

Problem Formulation, Problem Characteristics and a Need for Competence - Case Studies of Advisory Services in Norway

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Abstract: Our purpose was twofold: to explore the roles of farmers and advisors in problem identification and definition in advisory meetings, and to explore how the characteristics of these problems influence the demand for different types of professional and relational competence. We used a multiple case study approach where three advisory services are observed, and personal interviews and observations were the primary methods of data collection. In two of the services, advisors primarily identified and defined farmers' problems largely based on farm records. The problems identified and defined ranged from very well-defined to ill-defined from the farmers view and problems were more or less obvious for the farmer. The problem formulation process and characteristics of the problem decide the need for professional and relational competence and the emphasis on purposeful and understanding-oriented communication. Advisory services should be more conscious of farmers' needs for various services and competent advisors, and they should emphasise engagement in problem formulation processes and contribute to developing farmers' knowledge. Approaches that contribute to developing more active involvement by farmers and learning in problem formulation- and solution processes must be examined. Unlike other studies of advisory services in agriculture, this work focused on problem identification and definition in advisory meetings relative to problem characteristics and the need for professional and relational competence.

Key words: advisory services, problem identification and definition, problem characteristics, relational competence, Norway

Introduction

Changes in national and global contexts have caused dramatic transformations in the orientation of advisory services, their organisation and their methods of intervention (Faure et al. 2012). These changes correspond mainly to trends toward privatisation and commercialisation in advisory services. In the Norwegian extension system, private services are the only type available, and they are more likely to charge for services than they have been in the past (Klerkx et al. 2017).

The advisory system faces a challenge in matching farmers' needs for knowledge and competence. Advisory organisations must develop services to meet this increased need for specialised knowledge in a range of fields and for advice on various types of problems. Adapting to this new reality is a particular challenge for advisory organisations accustomed to the old system where products were homogeneous and advice was free, as it is with the primary advisory organisations in the country (Klerkx et al. 2017).

Studies show that the quality of advisory services greatly depends on the skills of the advisors (Faure et al. 2012). Research on this topic has been related to the diversity and range of new knowledge and skills required of farmers on concrete issues as well as the interpersonal dimension of advisory services (Ingram 2008). Much focus has been placed on the joint construction of advice that leads to a revision of the advisor-farmer relationship through participatory learning methods where both the advisor and the farmer participate in searching for and defining problems and constructing solutions to those problems (Faure et al. 2012).

We focused on the problem identification and definition process in advisory meetings. The basis for this was that we know that farmers, themselves, do not always actively engage in information-seeking activities or problem recognition (Ingram 2008; Janson 2010). When it comes to demand articulation (Klerkx et al. 2006; Boon et al. 2011; Leeuwis and van den Ban 2004), this sometimes relates to concretizing unspecified, sometimes latent needs into clear demands. In such situations, articulation, according to Kilelu et al. (2014, must occur through dialog between the demand and supply sides of advisory services so that the formulation and provision of relevant support services are effective. Although advisors play critical roles in identifying farmers' needs, they may encounter difficulties in carrying out this task because they lack the appropriate skills and tools (Faure et al. 2012) or because the aim of the specific advisory service is not in line with the farmers' need.

Despite studies confirming that farmers face challenges in problem formulation, knowledge about what happens in meetings between advisor and farmers when problems are identified and defined is lacking. Unlike other studies, we examined the process of problem identification and definition in more depth and scrutinized this process in light of the characteristics of the problems identified and defined. The aim was to observe the roles of farmers and advisors in such encounters, to characterise the problem formulation process and problems defined during various advisory service processes and to determine the need for competence in finding appropriate solutions.

The following research questions were addressed:

- (1) What are the roles of farmers and advisors in problem identification and problem definition?
- (2) Which types of problems are identified and defined, what features characterize these problems and what competences are needed to achieve the solution?

Conceptual framework

Knowledge and competence

Knowledge development results from scientific activities and/or experience. Experience-based knowledge is primarily characterized by the way it develops and stores experience. Compared to science-based knowledge, it is not developed or accumulated through formalized methods. Many technical problems are too complex to control through experiments and models, and such problems can be solved only by generating learning or experience-based knowledge of a non-formalized nature. Experience-based knowledge consists in many cases of previous routine solutions where the store of knowledge resulted from a trial-and-error process (Valentine 1989).

An enormous amount of literature about competence is available, and a huge variation of definitions exists. According to Mulder (2001), 'a person is competent when he or she has the capability to successfully use his or her cluster of knowledge, skills and attitudes in behaviors required to accomplish a set of goals (to perform a task, solve a problem, make a responsible decision, and so forth)'. In short, the competence concept aims to shift attention from knowledge to the application of skills. In advisory services, professional competence can be divided from relational competence. Professional competence is the typical specialist competence that usually consists of science-based knowledge and, experience-based knowledge applied in to a specific field. Relational competence is 'competence about how to understand and interact with people we meet in a professional context in a good and appropriate manner' (Røkenes and Hanssen 2012, 9). There are two kinds of relational competence (Karterud 2006):

- *Purposeful communication*, where the goal is to convince the client to accept the advisor's analysis, and understanding

- *Understanding-oriented communication*, where the client and advisor work together toward a common understanding of the problems and solutions, providing co-produced knowledge. Enhancing the client's ability to learn is an important part of such communication, where a common technique is coaching.

In advisory services, the process of problem formulation and the problem defined determines whether purposeful or understanding-oriented communication should be emphasized.

Problem formulation and problem type determines the required competences

The ability to identify, formulate and define problems depends, among other things, on the problem type. Pounds (1969, 5) defines a problem as 'The difference between some existing situation and some expected or desire situations.' The literature presents two primary theoretical perceptions of a problem, one objective and the other subjective. From the objective point of view, the problem is independent of the person observing the problem (Morgan and Smirchich 1980). From the subjective point of view, problems cannot be isolated from the problem owner. Perception of the real problem, according to the subjective view, depends on the situation, the person identifying the problem and frame of reference (Herden and Lyles 1981). The subjective view focuses on a perceived world with perceived problems and not a world where objective problems are independent of the problem owners (Lai 1991). Lai (1991) suggests it is possible to look at the two views in context using a theoretical classification of problem types, as defined by Dillon (1982):

- *Obvious problems*, where solutions must be found,
- *Implicit problems*, where problems are suspected but are not clearly formulated and
- *Potential problems*, where problems are created but were not recognized as problems initially.

Based on this classification, Lay (1991) posits that problems can be placed along a continuum, where obvious problems are more objective than the others, potential problems more subjective than the others, and implicit problems lie between these two. Pretz et al. (2003) distinguishes between well-defined and ill-defined problems. A problem that provides a goal, a path to a solution and obstacles to solutions is well-defined. In contrast, ill-defined problems lack a clear path to a solution and has unstated constraints. Ill-structured problems possess problem elements that are unknown or are known without any degree of confidence (Wood 1983). They possess multiple solutions or solution paths or no solution at all (Kitchener 1983). We assume that the way problems are identified and defined will influence how demanding an advisory process will be. If problems identified are not obvious for the farmer and/or farmers perceive a problem to be ill-defined, such a situation will most likely demand an advisor with a high degree of both professional and relational competence. Understanding-oriented communication will be important to secure that the advisor understand the farmer's need and to reach a common understanding.

Effectively taking advantage of new knowledge can be challenging depending on problem type and the need to adapt implementation of the knowledge. Adler and Shenbar (1990) argue that the more comprehensive the technology change, the higher the demand for change and learning. Small changes demand small adaptations in employees' skills and/or routines and learning at a lower level usually implies fast implementation. More radical technology innovations, on the other hand, usually demand not only changes in skills and routines, but also in the structure of an organization, the strategy and, in some cases, the culture of an organization. When it comes to changes at for example a strategic level, this is usually a more time consuming process. By viewing agricultural extension with this perspective, to change the type of concentrate is an operational problem that only require a

small change for a farmer. A problem at a tactical level, for example, when a farmer need a new feeding system, this problem demand new skills, change of routines, and is more time consuming to implement. However, to change to robotic milking for example, will demand changes at all levels of a farm including a strategic level and probably also in the culture of farming and will require a lengthy implementation.

Methods

This study is part of the “Competent Farmer” research project in which extension services in Norway and how advisors interact with farmers while providing various services are assessed. This study is a multiple case study (Yin 2002) using three advisory services from the three organizations important in Norwegian AKIS: Felleskjøpet Agri (FK), Tine and Norsk Landbruksrådgivning (NAES). The cooperative FK is a large actor in the input supply industry offering farmers concentrate fertilizer machines and equipment and grain. Tine is the dominant milk cooperative offering a range of advisory services to its members, and it has developed a department for providing advisory services. The cooperative NAES is an independent advisory organization initially focused on plant production that has broadened its focus, now offering a range of services. One service from each organization was evaluated for this study. We chose these services because our focus is on problem identification and definition, and these services differ in the types of problems they primarily address.

The cases

The service evaluated from FK is the Young Farmers mentoring program. It offers expert knowledge, in our case, on feeding. This relatively new service from FK, where the advisors are accustomed to being salespeople, provides a mentor who is to closely follow up with new and young farmers and serve as a contact person at FK, connecting him to other relevant FK experts if needed. Young Farmer is a free service, and farmers decide how frequently the mentor should visit. From Tine, we evaluated a mandatory advisory service to dairy farmers called Key Advice. It offers one free visit annually to all members and has two functions: to check the production conditions in the cowshed and the herd recordings and through coaching to identify and define problems to clarify farmers professional needs. Finally, we evaluated Dynamic Strategy, offered by NAES for farmers facing big decisions. It supports them in defining goals and the strategies and tasks necessary to reach those goals. Dynamic Strategy is not a free service.

The case study is based on interviews and observations of meetings between advisors and farmers. One person responsible for advisory services in each organization was interviewed. We studied four mentors and four farmers in the FK program, five dairy advisors and ten farmers in the Tine program and three advisors and four farmers in the NAES program. For Young Farmer and Key Advice, advisors were interviewed face-to-face before and after we visited the farmer. Some days after the visit, all farmers were interviewed via telephone. We joined the advisory meetings, which lasted 2-2.5 hours, as observers. For Dynamic Strategy, we interviewed six farmers after the process, and we joined the process with two of them. Advisors were reluctant to agree to our attending meetings as observers because they might be personal and “touchy” processes for the participants. Interviews and the meeting between the advisor and the farmer were tape-recorded, transcribed and analyzed using NVivo software. Table 1 shows some characteristics of the three services and the types and number of informants in each case.

Table 1: Characteristics of the services and of data collection.

Service	Type of service	Advisor competence	Data
FK, Young Farmer	An advisor offers to follow up with young and new farmers with free visits over three years to provide specialized advice on the farmer's most important production and on being a contact person at FK. A one-to-one service.	Specialists in concentrates and growth	1 advisory service 4 advisors 4 farmers
Time, Key Advice	Mandatory annual farm visit to control, discuss plans, and define the problems and needs for services. A one-to-one service.	General competence in milk production, trained in coaching	1 advisory service 5 advisors 10 farmers
NAES, Dynamic Strategy	Two meetings over 2-3 months between advisor and farming couple and others engaged in the farm for developing goals, strategies and tasks.	Certified as a DS advisor, coaching competence, typically a background in economy	1 advisory service 3 advisors 6 farmers

When selecting advisors to follow, we emphasized variation between regions and types of advisors. Leaders from the advisory organizations suggested advisors to study and asked the advisor beforehand if he or she would join the project. We then contacted the advisors for further agreements. Before the meeting was organized, the advisors asked the farmers if researchers could join the meeting.

A major weakness in this method is that the selection of both advisors and farmers may provide bias. Leaders may have suggested candidates who are more clever than the average advisor, and advisors may have selected farmers that were not problematic. In the Young Farmer and Dynamic Strategy programs, not all advisors joined the study. Even though the advisors and farmers selected might not be average, we are satisfied with the variation we found.

Findings

The Young Farmers mentoring program

Young Farmer was established by FK to take special care of young and new farmers to contribute to the improvement of the economy and to secure membership in FK. The service is different from their ordinary service to farmers in that the mentor is to follow up with the farmer more closely and that it is a pathway into FK's network of relevant knowledge contributors. The mentor thus took on a larger role than previously played, where the primary goal of visits was to sell concentrate and other farming products. All mentors we followed were experts on concentrates, three in pig production and one on ruminants but were neither educated nor trained to the new role as a mentor.

The roles of farmers and advisors in problem identification and definition

The typical process among the three pig production mentors was to prepared for the meeting in advance by studying the farmer's records of performance in key areas. The point of departure for identification and defining problems was if the farmer's records showed below average performance compared to pig farmers. The mentor then defined problems areas that had potential for improvement. The mentor defined the agenda, and started by referring to the performance records, then pointing to positive changes and presenting problem areas

detected. If the problems were connected to routines and/or the barn environment, the mentor attempted to find the reason behind the poor performance in discussions with the farmer. Based on this information, the mentor suggested solutions to the problem defined. The problem was formulated based on the farmer's record and the mentor's expert knowledge of feeding.

When we asked the farmers about their roles in problem identification and definition, they expressed that they did not prepare in advance. They knew the main topic for the meeting (feeding and growth) and the competence that the advisor embodied. For example, one farmer stated, *'I did not prepare much, I knew that we were going to talk about concentrate and that she usually suggest what to do.'* According to the farmers, meetings are similar from one time to the next. The mentor behaves as they have in the past, and they focus on the same topics of advice as they did during prior visits. Mentors tried to connect farmers to other experts in FK to a small extent even though this is a stated goal of the mentoring program. The pig farmers appreciated the visits and thought they were useful. The dairy farmer was more reluctant about his mentor and did not perceive that much support was gained.

Characteristics of the problems identified and defined

Examples of problems by mentors are excessive death rate among newborn pigs, excessive fat percentage on pigs and unsatisfactory pig growth. Mentors asked a few questions in search of other possible problems where FK can offer solutions. The problems can be divided into two categories according to the knowledge needed for solutions. Most were connected to feeding, and science-based knowledge was needed to suggest solutions. Others required experience-based knowledge, and the parties needed to discuss possible solutions.

Problems identified and discussed were obvious and well-defined for the mentor. This was not necessarily the situation for the farmer. Only a few checked the record before the meeting and not all numbers are easy to understand without expert knowledge. For farmers some problems identified by mentor was more implicit or potential – for example because it would cost too much or demand extra work to implement a solution.

Solutions provided the by mentor seemed to be easy for farmer to use. It was mainly operational problems defined. In some cases though, implementation of a new concentrate involved investment in a new silo and new equipment for feeding. This is a tactical problem and demands new skills and routines and is more difficult to adopt. For the type of problems defined in Young Farmers, mentors used mostly purposeful communication to address solutions. In situations where problems were not obvious for the farmer, they had to discuss and agree if farmer perceived this as a problem or not. In such situations, there is a need of more understanding-oriented communication. Only occasionally did mentors support the farmer in defining more ill-defined problems that also demanded some degree of understanding-oriented communication. Although FK established the mentoring program to have a broader focus on farmer's needs, the mentors managed to take on this role to only a small degree.

Key Advice

Key Advice is a free annual service from Tine for all members, and it is aimed at giving dairy farmers comprehensive advice in dairy production. The advisor is to clarify the farmer's professional needs and is to sell services to the farmers in these meetings. Tine trains key advisors for the job and improves their relational competence in areas such as coaching.

The roles of farmers and advisors in problem identification and definition

Key advisor prepare for the meeting by looking at the farm records. He then gives the farmer key indicators of performance, such as milk volume, milk quality and animal health. The farm visit usually begins with a tour of the cowshed as a basis for the key advisor to determine if everything looks good. The advisory meeting continues inside the farmer's house.

In these cases, it was common to start with farm performance. Typically, the advisor commented on the performance numbers and identified problems by focusing on areas where the farmer scored lower than average. They discussed possible reasons for poor scores, and the advisor suggested solutions. The problems defined were not necessarily obvious to the farmer; he might not have been aware of the problem before the advisor pointed it out. Although these figures are available for farmers via computer, not all farmers study and/or understand them.

Advisors behave differently according to the problem identification and definition process. Some focused mainly on the records, and others additionally emphasized farmers' needs. For example, one advisor adapted the meeting to address the farmer's need for feedback on drawings of a new barn, and another advisor searched more broadly for problems and addressed questions at both strategic and operational levels to identify problems. Few problems identified addressed new services from Tine even though this is part of the key advisor's role. The interviews with advisors show that some of them are very active in connecting farmers to Tine's services when other perceive this challenging.

Farmers typically do not prepare for meetings. This is explained by two farmers: *'Meetings are the same from time to time.'* *'I know what we are going to talk about.'* The meetings seem to be quite routinized. Farmers behave as recipients of knowledge because of the price for new services: *'I would like closer follow-up, but it costs.'* This statement is typical for the smaller family farms than for robotized dairy farms where it is common to utilize experts. Two dairy farmers with robots stated they did not feel the advisor embodied the competence they needed: *'The meeting was ok, but how useful, I don't know.'* In these cases, there is not a fit between the offer and the demand. Other farmers valued the meetings.

Another recognition is that some farmers are more active in formulating problems during the tour of the barn and valued the visit: *'When visiting us only once a year, it is important that he spends time in the barn. It is possible to become too short-sighted when not discussing with others.'* Another farmer supports this view: *'could have more time to discuss other parts of farming A bit more about practical issues, now it is most theory through numbers.'* Farmers value discussions of practical problems in the barn and a confirmation that things are correct and they are doing the right things.

Characteristics of problems defined

Problems defined based on performance data were typically about feeding, quality of fodder, with getting cows to conceive, bad milk quality, vet bills and health issues. Knowledge used by the key advisor to find solutions was a combination of science-based and experience-based knowledge where experience was important in the discussion for use of the knowledge. Solutions for the problems discussed in the barn were mainly experience-based; practical knowledge was needed where the advisor and farmer discussed solutions based on the farmer's situation and experience.

The problems identified and defined were primarily obvious and well-defined for the advisor. Sometimes, the farmer does not perceive the problems recognized by advisors as a problem or a relevant problem. For example, when a farmer prefer a one-month summer

holiday with his family and adapted insemination to fit this need, it did not give the most efficient production, but the farmer felt the holiday was more important

Problems defined were mainly easy to adapt. For example testing the quality of the milk on a more regular basis. Other solutions were more demanding and needed new skills and adaptation of the farmer's routines, but these usually represented minor challenges for the farmers. For example, if calves have health problems, farmers needed to adapt routines until the problem was solved. There were some discussion of problems at strategic level, such as conversion to organic agriculture. For the farmer this was not a relevant problem because he wanted his son soon taking over the farm to take this decision.

The problems identified and defined demanded varying degrees of purposeful and understanding-oriented communication. Some problems defined from records was well defined for both parties and demanded mainly purposeful communication. Other problems, both science-based and experience based, demanded changes in farmers' routines, and understanding-oriented communication was important in securing the farmer's adaptation to the knowledge in his context. In situations where advisors defined a problem potential or ill-defined for the farmer, understanding-oriented communication was important to reach a common understanding – if the farmer perceived this to be a problem he wanted a solution to.

Dynamic Strategy

Dynamic Strategy is a service aimed at supporting farmers facing a crossroads and supporting them in decision-making through a process of establishing goals, defining strategies and determining the tasks needed to reach those goals. The service is comprehensive and includes the family and other persons working at the farm. It is a paid service that has been available for a number of years, but according to NAES, it is a service that is difficult to sell. None of the farmers we interviewed paid full price for the service. Advisors possess certificates; therefore, they are trained in coaching and in following a structured process for reaching a plan.

The roles of farmers and advisors in problem identification and definition

When a farmer has identified a problem and articulated the need for support, an advisor will apply this process based on a coaching style of communication. Thus, the advisor supports the farmer in defining the problem(s) and planning solutions based on the farmer's goals and resources. The framing for defining the problem is a whole-farm perspective.

Although the process is based on the farmer's obvious need for support, this service was not requested. One farmer described why she thought it was difficult to sell this service to farmers: *'Most men farmers do not think this [the process] is useful and they want just to take a fast decision without a process... I think many farmers perceive the process as difficult to formulate goals and strategies and visions ... hallo, they get scared.'* The same farmer mentioned that the process could be very demanding for some farmers *'you have to be open minded to appreciate such a process and willing to receive input ... not all farmers are comfortable in such a situation.'*

Characteristics of the problems defined

The types of problems defined in Dynamic Strategy differ from one another. One farmer planned to build a new farm building for calves; another, a member, planned to rebuild his barn for robotic milking. The other farmers had problems making decisions about investing in a new dairy building with robots, investing in new buildings and making a whole-farm plan, taking over a family farm, the business activities necessary to develop on a newly purchased small farm. In the first two instances, farmers had decided what to do, the problem was obvious for both the farmer and the advisor and the process of finding a solution was well

known. In the other instances, farmers had to make important decisions, and the solution was not straightforward. The problems are more implicit and in many cases ill-defined.

Farmers with implicit and ill-defined problems were very satisfied with the process and wanted to repeat the process for full price. One farmer stated it was *'Positive that somebody from outside asked critical questions and managed the dialog, then it is easier for all to understand'...* *'It was important that all joined the meeting, because activities at the farm has to be adapted to harmonize with family, parents, and wife's job.'* They appreciated the whole-farm perspective. In these examples, understanding-oriented communication and coaching competence was decisive for a successful process. In three of instances, the process led to heavy investments and development processes demanding changes at strategy levels of the farm.

In the two instances where the problem was defined in advance, it was not obvious that farmers needed a Dynamic Strategy service to find a solution. One was negative to the process. Cooperative farm members, on the other hand, experience the process to be "surprisingly" valuable. For first time, the members discussed and developed common goals, strategies and working routines. The advisor challenged them and demanded concrete answers: *'she ensured that we agreed upon decisions'*. The process gave a solution to a problem/challenge they were not very conscious about (implicit problem) *'we were wiser when the process ended; we look at things with new eyes.'*

Analysis and discussion

Problem identification and definition

In the literature on advisory services, it is perceived that service should be directed toward farmers' needs and that problem identification, definition and solution should be developed in close interaction with the farmer (for example, Cristóvão et al. 2012; Faure et al. 2012). In our cases, this was not always the situation. Both in Young Farmer and to some extent in Key Advice, advisors primarily defined problems (Ingram, 2008). Performance records were undoubtedly useful to the advisor. On the other hand, farmers do not always focus on improving the economy. A problem might arise if farmers face other needs that do not come to surface because advisors focus only on specific performance records. Another point is that performance records might give the advisor a strong position vis-à-vis the farmer to steer the discussion, and the result could be what we observed – farmers behaved in a reactive way. Thus, it is reasonable to believe that the services will enhance perceived quality for farmers if advisors included them in the process of formulating problems to a greater degree (Bateson 2002). In Dynamic Strategy, advisors behaved as facilitators in problem formulation and definition (Ingram 2008). The challenge was that the service was process-oriented, highly intangible and invisible, and farmers did not perceive the need (Klerkx and Leeuwis 2008).

Farmer involvement in problem identification and definition

The case description mentions certain conditions that could influence the farmer's reactive role in the problem formulation process. Here, we take a closer look at two conditions identified in the Young Farmer and Key Advice cases. Farmers joining these services perceive the visit to be very predictable and routinized. The meetings seem to go the same as in the past, and the parties have adapted roles that may not only be a result only of the attitudes of advisors, but also from the attitudes of the farmers (Klerkx and Jansen 2010). Routinized meetings and behavior are not necessarily easy to change and may function as inhibitors to include a broader view on the farm and more emphasis on the farmers need (Nelson and Winter 1982). Another perspective on farmer involvement is that such processes demand competence and capacity the farmers might not necessarily embody (Leeuwis and Van den Ban 2004). This seems to be the situation in particular with the science-based

problems revealed through performance records. In the barn, on the other hand, farmers have better prerequisites for identifying and expressing practical problems during work, and some farmers placed particular emphasis on experience based problem (Morris 2006; Röling and Wagemakers 2000). Thus, the more practical oriented farmers feel more comfortable in discussing problems during the barn visit. Perhaps visit in the barn should have a more important function in problem identification and definition at least for some farmers.

Characteristics of problems – knowledge demand

Problems defined in the three services differ. In Young Farmer and Key Advice, problems identified and defined were mostly related to regular operations. In Young Farmer, it was mainly on feeding, and in Key Advice, it was more generally on dairy production. Problems defined in Dynamic Strategy were at a strategic level and, compared to the other two cases, more implicit and ill-defined for both farmers and advisors (Pretz et al. 2003).

The problems defined by the three services varied according to the knowledge needed to find a solution. In Young Farmer, the advisors primarily defined the problem and knowledge needed that was science-based on feeding, and emphasis was on purposeful communication (Karterud 2006). This way of extension is similar to the top-down linear model of knowledge transfer (Cristóvão et al. 2012), but in cases where problems are obvious and well defined for both parties purposeful communication may function very well. However, this is seldom the situation nor in Young Farmer. As Labarthe and Laurent (2013) claim, that except in highly standardized technical problems, nearly all problems need to be co-constructed, and co-production of solutions is necessary. To achieve the goal of the Young Farmer mentoring program, mentors have to take a whole-farm approach based on the FK offers. Advisors are to gain more competence both in the various expert fields of FK and in understanding-oriented communication to identify and define problems in dialogs with farmers. This is in particular important when problems are ill-defined or not obvious for farmers.

In Key Advice, advisors need both science-based and experience-based knowledge to find solutions that more or less implied changes in farmers' skills and working routines (Adler and Shenbar 1990). The types of problems defined depended on the advisor, where his relational competence seemed to enhance problem definition according to farmers' needs. Key Advice have a broader approach than Young Farmer, and we assume this enhance the need for understanding-oriented communication to identify and define problem and solution in accordance with farmers need. The process used in Dynamic Strategy did not demand scientific knowledge and was not necessarily experience-based knowledge from agriculture. This process demanded a high degree of relational competence and in particular competence in understanding-oriented communication. Figure 1 shows the need of different forms of relational competence in the different services according to their aims for problem solution, where ill- and well-defined problems are based on farmers view.

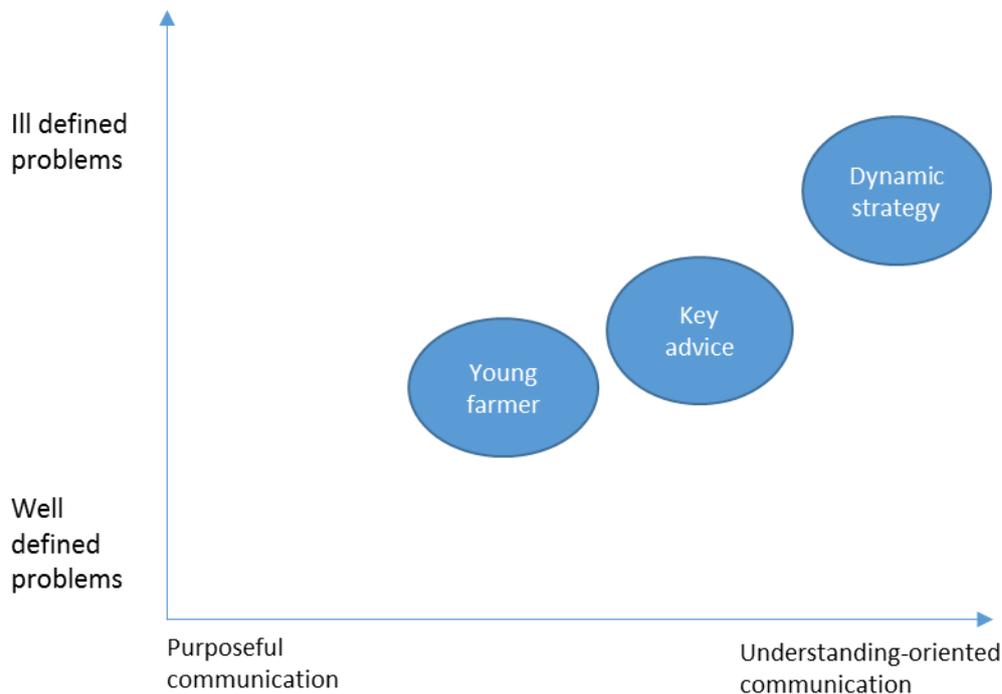


Figure 1: The need for relational competence according to the aim of the service.

A relevant question in this context is whether a “conventional” advisor is able to take on new roles and become a professional facilitator (Röling and Jiggins 1998). Results indicate that some advisors in Young Farmer and Key Advice lack this competence. Some advisors take too narrow a perspective and dominate in the problem-formulating process even though some have training in coaching. Thus, training might not be sufficient for shifting them from experts to learning facilitators (Van Weperen et al. 1998; Klerkx and Leeuwis 2008). Thus, not all advisors seem to embody the skills necessary to take on a facilitator’s role.

Conclusion

The Norwegian advisory system remains in transformation, and our study shows that some services continue to be supply driven orientation even though the goal is to identify farmer needs and take a whole-farm perspective. In two of the services it is primarily advisors that define the agenda and, to a great extent, identify and define problems. The established system, with its routines, advisor competences and farmer expectations, make it difficult and time consuming to adapt to a more participatory approach.

The problems formulated in these three cases differ according to how well they are defined and how obvious they are for farmers, and the changes needed at farm level for solutions. Nevertheless, there is a need for understanding-oriented communication in all services, but in a varying degree, to secure the success of the service.

It is difficult for farmers to see the value in the Dynamic Strategy service in advance, but it is a very useful process when a farmer is at a crossroads typically characterized by ill-defined problems. Because solutions to such decisions are important for the farmer and its family, the local community and the region as a whole, such services may need public subsidizing to ensure farmers use the service (Labarthe 2005; Klerkx et al. 2006, and Rivera and Alex 2004).

Practical implications from this study are that advisory organizations should be more conscious about the various services they offer and their advisors needs for competences, relational competence in particular. Additionally, they should emphasize farmer's needs and find tools and approaches that secure farmer involvement and learning in problem formulation – and solution processes (Röling and Jiggins 1998). Further research need to examine which approaches contribute to developing a farmer's capacity for more active involvement in problem identification and definition and learning from such processes.

Acknowledgements We would like to acknowledge the Norwegian Research Funding for Agriculture and Food Industry; county governors in Møre and Romsdal, Sør-Trøndelag and Nord-Trøndelag; cooperatives TINE, Nortura, and Felleskjøpet Agri; the Norwegian Agricultural Extension Service; the Mid-Norway Board of Cooperation in Agriculture for funding this research project, Competent farmer.

References

- Adler, P.S. and Shenbar, A. 1990. Adapting Your Technology Base: The Organizational Challenge, *Sloan Management Review*, Vol.32, nr.1, p. 25-37.
- Bateson, J., 2002. Consumer performance and quality in service. *Manag. Serv. Qual.: Int.J.*12(4), 206-209.
- Boon, W.P.C., Moors, E.H.M., Kuhlmann, S., and Smits, R.E.H.M. 2011. Demand Articulation in Emerging Technologies: Intermediary User Organisations as Co-producers? *Research Policy* 40 (2), doi: 10.1016/j.envsci.2007.02.007.
- Dillon, J.T. 1982. Problem Finding and Solving, *Journal of Creative behavior*, Vol. 16, nr.2, 97-111.
- Cristóvão, A. Koutsouris, A., and M. Kügler. 2012. *Extension systems and change facilitation for agricultural and rural development*. In Darnhofer, I. Gibbon, D., and B. Dedieu (eds.) *Farming Systems Research into the 21st Century: The New Dynamic*, doi 10.1007/978-94-007-4503-2_10.
- Faure, G., Yann, D., and Gasselín, P. 2012. New Challenges in Agricultural Advisory Services from a Research Perspective: A Literature Review, Synthesis and Research Agenda, *The Journal of Agricultural Education and Extension*, 18 (5): 461-492, doi: 10.1080/1389224X.2012.707063
- Herden, R.P., and Lyles, M.A. 1981. Individual attributes and the problem conceptualization process, *Human Systems Management*, 2: 275-284.
- Ingram, J.2008. Agronomist–farmer knowledge encounters: an analysis of knowledge exchange in the context of best management practices in England. *Agriculture and Human Values*, 25 (3): 405-418, doi: <http://dx.doi.org/10.1007/s10460-008-9134-0>
- Karterud, H.N. 2006. Diagnose til besvær? – en studie as pasienters sykdomsforståelse og erfaring med diagnosen Psykogen, ikke-epileptiske anfall. Hovedoppgave Universitet i Oslo.
- Kilelu, C., Klerkx, L., and Leeuwis, C. 2014. How Dynamics of learning are Linked to Innovation Support Services: Insights from a Smallholder Commercialization Project in Kenya, *Journal of Agricultural Education and Extension*, Vol.20, No. 2, 213-232.
- Klerkx, L., de Grip, K., and Leeuwis, C. 2006. Hands off but strings attached: the contradictions of policy-induced demand-driven agricultural extension, *Agriculture and Human Values*, 23: 189–204, doi: 10.1007/s10460-005-6106-5
- Klerkx ,L., Stræte,E-P., Kvam, G-T., Ystad, E., and Hårstad, R.M.B. 2017. Achieving best-fit configurations through advisory subsystems in AKIS: case studies of advisory service

- provisioning for diverse types of farmers in Norway, *The Journal of Agricultural Education and Extension*, doi: 10.1080/1389224X.2017.1320640.
- Klerkx, L., and Leeuwis, C. 2008. Matching demand and supply in the agricultural knowledge infrastructure: Experience with innovation intermediaries, *Food Policy* 33: 260-276.
- Klerkx, L., and Jansen, J. 2010. Building knowledge systems for sustainable agriculture: supporting private advisors to adequately address sustainable farm management in regular service contacts, *International Journal of Agricultural Sustainability*, 8 (3):148-163
- Labarthe, P., and Laurent, C. 2013. Privatization of agricultural extension service in the EU: Toward a lack of adequate knowledge for small-scale farms? *Food Policy*, 38: 240-252.
- Lay, I. 1991. *Selective Attention in problem Finding*, PhD at NHH, Bergen, Norway.
- Leeuwis, C., and Van den Ban, A. 2004. *Communication for Rural Innovation: Rethinking Agricultural Extension*. Blackwell Science, Oxford.
- Morgan, G. and Smirchich, L. 1980. *The case for qualitative research*, Academy of management Review, Vol. 5, No. 4.
- Morris, C. 2006. Negotiating the boundary between state-led and farmer approaches to knowing nature: an analysis of UK agri-environment schemes, *Geoforum* 37: 113-127.
- Mulder, M. 2001. Competence development - some background thoughts, *The Journal of Agricultural Education and Extension*, 7 (4): 147-158, doi: 10.1080/13892240108438822.
- Nelson, R.R., and Winter, S.G. 1982. *An Evolutionary Theory of Economic Change*, Cambridge, Massachusetts: The Belknap Press of Harvard University Press.
- Pounds, W.F. 1969. *The process of problem finding*, Ind. Management Review, No11 (Fall): 1-19.
- Pretz, J.E., Naples, A.J., and Sternberg, R.J. 2003. *Recognizing, Defining and Representing Problems*. In Davidson, J.E. and Sternberg, R.J. (Eds) *The Psychology of Problem Solving*. Cambridge. Cambridge University Press.
- Röling, N., and Jiggins, J. 1998. The Ecological Knowledge System. In *Facilitating Sustainable Agriculture: Participatory Learning and Adaptive Management in Times of Environmental Uncertainty*, edited by N.Röling, and Wagemakers, A.A.E., 283-311. Cambridge: Cambridge University Press.
- Röling, N., and Wagemakers, A. (Eds.). (2000). *Learning Sustainable Farming: Facilitation, Institutions and Policies*. Cambridge University Press, Cambridge.
- Røkenes, O.H., and Hansen, P-H. 2015. *Bære eller briste – Kommunikasjon og relasjon i arbeid med mennesker*. Fagbokforlaget, Bergen, Norway.
- Valentine, F. 1989. *When Companies Learn, Innovation and the generation of Knowledge in Small and Medium Sized Danish Enterprises*, In Borum, F. Kristensen, P.H. (eds.) 1989, *Technological Innovations and Organizational Change – Danish Patterns og Knowledge, Network and Culture*, Institut for Organisation og Arbejdssociologi, Handelshøjskolen, Coopenhagen, Denmark.
- Yin, R.K. 2002. *Applications of Case Study Research*, Second Edition, Applied Social Research Methods Series, Volume 34, Sage publications.