/funders) interests, need and desires

Our Experience of AR in the EAERP

In the EAERP, WP1 (the work package for which we were hired) was not designed explicitly as AR, but in reality was a mix of everything. In the table below we show that the tasks given and the methods proposed by the project plan comprise outer and middle loop research as well as the dissemination of research findings from other WPs.

Table 2. Tasks given in the project plan structured using the three loop model.

Task for WP1 in project design	Method in project design	In relation to three loop model	Underlying assumptions in project design
Task 1: Documenting Documentation of ongoing activities and analysis of bottlenecks for improvement of local food system.	Observation by interviews, analysis by researchers, outcome published in project report.	Outer loop – traditional research – no action research.	**Assumption 1:** It is assumed that researchers' analysis can be "given back" to the actors in a way that it stimulates a process of change.
Task 2: Promoting Bring actors together and work out a common agenda for improvement of the food system. Promote the proposed change. Analyse the process. Expected results: 1) Improvement of the food system in the community. 2) Knowledge of how to develop a sustainable local food system.	Methods not explicit in project design except "bringing actors together".	Middle loop – Extractive Action Research. Acting in the situation. Reflection done by researchers alone. Result published as research findings. Target group for outcome are actors in other places and the researchers' society.	**Assumption 2:** It is assumed that the actors in the cases chosen were interested in an improvement of the food system in the sense of the project. **Assumption 3:** It is assumed that the "How-to" from a very specific context can be of value in another place.
Task 3: Disseminating Dissemination of results from WP 2-4. "…ensuring that the results (from WP 2-4) are made known to the actors and utilised to improve their work."	Method not explicit in project design.	Translation and transfer of results from the projects outer loops to the actors in the case-studies. This role is not traditional research, neither action research, but 'extension' or research journalism	**Assumption 4:** Actors in the cases are assumed to be willing to change work/life based on scientific knowledge.

While the table above shows what we were expected to do, the next table shows what we actually did. Table 3 shows that our intention all the time has been to perform inner loop processes. In this we have had limited success, with the school project as an exception.

Table 3. Our performed activities and the methods applied structured using the three loop model.

Activity	Method used	In relation to three-loop model
First actor meeting (A1)	Adaptation of Appreciative Inquiry (Cooperrider and Whitney 1999)	Inner-loop process
Documentation (A2)	Adaptation of Appreciative Inquiry combined with semi structured interviews.	Intention of inner-loop process but ended up into an outer-loop process.
Open Space meeting (A3)	OST (Owen 1997)	Inner-loop process
Reference-group meeting (A4)	Group/Collaborative Reflection	Inner-loop process
School project (A5)	Group/Collaborative Reflection and action	Inner-loop process
Food in winter (A6)	Collaborative Reflection	Intended to be inner-loop process.

Looking back it may be more correct to say that the research we performed was middle loop (extractive) and focussed on our own learning ,where this paper is a main outcome.

V. Conclusions

During our work in the EAERP we have gained learning on many different levels. In the following we want to sum up our learning regarding a) project design and b) preconditions for participative process.

Reflection on project design for action-oriented multidisciplinary environmental research projects

All kinds of research categorised in the three loop model were represented in our EAERP. However it was not clear how these different kinds of research should relate to each other to make the project work effectively toward its goals. The project design was paradoxical, housing a traditional extension approach together with a wish for participation to happen. There was an instrumental view on participation. That is, participation was seen as a means to achieve the changes suggested in the project plan, as well as to reach out with new knowledge. We believe that our EAERP is not at all unique in housing many different, and not always explicit, beliefs about how environmental research can be linked to societal change. In the following we want to share our reflection on how multidisciplinary environmental research projects, that also have the ambition of promoting change, can be designed.

The traditional model

The traditional model employs the strategy of conducting scientific inquiry first (WP2-4 in our EAERP), based on questions considered important to the scientific community. Then, after the results of the scientific investigation are finalized, which may be 2-3 years after the investigation is initiated; the interactive and information dissemination pieces of the project can be set in motion (WP 1 and WP5, in our EAERP). This is the traditional mode of trying to get the information "out" to actors, and to stimulate action in the target groups, based on the scientific knowledge gained in the initial part of the project. In our EAERP, this first model was not possible to apply due to the fact that results from WP2-4 were not available yet.

The collaborative platform model

In juxtaposition to the traditional model of research design is the collaborative platform. In this model, the dialogue between the researchers and the community forms the base for the whole project from the very beginning so that the research questions and the structure of the project are defined in dialogue, where concerns, perspectives and insights are mutually shared between researchers and community members. This process allows the research to become an active part of the reality that is to be changed, which is traditionally only thought of as the "receiver" of the results.

A collaborative learning process requires the following:
- self-selected participation
- holding a high standard of authenticity and genuine interest that includes an open research agenda
- that actors and researchers are equals (possibly requiring remuneration of actors)

Here we are essentially talking about a design were the whole project turns into an AR project, but AR in a slightly new sense, where traditional researchers enter into dialogue with the community. In this design there is no 'action researcher' but rather a professional facilitator. The whole project has become action-oriented, and participant-driven, while maintaining the traditional skills of the traditional researchers. In such a project the FMA+NP can be used to structure a collaborative learning process between the researchers as well as the community members.

Our experience has led us to believe that there should be one person who acts solely in the capacity of facilitator. Too often, roles get confused if, for example, one researcher steps forward and sometimes acts as a facilitator and sometimes as an individual who has their own stake in the research. It is here that the importance of the invisible skill of facilitation, what we have earlier termed 'process competence' (P), must be recognised. The difficulty in this level of collaboration is that it is not possible to predict or plan *what the outcomes will be.* This has implications for funding of projects. An important learning that we have gained working in the EAERP is that the increased demand for AR from research funding agencies also needs to be accompanied by a change of criteria for funding which is more appropriate to open processes.

Preconditions for participative processes – reflexion on our experiences of AR

How can a complex social and organisational process such as an action-oriented environmental research project be described, analysed, and understood? We have found Robert L Flood's four systems window to be a helpful way forward (Flood 1999). According to this model, any form of social organisation can be described in terms of its structure, processes, knowledge-power, and meaning. It is four different perspectives on the same phenomena, allowing the researcher to put certain aspects to the fore. Being aware of the complementary nature and importance of all perspectives, the model might also be helpful when designing AR-oriented research projects.

The meaning of the project

One major challenge to action-oriented environmental research projects is related to the assumptions and normative goals of these projects. In our case, the assumptions in the project plan were that the actors would both share the project's vision and would be ready and willing receivers of the information being offered by members of the scientific research team. This was not the case. While the project had strong meaning to the project designer and to some of the main researchers, it lacked meaning to some of the 'actors' that the project hoped to involve. At the Open Space meeting, where everybody was invited to formulate their own meaning, we observed that the issue of local food was 'hot' to many people, although a wide spectrum of meanings was present.

Our experience tells us that it is important to make existing meanings explicit and the process design must enable this. All involved ought to have the opportunity to become aware of the perspectivity within the project. The purpose would be to make the inter- and transdisciplinary project as a whole more competent in managing existing heterogeneity and diversity. Developing a common meaning would therefore be an ongoing process, impossible to foresee, when opening up for genuine participation.

Structural frames and guiding principles

An action-oriented and participative research and development approach runs counter to the culture of predictability and engineering-type control that pervades much of our society. We entered the project with the ambition to create preconditions for collaborative learning. The meetings were designed with agendas giving the participants space to bring their own perspectives and concerns. We tried to enable dialogue and learning through the way we normatively designed activities.

Actors and researchers sat together, but not so much happened. Why? Probably it is a combination of different factors. It might be that there is a long history of projects in the community, and saturation might have occurred ('yet another project'). The way the EAERP-project was implemented, by informing actors that it had started, instead of involving people in the project design, had probably also affected the motivation to participate. Regardless of why, some of the key actors did not attend the meetings arranged, impacting the ability for those attending to mobilise. Those actually participating had a good dialogue, but their incentives to act were too weak. There was still a gap between good intentions and concrete action.

Consequently, the project coordinator got more eager to see concrete outcomes in line with the expected results that were included already in the project plan. There was an expectation that something would happen and he expressed that he wished us to make that happen. As process facilitators we faced a dilemma. On the one hand we had created structures enabling people to participate and act on a voluntary basis; on the other hand the incentives seemed too weak. One way forward would be to act more strongly, coaching the participants and taking more responsibility for their action. But this would probably be contra-productive if one wants the actors themselves to develop sustained improvements and ownership of the forthcoming process. Our conclusion was that the guiding principles for our work, and the structural frames created, should focus on enabling participants to act out of their own meaning and willingness, not what was suggested in advance in the project plan. We believe that the double signals about traditional versus participative approach was confusing to the community members that we interacted with, and that this is one explanation to why we had difficulties to attract collaborators.

After some effort to find a compromise were the project co-ordinators' wish could be met, our response was to open up space even more and listen to the actors' perception of meaning. We interviewed both those present at the meetings and those who did not come. The months during which these discussions took place might be seen as an important period in the development of the whole EAERP-project. These discussions also resulted in important learning both for us and for those responsible for the project coordination as we shared what we had experienced. An illustrative example of what happened, is that one of the local actors, a person that the project aimed to involve but who had never felt attracted to participate in our meetings, was interviewed and as a consequence is now employed directly by the project.

Looking back we can see that we have created preconditions for a learning process, but in a different way than we had expected. Due to the tensions between paradigms inside the project our own learning focus got more and more directed to higher abstraction levels. To understand what was going on in the project we ended up learning more about research paradigms and less about the area of concern, that is, the dynamics of food systems. Fortunately enough the project co-ordinators' learning led to some redesign in the project already for the second year.

A traditional project plan, where activities are fixed years on beforehand, becomes problematic when working with an AR-approach. Fixed schedules for activities and promised outcomes closes down space instead of opening it up for participation. Instead, what should be agreed upon beforehand and what should be carefully followed up is the overall approach and the basic principles that guide the work. It is important to show awareness about N, F, M and A, and it can be useful to structure the learning in a similar way. Milestones could only be set up in the sense that after x months it should be reported what has been achieved so far. What can be followed up is to what degree an authentic learning process has happened, who learned and what emerged in the process.

A process perspective

Working in the EAERP we found ourselves balancing between a traditional project plan, where activities were fixed on the one hand, and our own ambition of facilitating open ended processes of change based on the genuine interest of the participants on the other. In so doing we created islands of open space in an ocean of preset goals, norms and promised outcomes. The Open Space meeting was successful because it engaged people at the level of their personal goals and norms. The school project was successful because it was a response to a concrete demand. Opening up for dialogue about meaning led to the employment of one of the important actors in the local food system.

Leverage was created through the concrete activities arranged (see chapter III), but also through the ongoing communication which took place in-between these meetings. When people meet and learn together innovative ideas and new perspectives might emerge. But this does not happen by itself. It is by creating a flexible framework for working together, establishing a normative communication culture, and reflecting upon the learning and communication that takes place that learning is facilitated. It is a self-reinforcing process, where successful communication becomes a prerequisite for sustained relations, trust, shared learning and decision making, and thus collective action. As action researchers we had to work both with the ways we communicated with each other, with the project managers, with other researchers in the project and with the local actors in the community. Communication, in this context, was like dancing with different partners, where we experienced different rhythms depending on whom we interacted with.

Social structures and social processes are intertwined and hard to separate. New structures emerge as a result of ongoing processes, others erode. A process perspective on the EAERP-project in general, and the action-oriented research more specifically, informs us that communication and deliberation are two basic processes which occur, and which often are handled without reflection. By creating space for internal meta-reflection on the communication in a project it is possible to increase the ability to adapt to ever-changing circumstances. By doing this the quality of project outcomes can also improve.

Trust in human processes, and the letting go of control, is a prerequisite for true participation to happen. In our case the project predetermined both WHO we should involve and WHAT the outcome should be. This left too little space for people to really engage. We have come to the conclusion that as a principle there is a choice: either you control who participates (this is not possible in a community, but it is often in a working place), or you control the agenda. If you control who participates it is of utter importance to really leave the agenda open enough otherwise people will not engage authentically (although they might play the game). If you want to control the agenda, participation need to be self-selected. This is a question of respect, and it is also a question of the probability of something happening as a result of the group process.

Power and knowledge

What knowledge is relevant to take into account? Who is to decide what measures should be taken? How is genuine participation achieved? These are all questions that one ought to reflect upon in AR and other policy relevant research. But these are not only questions to be reflected upon by the researchers themselves. Through the EAERP-project it is clear that what defines relevant knowledge, participation and useful outcomes are issues partly formulated already by the financing bodies of research. Such structural power is often perceived impossible to change by participants in action research, and one might argue that there is a risk that AR gets co-opted and becomes part of an inauthentic process. We might have an innovative and functional collaboration, but collaborative groups will be able to change neither the food system, nor how the outcomes of research are valued and measured by the scientific community.

At the same time there is an increased request of AR and policy-relevant research today. The problem is that this development is not accompanied by modifications in requirements for funding. No doubt, the funding bodies' perspective on what defines high quality and relevant research influences the development of AR as a research methodology.

We believe that funding agencies that are serious about action research and actionable results need to loosen up the request for predictable results, fixed agendas, and engineering-style planned projects. The criteria for control will have to change. Our suggestion is that the following is included in the evaluation that precedes a decision about financing of an action oriented research project:
- That the applicant is clear about N, F, M and A, and open to modify them as a result of the learning in the project.
- That the applicant is clear about the roles in the project.
- Space is made for professional facilitation in a free position in relation to the researchers.

It is naïve to believe that the existence of asymmetries in people's relations will disappear. As for conflict, we have to learn how to manage our differences in power and knowledge. For process facilitators, it is necessary to be aware, and also self-critical, in this respect. But many things can be done to improve the situation if the actors are viewed as equals to the researchers. One area is the question to consider is remuneration or compensation for the time actor's spent with project-relevant work, as well as the payment of the researchers.

The magnitude of the challenge and the need for AR

The nature of today's environmental problems requires that we engage in these kinds of multidisciplinary, complex projects. The reasons why are related to the complexity of environmental problems and the diversity of stakeholders. The complexity and scope of the problems preclude simple solutions. Take nutrient leakage and climate change for example. These problems are the result of the excess release of perfectly natural substances into the environment, and the cause of both problems is to various extents shared among all members of society. There is no clear perpetrator in these cases.

However, many action-oriented environmental research projects describe the need for 'implementing' change. The word 'implementation' indicates that there is an existing solution ready to 'implement' and that there exists tools and methods for inserting these solutions into society. The word implementation is thus, in our opinion, overly simple. The reality is that promoting environmental change in complex systems, through direct interaction with these systems is a huge challenge. In our opinion, nobody actually knows how to "promote sustainable food systems" or promote the more general goal of sustainable development, either. There is not one correct solution which can be described in advance and be elaborated by persons other than those who are expected to take action. Therefore, we feel that projects based on the idea that the results can and should be 'implemented' in society already demonstrate a lack of sophistication regarding how this process actually works in reality.

Considering the challenge and the imperative nature of the problems to be addressed, the facilitation of change towards sustainability is perhaps one of our most important research questions today. And considering our collective track record, we are still ignorant in this regard. Understanding how to make sustainable change is the very most important knowledge we need to survive on this planet.

So how do we do this research? We believe the best way is to start experimenting. Trying to make change towards sustainability happen, being very careful with the following up, and consciously asking and reflecting on what we have learned until now regarding how change towards sustainability can be facilitated. This would really be action research. For this process the FMA+NP model should be used rigorously.

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