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## Soil conservation in Swiss agriculture—Approaching abstract and symbolic meanings in farmers' life-worlds

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### ABSTRACT

This paper explores the significance of 'life-worlds' for better understanding why farmers adopt or reject soil conservation measures and for identifying basic dimensions to be covered by social learning processes in Swiss agricultural soil protection. The study showed that farmers interpret soil erosion and soil conservation measures against the background of their entire life-world. By doing so, farmers consider abstract and symbolic meanings of soil conservation. This is, soil conservation measures have to be feasible and practical in the everyday farming routine, however, they also have to correspond with their aesthetic perception, their value system and their personal and professional identities. Consequently, by switching to soil conservation measures such as no-tillage farmers have to adapt not only the routines of their daily farming life, but also their perception of the aesthetics of cultivated land, underlying values and images of themselves. Major differences between farmers who adopt and farmers who reject no-tillage were found to depend on the degree of coherence they could create between the abstract and symbolic meanings of the soil conservation measure. From this perspective, implementation of soil protection measures faces the challenge of facilitating interactions between farmers, experts and scientists at a 'deeper' level, with an awareness of all significant dimensions that characterise the life-world. The paper argues that a certain level of shared symbolic meaning is essential to achieving mutual understanding in social learning processes.

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### Introduction

About 20% of Switzerland's cultivated land is affected by soil erosion (Mosimann et al., 1990; Ledermann et al., 2008). The age-old practice of turning the soil and preparing a fine seedbed by use of a plough before planting a new crop is considered as one of the root causes of this process.<sup>1</sup> In response to this, farmers, agricultural experts and scientists have developed alternative cultivation methods for growing crops without using a plough. No-tillage is one of these methods which help to reduce soil erosion by planting the seed directly into the undisturbed soil (Jones et al., 2006). In

no-tillage, planting is accomplished using special machinery, and weed control is done by use of herbicides. Better soil structure and soil cover as well as economic efficiency are generally seen as advantages of the system. In scientific literature, no-tillage is widely recognised as a viable approach to preventing soil erosion and thus contributing to a more sustainable agriculture (Lal et al., 2007; Sturny et al., 2007; Derpsch, 2008).

Emerging off-site impacts of soil erosion, for example damage to private and communal infrastructure and eutrophication of various Swiss lakes, as well as extensive research activities brought the issue to the public's attention (Prasuhn and Weisskopf, 2004; Weissshaidinger and Leser, 2006). A general reorientation of agricultural policy towards a more sustainable agriculture in the 1990s has led to the introduction of several legal regulations regarding soil protection and sustainable land resource management. The Ordinance on direct payments, for example, contains a clause that farmers who intend to receive direct payments must take suitable protection measures against soil erosion. Subsequently, cantonal authorities, such as soil protection agencies and agricultural offices, began to develop different approaches to implementing these regulations: they devised special control systems using soil erosion risk maps and agricultural inspectors, conducted training courses,

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<sup>1</sup> There are other important causing factors such as the extension of lots, the introduction of crops extremely vulnerable to soil erosion, the narrowing in crop rotations, redirection of rows. However, the analysis of these practices is beyond the scope of this paper.

produced information leaflets, and implemented financial support programmes for no-tillage. Despite these efforts, no-tillage has failed to be widely adopted: it is currently applied on no more than about 3% of farmland in Switzerland (Ledermann and Schneider, 2008).

While adoption of soil conservation measures has been extensively investigated in the United States as well as in many developing countries (see Knowler and Bradshaw, 2006 for a review), only few studies have been conducted in Europe (Lahmar, *in press*). However, in the past years research activities on the topic have been started in many European countries (see De Graaff et al., *in press* for an overview). De Graaff et al. (*in press*) states that acknowledging the erosion problem and developing a positive attitude towards soil conservation measures are the first steps taken by farmers when adopting these measures. Wauters et al. (*in press*) showed that farmers' intentions towards soil conservation practices are the predominant determinant of their behaviour, and thus identified the main reason for low adoption as being the negative attitude of farmers towards these practices. Other authors explored farmers', experts' and scientists' perspectives on soil erosion and soil cultivation and identified the differences between their views as an important part of the implementation problem (Fry, 2001; Darré et al., 2004; Ingram et al., *in press*). Finally, Sattler and Nagel (*in press*) demonstrated that, despite the general assumption that farmers' decisions are mostly driven by economic rationality, costs were regarded as an important, but not the most important, factor: other factors, like associated risks, effectiveness, or time and effort necessary to implement a certain measure, were equally or even more important. In particular, it was shown that conservation measures that combine economic, social and ecological requirements were assessed most favourably.

All these studies show that when analysing adoption of soil conservation, the farmer's role cannot be reduced to the ideal of the 'homo economicus' who is deciding for or against soil conservation based on entirely rational choices oriented towards an economic optimisation of his farm. Processes of internal sense-making and actor-specific perceptions are shown to be just as important as favourable structural conditions for the spread of soil conservation measures.

We deduce from this a need to strengthen the investigation of social processes leading to adoption of soil conservation measures. Innovating sustainable agriculture depends essentially on how farmers, scientists and advisors can collaborate to re-negotiate existing and co-create new meanings for soil erosion and soil conservation.

In the literature on sustainable agriculture and natural resource management there is growing agreement that the quest for more sustainable practices should be understood as social learning processes rather than a transfer of knowledge from research to the farmers (Roux, 1997; Hagmann, 1999; Röling and Wagemakers, 2000; Eshuis and Stuiver, 2005; Jiggins et al., 2007; Tàbara and Pahl-Wostl, 2007). The social learning approach focuses on participatory processes of social change where farmers, experts and scientists transform their understanding of the situation (Steyaert et al., 2007) and consequently join a process of knowledge co-production (Jasanoff, 2004) finally leading to adoption of the practice in question. In other words, it is about space and time for new meaning to emerge (Snowden, 2002).

Rist (2006) identified 'life-worlds' as the most prominent space for social learning and as important sources of rules, norms and values of interaction. In accordance with Alfred Schütz (Schütz and Luckmann, 2003), 'life-world' can be conceptualised as the intersubjectively constituted, taken-for-granted context of life structured by a common frame of meaning. Decision-making takes place within this intersubjectively meaningful context of common

experiences and understandings. Members of a social group (e.g. farmers, but also subgroups of farmers such as cattle breeders or organic farmers) generally share a common life-world and thus interact on the basis of common explicit and tacit understandings, which include values and social norms. Schütz and Luckmann (2003) divide the totality of this context of life into different 'provinces of reality' such as the 'everyday life-world',<sup>2</sup> 'dreaming', 'religious experience', 'science', and the 'art world'. These provinces of reality are determined by different cognitive styles with their own, inherent topical, motivational and interpretational relevance.

The 'everyday life-world' is characterised as the paramount reality of human beings that the wide-awake and normal adult simply takes for granted. Every state of affairs seems to be unproblematic and unquestionable until further notice. The 'natural attitude' assumed in daily life is pervasively determined by a pragmatic motive (therefore also 'practical attitude'). So long as people remain immersed in their everyday practical attitude they do not have a motive to critically evaluate their own taken-for-granted presuppositions. Thus, according to Stoltzfus (2003), transcendent symbolic meanings of other provinces of reality help to create some measure of reflexive equilibrium in the midst of competitive moral options, diverse cultural perspectives, and distinctive ethnic and religious affiliations.

Against this background, the present paper explores the significance of the life-world concept for better understanding why farmers adopt or reject soil conservation measures, with a view to identifying basic dimensions to be covered in social learning processes in Swiss agricultural soil protection. While the life-world concept has been adopted in many scientific disciplines such as health, education, ethnology and cultural studies (e.g. Olufemi and Reeves, 2004; Pettersson et al., 2005; Hodge, 2008), to our knowledge it has rarely been used in studies on sustainable agriculture and natural resource management. The works of Currie (1995) and Long (2001) are valuable exceptions.

The paper begins with a brief overview of the research methods. Then, the empirical results are presented in light of the theoretical reflections. First, we focus on farmers' perception of soil erosion and their argumentation related to the soil conservation method of no-tillage. Then differences in their assessment of no-tillage are explained by referring to selected provinces of reality, particularly the everyday life-world, the province of aesthetic awareness and the province of value meaning. Finally, conclusions are drawn regarding the significance of shared symbolic meanings for the creation of mutual understanding and the further development of social learning processes related to soil protection and sustainable agriculture.

## Research design

Exploring the significance of 'life-worlds' and identifying dimensions relevant for social learning processes required an explorative research design, allowing the farmers to express themselves in their own words. Therefore, the study was based on a qualitative research perspective (Flick, 2005). Qualitative methods are especially valuable when it is about investigating complex and interdependent social processes in depth and detail. Furthermore, they allow exploring the 'deeper' dimensions of the farmers' life-words which can hardly be approached through formalised questionnaires.

Data was collected through semi-structured interviews, informal discussions, participatory observation, group discussions,

<sup>2</sup> Schütz used the term 'life-world' for this 'province of reality' as well as for the entire context of life, which can be perceived as slightly confusing.

document and literature review. The research is based on the comprehensive study of the life-worlds of 22 farmers, of whom 10 had adopted and 12 had rejected the soil conservation system of no-tillage. 16 of the farmers were experiencing soil erosion problems, among them 4 who had switched to no-tillage. We focused on no-tillage because it is regarded as the most 'extreme' of several soil conservation measures such as mulch tillage, strip tillage, grass strips, and changes in crop rotation. Thus, the selection of no-tillage had the advantage that a greater variety of dimensions was involved. The sample was selected in discussions with cantonal soil conservation agencies and during soil erosion damage mapping by one of the authors. Moreover, the sample covered a wide range of farm types (full-time, part-time) and farming philosophies (extensive/intensive, organic/conventional farming).

In addition to the formal interviews, informal conversations with sample farmers before and after the interviews and with many other farmers during farmer meetings and field trips were considered as well. In fact, these informal discussions proved to be a very important element of the study, as socio-cultural aspects and elements relating to a more symbolic level of meaning were often not addressed during formal interviews but came up at a later stage, when contact was informal.

## Results—presentation and discussion

### *How farmers perceived soil erosion*

Conversations with farmers who adopted and rejected no-tillage revealed wide agreement that soil erosion is undesirable and should be avoided: statements such as “No-one likes it when the soil runs away” or “Well, it's the good soil that disappears” illustrate this perception. Although soil erosion was unanimously regarded as negative, a first finding of this study was that soil protection was not a high priority in farmers' daily lives. Soil erosion was considered as just one of several challenges to be met. A characteristic way of expressing this idea was: “One year it's erosion, the next year it's hail, in the third we are plagued by frost . . .”.

When further analysing farmers' perceptions of soil erosion we identified three types of argumentation. Some farmers explained soil erosion mainly as the result of natural events, referring to extraordinary rainfall events during the early stages of a growing season. They saw soil erosion as 'natural' side-effects of farming, rather than something that can be directly controlled by adapting farming practices. Other farmers distinguished between aspects that they could influence (e.g. soil cultivation) and others that they could not influence (e.g. weather conditions). A third group of farmers, especially those highly committed to no-tillage, emphasised the fact that farming practices, and thus human activities, were the main determinants of soil erosion.

While the last two groups of farmers saw certain options for manoeuvre and reflected on alternative cultivation methods such as no-tillage, the first group could not, or did not want to, see these options and refused to change their management practices in any way. They persisted in using band-aid solutions such as filling up the rills with soil or straw, flattening the rills to avoid further erosion, or digging a furrow on the field border to collect the soil and prevent off-site damage. These farmers who negated any options for manoeuvre expressed a strong feeling of helplessness regarding natural events:

“Erosion is part of agriculture. On an open field, erosion just happens” or “. . . you can't do anything about it. Wind, fire and water are natural phenomena. If you're hit by them, you just have to accept it. It's always been like that and will always remain so.”

This feeling of helplessness in the face of natural events was often linked with a feeling of helplessness with regard to socio-cultural dynamics. Interviewees expressed deep insecurity about structural change and globalisation in agriculture as well as changing social relations in their communities, which threatened their values and traditional way of living. This is related to a changing position of Swiss farmers within the more general societal hierarchies. During the two World Wars in the last century Swiss farmers were considered 'pillars of society' because they contributed to food security and thus to national defence. Farmers were encouraged to increase crop production and thus built their identity as producers and food providers (see also [Jurt, 2003](#); see also [Burton, 2004](#)). Our interviews showed that in the past few decades, overproduction, changing market conditions and increasing criticism from society regarding the ecological side-effects of farming have placed this traditional identity and the related social position of farmers under high pressure. Swiss farmers are criticised for unsustainable cultivation practices, extensive use of pesticides, contribution to high particulate matter loads, climate change and expensive food production. Thus, farmers feel they are increasingly becoming scapegoats for events that they cannot influence. Soil erosion is regarded as just one more of these events.

Consequently, these farmers located themselves within an interpretative framework that justified the incidence of soil erosion and made it seem normal: the statement “*I had simply treated the land normally. I can't influence the weather*” expresses this attitude well. Such strategic arguing was observed especially when soil erosion caused off-site effects such as flooding of roads or houses, leading to social and/or legal conflicts in which farmers were blamed for this damage.

However, in-depth interviews showed that regardless of whether farmers emphasised their powerlessness regarding natural events or their personal responsibility, feelings alluding to personal failure were expressed by all of them. Some articulated these feelings explicitly, e.g. “*There was also a sense of personal failure*”; others voiced them more indirectly: “*Do you think I'm proud of this damage?*” Although many farmers stressed the 'natural' causes of soil erosion, it can be concluded that at the same time most of them also felt they had not succeeded in cultivating the field properly: they had not worked according to the norms of professional ethics.

### *How farmers argued in relation to the soil conservation measure of no-tillage*

Narratives of farmers who rejected no-tillage and those who adopted it revealed a broad set of arguments. It is not surprising that most arguments of both groups of farmers refer to economic, ecological, agronomic and social dimensions. However, a new and rather unexpected result was that aesthetics plays a crucial role as well when farmers reflect about options for addressing soil erosion. Although rejecters and adopters referred to the same five dimensions, they accentuated different aspects (see [Table 1](#) for an overview of the main arguments).

Nevertheless, both groups of farmers justified their practice mainly using arguments pertaining to financial, ecological and agronomic dimensions. Regardless of whether farmers had or had not adopted no-tillage they stressed the dimensions of financial feasibility. Farmers who adopted no-tillage mentioned reduced inputs of fuel and working time along with higher income, whereas farmers who rejected no-tillage alluded to additional costs for agricultural contractors, investments in new machinery and reduced yield. Ecological arguments were also quite often produced: some farmers stressed the positive effect of no-tillage on soil erosion, while others disliked the obligatory use of non-selective herbicides.

**Table 1**  
Farmers' main arguments in relation to no-tillage.

Thematic dimensions	Farmers who reject no-tillage	Farmers who adopt no-tillage
Economic dimension	No-tillage causes additional expenses for pesticides, slug pellets and fertilisers No-tillage requires investments in specialised equipment or involves costs for no-tillage contractors No-tillage leads to reduced yields	No-tillage saves working time, fuel and thus money because there are less working steps No-tillage does not necessarily mean lower yields  No-tillage can increase income even if yields may be reduced, since expenses for fuel and working time are lower (Some) cantons financially support no-tillage
Ecological dimension	No-tillage requires (higher loads of) herbicides	No-tillage prevents soil erosion and improves soil structure No-tillage is conducive for soil organisms such as earthworms
Agronomic dimension	No-tillage provokes problems such as slug invasions, weeds, slower germination and the European corn borer. With no-tillage, manure cannot be worked into the soil and lanes of the combine harvester cannot be levelled out Soil loosening is important for maintaining soil fertility  Continuous use of no-tillage is incompatible with certain crops such as potatoes or vegetables With no-tillage there is a higher risk of crop failure  Soil and weather conditions of some farms are not favourable for no-tillage Collaboration with contractors requires compromises regarding cultivation time as they have many clients No-tillage means giving up ploughing, an activity described as one of the most beautiful moments in the agricultural year No-tillage leads to dependency on no-tillage contractors	No-tillage facilitates cultivation of stony soils and increases crop quality (e.g. protein content in corn) In dry areas no-tillage reduces evaporation by guaranteeing continuous surface cover No-tillage allows for a more flexible organisation of working steps and makes it possible to wait for the ideal cultivation time as the work can be accomplished in a shorter period No-tillage helps to even out labour peaks  Problems with pests, weeds and diseases can be managed with suitable cropping practices
Social dimension	It is nice to have one's own equipment on the farm  No-tillage means estranging oneself from established social contexts in cases where family members or neighbours are against the new cropping system  No-tillage means abandoning existing structures of collective farming No-tillage is bad for the image of agriculture: villagers deplore the appearance of 'burned fields'	No-tillage is a cropping system for innovative farmers.  There is a very encouraging atmosphere among the community of no-tillage farmers. No-tillage requires less working time, thus leaving more time to be spent with the family No-tillage is more demanding with regard to professional skills and thus not every farmer is capable of practising it successfully; successful no-tillage farming is something to be proud of No-tillage represents a new aim and challenge
Aesthetic dimension	No-tillage fields are irregular, disorganised and not cultivated properly	With no-tillage you have to learn to see differently  'Burned' fields please the eye with their green lines on yellow

Agronomic arguments were naturally at the centre of the farmers' professional interest: all interviewed farmers agreed that no-tillage increased difficulties with slug invasion, slower germination and the European corn borer and generally increased the risk of crop failure. However, while no-tillage farmers saw solutions to these difficulties (e.g. changes in the crop rotation or fertilising systems), farmers who rejected no-tillage did not look beyond the problems.

Arguments relating to the social and aesthetic dimensions are generally not produced in public debates and were voiced only occasionally during the formal interviews in this study. Empirical evidence for these dimensions was more likely to be found in informal conversations before or after the formal interviews. For example, all interviewed farmers reported that social relations in the family and the village, as well as the pleasure related to activities of traditional tillage agriculture, heavily influenced their decisions regarding no-tillage, since these were crucial factors in coping with the daily work load as well as in determining what is considered the 'good way of farming'. The latter point was given particular emphasis, as farmers felt that no-tillage fields looked disorganised and not properly cultivated. Agricultural contractors even stated that the perceived aesthetics of fields was one of the most important prejudices against no-tillage among their clients.

A more detailed analysis of the farmers' narratives revealed that although financial, ecological and agronomic arguments are the ones most often mentioned in public debates, their influence

is generally overestimated. We do not intend to downplay these dimensions; they are no doubt important for farmers' decision-making with regard to no-tillage. However, we argue that they tend to be emphasised more by farmers because they are strongly accepted in the thinking of present-day society and are considered to be rational. For example, in emphasising financial feasibility, farmers respond to society's demand that farmers should think and act as entrepreneurs. 'Farmers do not produce for the aesthetics but for profit' is just one quotation exemplifying this expectation.

However, we must take account of the fact that the traditional Swiss farm is a family farm and cannot be understood as business functioning according to a profit-maximising logic alone. Agronomic and economic aspects of soil cultivation are interwoven with family life, leisure time and hobbies. Conversations quite frequently showed that farmers divide their farming activities into 'professional' and 'hobby' activities, the latter not primarily aiming at income generation. However, although ploughing in spring is clearly attributed to the income generation activities, farmers also described it as one of the most beautiful moments in the agricultural year. Thus, adopting no-tillage means giving up a most-loved activity. This emotional attachment to activities of traditional tillage agriculture may be one of the main and quite underestimated reasons why farmers refuse innovations such as no-tillage when these are justified only by economically and technologically inspired instrumental reasoning. Furthermore, in contrast to tra-

ditional soil cultivation using the plough, no-tillage is usually not done by individual farmers but by contractors who bring in the required special machinery. Adoption of no-tillage, therefore, creates dependency on a contractor and involves a loss of autonomy that clearly contradicts farmers' professional ethics and their identity, in which self-realisation plays an important role.

The fundamental importance of the social dimension in relation to financial or ecological aspects was also expressed by farmers who had adopted no-tillage. The following quotation exemplifies how one of the interviewed farmers experienced this relation:

"I noticed that a few years ago I was at a standstill, I was no longer motivated. No-tillage was simply what I needed (...). When cultivating fields, we used to do what we'd done all the time, and I simply no longer felt a challenge (...). Well, this level is much more important to me than everything else, but the rest [finances, saving diesel and energy] also needs to be ok... for me it's what is human (...). I just need the challenge, it's so that I can make my place in my life, my environment, my community, these people around me. That's what I am."

These findings show that although in public arenas farmers argue almost exclusively on the basis of financial, ecological and agronomic feasibility, in fact they interpret soil erosion and soil conservation measures against the background of their entire life-worlds. In order to explain differences in the valuation of no-tillage, the next chapter will shed light on different kinds of meaning that the mentioned aspects have in distinct provinces of reality.

#### *No-tillage in different provinces of reality*

By referring to the life-world concept, major differences in the sense of personal responsibility regarding soil erosion events and the valuation of soil conservation measures can be explained by the degree of coherence farmers could create between what they considered feasible based on their practical attitude of everyday life, the relation it has to underlying symbolic meanings and their images of themselves.

A closer look at how the aspects presented so far are interrelated revealed that farmers simultaneously live in multiple horizons of meaning and their experience tends to switch from the province of everyday life into other 'provinces of reality'. For the present study, the 'province of aesthetic awareness' and the 'province of value meaning' proved to be particularly important. Before elaborating on these three provinces of reality and how they are interrelated in the case of no-tillage, we have to introduce further concepts of Schütz's life-world approach.

According to Schütz (Schütz and Luckmann, 2003), within one province of reality such as the everyday life-world or the province of aesthetic awareness, experiences can be passed beyond time and place by individual 'marks' and intersubjectively valid 'signs'. In the context of agriculture, a typical example of such signs and marks are features of agricultural land (e.g. regularity of crop density or leaf colour) that allow farmers to appraise crop condition. However, experiences made in one province of reality cannot be transferred one to one to another province of reality. For example, experiences made in the province of value meaning can only be transferred to the everyday life-world by means of 'symbols'. Symbols as defined by Schütz serve as bridges between different provinces of reality. As such, they integrate extraordinary experiences into the pragmatically motivated and socially established world of everyday life. Therefore, symbols are part of one province of reality, while their meaning refers to other provinces of reality. For example, 'high yields' are parts of the farmers' financial considerations in the everyday life-world; however, 'high yields' also

have the symbolic meaning of being a 'good farmer' and thus refer to the province of value meaning.

#### *No-tillage and the practical attitude of everyday life*

When farmers apply typical solutions to typical problems in order to cope with the requirements of daily life, they clearly act based on their practical attitude of everyday life. In this attitude, farmers focus on technical, ecological, financial or social feasibility, or everyday practical efficiency and usefulness. Soil conservation measures must fit into the routine of farming activities. However, no-tillage profoundly challenges the routine of farming activities. This routine is shaped by concepts and practices of traditional tillage agriculture: ploughing is deeply internalised into the taken-for-granted everyday life-world of farmers, symbolising the traditional image of farming. This is the unquestioned result of experiences garnered in the course of many farming lifetimes and passed on from generation to generation. This image includes the belief that ploughing is intrinsically linked to soil fertility, seedbed preparation and weed control. Soil erosion is seen as a side effect of this system.

Thus, in order to integrate no-tillage into their everyday life-world, farmers are forced to fundamentally reconstruct their existing concepts (e.g. images of farming and nature-society relations), practices (e.g. crop rotation, fertilising and work organisation) and experiences (e.g. interpretation of plant growth). In particular, farmers stressed that no-tillage is more demanding with regard to professional skills. Even farmers with several years of experience in no-tillage explained how ambiguous and uncertain their feelings were after sowing. This shows that even for convinced no-tillage farmers, no-tillage is quite difficult to integrate into their unquestioned everyday life-worlds.

Thus, integration of no-tillage into the everyday life-world requires that technologies be feasible and efficient not only in abstract terms, but also in the light of the necessary reconstructions of that same life-world. For example, it became clear that the parameter of 'saving time' through no-tillage was only relevant for farmers who aimed to re-invest the time they saved in other financially, socially or emotionally significant activities. For other farmers, the abolished working steps in no-tillage were more related to a feeling of not fulfilling their traditional farmer's role and poor commitment to agriculture.

#### *No-tillage and the province of aesthetic awareness*

The significance of aesthetics in the question of no-tillage has already been presented above. However, as stated by Berleant (1995), Bonsdorff (2005) and Winkler (2005), aesthetics is not only about beauty, but also about comprehensive sensory awareness. For the context of agriculture, Winkler (2005, p. 3) introduced the term 'professional sensitivity': "The essential feature of professional sensitivity is the highly selective perception of the least differences. It creates a high level of sensuous discrimination, containing the instantaneous identification and the symbolic representation either in practice or in words. Moreover, it aims at an embodied, incarnated performance of the senses."

While we consider this capacity of intensified sensory awareness as different from the cognitive style in the practical attitude of everyday life, it is, nevertheless, an important source of the farmers' life-world knowledge. Differences in appearance between fields are highly important criteria for farmers' appraisal of crop condition. Features of agricultural land, including time of germination, regularity of crop density or leaf colour, serve the farmers as 'signs' and 'marks' to 'read' past acts of cultivation and future development potentials. As crop growth with no-tillage differs visually from growth in traditional agriculture, farmers who adopt no-tillage need to adapt their professional sensitivity, their experience and

interpretation of plant growth. Farmers express this by statements such as:

“You have to learn to *see* differently. A field sown without tillage doesn't seem to grow very well at the beginning, but when it does grow, it comes alright. You have to be patient; don't be discouraged if it doesn't look so good at the beginning.”

However, when farmers switch from plough agriculture to no-tillage they do not only have to change the previous meanings of these marks and signs in the province of aesthetic awareness; they also have to transform the related symbolic meanings which refer to the province of value meaning. The following quotation shows how an interviewed farmer who refused no-tillage linked the aesthetics of the field to a certain type of professional and personal ethics:

“The aesthetics of the field? Yes, it hurts the eye (. . .) when the field isn't nice and tidy. . . (. . .) if for example there are signs of an attack by some parasite and you don't treat it. . . with the new agricultural policy, where you do things extensively, you let things go. . . you see, I don't do that. It is a bit of a philosophy, when you do something you like to do it well. (. . .) We also had examples of farmers who gave up. They also just let everything go, it was a bit the end, . . . people who started drinking, for example. So they did very little, a minimum, less and less, less and less, . . . and then you've got to sell because it doesn't work anymore, you see.”

The narrative of the farmer who gave up can be read as a story of social decline and downfall: the farmer who practiced extensive land management finally had to sell his farm and thus lost his status in the farmers' community. He lost control over his fields and in the same way over himself. He became an alcoholic and was not able to maintain his social position in society. In other words, the aesthetics of the fields is seen as symbol of the social position of the farmer.

Whether extensive land management was truly the reason for the farmer's downfall is not relevant at this point; what is important is the interpretation of his demise in the eyes of his neighbour. It might be argued that this example is a rather extreme – and thus maybe not very representative – way of relating no-tillage farming and the farmer's life-world. However, it has the advantage that it makes explicit how the aesthetic dimension links up with professional ethics and identity: there is an almost indivisible unity of the cropping system with personal features of social status, self-representation and identity.

#### *No-tillage and the province of value meaning*

As we have shown, the symbolic meanings in the province of aesthetic awareness refer to what *Stoltzfus (2003)* introduced as the province of value meaning. Referring to *Schütz*, *Stoltzfus* states that an object, event, or person experienced in the everyday life-world can become paired with a transcendent horizon of meanings such as a shared sense of moral value. He exemplifies this by *Rosa Parks* who has become a symbolic representative of the Civil Rights Movement in America and the values of freedom and equality. *Rosa Parks* is the person experienced in the everyday world, and freedom and equality are the appresented aspects of shared moral value. *Stoltzfus* argues that the resulting conglomerates of abstract and symbolic meanings mediate to experience a vision of moral, spiritual, or aesthetic completeness and wholeness.

Practices of traditional tillage agriculture as well as no-tillage have many meanings symbolising moral values. For example, an interviewed farmer expressed the value meaning of treating the grass with herbicides as required by no-tillage as follows: “*Us farm-*

*ers with cows, we can't just burn [spray] the grass. You just don't do that; it must remain nice and green. That's just a moral barrier, you see*”. For this farmer, ‘burning’ the grass with herbicides has the symbolic meaning of destroying the basic resources on which his cattle depend. Interestingly, to bury the grass by use of the plough as in traditional tillage agriculture does not have the same value meaning; it is rather seen as an activity of seedbed preparation for the following crop.

For many other farmers the parameter of ‘high yield’ does not only relate to possibly high financial return, but to a certain sense of professional ethics and identity: high yields are seen as a symbolic representative of a ‘good farmer’. In other words, apart from its physical or financial aspects, crop yield plays a role also as a social value that symbolises a farmer's ability and competence. The case of no-tillage illustrates this symbolic meaning particularly well: the possibly higher yield in traditional tillage agriculture does not necessarily mean higher income, since expenses for inputs of fuel and working time are higher as well. Hence, even if certain farmers practicing no-tillage may be more successful from an economic perspective, they risk being perceived as lazy by the farming community because of their lack of commitment to the traditional nurturing and custodial roles of the farmer. Thus, our findings correlate with those of *Burton (2004, p. 209)*, who states that

“... the symbolic value of the crop is thus in that it displays the farmer's commitment to agriculture as a way of life, to the soil and to the crop, and not in its display of the profitability of the farm.”

These examples demonstrate not only that values, norms and philosophies of life play an important role in the life-world of the farmers. They also show that these normative elements can become embodied in farming practices. In this perspective, farmers' interpretation of soil erosion and soil conservation can be conceptualised as reflections of their self-images and their personal and social identities. If the abstract or symbolic meanings of new soil cultivation practices contradict the personal and social identity of farmers, they tend to refuse them. By contrast, if soil conservation conforms to their aim, vision and self-determination, farmers consider uncertainties and difficulties a challenge inherent to any process of change.

#### **Conclusions**

The results of this study show that farmers interpret soil erosion and soil conservation measures against the background of their entire life-world. A first finding of this study was that, although soil erosion was unanimously regarded as negative by farmers, soil protection was not a high priority in their daily lives. However, while farmers who switched to no-tillage emphasised their room for manoeuvre, farmers who rejected no-tillage stressed their powerlessness regarding natural events. Interestingly, feelings alluding to personal failure were expressed by all of them. Further analysis of the farmers' narratives revealed that both groups of farmers justified their practice mainly using arguments pertaining to financial, ecological and agronomic dimensions. However, a new and rather unexpected result was that social aspects and aesthetics play a crucial role as well when farmers reflect about options for addressing soil erosion. For example, we could show that the emotional attachment to activities of traditional tillage agriculture may be one of the main and quite underestimated reasons why farmers refuse innovations such as no-tillage when these are justified only by economically and technologically inspired instrumental reasoning. Moreover, agricultural contractors stated that the perceived aesthetics of fields was one of

the most important prejudices against no-tillage among their clients.

By referring to the life-world concept of Alfred Schütz, we found that the mentioned aspects play a role not only as objects or events experienced in the practical attitude of everyday life, but also as symbolic representatives of social values and norms, personal and professional ethics, and identities. This is, in the practical attitude of everyday life no-tillage has to be feasible and fit into the routine of the farming activities. However, as we exemplified by the question of 'aesthetics' or 'high yields', characteristics of new technologies such as no-tillage also have to correspond to symbolic meanings in other provinces of reality: We showed that apart from its physical or financial aspects, aesthetics of fields and crop yields play a role also as a social value that symbolise a farmer's ability and competence. Major differences between farmers who adopt and farmers who reject no-tillage were found to depend on the degree of coherence they could create between the abstract meanings of no-tillage in the everyday life-world, the symbolic meanings of no-tillage referring to other provinces of reality and their images of themselves.

Thus, soil conservation measures such as no-tillage must fit not only into the practical requirements of daily farming life but also into the universe of farmers' life-world. Consequently, adopting no-tillage, farmers have to fundamentally reconstruct their existing practices, experiences and concepts, including abstract and symbolic meanings. In other words, a process of innovation cannot be seen as a simple change of technology; it must be conceptualised as a broad change of the entire life-world. In particular, abstract and symbolic meanings of old and new situations have to be reshaped in the context of the farmers' self-images. This explains that even for convinced no-tillage farmers, no-tillage is quite difficult to integrate into their unquestioned everyday life-worlds.

However, these dimensions do generally not find their way into public debates on agricultural soil protection. Especially in conflictive situations related to off-site damage farmers argue on the basis of supposedly better-accepted technical and economic aspects of soil conservation. Attempting to defend their practices against external accusations, they tend to stick to strategic action, which disregards the hidden aspects of farming related to identity, social relations, ethics and aesthetics, despite the fact that these are often much more important in guiding farmers' decisions, as we have shown in this study.

From this perspective, soil protection implementation faces the challenge of facilitating social learning processes between farmers, experts, and scientists at a 'deeper' level, allowing actors to interact with an awareness of all significant spheres of relevance that characterise the life-worlds. Thus, when debating soil protection in social learning processes it will not do to consider only the technical, financial and ecological feasibility – it is just as important to take into account the symbolic meanings providing a vision of wholeness. The study particularly emphasises the importance of a certain level of shared symbolic meanings in order to promote mutual understanding between farmers, experts, and scientists with regard to more sustainable practices in soil cultivation. However, this kind of interaction cannot be imposed upon the actors. Instead, as further study (Schneider et al., forthcoming) showed, the conditions for the emergence of social learning can be positively influenced. An atmosphere of trust where farmers', experts' and scientists' views, knowledge and life-worlds are taken seriously is one of the most important prerequisites. This also implies that experts and scientist do not insist on predefined solutions such as no-tillage, but that they are open to learn from the farmers and their experiences. This will provide a basis for transforming existing and co-creating new meanings—and eventually lead to better adoption of sustainable farming practices.

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