

System Innovations, Knowledge Regimes,  
and Design Practices  
towards Transitions  
for Sustainable Agriculture

Edited by Marc Barbier and Boelie Elzen



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ISBN: 2-7380-1306-6



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Citing this document

**Barbier M. and Elzen B. (eds), 2012. *System Innovations, Knowledge Regimes, and Design Practices towards Transitions for Sustainable Agriculture*. Inra [online], posted online November 20, 2012. URL: [http://www4.inra.fr/sad\\_eng/Publications2/Free-e-books/System-Innovations-for-Sustainable-Agriculture](http://www4.inra.fr/sad_eng/Publications2/Free-e-books/System-Innovations-for-Sustainable-Agriculture)**

# Chapter 4. Bridging incompatible regimes: how the formation of intermediary regimes drives system innovation

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## **Abstract**

System innovations, which comprise changes in socio-technical networks, rules and routines governing particular fields of practice, are generally regarded as essential to a transition towards sustainability. Various researchers have tried to unravel the pathways of system innovations in order to understand how these innovations can be stimulated or facilitated as part of transition management. This chapter aims to contribute to knowledge on system innovation pathways by studying the development of care farming as a cross-sector system innovation. Care farming is a rapidly expanding form of multifunctional agriculture that combines agricultural production with an offer of day-care to a diversity of clients. It emerged when a few pioneers started to provide care services at their farms and successfully integrated the different regimes governing the rather distinct fields of agriculture and care. Since then, the number of care farms has increased substantially. A new intermediate care farming regime has evolved, comprising new rules and routines, and embedded in regionally and nationally organized care farmer networks that are increasingly acknowledged by the healthcare sector. Our findings suggest that, at niche level, farmer strategies of (individual and collective) alignment and self-empowerment facilitate the development and maturing of a new regime. At regime level, supporting pioneers, creating room for experimentation, and looking beyond sector borders are factors that contribute to the successful realization of system innovations.

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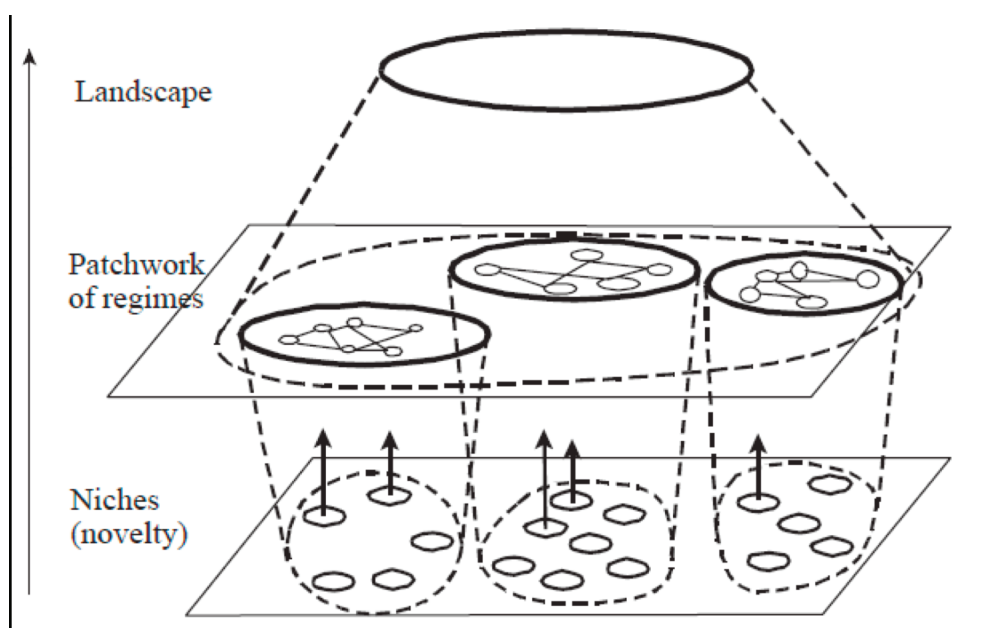
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# 1. INTRODUCTION: CARE FARMING AS A MANIFESTATION OF SYSTEM INNOVATIONS AND REGIME CHANGE

Contemporary agriculture faces a range of persistent problems, such as environmental pollution, loss of biodiversity, water depletion and world food problems. These problems involve complex systems of closely interacting physical, biological, and social processes as well as a diversity of actors. They are thus multidimensional and involve a multiplicity of actors. Addressing and resolving these problems therefore requires a multidimensional and multi-actor approach, which ultimately leads to the innovation of an entire socio-technical system, a so-called *system innovation* (Elzen et al., 2004). System innovations are generally seen as key to achieving sustainability. For that reason, both researchers and policy makers are increasingly focusing on system innovation processes.

Because of their multidimensional nature and the multiplicity of actors involved, system innovation processes are however far from straightforward. In order to understand system innovations, several researchers have studied historical system innovations retrospectively. A conceptual framework, the Multilevel Perspective (Rip and Kemp, 1998; Geels, 2002; 2005a), has been developed based on historical descriptive research and is nowadays commonly used to understand and explain system innovations. This framework conceives of a system innovation as the outcome of process interference at three levels: the '*niche*' level of individual innovative practices, the '*regime*' level of dominant 'rule sets', and the '*landscape*' level of long-term, exogenous trends and structures, such as political or demographic structures, cultural changes and infrastructure (see Figure 1).

Figure 1: Increased structuration



Rip and Kemp (1998) define technological *regimes* as “rule-sets or grammar embedded in a complex of engineering practices, production process technologies, product characteristics, skills and procedures, ways of handling relevant artefacts and persons, ways of defining problems; all of them embedded in institutions and infrastructures.” Following Geels (2004, referring to the structuration theory of Giddens), we generalise the concept of regime as largely taken for granted, shared rule sets that structure and are deeply rooted in social and technical practices as routines. A dominant regime thus reflects a shared way of thinking and acting (Zijderveld, 2000) that governs a particular actor network and that sediments into a more lasting socio-material ordering (landscape). In line with Giddens (1984), Geels (2004) distinguishes three types of interactive rule sets: regulative rules, such as formal laws and regulations; normative rules, including norms, values, role interpretations, and codes of conduct; and cognitive rules, such as belief systems and paradigms.

The term *system innovation* refers to comprehensive regime changes, i.e. changes in prevailing shared rule sets and routines in actor networks governing particular fields of practice. Regime change and system innovation can be induced by mutually reinforcing dynamics at niche level, through the development of unusual, novel practices in protected spaces challenging prevailing rule sets, and at landscape level, through structural developments. The breakthrough of innovative practices at regime level can for example be facilitated by socio-cultural or political changes which force a regime to ‘open up’ to, incorporate and institutionalize novel practices (Smith et al., 2005). Wiskerke and Van der Ploeg (2004) offer well-documented examples of niche creation and novelty production in agriculture, which entail the co-evolution of technical and institutional change (Roep and Wiskerke, 2004).

In order to gain more insight on how system innovations can be accomplished, researchers have tried to unravel the pathways of system innovations. For example, Berkhout, Smith and Stirling (Berkhout et al., 2004; Smith et al., 2005) have proposed a typology that is distinguishing four ideal types of pathways: endogenous renewal, reorientation of trajectories, emergent transformation, purposive transition.

Geels and Schot (2007) have constructed another typology of system innovation pathways, by distinguishing the timing and the nature of multi-level interactions. They identify four main pathways (transformation path, de-alignment and re-alignment path, technological substitution, reconfiguration pathway). In addition, they describe a fifth possible route that sequentially combines those pathways and that could be followed when the landscape changes slowly but steadily. In these typologies, system innovation pathways are described as processes of adaptation of a regime’s prevailing rule sets to the needs of promising and socially desirable technologies. A dominant regime can change gradually over time by adapting or substituting some of its rules or routines to accommodate novel practices; it can change more radically by incorporating new rule sets for novel practices; and ultimately a new regime can emerge that can co-exist or compete for domination with the ‘old’ regime. Within innovation and transition

studies, regime or institutional changes are often thought as being driven by technical innovation; although the co-evolution of technical and socio-technical change is acknowledged (e.g. Geels, 2005b), institutional innovation is rarely recognised as a prime driver of (technical) change.

In this chapter we present a case study that effectively reflects this type of change, governed by institutional innovation: the development, scaling up, professionalization, and institutionalization of care farming in the Netherlands<sup>3</sup>. This case originated at the interface between two different and, until then, more or less exclusive regimes in two different domains. Care farming is a rapidly expanding form of multifunctional agriculture that combines an agricultural production context with the delivery of different forms of day-care services to a diversity of clients, such as people with mental or physical disabilities, individuals suffering from mental health issues, youngsters with developmental disorders or learning difficulties, and demented elderly. The emergence of care farming as a new system was initiated by a few pioneers, who intended to integrate care activities on their farms. Today, care farming has developed into an essentially professional intermediary sector, integrating agriculture and healthcare activities in a new, intermediary regime involving newly developed rule sets, including the routinization and institutionalization of care farming practices. This newly developed intermediary regime bridges the two initial more exclusive regimes by adapting new rules and practices to some of the prevailing rules, on the one hand, and developing new rule sets to fill the 'institutional void' (Hajer, 2003) between the two regimes, on the other. However, despite this co-existence, by virtue of its very existence the intermediary regime may further challenge the prior regimes, which might open up new opportunities and provoke further change in (multifunctional) agriculture as well as in health care.

As argued in this chapter the case of care farming, which shows the development of an intermediary regime favouring cross-sector system innovation, can contribute to further understanding of the relationship between regime change and system innovation, and the pathways these processes might follow. In the next section we elaborate on the development of care farming. We then describe the challenges faced and the strategies adopted in the maturing process of care farming. We conclude by discussing new insights on system innovation pathways.

## **2. THE DEVELOPMENT OF CARE FARMING**

Although historically, in the Netherlands, mentally or physically disabled people and people with psychiatric problems have often been taken care of at farms, it

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<sup>3</sup> Various terms have been used to refer to this phenomenon: social farming, green care, and farming for health (Hassink et al., 2007). In this chapter we use the term 'care farming', which refers to all kinds of agricultural enterprises offering day care to a diversity of clients.

was only over the last few decades that care farming developed and was professionalized into a rather successful (sub)sector. The number of care farms in the Netherlands has increased considerably, from 75 green care farms in 1998 to 944 in 2008<sup>4</sup>. Care farming practices provide positive results with respect to enhancing customers' quality of life. Characteristics that contribute to the specific value of care farming, as mentioned by both clients and care farmers, are the structured day-programmes, the presence of (and work with) animals, the diversity of relevant activities in a real rural setting, the (green) space and quietness of the natural environment, and the personal attention provided by the care farmer (Ferwerda et al., 2008; Hassink et al., 2007).

The first official care farms were established by a few individual farmers who started to offer care at their farms for ideological reasons. These farmers can be considered as niche pioneers who had innovative ways of thinking and acting in a rather protected space – their own farm. They had to find their own ways of dealing with the healthcare regime, manifested in financial compensation routes, quality standards, ways of communicating, etc. However, changes within both the agricultural sector and the healthcare sector, as discussed below, strongly facilitated the transformation of many more farms into care farms.

## **2.1. Agriculture and Healthcare in transition**

Following World War II, the Dutch agricultural sector was increasingly successful in terms of productivity, product quality, and efficiency. There was a strong focus on increasing production volumes through scale enlargement, specialization and intensification of land use (Roep, 2000; Van der Ploeg and Roep, 2003). However this strong intensification of agriculture came with a number of problems and societal concerns, such as the loss of nature and landscape values, increasing environmental pollution by mineral fertilizers, manure, and pesticides, high energy use, and poor animal welfare (Harms et al., 1987; Hodges, 2003). Since the 1980s, national and international political awareness of these issues have led to the introduction of a number of conditions and restrictions seeking to promote environmentally- and animal-friendly agricultural production (Moynagh, 2000; Ministry of Agriculture, Nature and Food Quality, 2008). As a result, farming costs have risen while returns on products have decreased due to the ongoing globalisation of agricultural production, leading to the agricultural squeeze (Van der Ploeg and Roep, 2003; Van der Ploeg, 2006). Moreover, the growing social awareness of the issues of environmental pollution and animal health and welfare has resulted in greater social pressure on farmers, questioning their social 'licence to produce'. Dimmer economic prospects for average-scale farming and the demand for a renewed social legitimacy have urged many farmers to search for new entrepreneurial strategies and alternative sources of income. One of the strategies that has been followed by a continuously growing group of

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<sup>4</sup> See [www.landbouwzorg.nl](http://www.landbouwzorg.nl), May 2008

farmers is to capitalise on new social demands through the provision of additional products and/or services that could generate extra income (Van der Ploeg and Roep, 2003; Oostindie et al., 2006, Van der Ploeg, 2008). A new paradigm has emerged: multifunctional agriculture, which contributes to re-connecting agriculture with society and nature.

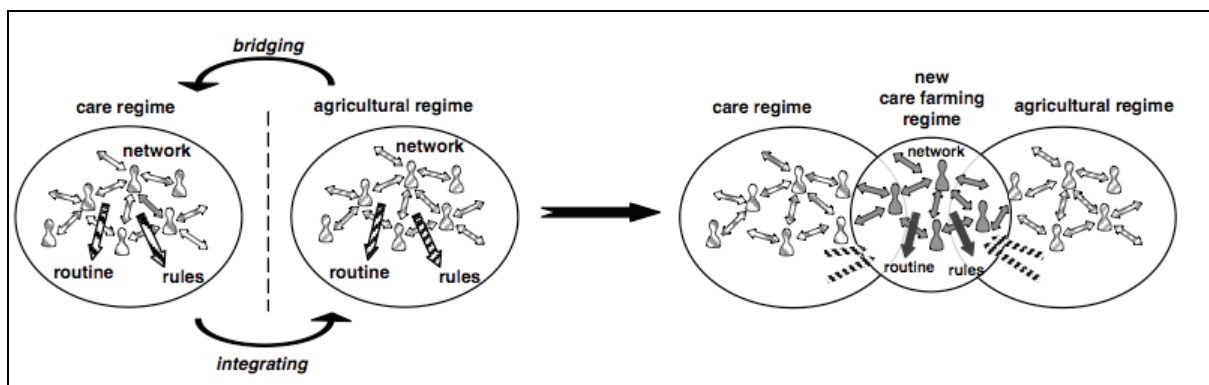
The healthcare sector has also experienced exponential growth and technological sophistication since WWII. The rapid development of knowledge on antibiotics (Penicillin) and pharmacology has shifted the attention to curative measures and led to the invention of a growing range of drugs. Furthermore, ongoing scientific and technological progress have allowed for the development of increasingly sophisticated medical technologies in care, treatment and laboratory research (Gelijns et al., 2001). Meanwhile, the expansion of medical knowledge has led to the ongoing specialisation of medical disciplines, and to an increase in society's trust and faith in the power of medicine and a dominant focus on physical health that neglects broader aspects of well-being. However, technological developments and the resulting continuous inflow of better and more expensive machines, tools, treatments and medicines have caused an uncontrollable increase in healthcare costs. Since the 1980s, the focus of healthcare policy has therefore shifted from the expansion of services to the reduction of costs. This has resulted in a number of new regulations and agreements and the self-regulatory role of the health care sector, in which Health insurance companies are assigned the role of watch dogs (Van der Maas & Mackenbach, 1995; Exter et al., 2004). In the 1990's, this focus on cost reduction was gradually accompanied by renewed attention to environmental and preventive measures (Van der Maas & Mackenbach, 1995) and a demand for the re-socialization of healthcare (e.g. through continuous volunteering). As the unidirectional focus on cost reduction had resulted in long waiting lists and inequalities in care provision, Dutch healthcare policy reflected growing concern about healthcare accessibility and quality. While care quality was long defined by evidence-based effectiveness, care is increasingly defined as meeting patients' (individual) demands. The growing empowerment of clients and patient organizations has reinforced this trend. As a result, various attempts have been made to shift the traditional supply-driven orientation of healthcare towards a more demand-driven framework (Saltman, 1994). In 2001 this led to the introduction of the Personal Budget (PGB), a new form of healthcare reimbursement within the framework of the Exceptional Medical Expenses Act (Algemene Wet Bijzondere Ziektekosten; AWBZ), which deals with funding long-term and chronic care. The PGB allows clients to purchase their own care, without any specific requirements, thereby providing a fairly adequate method of funding care farming (Exter et al., 2004; Hassink et al., 2007). Moreover, the focus within care for people with chronic diseases, mental health problems, or intellectual disabilities is shifting towards the encouragement of patients' individual autonomy and self-realization, resulting in many efforts to (re-)integrate them into society (Van Weeghel et al. 2005; Schols & van Schriek-van Meel 2006).



## 2.2. The rise of care farming

The transitions in agriculture and healthcare reflect developments at both landscape and regime level which together have created (and still provide) a 'window of opportunity' (Geels, 2002) for the breakthrough and evolution of care farming. Pressures on the agricultural sector (global competition, sustainability requirements, animal diseases, competing claims, animal welfare) have urged farmers to look for other entrepreneurial strategies, while changes within the healthcare sector (demand orientation, socialization of care, demand for holistic and personal care, ageing of the population) reflect new opportunities for alternative care settings. The integration of a care branch in the agricultural enterprise is proving to be rather lucrative for many farmers and to contribute to the social legitimacy of the farm. At the same time, the farm-bound care offered seems to meet new demands in the healthcare sector, by offering small-scale, client-centred care in an informal but real societal setting. The establishment of the Personal Budget, reflecting an institutional change, provided a smart link between both sectors and an important catalyst for care farming to further expand. Furthermore, the development of care farming was encouraged by the government with the establishment in 2000 of a National Support Centre for Agriculture and Care by the Ministry of Agriculture and the Ministry of Health. This support centre has been serving as an expertise centre for all parties involved for the last eight years.

**Figure 2: The rise of care farming as an intermediary regime**



In this context, over the years, the number of care farms has exploded. Meanwhile, care farmers have organized themselves into national and regional societies and study clubs, developed new routines, and established their own quality assurance system. Within their professional context, they have proven able to bridge and harmonize the formerly exclusionary and highly incompatible regimes of agriculture and care, partly by adapting daily farming routines to rules that dominate health care practices. They have ended up constituting a new intermediary regime that incorporates elements from both regimes, as well as newly defined rules and practices (see Figure 2).

However, the process of bridging exclusionary regimes and building a new regime is not an easy one. Care farmers have faced and still face many challenges. In the following section we elaborate on these challenges and on the strategies adopted by farmers to overcome them.

### **3. THE DYNAMICS OF CROSS-SECTOR SYSTEM INNOVATION**

#### **3.1. The challenges**

A major challenge that confronted the first care farming pioneers was to be accepted, acknowledged and adopted by the healthcare networks. They had to fight to become granted a place in these networks by other network parties and to receive financial compensation for the care services they delivered. Even today, a number of care farmers still struggle with this. The establishment of the PGB significantly relieved this problem since care can be provided to clients that have a personal budget, independently of the recognition by care institutions and other care professionals.

Another significant challenge is to bridge the gaps and incompatibilities between the rule sets governing the different regimes. These include: formal regulatory rules; normative rules, such as norms, role values, role interpretations, and codes of conduct; and cognitive rules, such as belief systems and paradigms (Geels, 2004). Many rules within both the agricultural and the healthcare sectors are based on the basic needs of the actors involved: clients, animals, farmers, other employees. These needs have been translated into formal regulations or informal codes of conduct. However, in some cases rules and needs for optimal agricultural production or animal welfare are incompatible with rules or needs relating to client involvement in production or client safety and vice versa. Moreover, rules that seek to prevent or deal with the outbreak of animal diseases are usually not compatible with the combination of agricultural production and care. Conversely, rules that aim to guarantee care quality generally risk hampering the integration of agriculture and care.

On a more informal level, differences in normative rules – such as norms, values and routines – as well as in cognitive rules – such as beliefs, paradigms, and languages – may also hinder regime crossing. The hierarchical and bureaucratic world of healthcare sometimes collides with the more flexible and pragmatic world of agriculture, which impedes effective communication and collaboration. Similarly, the approach to clients differs significantly. In healthcare, clients are predominantly regarded as people who need effective and efficient care because of their disabilities or illnesses. In care farming, they are predominantly treated as equals who have certain potential for development and growth.

### 3.2. Strategies for cross-sector system innovation

In order to meet these challenges, care farmers develop and apply several individual strategies:

- proper self-reflection on their own capabilities, preferences, perspectives and priorities concerning the type of services to deliver and the kinds of people for whom they should cater;
- adequate management of relationships and networking with care institutions, local and regional governments, other care professionals, fellow care farmers, etc.;
- an adequate PR strategy and the mobilization of their own supportive network, consisting of professional 'allies' or of clients' enthusiastic parents or partners;
- the provision and dissemination of a certain level of professionalism, for example by achieving the quality mark for care farming, attending specific educational courses or employing professional care providers on the farm. This increases the confidence of and strengthens relations with other care professionals and care institutions;
- seeking support or advice from fellow care farmers, umbrella organizations, consultancies, etc.;
- the adaptation of farm and animal housing, farming equipment, daily activities or farm management, in order to be able to comply with rules and demands for care quality and client safety (see also Ferwerda et al., 2009).

One strategy to bypass confrontation with the healthcare network and its rules is to seek some sort of independence from care institutions, for instance by welcoming clients with personal budgets only.

In addition to individual strategies, care farmers develop and apply collective strategies that contribute to the acknowledgement and embedding of care farming in the care sector:

- collaboration and creation of a national branch organization, regional societies, study clubs, and other networks. The national branch organization was initially established and supported by the national government, in order to stimulate the development of care farming. In regional structures, care farmers jointly undertake certain activities (PR, negotiations with care institutions, the development of management systems, etc.). These branch initiatives partly relieve individual care farmers from administrative and networking tasks, and especially help to develop care farming into a more professional activity and an equal party in negotiations with care institutions. Furthermore, the established (regional) networks provide platforms for knowledge exchange and mutual learning;

- increasing professionalism of the new sector, for example by organizing specific educational courses and a quality assurance system, set up and managed by the sector itself. The quality assurance system for care farming is currently being adjusted to the Dutch national norms for care quality (HKZ norms);
- building scientific evidence on the added value of care farming for clients, the healthcare sector, and society as a whole. This effort is expected to make a decisive contribution to the political legitimisation and wider social acknowledgement and institutionalization of care farming. Until now many people have believed in the value of care farming, but scientific evidence is still lacking.

All these care farmer strategies can be considered as attempts to *align* newly developed rules and practices within their own regime, with the rules and routines of the other (in this case healthcare) regime, and/or as instruments for *self empowerment* by means of network/relationship management, and greater professionalism and organization. Together the strategies have contributed to the evolution of a new, intermediary regime that consists of new formal and informal networks, and new rules and routines, which are increasingly acknowledged and embraced by both original regimes. For example, the majority of healthcare professionals is now convinced of the added value of care farming as a complementary form of small-scale care that needs to be embedded into healthcare chains. Within the agricultural sector, care farming is increasingly regarded as a way of finding new sources of income and acquiring social legitimacy, thereby enhancing the sustainability of the sector. In this way, the emerging regime is gradually influencing both original regimes.

## 4. REFLECTION AND DISCUSSION

In this chapter we have described a specific pathway of system innovation via the construction of an intermediary regime, at the interface of two previously exclusionary professional regimes. We defined a ‘regime’ as a largely taken-for-granted, shared rule set that structures social and technical practices as well as actor networks.

Of course one could argue that people always have to deal with different, sometimes exclusionary regimes, reflecting their different roles in daily life and referring to the different communities and networks they take part in. However, over and above all these diverse regimes in daily life, within their professional practice, pioneering care farmers were confronted with two different, sometimes highly incompatible, professional regimes that could prescribe contradicting rules.

Reflecting on our findings, we identify roughly three phases in the process of system innovation via the construction of intermediary regimes:

▪ **The initial bridging of regimes.** In this phase, at niche level, pioneers develop novel ways of bridging and uniting formerly exclusionary regimes and of achieving a certain degree of acceptance.

▪ **The formation of an intermediary regime.** New shared rules, routines and practices are developed and professionalized. These routines and practices do justice to the characteristics of the original (agricultural) regime and make explicit links to main elements of the regime to be entered (healthcare). In addition, new formal and informal networks are established and professionalized. Alignment and (self-)empowerment strategies play an important role in this phase.

▪ **The maturing of the regime and the sedimentation of novel practices.** As the intermediary regime becomes even more robust and socially embedded; care farming practices eventually become entrenched at landscape level, reflecting more lasting, structural change. As such it will be fully accepted by the original regime, and will even influence its rules and routines. This maturation is facilitated by governmental support as well as continued organization and professionalization. This might, in turn, create new windows of opportunity and thus reinforce the maturation and sedimentation.

This three-phase process largely coincides with the three-step process described by Kemp and Grin (2008), of (1) 'co-existence' of new and old niches and regimes, (2) 'scaling': dissemination and consolidation of the new regime, and (3) 'anchoring': embedding in other structures and cultures, and mutual reinforcement of structural and cultural elements. Since the newly developed care farming regime influences rules and practices in both agriculture and healthcare, the system innovation resembles a form of 'effective reformism' as described by Roep et al. (2003).

Although it is becoming robust, there are still some uncertainties around the new care farming regime. Not all care farmers and other actors involved applaud the far-reaching professionalization of care farming. They fear the 'danger' of care farming developing into a new type of institutionalized care resulting in the loss of some of its specific valuable characteristics such as the small scale, the personal approach, and the participation of clients in real society. In addition, the discontinuation of the agricultural production branch is considered a risk. For some client groups, participation in agricultural production strongly contributes to their personal development and quality of life.

This case study of cross-sector system innovation processes is hard to interpret using the typologies proposed by Berkhout et al. (2004) and Geels and Schot (2007). The most significant incongruence is that, while both typologies focus on the replacement of regimes, in the development of care farming there is no replacement since the new emerging regime continues to co-exist with the former regimes. At the same time, elements of the typologies can be recognized. From the agricultural perspective, the initial emergence of care farming somehow reflects a reorientation of trajectories or a transformation path

instigated by pioneers and supported by changes at landscape level,. These changes consisted of pressures on the agricultural side (income squeeze, limited expansion possibilities, animal diseases, personal physical problems) and opportunities on the healthcare side (personal budgets, demand for small-scale, personal and socialized care). Later on, when governmental support explicitly encouraged the further development and professionalisation of care farming, the system innovation process presented aspects of a purposeful transition or a technological substitution. From the healthcare perspective, the system innovation started externally and, to some extent, represented an emerging transformation.

Our case has shown the following:

- Cross-sector system innovations start with the action of isolated pioneers within a certain regime who develop new practices arising out of the encounter with another regime.
- In cross-sector system innovations, regimes need to be bridged first at the level of novel innovative practices, developed in protected experimental space or niches. Then, gradually, an intermediary regime is developed and institutional voids are filled. Finally, maturation consists of the further structural social embedding of the new intermediary regime at landscape level.
- Cross-sector system innovations (like all system innovations) benefit from changes and pressures at landscape level. In our case, pressures on the agricultural regime urged farmers to search for alternative entrepreneurial strategies, while changing trends in healthcare provided new opportunities, together creating a window of opportunity that facilitated cross-sector system innovations. At the same time, the healthcare sector urged care farmers to formalise and justify their rules and routines, and thus to make their new regime explicit.

Moreover, cross-sector system innovations need some 'room for experimentation'. In the case of care farming this was provided through the establishment of the Personal Budget as an alternative, unconditional form of financial compensation for care services:

- governmental support, in the case of care farming embodied in the establishment and financing of a National Support Centre for Agriculture and Care, can accelerate the development of a new regime;
- successful entrepreneurial strategies to contribute to a successful cross-sector system innovation are (1) the alignment of the newly developed regime to the rules and routines of the yet unfamiliar regime, and (2) self-empowerment through the organization of networks and professionalization.

Finally, the lessons above suggest that cross-sector system innovations can be facilitated deliberately by combining the following strategic interventions:

- adopting novel, sector-crossing practices of the pioneers;
- supporting and creating room for experimentation at institutional level;
- involving actors operating in different regimes in order to explore new, promising transcending links;
- organizing governmental regulatory and financial support, and mobilizing political pressure to support and promote promising novel practices that challenge prevailing regimes and vested interests;
- stimulating new regime actors to organize and professionalize themselves.

A combination of these actions might be effective to help pioneers bridge initially exclusionary regimes, to stimulate the development of a new intermediary regime, and to subsequently enhance system innovations. The establishment of a new regime and the realization of a system innovation will likely affect the initial regimes, inducing further regime changes and creating new windows of opportunity.

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