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# The Transformation to Organic: Insights from Practice Theory

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## 1. Introduction

This paper draws on practice theory to frame and understand the process of converting from non-organic (conventional) to organic farming. Within this context we seek to deepen our understanding of the transformation<sup>1</sup> processes that occur, including the on-farm experiences of farmers in the course of conversion to organic practices. More specifically, our aim is to

- Introduce general characteristics of the transformation process;
- Develop a theoretical framework based on practice theory which helps us understand the complexity of the transformation processes and
- Apply this framework in discussing selected aspects of transformation of an organic farm in the plant production sector;

We close with findings that are of theoretical and practical interest in understanding the transition to organic.

Practice theory offers a useful analytic means to identify and describe the essential or defining farms and related systems and dynamics of both non-organic and organic farming characteristics, as well as the related transformation processes from non-organic to organic systems. We look to practice theory for insights and understanding in the dynamic and reflexive inter-relationships between structures and individual performance, materiality and embodiment of practices and cognitive-mental processes.

Practice theory draws attention to the inter-relatedness of: the farmer's physical activity; the materiality of the things and artifacts with which the farmer works and which help to define the farmer's physical environment; and, the interactions between nature and the farmer as a social actor. We illustrate this process by looking at selected practices mainly in plant

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<sup>1</sup> We recommend that the use of the term transformation in agri-food systems is used in a more broader, complex and holistic context going beyond the technical aspects of the farming system and to include linkages with systems outside of the farm (e.g. markets, input-industry, social networks etc.), while transition/conversion is mainly applied if the focus is only on technical and economic aspects e.g. of a farm.

production,<sup>2</sup> and try to specifically illustrate different patterns of social practices in all three phases of production from non-organic, through the transition and into organic.

From our perspective, the transition from non-organic to organic practices involves much more than following an approved set of directions or guidelines. For us, the transition involves a range of contradictory materialized and reflected worldviews. In this transformation farmers are challenged to rethink and reorganize their farming practices and their social networks. In order to capture the dynamics of this process, and to understand its agro-socio-cultural and political significance, we draw upon social practice theory to identify and generate new insights into the transformation process.

## **2. General characteristics of the transformation process**

The conversion period from non-organic to organic farming practices is generally, and in some countries, legally, defined as a formalized process that is stipulated to occur over three years, during which farmers must follow all organic regulations (see Courville 2006; Greene and Kremen 2003; Greene and Dimitri 2003; United States Department of Agriculture 2002). On all farms, the transformation to organic involves a complex change in a farm's livelihood practices, including its internal and external (off-farm) social, ecological and economic relations.

Organic farming itself, and the transformation process on a farm, is discussed as an innovation process. More than that it is discussed as a step towards a paradigm shift in farming (e.g. Michelsen 2001, 3; Beus & Dunlop 1990). The rich literature about farmer's motives to convert to organic and how farmers convert their farms (e.g. Cranfield et al. 2010; Padel 2001; Fairweather 1999) explains, that this innovation process is not only initiated but is to be interpreted by general innovation characteristics identified from Rogers (1995), e.g. "relative advantage (more the better), relative complexity (less the better), compatibility (more the better), reliability (more the better), observability / trialability (more the better)." These mainly cognitive-mental arguments are of relevance, however they are different in organic and do not highlight the concrete practices, from which these reflections arise.

In contrast to other innovations in agriculture in the last decades, organic is not only a part of a new technique or a change of one practice on the farm, but a complete system change. Farmers adopt traditional techniques in a new context; conventional techniques are modified for the organic system; and specific new organic techniques are adopted. Besides these techniques, farmers follow specific rules and laws, which entail an ethical dimension. With this innovation they enter into new farm input systems, product markets and social systems, research needs and collaborations, and educational approaches.

The multi-layered process of transformation explains that the implementation of organic farming at the farm level does not follow a linear process or an S-curve of diffusion processes (Rogers 1995; Ryan & Gross 1943) over time. The diffusion of this innovation on a farm seems much more a back-and-forth process, which is influenced by the farm's internal and external changes. It follows loops, path dependencies (Latacz-Lohmann et al. 2001), and surprising developments. It is a contingent process of adoption and adaptation of old, modified and new practices which have to stand the test of time. This transformation process is embedded in and shaped by a specific space-time, cultural, social, economic and an agro-ecological context. The transformation process is formally finished after three years.

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<sup>2</sup> We are aware that the specific focus on plant production might exclude relevant aspects to fully interpret the phenomena of transformation.

However, the adoption and diffusion of practices is an ongoing process, and each sector of the farm has its own specific processes of change and innovations. Therefore, we argue that the transformation process is a non-linear cyclic innovation process (cf. Cheng & Van de Ven 1996). The transformation process is not a predetermined process and it neither follows one pattern nor ends up with the same result. On the contrary, there are differences concerning the extent of “change”; e.g. between farm types (e.g. dairy farms, vegetable or hog farms), agro-ecological zones (e.g. mountainous or arable regions), cultural impacts (e.g. farmer-consumer co-operations or export oriented production; country and region specifications) and farmers following a resource limited approach and those who are engaged in “substitution organics” (see Guthman 2004a; Guthman 2004b). These different types could be classified as transformation types, defined by their starting point and their target intensity and the degree of change. However, types presented in Table 1, are not more than a simplified picture of this diversity.

Transformation type / farm level	Low change	Low change	Low-medium change	a) high b) low change
Starting intensity non-organic	Low input*, part-time farmer	Low input, fulltime farmer	Integrated farming, fulltime farmer	High input, part-time or fulltime farmer
Organic target intensity (Agricultural intensity)	Low input**, part time or fulltime farmer / often modernized	Low input, fulltime farmer / often modernized	Low-medium input, fulltime farmer / modernized	a) low input b) high input / fulltime farmer / modernized

\* Input: Herbicides, pesticides, mineral fertilizers, livestock unit per ha

\*\* In the framework of the Basic Standards: mineral (Phosphorous, Potassium) and organic fertilizers and “organic” certified pesticides; livestock unit per ha; share of fodder legumes in the crop rotation

Table 1. Diversity of transformation types

A wide variety of issues related to the transformation process have been studied over the last two decades. The driving forces for transformation to organic farming involve a broad set of motivations, which might be environmentally, economically, religiously or ethically driven (Cranfield et al. 2010; Khaledi 2007; Locke 2006; Engel 2006; Darnhofer 2006; Darnhofer et al. 2005). According to Cranfield et al. (2010), we differentiate between four types of farmer motivations, which are approximations of what we find in reality:

- To find an economic solution for the farm: economic survival, market strategies, farm reorganization
- To take care for the environment: nature protection, water protection, soil fertility
- To avoid risks and to increase health: to exclude unhealthy methods, to recover health
- To follow and fulfill idealistic motives: to live a self-realized, spiritual, religious, value driven life

These different motivation types underlie the transformation process and go beyond a change and reorganization of techniques. This observation also explains that there are more than enough reasons that the perspectives of researchers on the transformation processes highlight a broad spectrum of topics. Some of these are: the challenges in the transformation period in a broader context (Lamine & Bellon 2008; Padel 2001; Tress 2001; Lockeretz 1995; Freyer et al. 1994; Lampkin 1994; Freyer 1991; Rantzaus et al. 1990); production and economic (Schneeberger et al. 2002; Dabbert 1994); investment (Odening et al. 2004); market processes (Tranter et al. 2009); transformation planning (Goswami & Ali 2011; Ács 2006; Freyer 1994; Lampkin 1992; Dabbert 1991; MacRae et al. 1989); and the systemic characteristics of the

organic farming (Darnhofer et al. 2010; Noe & Alroe 2006, 2003; Høgh-Jensen 1998). Despite their different theoretical perspectives, all of these studies sensitize us to the multi-faced characteristics of the transformation process.

Drawing on this wealth of empirical and conceptual discussions of organic farming, as well as our own experiences about the complexity of transformation processes at the farm level (Freyer 1998; Freyer et al. 1994; Freyer 1994; Freyer 1991; Rantzau et al. 1990), regional transformation processes (Freyer et al. 2005; Freyer et al. 2002; Freyer & Lindenthal 2002), participatory approaches (Wehinger et al. 2002) and our initial efforts to apply practice theory (Freyer et al. 2011), we argue that there is a need for new theoretical perspectives on transformation processes.

### 3. Conceptualization of practice theory

Before we describe our model, we first explain more specifically our interest in practice theory and offer some insights into this theoretical perspective. From our own life experiences we know what the challenges of changes in habits can be. Change occurs in thinking, feeling and in what we communicate. However, change becomes most visible when we engage in a practice and when this activity becomes part of a routine in our life. Similarly, we suggest that rethinking the transformation from non-organic to organic farming requires the use of a theoretical perspective that captures the practices of farm transformation from a non-organic towards an organic farming system.

Theories with a broader perspective for analyzing complex systems change are systems theory (Bertalanffy 1973), social practice theory (e.g. Schatzki 1996) and transformation theory (e.g. Reissig 2009). Social practice theories play an intermediate and integrative role between systems and transformation theory. We argue that system theory, which is sensitive to actors and actants, offers a methodological feature that draws attention to the pre-structuring of relevant factors, - in our case the material - which is part of the social practice. In addition, it also highlights the ways in which humans participate in the practice as well as in the exchange of materiality. However, it underestimates the individual dimensions such as cognitive and mental processes or how individuals act.<sup>3</sup> Transformation theory focuses on macro level development processes, on organizational and societal structural change (Reissig 2009), but it is not sensitive towards the individual, materiality or embodiment of practices. Therefore we redefine and extend the term transformation with reference to systems theory as well as practice theory and to processes at micro-, meso- and macro-level.

So, why practice theory? In the transformation process from non-organic to organic farming the farmer specifically confronts changes in those practices that were learned, created, sustained, and part of social experience and reproduction in everyday life. The transformation requires changes to embodied practices that made sense for a long time, and that informed what was always done, and was confirmed by the cultural and social context (Schatzki 2002).

To describe farm and farmers transformation, we seek a theoretical concept that is sensitive to the farmers' individual perspectives, the changing material, social, knowledge, mental and structural conditions confronted in this period, and that guides or influences decisions. Practice theory offers such a broader view on human behavioral change. It is sensitive to those aspects, which are fundamental in change processes, e.g. (Strengers 2010, 17): "How are everyday practices reproduced in daily life and what, if anything, disrupts these

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<sup>3</sup> This observation however will be deepened in a further paper.

routines? What rules constitute specific practices and how do they affect what individuals' do? To what extent do individuals past experiences and upbringings influence their practices? How and why are practices changing?"

In the last two decades various analytical approaches were developed which could be called "Theories of Social Practices" (Reckwitz 2003, 282). Practice theory seeks to overcome the dichotomy between structure and action, and to understand structures as the repetition of micro-situations (Collins 2000, 107) as well as the habitus of people as a product of social conditions (Bourdieu 2005, 45). Furthermore, practices are built on materiality of things and artifacts in a specific arrangement, which relate to a space-time context, follow routines, but are also open to change. A series / bundle of these social practices create lifestyles, constitute structures or social fields – networks, organizations or institutions (Reckwitz 2003, 285, 294, 295). These routines of behavior, which emerge as interplay between actor and actant, together create the site of the social (Reckwitz 2003, 287), in contrast to most cultural theories in which the site of the social is a cognitive and mental-intentional structure (Reckwitz 2004, 318). Practice theory is not a cognitive scheme, or something embedded in discourses and communications, but a practical knowledge, a know-how, a series of every day life concrete practices (Reckwitz 2003, 287) which are reproduced, routine-embodied performances; "objects are handled, subjects are treated, things are described and the world is understood" (Reckwitz 2002b, 250). The understanding of this practical knowledge includes both – "consciously reflected and semi- or deeply embedded knowledge" (Strengers 2010, 8).

We argue that there is need to add cognitive-mental and structural perspectives with the concrete practices and the related materiality. There are several reasons to adopt this perspective. As Nicolini (2009) summarizes:

"the meaningful, purposive and consistent nature of human conduct descends from participating in social practices and not from the deployment of rules, goals and beliefs" (Nicolini 2009, 4); Further more: „practices constitute the horizon within which all discursive and material actions are made possible and acquire meaning; that practices are inherently contingent, materially mediated, and that practice cannot be understood without reference to a specific place, time, and concrete historical context" (Engeström, 2000; Latour, 2005; Schatzki, 2002; 2005; cit in Nicolini 2009). While practices depend on reflexive human carriers to be accomplished and perpetuated, human agential capability always results from taking part in one or more socio-material practices (Reckwitz, 2002b; cit in Nicolini 2009,5). Practices are mutually connected and constitute a nexus, texture, field, or network (Giddens, 1984; Schatzki, 2002; 2005; Latour, 2005 Czarniawska, 2007). Social co- existence is in this sense rooted in the field of practice, both established by it and establishing it. At the same time, practices and their association perform different and unequal social and material positions, so that to study practice is also the study of power in the making (Ortner, 1984; cit. in Nicolini 2009, 5).

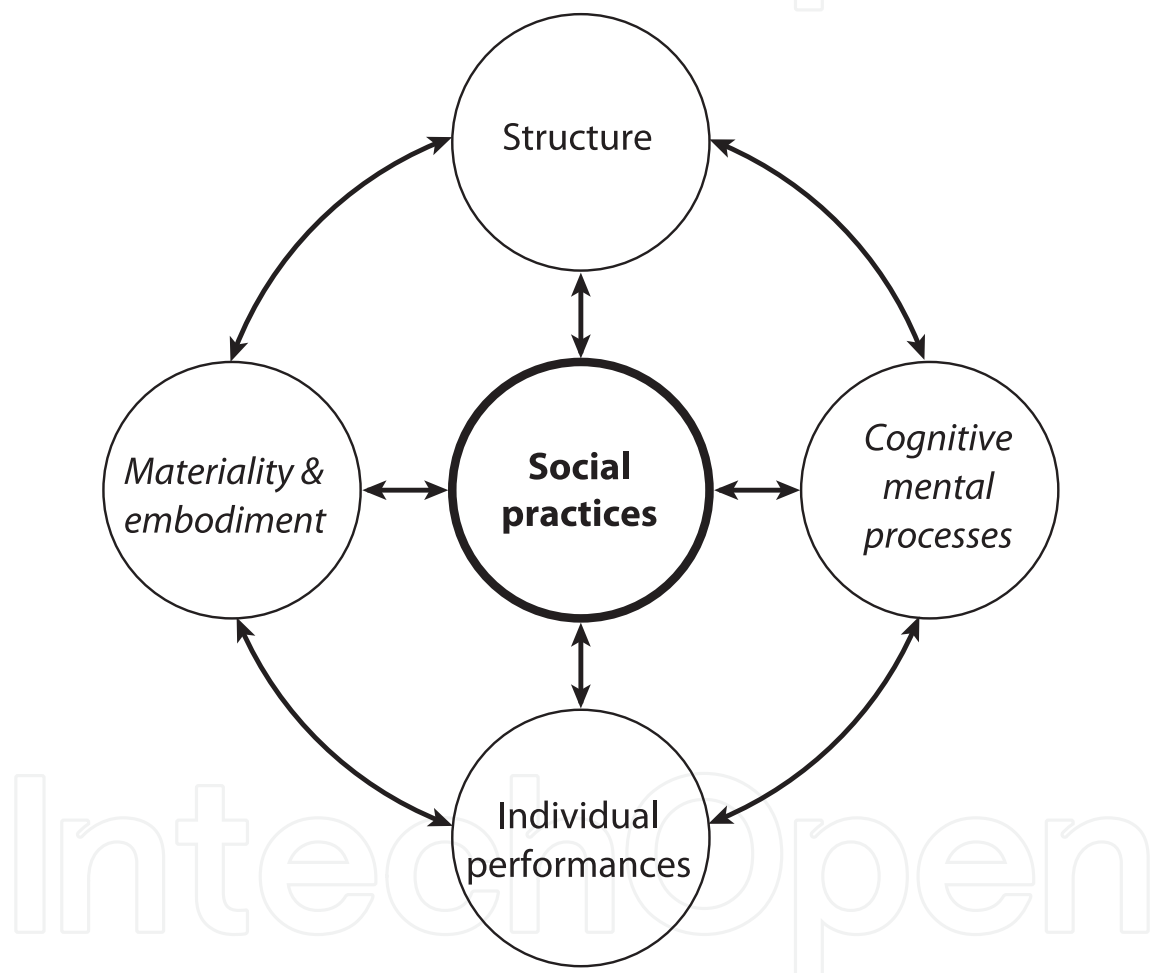
Transformation is not only a change of one technique, it's a systems change that involves social relations and structures; it is a far reaching break with former practices (Reckwitz 2002b, 255), common understandings, how to do things, following certain norms, conventions, customs, traditions, and what is acceptable in practice or not (cf. Turner 1991). If we follow Bourdieu (2005, 47) the characteristic of habitus change is constantly and continuously a change between historical given structures and new practices. With the transformation process, the farmer moves a big step forward and rejects most former social practices.

To conclude, we picture our approach to organic transformation as an interplay of four analytical-theoretical dimensions: structure, individual performance, materiality and

embodiment, and cognitive - mental processes (see Figure 1). In the following we describe our understanding of these dimensions, their relation to social practices and their inter-relatedness.<sup>4</sup>

### 3.1 Structures

To frame the dimension of structures we draw first from Anthony Giddens' approach to structuration. Giddens (1992, 1984) identifies structures (orders of knowledge) as sets of rules and resources (see Westermayer 2007, 10) (Table 2).<sup>5</sup> Structures are interpreted as rules with a regulative and constitutive dimension in a space-time context and as material and power resources. Rules and resources are established in and through practices, by doings and sayings.



Note: All dimensions are linked and they influence and form each other. They are stored in structures and arise through carrying out social practices, defined as a bundle of practice arrangements, which exist independent from individuals. Individuals take over but also perform the social practice beyond their own materiality and embodiment and as well cognitive-mental patterns. Social practices combine objective behavior and subjective sense.

Fig. 1. Framing A Theory of Social Practices

<sup>4</sup> For other models on practice theory see e.g. Brand 2011

<sup>5</sup> Anthony Giddens understanding of structures contrasts with that of Ralf Dahrendorf's (1973) theory of conflict sociology and Talcott Parsons functional part systems of society (AGIL scheme)(1970)

Rules stipulate how to engage different resources, how they are socially shared yet remain anchored individually (Giddens 1992, 316). Two different types of rules can be identified: those that are constitutive, or produce sense and significance, and are communicable; and, those that are regulative because they limit or encourage action. Norms are reflected and embedded in cognitive structures of knowledge (Reckwitz 2004, 315). With practice theory the character of rules and norms is also a practical one. The reproduction of the social practice (Giddens 1984, 21) involves a cognitive, conscious reflexivity (Collins 2000, 107); “rules also emerge out of practices, and are often interpreted and incorporated into practices in ways different from those originally intended” (Strengers 2010, 12, modified). Resources can allocate, or have the power to change something, or they can be authoritative, or have the ability to influence the acting of others.

Orders of knowledge are formed by social practices. In turn, they reproduce, reformulate and modify practices, and empower or hinder acting. Orders of knowledge do not exist without a social practice. They become relevant in the execution of a social practice and these practices reproduce institutional orders (Giddens 1984). In the meantime, they support a sense making identification and selection of social practices.

Structures are formed by materiality (e.g. things, artifacts), and they are also initiated through cognitive-mental processes, which form orders of knowledge through discourses, norms, rules or laws (see below). However, and this is the specific characteristic of practice theory, structures always exist only within a context to any practice.

			Medium of acting	Institutional order
Structures	Rules (shared knowledge)	Constitutive aspects	Foundation of meaning, communication	World views, discourses, codes
		Regulative aspects	Moral relation, sanctions	Moral, legitimate order, laws, norms
	Resources (tools)	Availability of allocate resources	Material power of arrangement	Economic institutions
		Availability of authoritative resources	Power over other actors	Political institutions

Source: Westermayer (2007, 10, modified); Giddens (1984)

Table 2. Model of Acting based on Structuration

### 3.2 Materiality and embodiment

The concept of materiality and embodiment draws our attention to the materialization of the social and the cultural in objects, the embodiment of practices, and the engagement with things and technology and in our context also specifically with natural resource management (Pali et al. 2011). In practice theory, things (e.g. artifacts, bodies or natural objects) are re-conceptualized as social entities that contribute to the formation of practices (Preda 1999, 349).

As Schatzki (1996) argues, materiality represents a constitutive element or resource of social practices. To consider materiality conceptually means to consider natural objects and as well as man-made artifacts, including characteristics e.g. smell, taste, odor, sound, form, structure or function.



Following Reckwitz (2003) and others, we apply the idea of embodiment to define collective social practices by drawing attention to the site where practices are embodied and expressed by certain physicality. Things and embodied practices are also the carrier of rules or regulations, resources or certain knowledge (Reckwitz 2002a). Things represent rules and norms but they are also the source for their modification or rejection.

Material infrastructures are also of high importance in our investigation, because some investments in farms can be extremely difficult to change. Many are long lasting and path dependent, e.g. hog houses. Some hinder change, depend on their amortization costs (see also Arthur 1989). This path dependency could have a huge impact on change and with that on practices (Latacz-Lohmann et al. 2001).

### 3.3 Cognitive-Mental processes

Cognitive (perception, cognition) emotional or affective processes are “non-material” processes, ...” as well as cognitive bases of behaviour” (Warde 2006, 140). Cognitive-mental processes are part of individual and group practices, and they contribute to the formation of structures. Rules for example are based on, and integrate cognitive processes (see teleo-affective processes below). Knowledge processes arise in discourses, they contribute to orders of knowledge and they are part of a practice.<sup>6</sup> Discourses are specific social practices of representation, in which cultural codes are manifested (Reckwitz 2006, 43, cit. in Jonas 2009, 10). Codes are part of these social practices and enable these practices (Reckwitz 2008c, 17). Culturally formed codes transport the sense, they differentiate between ‘in – and outside’, that what is part of a system and that what is excluded (Jonas 2009, 10). “These conceptualized ‘mental’ activities of understanding, knowing how and desiring are necessary elements and qualities of a practice in which the single individual participates, not qualities of the individual” (Reckwitz 2002b, 249, 250).

### 3.4 Individual performance

Individuals perform, or they adapt and adopt their practices to structural realities on their own terms (Greve et al. 2009). Practice(s) is created in the mind, but subject to the availability of things and artifacts, as well as an individual’s capacity and capability to embody practices (Reckwitz 2006, 40); they are always related to an individual’s concrete practice. The adoption of practices by an individual is also heavily influenced through the socialization process of an individual (Shove & Pantzar 2005, 2007, cit in Jaeger-Erben 2010, 254), e.g. former execution of specific social practices and therefore generalization of these practices seems limited.

Through the social practices, an individual creates her/his own social position (Reckwitz 2006, 34, cit. in Jonas 2009, 13) and an identity. This understanding follows Bourdieu’s habitus concept (Pouliot 2008, 273, 274), with respect to these characteristics: interpretation from a historical perspective, formed through individual and collective experiences; a reservoir of practical knowledge, learned through practicing in the world; relationality learned through inter-subjective experiences; dispositional, in the sense that that habitus does not determine forms of action in a mechanistic way, but encourages actors towards specific actions.

For Reckwitz (2002a, 207), the individual’s subjectivity is created through cultural codes, and individual capacity for reflection (2006, 40). That is, individuals establish their own

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<sup>6</sup> See also Reckwitz’s discourse / practice approach (2002b, 2008b)

individual practical understanding; they are partly autonomous actors (see Rammert 2008; Thevenot 2002, 69). They have the ability to give meaning to their thinking and action (Jonas 2009, 18). The meaning of a practice is given by the practice itself (practice specific) and by the actor (actor specific sense), however, the practice itself exists independent from the actor. From this perspective, practical understanding does not mean that a rational actor holds a normative meaning to action, but steers the action by “conferring meaning” on it (Jonas 2009, 3).

### 3.5 Social practices

Based on the above-introduced dimensions, which are from and contribute to social practices, in this section we synthesize and re-conceptualize this theory from the perspective of social practices and their key characteristics.

First, a social practice can be described as a routinized, and physical performance (see Rasche and Chia 2009), or a spatially dispersed nexus or pattern of physical activities and observations on these activities (Schatzki 1996, 89). Social practices are “bodily-mental routines” (Reckwitz, 2002b, 256). These practices, or bundles of practices, are not homogeneous, but full of contradictions. From the perspective of systems theory, we talk about open, complex systems (Berkes et al. 2003) that are in a permanent process of reformulation, while temporarily static (routined habits). Practices exist independent of individuals, and constitute rules and resources. Social practices lead to material consequences and embodiment. There is always a cognitive-mental dimension ‘participating’ in these practices, but the majority of the practice theorists agree that social practices assume a leading position.

Second, practices are “ordered across space and time” (Giddens 1984, 2). They produce new social space through practices, as individuals become member of this space. They assume and practice rules and resources (e.g., any type of power) that exist independent of each individual (Bourdieu 1989). The site in which actors “perform” prefigures the acting. But actors and actants create a network of orders and practices (Schatzki 2002, 63) that is related to specific characteristics of sites. Practice also entails a specific conceptualization of time in which it is structured; and, each actor carries an individual interpretation and practice over time.

Third, practices are contextualized in social fields. Social fields are more or less differentiated and institutionalized concepts of complexes and networks of social practices and cultural discourses (Reckwitz 2004). A field is a common space of knowledge in which specific practices are legitimated or not; it is a “playground” in which actors become socialized to certain rules and resources and in which actors assume positions and try to optimize their social resources (Bourdieu 1993). Any practice and any thing also embody morality or immorality (Jelsma 2006, 222), i.e., fixed in rules, laws or regulations or culturally embedded as a common sense.<sup>7</sup>

Fourth, practices can be characterized as having different features. Those which arise in different contexts, but which always are more or less in the same form, are described as *dispersed* (following rules, imagining, describing) (Schatzki et al. 1996, 98). They contrast

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<sup>7</sup> For example in organic agriculture the threat of nature through pesticides is interpreted as immoral, something that is excluded by their regulations. Acting with pesticides is an embodied social practice in non-organic farms and for those farmers under certain circumstances not immoral. In contrast, it “protects” against a threat.

with *integrative* practices, which cover complex entities. There the acting and speaking is diverse, but is combined through practical understanding or a set of rules and a teleo-affective structure (goal oriented; combined with emotions etc.). Practical understanding is thus the capability to do or say something.

Fifth, some practices are in a certain sense self-evident (non-discursive), while others are discussed (i.e., discursive) (Reckwitz 2008a). Non-discursive practices are socially normed and routinized forms of behavior, which comprise certain knowledge, or “know how”, including interpretations, motivations and emotions. Discursive practices on the other hand are temporary and intended to be the starting point for new practices (Schatzki 2002, 85). Reckwitz assigns the discourses as primary generators of meaning for orders of thinking and saying (2008b, 193).

Sixth, an additional approach for distinguishing practices is how actor and actants are involved in their practices. Inter-subjective practices ask for more than one actor and are discourse oriented. Inter-objective practices are those between objects or artifacts and are self referential, if the practice is directed towards the individual (Reckwitz 2002a, 206). Adler (2005) describes in this context, communities of practices, as communities of common distributed actions instead of a common organizational structure.

## 4. The social practice perspective of agricultural transformation processes

### 4.1 Approach

In order to understand this overall process of transformation, it is important to have a broader view of the farm history from the non-organic period through the start of acquiring organic status. For the purposes of discussion we compare a 'typical' high-intensive non-organic farm with an 'ideal type' of diversified organic farm<sup>8</sup>. In addition, we use the case of a farmer who wishes to become certified, according a set of national organic standards or regulations. Finally, we consider the transformation process as one of moving from non-organic farming practices through a series of practices to becoming 'organic'. We use plant production with a focus on selected practices, such as crop rotation, weeding techniques, pesticide and fertilizer use in the three phases – non-organic, organic and the transformation towards organic.

The diverse farm histories, the complexity of agricultural practices, the diversity of farm structures and agro-ecological realities, farmers and their families and the understanding of a farm as an individuality, all of these teach us to be cautious with generalizations of farming arrangements and practices. However, there are some patterns, which characterize the types of farms on which we will focus in the following analysis. These are the arrangements –“assemblages of material objects, persons, artifacts, organisms, and things” – (Schatzki 2006, 1864), which are widely accepted as part of farming practices and the structural and organizational environment of the farm. However, these only partly inform how the practices are carried out.

We select several relevant characteristics, which frame non-organic and organic farming (Figure 2) and which describe the main artifacts and natural objects, etc. used in plant production (Table 3), and to make the systemic character of agricultural approaches more explicit. Moreover, we introduce with Table 3 the paradigms (cf. Lorand 1996, modified; Beus and Dunlap 1990; Guba 1990) of non-organic and organic agriculture in order to serve

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<sup>8</sup> We do not consider the multiple changes or practices after a farm is recognition as an organic farm.

as the underlying, model or ideal-type, orientations in acting and decision-making processes in the non-organic and organic world.

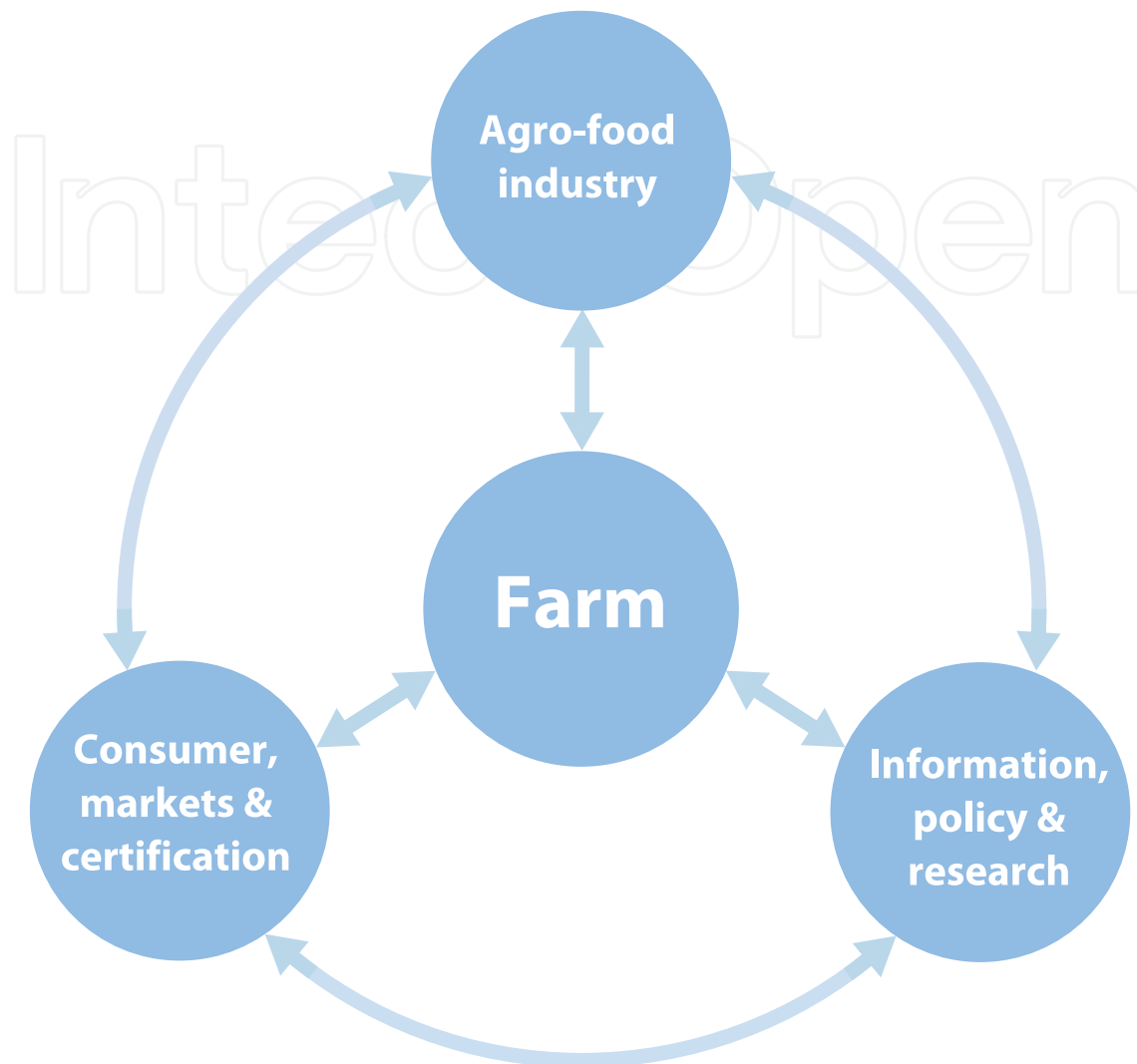


Fig. 2. Farm related environment

#### 4.2 Non-organic farming

The non-organic corn-soybean system is largely possible on flat arable lands that enable a type of farm style and size associated largely with the Midwestern states in the US. It creates a linear landscape structure of very large, “fencerow-to-fencerow” fields<sup>9</sup> designed to facilitate the use of very large equipment. The practice of corn-soybean cropping creates and organizes a particular type of landscape, based on specific arrangements of artifacts. This type structure of agro-industrial landscape dominated by extremely large machinery and absent of people illustrates what Schatzki refers to as the co-constitutive relation between practices and arrangements (2010, 140).

<sup>9</sup> Field: agronomic unit; social field as part of a social space (Bourdieu 1990, 1988, 1983): the entity of societal interactions and constellations; fields are e.g. politics, economy or arts: sub fields are e.g. field of literature, of school or university, which differentiate in the field of literacy and the cultural field

Characteristics	Non-organic	Organic
<b>Farm</b>		
Plant production and agro-ecology	High input system (mineral fertilizer, herbicides, pesticides, GMO, technology); mono-cropping, large farms, large field size, low amount of biotopes; Segregation between farming and nature protection	Low input system (limited fertilizer input, mechanical weed control, mainly biological pest control); crop rotation, legumes, biotope rich; compost, green manure; integration of nature protection into the farming system
Animal husbandry	High performance, large animal groups, high fodder input (concentrates), short life span of animals, antibiotics, hormones allowed, slurry production, confinement	Low input, mainly own fodder, low amount of concentrates, long animal life span, antibiotics regulated, hormones excluded, often stable manure, ethical rules; pasture and farm yard as run-off, free-range
Farm economy and market orientation;	Industry oriented, controlled by industry; one market, economy of scale	Diversified production, investment into soils and biodiversity, several markets
<b>Related environment</b>		
Agro and food industry	Global players, uniformed commodities	Local and regional players, diverse, partly international
Consumer and markets; certification	No contact with the consumers; mainly big retailers; voluntary certification systems	Diverse relations towards consumers and different markets; certification following specific guidelines, also linked with subsidies
Information; policy (subsidies); research	Industry; compatible with official agricultural policy, sector (commodity) oriented subsidies; research mainly by private companies and private financed Universities	State and farmer organizations; partly in line with policies, environmental friendly oriented subsidies; farmer driven research, University research mainly state financed
<b>Paradigms</b>		
Ontology	Short term profit oriented; maximization of labor and technological efficiencies	Farm is part of a broader eco- and socio-cultural system; natural conditions are accepted and adjusted
Methodology	Technology and output oriented	Balancing between the different parts of the farming system, avoiding losses
Epistemology	Observation, analysis and policy decisions, technological framework	Observation, diagnosis, and therapy, prevention and risk avoidance

Table 3. Characteristics of Different Farm Approaches

A truck delivers the seeds directly to the farm or the farmer has to order from the regional seed company. With the seeds, the farmer receives a complete set of inputs, which includes mineral fertilizers, pesticides and herbicides. These artifacts are the preconditions to organize and to conduct this type of farming. The practice to order these agricultural inputs does not require a long search process; all is advertised and supplied by firms; purchasing these inputs is a routinized process of given bio-chemical materialities. These practices take place every fall and spring, at the same sites with the same technology and within the same social web; they are site and time specific.

The practice of this style of farming needs a certain materiality of big tractors with an air conditioned cab, driving up and down a field with a size of several football fields, in a cleared out landscape, plowing the soil, talking on a cell phone, watching a movie or TV. It means sitting in a tractor, and activating electronically controlled steering mechanisms. The physical landscape, the technology, but also the knowledge order given by agro-industry, the farmer translates into a certain agricultural practice in his specific farm context; they all hang together and the practice would not exist without each of these artifacts. These practices became routines and are unquestioned orientation for practicing corn-soybean agriculture. They are also confirmed in official statements, documents, internet pages, or news journals of the agricultural administration and industry and by a majority of agricultural researchers.

The farmer handles the tractor computer with a GPS to spray the exact amount of mineral fertilizer or pesticide, using a technique prepared and recommended from agro-industry. The farmer (or any company using airplanes for spraying) repeats the pattern of practice carried out while plowing: driving precisely row by row, up and down the mainly rectangular field. In the tractor cabin and "protected" from outside, the farmer is unable to listen to or smell nature.

The site where the inputs of farming are created/produced/prepared/collected is off the farm. At the same time, "farming practices" are carried out by one person in "cooperation" with technological artifacts. Interaction with nature is limited as electronic devices, which "interpret" nature and guide the practices, give most of the relevant information for the practice. The moral justification for using chemicals exists in the conviction of 'we are feeding the world'.

The industrial artifacts with bio-chemical and biological characteristics are transported over long distances, figured out by humans who are acting in an anonymous web of relations, and materialized in communication technologies. Machinery (tractor...), the biochemical and biological artifacts and related practices to produce them, are dislocated from the farm over long distances. They move towards farms and are stored temporarily in the farm barn. For that, the farmer uses a front loader to stack the bags in one part of his barn. These practices describe parts of the energy flow, and the accompanying technological and social constellations, which enable the transfer/movement of materiality from site to site – from outside to inside the farm, and from site to site within the farm.

Harvest might be done together with additional personnel or is out-sourced to specialized companies. Efficient use of harvest technology again requires a certain field size and form – landscape design is also part of the specific harvest practice (cf. Shove et al. 2007, 134). Harvest itself takes place in several days, again with powerful technical equipment. Parts of the harvest might be stored on the farm in a storehouse, which do not look any different from buildings in a suburban industrial zone, or is directly transferred with large trucks

towards a train station or a regional storage building. And finally, the truck dimensions require a certain size of road system in the landscape between the fields.

Farm practices require certain architecture, and architecture enables the practice. Using inputs from outside the farm has its impact on farm architecture, barn structure, storage buildings and daily routines, the design of the farm yard and the stretches of roads and paths in the farm yard, as well as towards the fields or to buying and selling points for agricultural inputs or the harvest.

The materiality of non-organic agriculture pre-structures the daily practices and the labor distribution year round, it forms the landscapes, the colors of nature, the smell and the structures of the fields, the soil and water quality, and the (non-) existence of biotopes or the biodiversity of plant and animal species.

Fieldwork constructs a farmer's annual schedule. The farmer waits for best weather conditions, or is informed by the regional agriculture weather report, when to start with fieldwork. Fieldwork is done in two, or a maximum of three time periods in early and later spring and finally at a crop's specific harvest times by the farmer or with workers. These industrial and nature preformed practices not only structure daily life, but also occur at specific times over the year and thereby structure the whole year on the farm, largely independent of any individual decisions.

Farmers slightly modify their practices every year by adopting new industrial products and adapting to changing weather conditions. Tolerance for reformulating or reshaping the practices by the farmer is limited. Natural science and technological knowledge is embedded in the artifacts, produced and recommended by a disciplinary oriented science. Industrialized agriculture is an example for social practices which are characterized by reproduction, while change is limited (Reckwitz 2002a, 255, in Bueger and Gadinger 2010, 289). Farmers are the carriers of the materialized industrial products on the landscape, and landscapes in turn are patterns of these practices.

The materialized production program also influences relations with consumers - the dimension of production excludes direct marketing in a region, and with that, it limits the social network potentials. This type of agri-culture does not communicate with a region, because its products are unable to play this role; instead, it creates a monotone landscape whose message is: "stay out". As such, production does not "produce" social relations or a local culture. Many successful conventional farmers take over more fields from the neighbors; essentially, the farmer is "buying out" his community. The agricultural related social network is mainly limited to the industrial partners.<sup>10</sup> As players in the global network, the relation with the farmers is that of a business relation.

In summary, the social practices of non-organic agriculture are often and specifically in this described case, dominated by the materiality of industrial and industrialized inputs, embodied and habitualized in concrete farming practices as well in the structure of the farming landscape. These practices became routines and serve as unquestioned orientation for practicing corn-soybean agriculture, also confirmed by the dominating (agro-industrial) media. While the production risks are in principle assumed by the farmer, significant public subsidies to maintain industrial farming help offset these risks. Practicing the same agriculture, the farming practices of the farmer are accepted by their neighbors. Daily information by Internet and glossy brochures by industry guide the practices. Preparing the

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<sup>10</sup> From Schatzki (2010, 128), the site is not a geographical but a social dimension, ..." pertaining to human coexistence, ..." the hanging together of social life's".

annual crop business, the farmer studies in the Internet the global stock market, contacts the dealer electronically or by cell phone.

In the socialization of industrialized agriculture, these practices have been for decades non-discursive. Those who follow this practice are on the one hand path dependent, and on the other hand supported by the agriculture and food industry (inclusive consumers), research and education system – all reinforcing this type of farming, partly criticised, but mainly an accepted habit in current Western societies.

### 4.3 Organic farming

What are the defining practices of an organic farming system? All organic farms (except for some large-scale industrial operations, are organized around highly diversified cropping systems involving more than five different crops organized in a crop rotation and inter-cropping systems. In this type of farming, each crop plays a different role in mobilizing nutrients, creating soil fertility, weed-control and pest and disease management. Instead of mineral fertilizer from outside the farm, organic manure management techniques are essential to the system of practices.

One scenario of the inter-related and reinforcing practices can be outlined as follows: the diversity in crop rotation affects the weed diversity. Plant protection and soil fertility management in turn is related to cropping practices designed to manage long-term soil fertility (see Freyer et al. 2011). Diversified crop rotations are essential in pest and disease management. Fields are usually quite diverse in size and structured with a multitude of crops that play multiple roles in the overall farming system, including the maintenance of different habitats such as hedges and grass stripes that play a range of roles from soil to wildlife management. Equally important, no use of synthetic chemicals helps to foster soil health and diversity; “healthy soils mean healthy plants.” In short, there is a systemic and systematic set of diversified material interrelationships built into and generated from these practices. They are all of a specific material quality and require a specific technology in handling things, artifacts and embodying organic objects.

While crop rotation is part of non-organic farming, it is a pivotal element in organic practices. Farmers must have an intimate knowledge of their fields, including field histories (how they “behave” under different conditions over time) that help identify the ways in which previous cropping practices could influence current cropping practice, such as planting legumes to fix nitrogen. That is, in an organic system, all the agricultural practices account for time, both the past and expected future of a field, including each field’s relationships with other fields through organic material transfer or the habitat function for both pests and beneficials, which move from one field to the other.

In a similar way, plant protection or weed control is not first a matter of using industrial products. It involves: the arrangement of crops over time and space; the specification of the tillage system following the specific demand of crops; the biotope diversity in structure and function and distribution in the landscape; and the history of farming practices and the current qualities of a soil in a specific field. The farmer is at the center of this process, bringing old and new perceptions and understandings and an ever evolving discovery and understanding of organic practices. Organic farming becomes a self-referential rethinking of practice and inter-objective relations with nature. In many cases, organic farmer’s neighbors who often practice non-organic, offer little or no advice or relevant experience from which to learn.



Diversity in cropping involves diversity in the material arrangements for each crop (weed control, addition of organic manure, etc.); sowing and harvesting dates differ and lead to diverse cropping activities throughout the year as well as a diversity of relationships with “nature,” or uncultivated spaces. Intimately aligned with this, organic farmers seek to create the most favorable living conditions for soil organisms and plants by relying on natural processes and largely without external (to the farm) and synthetic inputs. This means that the source of the materiality contributing to plant production is located on the farm, and produced on the farm. The farm site, and not external, much less industrial actors, becomes the farm’s principal resource. Equally important, each organic practice, while it may be performed at a specific moment, occurs over time and is often cumulative. The site-specific agro-ecology of each farm reinforces the overwhelming importance for each organic farmer to adapt and act on a specific site – the whole farm including the relationship among different parts and sites on the farm as well as those off and around the farm.

The dominating organic materiality leads also to different forms of embodiment, which includes more direct contact to nature. The exclusion of synthetic chemicals generates a far-reaching chain of activities, including no purchasing, storing, processing and spraying. Instead, farmers become involved with the management of organic manure by establishing compost heaps, their coverage, and for some, hand mixing of bio-dynamic preparations in a barrel following rhythms for a specified time.

Farmer’s decisions regarding practices involve reflexive engagement. This is necessary because organic arrangements represent a redistribution of materiality, actor-actant relations, and the distribution of materiality, arrangements and practices over space and time. Diversity, limited inputs from industry, the dominant role of “organic/natural” objects and techniques, which support the self-regulation of nature, are defining characteristics organic farming plant production practices.

The limited impact of standardized artifacts and the broader contribution of natural objects and the complex, unforeseen nature-based processes require more interpretational activity by the individual; therefore to follow routines or concepts of organic practices has its limitations. The farmer’s decisions about carrying out practices require reflexive engagement.

Contrary to the conventional practices, it’s not first of all the industrial pre-formed technology, which shapes the organic practices, but the natural given objects, rules and ethical principles. Diverse farm patterns and the indeterminacy of the production process, given by complex natural processes, explain the learning processes.

There is a discursive character to the social practices in the organic context. Beyond the materiality, organic practices commonly overlap with interests of diverse groups of non-farming actors, often members of different social fields (e.g. artist, environmentalists). Practicing organic is communicative and discursive; this discursive character results from the complexity of the cropping systems with diverse practices over space and time. Consequently, the individual performances and engagement varies widely and involves a wide spectrum commonly individualized farming activities.

The limited involvement with industrial interests also influences the political and policy relationships in organic farming. The power, and the freedom of the farmer, is defined by: the state regulations that are often a precondition for receiving financial subsidies; the certifying organization that stipulates the rules to follow and the sanctions for non-compliance; and, the “voice of the market” including local consumers who come to the farm or a farmers market who prefer relationships built on trust and direct connections with the producer over those in supermarkets.

General conceptual “knowledge of orders” is formed by discourses on environmental and ethical standards, introduced by the IFOAM Principles (2009) and basic standards for organic farming. The arrangements of artifacts and the practices represent the transfer of the IFOAM principles (health, ecology, fairness and care) and basic standards into social practices, which include the ethical discourse and worldviews of the organic movement. Schatzki (2005, 480) describes this process as follows: “Understandings, rules, ends, and tasks are incorporated into participants’ minds via their ‘mental states’; understandings, for instance, become individual know-how, rules become objects of belief, and ends become objects of desire”. Principles serve partly as a “must”; norms, regulated by law, serve partly as recommendations. They represent the cognitive basis of organic farming, which regulates the practices, and influences the handling of soils and plants. Principles include the human-nature-relation, based on a deep respect for, and effort to understand nature that includes the exclusion of chemicals from the production. They represent a result of discourses based on farmer’s long-term observations, practices and research. Their implementation is discursive, and site-specific agro-ecological conditions, asks for a reflexive use, reinterpretation and adaptation.

Organic creates and relies upon the creation of social networks (e.g. Jarosz 2000), on and off the farm, and thereby creates communities of a culture. Consumers communicate with farmers about products or their worldviews. In other words, each “farmer – consumer community” involves a practice of sharing time, doings and sayings, which occur in specified social fields and take place in specific sites (cf. Hörning 2001, 160).

#### **4.4 Transformation towards organic farming**

It is simple, but important to understand that the transformation of the farm involves a move/change from well-understood and long-practiced non-organic activities into a series of unknown organic and unknown transformation-specific practices. As Schatzki (2006, 1068, 1864) reminds us, the actions constituting a farm history include a practical understanding of non-organic farming practices, a well-established “know-how” including knowledge of “non-organic” farming “rules,” as well as a general understanding of the role of nature in agriculture. In short, since practices are learned, exercised and routinized over time, moving to different practices requires moving to fundamentally different and new practice arrangements for which most farmers have no previous experience, knowledge or supportive social network (Reckwitz 2002a).

If the nature of practices is to establish “a secure and livable everyday life, where we are not compelled to do the overwhelming task of reflecting on every single act” (Gram-Hanssen 2008, 1182), their radical change, as it is often the case with converting towards organic, could be described as a temporary stage of a social practice, before re-establishing an equilibrium which arises after several years practicing organic.

How does change from non-organic to organic farming happen under those circumstances? Practices always contain the seeds of constant change (Warde 2005, 141), but something must initiate this change. From the perspective of practice theory, a specific practice-discourse initiates the adaptation and adoption of practices. In addition, the processes of change may involve bifurcations, continuous development, fragmentation, contingency, and conflict (Schatzki 2002). More specifically, the motives for converting to organic are as diverse as the barriers to converting (Lamine & Bellon 2008; Khaledi 2007; Locke 2006; Darnhofer et al. 2005) and they are linked as much with the materiality and the discourses of non-organic agriculture as with the promises and characteristics of organic practices

(Goodmann 2000). More generally, change is a discursive, communicative and material-driven break or shift in the reproduction of a practice (Reckwitz 2002b, 255). It can emerge from "... everyday crises of routines, in constellations of interpretative indeterminacy and of the inadequacy of knowledge with which the agent, carrying out the practice, is confronted in the face of the 'situation'." Obviously, social behavior often responds to stimuli and constraints from the biophysical world (Freudenburg et al. 1995, 366, in Schatzki 2010, 147 footnote 3). In other words, the material constitutes new social phenomena and vice versa. For example, excluding a formerly used materiality such as synthetic nitrogen fertilizer, creates a re-distribution of competences (cf. Shove et al. 2007, 54) and the site of the practice becomes framed by a modified order of knowledge embodied in the practices and in the new power relations which are manifested by these practices (Giddens 1984). But whenever we try to describe change of a practice, it emerges and is experienced through social practices.

The decision to convert to organic farming often follows an unforeseen path, created by the negative impact of pesticides, animal disease, decreasing soil fertility, family sickness (Jarosz 2000), a change in worldviews (ethical, religious, spiritual) or any other crisis in daily routines practices (Reckwitz 2002b, 255). Such events call into question the assumptions of current practice (c.f. Bourdieu 1993). This phase of transformation is accompanied by doubts, insecurity, disorientation, conflict and disillusion with the former ideas and practices; new questions about how to "practice" in future arise.

In the transformation period, previous practices, habits and roles in the daily farm life lose their relevance and new ones become created (see Table 3). Previous attitudes, ways of acting and thinking (Bourdieu 2001, 28) confront a new world; a new language is needed to capture new and different meanings, understandings and techniques. Farmers commonly find themselves in contradiction to their former orders of knowledge (and ways of knowing). Agricultural routines and habits, formed by family, school and education, primary socialization in agricultural communities, technical advisors, and friends, all of which shaped daily life (cf. Raphael 2004, in Jaeger and Straub 2004, 266-276), and in which the farmer was embedded, become irrelevant. A "converter" may no longer be able to learn from or adapt the practices of a "non-organic" neighbor. Moreover, the "non-organic" neighbor's practices, such as spraying pesticides or using genetically modified seeds, may now fundamentally endanger the "converter's" livelihood and well-being.

With the decision to exclude pesticides and mineral fertilizer, the farmer starts moving into a world of unknowns (Table 4). Lacking any experience in organic farming or traditional farming techniques practiced by predecessor questions arises: how to farm without mineral fertilizer, herbicides and pesticides? How to do all of this while only weakly connected to the organic movement and information, or to observations of organic practices?

In transformation, the farmer becomes the creator of a new system, developing new sets of artifacts, natural objects and social/professional/business relationships that involve new daily routines, social interactions and relationships with the farm landscape. Previous knowledge loses its significance but can also offer a starting point for adopting, developing, and establishing former and new techniques (cf. Hörning 1997, in Hepp and Winter 1997, 34). Because organic practices do not follow a recipe, the farmer often has to innovate and adapt new techniques and practices, without reference to other practices.

With limited or no experience with organic practices (Freyer 1991), the converting farmer engages in going back and forth between knowing what to do as a former non-organic farmer and embracing new and emerging approaches (Reichardt 2007, 51; Joas 1992, 239).

Type of change / practices	To exclude, to avoid	Facultative but system relevant	To adopt (modify, reduce..)to innovate
<b>Crop rotation</b>	Mono-cropping	Minimum of 20% fodder legumes	New crops, crop rotation, green manure crops, legumes
<b>Fertilization</b>	Mineral fertilizer	Organic fertilizer management	Selected and reduced amounts of mineral fertilizers
<b>Weed control</b>	Herbicides	Compost management (high temperatures to eliminate seeds)	Soil tillage, mechanical weed control, crop rotation
<b>Pest control</b>	Majority of non-organic pesticides	Biotopes: edges and herb-grass stripes	Soil tillage, crop rotation
<b>Varieties</b>	Seed with pesticides, GMO	Organic seed treatment, organic varieties	new seed sources and varieties
<b>Tillage</b>	Deep plowing	New machines	Tillage depth modification, time periods of tillage, tillage intensity

Table 4. Quo Vadis? -Commitment of Change in plant production

Similarly, when approaching crop fertilization, the farmer must start by organizing a two-year crop rotation of nitrogen-fixing legumes. Instead of relying on a commercial product, the farmer accomplishes fertilization through the use of legumes and the creation of biomass. For the converter, this clearly represents a new practice and a fundamentally different way of thinking about and practicing fertilization. In short, crop fertilization becomes what Schatzki (2010) defines as a new practice-arrangement nexus<sup>11</sup>. The farmer must think and act differently about what was done as a non-organic farmer.

The material configuration of plant protection in organic as well, must be conceived in relation to soil fertility management, specific crop rotations, organic manure sprayed a certain times of the year and a specific structure of biotopes. As Schatzki (2010, 130) notes in another context, we could argue that the material configuration of organic farming takes place on the farm and in the field.

The transformation is also accompanied by tremendous changes in thinking about the farming practice. A new awareness of nature emerges, as well as new understandings of responsibilities to family, neighbors and friends. To change the system means to test, to play with new options, to leave behind routines, and to lose the stability offered by former practices (Giddens 1992, in Reichardt 2007, 59). It means being able to accept the confrontation with new heterogeneous and diverging forms of practical knowledge

<sup>11</sup> Practice-arrangement nexuses (linkages), according to Schatzki (2010) are social sites, which contain practices and arrangements. These practices and arrangements connect into wider nets of nexuses, in this case such as the organic community, extension services, government and financial networks, these can in turn create even wider webs of nexuses.

(Reckwitz 2003). It means learning new techniques, experimenting, contracting new relations and memberships, reading different journals, and leaning a “new language”.

Because the transformation process affects all family members, the practice of converting to organic always creates family discussions. Most previous assumptions about labor, income, and decisions are “up for discussion.” All these changes in orders of knowledge, power, rules and resources arise independent of the individual per se, but are phenomena of social practices that are integral to the transformation process.

The adoption of new practices also confronts the converting farmer with the need to reorganize or establish a new social network. Advisors, farmers, consumers, and institutions, the farmer has never seen before, become now of relevance (Brunori et al. 2011). With this changing and embodying of unknown materiality, things and artifacts, and social relations, inherent in practices, the farmer discovers and creates new meaning for a new farming and everyday lifestyle. By excluding the use of synthetic pesticides, herbicides and fertilizers, the farmer has to find new strategies for managing soil fertility and pests. Instead of turning to chemical products the transitioning organic farmer learns ways for managing cropping systems, soil tillage and robust varieties as part of a range of pest management strategies that must be re-defined every season. More specifically, when re-establishing biotopes around a field to foster beneficial insects, the farmer must reflect on the spatial dimensions of the field, study the living conditions of predators and to identify and establish a structural quality through which the biotope helps to fulfill the demands of various living conditions.

Non-organic and organic provide subject orders or subject cultures which are contradictory and contested (cf. Reckwitz 2008a, 80). Reckwitz underlines the strength of related cultural codes in the formation of subject forms, and the challenge to change them. Schatzki in contrast interprets stability and change dependent upon the agency of components which are configured in the arrangements, specifically that of humans (Jonas 2009, 17). Specifically in the transformation period, we argue that the capacity of individuals is more challenging than in routine situations. In part, this helps us understand the limited availability of practice-discourses on organic farming specifically at the beginning of the transformation period.

## 5. Concluding observations

In this chapter, we have applied practice theory as an analytic approach to help understand organic transformation as a continuing and evolving practice in which each farmer creates a new understanding and embodiment of farming materiality – soil, plants and animals – and that generates new habits and social relationships. We have also introduced the importance of understanding organic transformation as a process that is accompanied by structural changes, new orders, rules, norms and resources and new ways for the farmer to assume, restructure, but also contribute to the orders of knowledge in this type of agriculture. We have sought to identify the ways in which we might continue to draw upon practice theory to identify and generate new insights into this transformation process. Cognisant of space limitations, this paper has focused on selected aspects in the plant production sector studying an industrialized non-organic farm with a more typical organic farm. Clearly, this could be elaborated and extended to animal and poultry or vegetable production and others.

Nevertheless, our discussion does illustrate the importance of understanding, as Schatzki (2002, 174) argues, that human, nature and materiality are not separate, but together and create a material entity and contribute to a social practice. Materiality, its effects on nature, processes, practicing techniques and individuals and organizations – can be interpreted as a unit of the social and material (Schatzki 2010, 133).

We have highlighted that organic practices emerge from and rely upon natural objects, rules and ethical principles. Consequently, we find diverse farm patterns and indeterminate production processes, adapted to different and complex natural processes; and that these rules and ethical principles result from various practices. This also explains the discursive character of the social practices on an organic farm.

Principles serve partly as a “must”, as norms, regulated by law and partly as recommendations. They represent the cognitive basis of the organic farming approach, which regulates the practices, and pre-forms the handling with soils and plants. The principles include the human-nature-relation, cognitively and as a matter of principle, to respect nature and to exclude synthetic chemicals from production. They represent a result of discourses based on farmers’ long-term observations, practices and research. Their implementation is discursive, as the site specific conditions require their reflexive use, reinterpretation and adaptation.

The principles and the basic standards with concrete recommendations about arrangements, artifacts and practices illustrate a type of on-going practice discourse in contrast to non-organic agriculture. Neither the principles nor the basic standards are static or carved in stone. There is discourse surrounding the values and ethics (e.g. Verhoog et al. 2003), the artifacts and materialities, and the practices. There are discourses and concrete arrangements which also include evolving human-human relations, e.g., fair relation between all chain partners, embodied by a specific pricing policy or further investments by the farmer into ethical values going beyond the basic standards, e.g. social care, establishment of wildlife habitats in between the production fields or cultivation of traditional farming practices (Goessinger & Freyer 2008).

In conclusion, we find it appropriate to draw on Schatzki’s (2010, 145) observation that “...one noteworthy outcome of writing histories and analyzing contemporary phenomena with these experientially resonant concepts (practice theory) is that history and the contemporary world seem less systematic or ordered and more labyrinthine and contingent than they do when described and analyzed through the conceptual armature of many other theories.”

And we close with the notion that practice theory offers new insights into the complex and multi-layered process of farm transformation. It is seen as one of several relevant theoretical concepts to support the description and reflections about transformation processes in the agro-food system.

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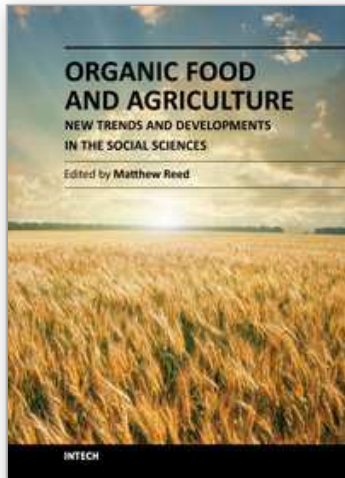
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The global phenomenon of organic food and farming, after three decades of progress, faces new challenges as markets mature and the impacts of the global recession start to change consumers' expectations. This global survey of the organic food and farming considers how the social sciences have come to understand in what way consumers make their choices as they shop, and how new national markets evolve. It also surveys how established organic sectors in North America and Europe are changing in response to the changes, that in part, the organic movement has created. Moving from a wide range of social science disciplines, methodologies and perspectives, this book represents an excellent starting place for new readers, and offers innovation to those already familiar with the literature.

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