



Social and Technological Transformation of Farming Systems: Diverging and Converging Pathways

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Andrew Wilcox and Karen Mills (Eds.)

Workshop 5.7: There are other options: boundary issues in innovation system governance

Convenors: Janice Jiggins, Niels Roling, Ray Ison and Chris Blackmore

Particular attention is paid to how system boundaries are determined, and by whom, because what is taken into account is constitutive of the kinds of innovation that emerge, who benefits and who loses from the change process, and how the governance of such change processes is performed. We understand:

- Relevant system boundaries to include (in diverse combinations and scales) biophysical and ecological functioning, production through market and consumption transactions, and social well-being;
- Innovation to mean coupled changes in socio-technologies and institutions at levels and scales of interaction that frame and regulate routine behaviours and practices and normative expectations;
- Governance as inter-connected actions for shared purposes, performed by a potentially broad range of actors linked (as individuals and/or in organisations) in networks, groups, platforms etc.

In the light of the above we sought original contributions that examine critically:

- Evidence of how systems thinking – when system boundaries are inappropriately drawn - can blind policy-makers, researchers and practitioners to the relationships that sustain ‘business as usual’ approaches to sustainable intensification;
- Evidence of how systems thinking, when applying more inclusive boundaries, challenges the claim that ‘there are no other options’;
- Evidence of how appropriately constituted system boundaries open new pathways and options for change, and new procedures and processes for governing sustainable innovation at system scales.

Under the first two points authors were expected to apply systems thinking to relevant evidential, conceptual or theoretical issues (about one third of the paper). The third point allowed for presentation, analysis and discussion of findings from (mini) case studies, action researching, and various forms of participatory research (about two thirds of the paper). Authors were able to address any level or scale of interaction.

The convenors provided a short background paper presenting evidence for i) how neo-liberal market thinking applied to agriculture and food futures draws system boundaries inappropriately, creating new forms of systemic risk; ii) the current focus on ‘transformative technologies’ and the potential for a handful of dominant commercial enterprises to ignore or under-value institutional dynamics that externalise (unsustainable) costs. These costs threaten bio-physical and ecological functioning and vulnerable social actors worldwide; iii) how different boundary judgements open pathways towards alternative, less risky and robustly productive innovations. Ongoing efforts in EU countries to bring forward transformational change were noted. In the UK, for instance, through the multi-stakeholder Westminster Food and Nutrition Forum (www.westminsterfoodandnutritionforum.co.uk Twitter @WFNFEvents) . France in 2014 introduced a new law, the Future of Agriculture, that requires all forms of agriculture to evolve agro-ecological farming technologies and practices, while sustaining France’s competitive position in world markets. This in turn is demanding new competencies

and attitudes within INRA, the national agricultural research system. In the Netherlands, while the government and the leaders of Wageningen University are promoting business as usual, the government has been challenged recently to meet its climate obligations (including in food and agriculture) by a judicial decision in a case launched by a charity (Urgenda). Instances from Australia, New Zealand, Ecuador, West Africa and other countries were also noted.

An investigation into the aspirations, governance and management challenges of Māori Farming Trusts

Phillips, T.¹, Woods, C.² and Lythberg, B.³

¹ *Centre of Excellence in Farm Business Management, Massey University*

² *Business School, University of Auckland*

³ *Mira Szaszy Research Centre for Māori and Pacific Economic Development, University of Auckland*

Abstract: This paper investigates areas for possible improvement in the governance and management of large New Zealand Māori dairy farm businesses. Building on the innovative practices of their tūpuna (ancestors) Māori are defining their own aspirations, realities and goals in the dairy farming world and their accompanying challenges, as expressed by individuals and collectives currently engaged in Māori dairy farm businesses. Māori strategic plans and business values place emphasis on relationships, responsibilities, reciprocity and respect. These are exemplars of a Māori world-view, which explicitly acknowledges particular historic and cultural contexts. The Māori way of doing business is described in this study as having a Quadruple Bottom Line of: Profit, People, Environment and Community business objectives. More specifically, 'Māori farms often have an inverted Quadruple Bottom Line; People, Environment and their Community often come before Profit....but without Profit none of it happens.' Māori Trust farms have different strategic objectives and are not solely profit focused, but poor governance may explain why some Māori farming families fail to meet their business objectives. Māori are genuine leaders of dairy farm environmental management, due in part to their attitudes to land ownership, business values and holistic world views. The top tier of Māori farming trusts comprises fast growing enterprises, which are rapidly improving business performance. Their expertise and governance of large corporate farms has much to offer other farming businesses.

Keywords: Strategic management, business values, large farm business, New Zealand, dairy farming, quadruple bottom line, indigenous, social capital, environment, entrepreneurship.

Introduction

Farm business governance is concerned with strategic leadership (to achieve the purpose or mission of the business) whereas management controls tactical and operational decision making. Governance is about effective collective decision making to enhance business performance, and is based on the process of getting advice to provide a better perspective (Tapsell & Woods, 2010). Business failure is often attributed to poor governance. Māori agribusiness is being criticised for under-performance. Is this a governance issue? Māori Farming Trusts provide a unique case study into the governance of large farming businesses.

Today Māori freehold dairy farms produce 8-10% of New Zealand dairy production. Large management entities (greater than 1500ha) make up 60% of Māori land; there are 50 incorporations and 92 Trusts. The majority of Māori land quality is generally low, with lower than average natural fertility and more challenging terrain. A number of recent studies (White,

1997; Kingi, 2000; Te Puni Koriri, 2010 and 2011; Ministry of Agriculture and Fisheries (MAF), 2011; Clough, 2011; Bird, 2012) have sought to better understand how Māori freehold land is currently governed, managed and operated. These studies illustrate that the reasons for underperformance are complex.

Māori Trust farms are in business to make money, however the long-term and intergenerational ownership places considerable emphasis on both developing their people and protecting the environment in which they farm. Maintaining and strengthening one's 'cultural development and traditions' as part of farm business mission statements is perhaps unique to Indigenous peoples rather than European/Pākehā farmers.

The performance of New Zealand Māori agribusiness is not solely related to financial decisions but includes the social construct of social, environmental, cultural and spiritual objectives which at times are in competition. The aspiration is that Māori businesses such as dairy farms can be seen as value-creating, but to be effective requires leadership and communication. There is much to learn from better understanding the relational wisdom of indigenous Māori Family/Collective Business (Nicholson et al., 2012).

This paper puts in the foreground the importance of the 'quadruple bottom-line' identified by participants, as opposed to a dominant Anglo-New Zealand business of 'profit/production-maximising'. This preliminary scoping study investigates areas for possible improvement in the governance and management of large Māori dairy farm businesses.

Semi-structured interviews were conducted with ten people directly associated with Māori Farming Trusts and Incorporations. Those interviewed were Māori farmers (trustees, board members, beneficiary owners and managers) and rural professionals working with Māori dairy farm Trusts and Incorporations. There is considerable Māori farming activity in this area; 41 Māori Incorporations and Trusts farming 174,000 hectares of land (mostly dairying and forestry). These are farm systems in transition.

All interviewees selected were very familiar with Māori farming businesses and involved with governance and/or management of those businesses. It was considered that they would be information rich and provide illuminating insights.

The key research question was how Māori Trusts establish farm business goals/Key Performance Indicators (KPIs), and how those goals are communicated to the farm management/consultancy teams and shareholders.

Indigenous governance and Māori entrepreneurship

The Māori economy has a long and flourishing history, and connections between people, and between land and people, have always been foundational to Māori well-being. The whānau, the primary social unit of Māori society, often consisted of three or four generations at any one time. Nicholson et al. (2012) describe the concept of 'familiness', which denotes the distinct set of resources held within the family firm that has the potential to create competitive advantage. Māori business governance shares some tenets with family business, whereby owners value the goals of good governance in both the business and in the family: peace, cohesiveness, effective conflict resolution, and freedom to nurture the positive elements of heritage and pursue shared objectives and values (Aronoff & Ward, 2011). Families in business together have powerful motivation to govern themselves well.

In examining Māori entrepreneurial behaviour, Tapsell and Woods (2010) proffer that where Māori innovation occurs - in farming and elsewhere - there is an interaction between the young opportunity seeking entrepreneur (Potiki) and the elder statesperson (Rangatira). The interplay between these two key members of the whānau is illustrated by the double spiral (Takarangi – Figure 1), a spiral of creation leading to innovations that blend the traditional with the new ideas (Tapsell & Woods, 2010). The roles of the Rangatira/elder and Potiki/entrepreneur are complementary as they seek a balance between elements of chaos and stability, old and new thinking, all within the context of customary practice. Rangatira are responsible for maintaining kin identity through adversity. In this way tribal heritage and the interests of ancestors and descendants are protected.

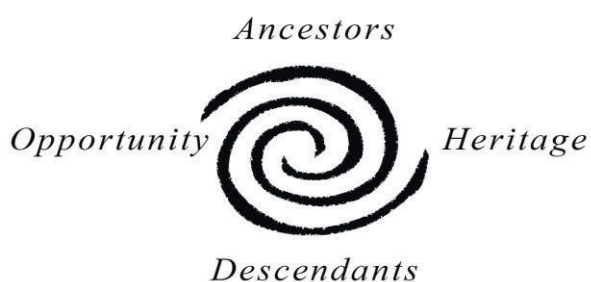


Figure 1. Takarangi (Overall et al., 2010 p. 156)

Tapsell and Woods' (2010) and colleagues' (Overall et al., 2010; Hēnare et al., 2014) emerging indigenous entrepreneurship theory builds on the work of entrepreneurship behavioural theorists such as Joseph Schumpeter and Israel Kirzner (Henry, 2007). Tapsell and Woods' (2008) linking of Kirzner's work to Personal Construct Theory (Kelly, 1970; Bannister & Fransella, 1971) is compelling as it puts the entrepreneur at the centre and in control of the innovation activity. Personal Construct Theory provides a theoretical understanding of the nature of learning and illustrates the importance of the learning, trust and relationships in farmer decision making, as reported by Phillips (1982, 1985).

The Māori entrepreneurial process is one of construction, exploration, experimentation, evaluation and exploitation of profitable opportunities to create something of value (as economic profit, and for people, environment and community), taking into account risk, alertness to opportunity and the need for innovation (Tapsell & Woods, 2010). Māori entrepreneurs operate from a world-view that explicitly acknowledges the particular historical and cultural context (Tapsell & Woods, 2010) within a continuum of self-organisation. If both partners (Rangatira and Potiki) are not interacting there is little progress and a potential for crisis. There is potential conflict between this entrepreneurship model and Māori Trust governance structures, raising questions of the appropriateness of imposing a European style governance structure onto Māori businesses.

Traditional indigenous communities such as Māori hold collectivist principles. Māori entrepreneurial activity is underpinned by social objectives to improve the wealth and wellbeing for the community, not just the individual (Henry 2007 p. 542). Pākehā (European New Zealanders) entrepreneurship differs from Māori entrepreneurship along the

individualism–collectivism spectrum. The Māori ‘harmonious collectivists’ base their aspirations upon the community expectations of the group (Henry, 2007).

This holistic view sees that spirituality, natural environments, society and culture are all interconnected processes that cannot be seen in isolation (Spiller et al., 2011). Barrett-Ohia (2009) used a proverb to illustrate these holistic relationships: *“My house has four cornerstones. When one corner is weak the whole house is jeopardized”*. Such holistic and multi-dimensional approaches are based on an ethic of care (Spiller et al., 2011). Māori values demonstrate a relational view of the world and a commitment to develop reciprocal relationships of respect and care to engender belonging. Māori businesses draw upon Māori values such as Kotahitanga (unity), Wairuatanga (spirituality), Whakapapa (genealogy), Aroha (care, empathy, charity and respect) and Manaaki (respect and kindness) in practice to endow a sense of belonging to each other and the natural world. The concept of ‘relational wealth’ or ‘social capital’ is about creating value for the entire network of stakeholders, through cooperation - a decentralised power and authority to build a consensus. For Māori, connectedness and relational wisdom are core values of the emerging Māori economy, for *“People are the Land and the Land is the People”* (Durie, 2003).

Historical background to Māori land tenure

In 1840, NZ Māori owned 66 million hectares of land. By 1896 this had declined to 11 million hectares of land, and by 1996 only 3 million hectares remained in Māori ownership (Gillies, 2006).

It is widely acknowledged that the European arrival in New Zealand generated what Lorenzo Veracini has coined ‘founding violence’, experienced by many colonised peoples and characterised as disregard for indigenous peoples, land, social structures, customs and safety (Panoho, 2006; Boast, 2008).

The New Zealand government had a programme of confiscating Māori land to reward militia troops and new settlers; in Waikato in 1864, 1.3 million hectares of Māori land were taken for this purpose. European buyers wanted the best agricultural land available (King, 2003). As Māori land was confiscated and fragmented, Māori re-settlement was often made on lower quality land. In the early nineteenth century, Māori settlements had been built around family or hapū membership. In some regions, Māori retained only a fraction of their original land area. Often, Māori were left owning the ‘Unimproved Value’ of the land while lessees farmed it in return for statutory rentals, which were infrequently reviewed (Sanderson, 2000).

Customary Māori land tenure

Māori belief and understanding is that land is permanent and human life is transient, as reflected in the Māori proverb “man disappears but the land remains” that describes Māori holistic values and respect for the land. Māori considered their association with land in terms of *“belonging to rather than owning [it]”* (Kingi, 2008). Land was regarded by Māori as a communally owned collective good and was treated with respect, owing to its possessing economic and spiritual qualities (Henry, 2007).

Māori society is hierarchically organised, with clearly defined roles and practices (tikanga) observed by those positioned within the different layers. The core of these layers are the whānau (extended families), which combined under common ancestry forming the central

social, economic and political units of Māori society called hapū (a collective of whānau that share genealogical links) (Tapsell & Woods, 2010). The whānau (extended family) usually held the rights to land.

The tribal Marae (the ceremonial courtyard) remains the focus of Māori society. Among other things, the Marae holds customary authority over surrounding land. So long as the Marae has survived, the kin group's identity to its ancestral estates is said to have endured (Tapsell, 2002). The Rangatira (elder statesman/kin group leader) control the Marae based forums, which centre on the core cultural values of whakapapa (genealogy) and tikanga (customs, traditions and protocols of behaviour), and the performative delivery, reception, exchange and use of 'treasures and learning passed down from the ancestors'. Through these lenses tribal identity is continually refocused.

Where agriculture is concerned, 'the Māori way' describes the collective will of Māori and modes of work and productivity of kinship groups (Hēnare, 2011). Traditional and oral history reports prepared by Hēnare and colleagues (2009, 2010, and 2013) observe that philosophically speaking, Māoritanga refers to Māori culture-society and its four well-beings; spiritual, ecological, kinship, and economic. These map well onto the quadruple bottom-line identified in this study - Profit, People, Environment and Community - and suggest that the wisdom of tūpuna or ancestors pervades contemporary practice.

The Treaty of Waitangi

The NZ Treaty of Waitangi (1840) is the agreement, in Māori and English, that was made between the British Crown and about 540 Māori Rangatira (chiefs).

In the early stages of colonization, most of the Crown's policies had negative impacts on Māori society, including loss of land (Bassett et al., 1994). Māori have for nearly 200 years attempted to gain recognition of their rights under the Treaty of Waitangi. However, before the 1970s it was not an operative document (Panoho & Stablein, 2005). In 1975 the Waitangi Tribunal was established to consider claims by Māori against the Crown regarding breaches of principles of the Treaty. Since 1985 the tribunal has been able to consider Crown acts and omissions dating back to 1840. The Treaty therefore informs the intergeneration discourse of Māori and the Crown and its governments on matters to do with economic development and politics (Hēnare et al., 2014).

Any discussion of Māori entrepreneurial activity (or lack thereof) must acknowledge the impact of colonization and the Treaty of Waitangi (Tapsell & Woods, 2010; Overall et al., 2010).

Farm business governance

Good governance, management and operational efficiency are critical to all dairy farm businesses. Large Māori family farms have corporate structures with large numbers of shareholders. The different roles of governance, management and operations need to be separate. This is how mature governance differs from 'founder-led businesses where there is no distinction between roles' (Lockhart, 2011a). These roles often get confused; Lockhart (2011) argues that immediate improvements could be achieved if the Board and management roles were conducted independently of each other. A good Board process allows differences to be addressed and bridges built both horizontally and vertically (Irving et al., 2009).

Lockhart adds that independent thought is a requisite for effective collective decision making, and argues that good governance is achieved where governance is defined as effective

collective decision making resulting in exemplary company (business) performance (Lockhart, 2011). The selection of directors needs to be based on how their competencies and behavioural characteristics complement each other.

Governance Boards exist for purposes other than compliance (Lockhart, 2011); effective governance requires accountability between shareholders and the business (Aronoff & Ward, 2011), and reporting business direction and performance would be of value to debt providers (Lockhart, 2011).

Irving et al. (2009) offer a model that demystifies governance by identifying its three key roles and the activities of each: the key components of governance are strategy, infrastructure and monitoring. The Board or Trustees decide the business strategy, and the key policies ensure there is adequate resourcing to achieve the strategic goals. To monitor the business, the Board/Trustees must ensure they are properly informed on the performance and state of the business.

At the 'Top End' (Tier 1 farms (MAF, 2011)) the Māori Farming Trusts are both professionally governed, managed and are very profitable. A good example is '**Wairarapa Moana**' <http://www.wairarapamoana.org.nz/> where the vision, strategic plan and business values are clearly stated on their website for all 3000 stakeholders.

Kapenga M Trust <http://kapengamtrust.Māori.nz/> has a clear Vision Statement and their Strategic Plan includes five points that drive the direction of the farming business:

- The retention of the land.
- Maintaining the unity within Kapenga M.
- Maintaining the authority and leadership of the Trust.
- Encourage young people to participate in the Trust.
- Promote farming amongst our young people.

The **Kapenga M Trust** was established in 1981. The Trust's 915 shareholders are of Tūhourangi descent and own a total of 1,858 ha. The 'core drivers' of the business are all about farm business management.

At the 'Top End' (Tier 1 farms (MAF, 2011)) of Māori Farming Trusts there is no doubt that the business vision and values are clearly communicated to owners, beneficiaries, consultancy team/farm managers and farm staff. In contrast, many of the 'under-performing' farms have low profitability and poor cash-flow (Clough, 2011; Bird, 2012), and although generally conservative regarding debt, struggle to gain access to additional capital (ANZ, 2014).

However it is unclear what proportion of the Māori Farming Trusts have good effective governance and management systems, nor whether it was good governance, excellent management or leadership that allowed the 'top Trusts' to perform at this high level (Lockhart, 2014). The modern European corporate structures and processes, with which the Māori Farming Trusts must comply, are not part of Māori culture or decision making.

New Zealand farmers and advisors tend to judge farm business success on very narrow production and profitability criteria. Capital gain is very important to most farmers but as Māori land is not sold, capital gain is not a business driver for Māori. In terms of priorities, profit is often seen as the fourth priority. Just having secured land ownership and control (post-colonialism) is in itself very important. These values and drivers of business are different from mainstream New Zealand farming businesses, but they are neither unique nor untenable.

Findings

Interviewing 10 well-informed respondents has provided valuable insight into the current state of Māori Farming Trusts' governance and management. Wairarapa Moana and Kapenga M Trusts are exemplars of excellent farm business governance and management.

Wairarapa Moana's Vision Statement reflects the long-term needs and aspirations for their people and families, such as community, health and well-being, educational achievements, cultural development and capability. This is a good example of 'developing social capital' to create competitive advantage (Nicholson et al., 2012).

The Strategic Plan (farms, hydro and forestry) clearly sets out tasks, performance indicators and expected outcomes. The farm staff were all included in developing the "Farm Business Values statement" and the finished document is included in their individual employment contracts. On-farm manager meetings are weekly, and these are supported by group emails and the "AgHub" intranet system where managers report weekly and the farms are benchmarked within the farm business. <http://www.onefarm.ac.nz/resources/webinars/showrecent/52>

The business values focus on relationships, responsibilities, reciprocity and respect. This is an exemplar of a Māori world-view, which explicitly acknowledges the particular historic and cultural context (Tapsell & Woods, 2010). The Strategic Plan is to act as a guide to how the Trust can protect the environment, and sustain, grow and preserve its history and future. The strategic plan illustrates the spiral or matrix of values 'He Korunga o nga Tikanga' as envisaged by (Nicholson et al., 2012).

The Kapenga M Trust's goals meet the dual imperative of retaining the land and strengthening the cultural connections. This exemplifies the principle of Kaitiaki—being good caretakers of the land and passing it on in a better state for future generations while honouring past ancestors. Aspirations are directly linked to core values of the Trust. Aspirations seem also to be linked to the current way in which the land is used. The ideal was a balance between a viable business and the maintenance of the owners' cultural connections.

The top 'performing' Trusts have good financial returns, which are enabling them to take advantage of investment opportunities and invest in education. Such farms have high equity and are rapidly growing.

There was consensus among the interviewees that effective governance was critical to delivering the owners' aspirations. This group of well-informed rural professionals also expressed confidence in the Māori governance that they had contact with, and in the rate of improvement of that governance. It is also true that in this study 'poor governance' was given as the main reason for 'poor Māori farm trustee' performance, especially the lack of farm business management skills of the trustees.

There is however a community optimism that: “*Māori farming business in general has massive potential – they’ve got plans, they have ambition, they want to grow and they’ve got governance that’s improving all the time across the board—some are already excellent.*”

The strategic management plans of the Māori Farming Trusts prioritise the development of social capital to create competitive advantage. There is clear evidence of culture/language (ancestral/elders) being blended with new ideas/technology (entrepreneurship) to create innovative decision making and strong business performance. Strong business performance ensures better education and welfare of descendants as well as environmental protection.

Key factors identified with ‘under-performing’ Māori farm trusts

It is important to quantify what is meant by the term ‘under-performing’. In part, it is not being as profitable as the potential for that land class, in other words not having a high enough return on assets (Clough, 2011). The MAF (2011), Clough (2011) and Bird (2012) studies did not judge Māori or non-Māori farm businesses on the basis of ‘quadruple bottom-line objectives’, but on Anglo-NZ profit/productivity criteria only.

Tier 2 Māori land-owners (less profitable farm businesses as defined by MAF (2011)) have weaker links to the land either because of living some distance from the land, because the land was previously leased to Pākehā farmers or for forestry, or because the owners have less agricultural and business skills and knowledge. Their aspirations are being shaped by the current or recent past use and output of the land. Culture remains of equal importance to these farmers as making money, but being viable is different from seeking good financial returns, and there is a greater possibility of conflict and trade-offs between culture, people and profitability.

The following ten opportunities for growth emerged from this scoping study:

1. The challenge of a clear vision

The better performing Trusts were deemed to have governance totally separate from the management, and to have a very clear business vision. Within these Trusts the governance team is prepared to make full use of their accountants and advisors to develop the vision and really critique those decisions they’re making. The struggling Trusts don’t have that clear vision or clear goals outlined. Some Trustees confuse the roles of governance (strategic management) with farm management (tactical and operational decision making).

2. The challenge of understanding Māori Governance

The strategic direction needs to be driven by Māori values. Māori agribusiness has a unique opportunity to incorporate ‘whānaungatanga’ to create a competitive advantage (Nicholson et al., 2012). Leadership by either the Trust or Rangatira, and evidence of well-supported entrepreneurship, are core assets that separate thriving and struggling Māori businesses (Tapsell & Woods, 2010).

3. The challenge of due diligence

The rural professionals interviewed believe it is important for Māori governance boards to be able to assess the implementation of the strategies used within their businesses. Trustees need to know that their substantial assets are being used efficiently. Not all Māori governance boards have the farm business management expertise to critically assess outcomes of

strategic decisions. There is a poor understanding of basic dairying and the appropriate KPIs, farms are not achieving the production goals set at the time of conversion to dairying.

4. The challenge of knowledge capacity for governance

Some less successful Trustee Boards lack clear, well-informed leadership, and the farm business management skills and knowledge amongst the Trustees is insufficient to ensure success. Many who are in Trustee positions are now older people who were elected on the basis of their standing within the hapū (a collective that shares genealogical links), not on their dairy farming knowledge. The lesser Trusts were either relying too heavily on consultants and advisors and not up-skilling their own expertise - either way, they were not in a position to adequately question decisions or judge outcomes.

5. The challenge of quality of leadership

Strong leadership is required to give clear direction to the business. Leaders need to fully inform shareholders/beneficiaries, management and the operational staff. Resolving boardroom differences of opinion can be difficult for Māori (Panoho, 2012).

6. The challenge of the relationship between the chairman and the CEO

Respondent-2: *"The relationship between the chairman and the CEO is the key issue in the Trust's success as it is this group that drives the business and the decision making. This relationship is critical for the consultant too."*

7. The challenge of investing in Māori capability

Respondent-5: *"It seems like being between a rock and a hard place - if you don't have the expertise, you need to get advice. If you invest too much in it then you divest the responsibility, you're never actually building the capital there yourself. Māori need to invest more time in building knowledge capability in the younger Māori people."*

8. The challenge of appointing Trustees not on skills or business acumen but on the basis of lineage

Most Māori farming Trusts appoint Trustees for 'life' on the basis of standing within the hapū. A smaller number of Trusts appoint Trustees on a rotational basis. Some outside accountants are appointed to Trustee Boards, which could create possible areas of conflict of interests (Lockhart, 2011a). This can often mean that decision making is slow and arduous and may falter.

9. The challenge of using dairy farm business management benchmarking and Key Performance Indicators (KPIs)

There was universal agreement by interviewees that all Māori Farm Trusts need to engage with the DairyNZ industry 'Dairybase' and benchmark.

Respondent-1: *"Māori farm infrastructure is usually very good as it is seen as a long-term investment. However management decisions are a challenge. What they need are appropriate KPI's that they can benchmark their operations against and then they can ask their adviser the questions."*

10. The challenge of using outside farm consultants

The farm consultant is a key person, especially those with farm business management skills and good facilitation expertise. Consultants who have built a sound reputation amongst Māori appear 'over-stretched' and unable to meet demand. There was criticism of the manner in which some consultants operate and of the dairy farm management expertise of others working with Māori.

The problem for Māori is no longer 'do they have the resources?' It is about how to develop those resources to get the best value for owners from the particular resources in a sustainable way. The knowledge gap has been identified as farm business management. A very poignant comment about current Māori capacity was that "We need more whānau (extended family) working in the business but the reality is that the available pool of suitable people is very small. I believe more than 50% of Māori leave school with no qualifications which then has flow on effects into all industries not just agriculture."

Conclusions

There has been little research into rural business governance, and the relationship between good governance and subsequent business performance has not yet been established (Lockhart, 2011a). There is also very little data available on the productivity of the Māori economy. However, when comparisons have been made between Māori and other dairy farms they have focused on profitability and production, neither of which feature prominently in the Māori strategic priorities. Has the comparison really been with 'similar' businesses?

Māori business values focus on relationships, responsibilities, reciprocity and respect. Their strategic management plans illustrate a matrix of values (Nicholson et al., 2012) and emphasise the development of social capital to create competitive advantage. Such strategic plans reflect the Māori vision and aspirations to sustain and grow the land base, provide leadership and guidance for the whānau, develop capacity and resources within the Trusts, and to perform better as businesses.

According to the Māori way of doing business; "they have 'Quadruple Bottom Line' of Profit, People, Environment and Community" business objectives. It is very important to understand that Māori have a very long-term view of business and land ownership, ensuring that the land (whenua) will never be sold. This impacts on both strategic and tactical decisions. It changes the vision from short- to medium-term to long-term. Māori in general have a conservative view toward borrowing and debt, but these attitudes are driven by a feeling of responsibility on behalf of the whānau to protect ownership of the land. Most Māori Trust farms are located on lower land use categories and have only been established as dairy farms in recent times. Māori Trust farms have different strategic objectives that reflect their values and world-view.

A separate question is: can the Māori Trust dairy farms be more productive and more profitable? The answer is a definite yes, and it needs to be acknowledged that the top performing Māori Trust dairy farms already outperform similar farms. Yet Māori leaders acknowledge that: "*Generally speaking, Māori farming or Māori resources are under-performing*" (Māori Agribusiness Forum (MPI), 2013). The reality is that it is very difficult - and accentuates management challenges - for a Māori Trust to deliver on the People, Community and Environmental outcomes if Profit is poor or insufficient. What the Māori Trusts need are **appropriate KPI's**, industry-wide, that they can benchmark their operations against so they can challenge their advisers with well-informed questions.

Much of this study has been related to the farm business management skills of Māori Trust governance and management. There are talented young Māori getting tertiary education, and receiving Trust scholarships to support their higher level education. There should be more

encouragement of young Māori to seek degree training in agricultural science, agribusiness and especially farm business management.

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Institutional change: challenge for agricultural extension and the science that supports it. Evidence from West Africa

Röling, N.

Wageningen UR

Abstract: Even in this age of small government, agricultural extension provided by public, private, and civil society actors is still the profession of thousands of 'front line staff', managers, policy makers, consultants and other change agents. It continues to be a crucial interface between science and agencies of collective action on the one hand, and the rural communities and industries that use land on the other. Extension is usually seen as an instrument to help farmers adopt technology, i.e. ride the treadmill of technological innovation and capture the economies of scale that, at macro level, ensure food security at minimal cost in terms of human resources and consumer spending. Though not a discipline, with the body of knowledge that informs extension professionals and the actors that deploy extension as a policy instrument, extension studies is an applied social science with researchers, academic departments, conferences, and a journal or two, that is usually part of an agricultural faculty, college or research organisation. This paper is based on twelve years of innovation system research in West Africa that was instigated by the question of whether the body of knowledge that underpins agricultural extension imposes severe limitations on the impact of the resources invested in it, and leads to high opportunity costs in terms of what could have been achieved. The paper presents evidence that institutions provide a crucial but neglected context for innovation on smallholder farms, that they can be changed, and that innovation platforms can be effective in initiating such change. This evidence raises important issues for extension professionals and the social science that informs them.

Keywords: Smallholder farming, innovation platforms, enabling conditions, diagnostics, power, Benin, Ghana, Mali

Introduction¹

Agricultural extension here is defined as a policy instrument that is used by government, business and civil society to intervene in land use practices usually with the aim of improving productivity and sustainability of resource use. It specifically targets voluntary behaviour of land users, based on perceived self- or collective interest, understanding, persuasion, change of norms and rules, empowerment, etc. As such, extension usually is combined with more compulsory instruments, such as market forces, regulation, credit, access to research, inputs

¹ *The paper is based on a research programme (www.cos-sis.org) that has been productive in terms of publications. Therefore, the author has refrained from providing references for all his assertions. Two key publications that provide documented background documentation are Hounkonnou et al. 2012 and Hounkonnou et al. in press 2016.*

and services; and fiscal instruments, such as subsidies. Its thousands of professional field workers, managers, consultants, trainers and evaluators are guided by a body of applied social science, usually referred to as 'extension studies', which in turn is informed by such disciplines as anthropology, rural sociology, communication science and agricultural economics, and by research traditions such as diffusion of innovations, farming systems research, social marketing, science and technology studies, soft systems methodology and, more recently, innovation systems research (e.g. Leeuwis with Van den Ban, 2004; Rivera & Sulaiman, 2009).

Extension studies strictly cannot be called a 'science': there is not much accumulation of knowledge. Instead, (and this is based on my many years of involvement) it is more usually marked by (politically) contested paradigms, shifting perspectives, re-invention of arguments, and persistence of 'theories of yesteryear'. All this makes it a fascinating field, be it that expertise does not lead to much credibility, authority or impact. Any banker, donor, businessman, feminist or agronomist can claim it. One of the seductions of extension studies is paradigm bashing e.g. of the linear model. I try to avoid it in the present paper. Some explanation of my critical view is in order.

My earlier work on Agricultural Knowledge Systems (AKIS) (e.g. Rölling & Engel, 1991), which was explicitly based on Checkland's (Checkland & Scholes, 1990) Soft Systems Methodology, was picked up by the World Bank. It soon became a hard systems notion with given goals (productivity per hectare), given boundaries (the national agricultural research 'system') and given components (research, extension, farmer), truncating the very elements that could have made a difference. FAO's pioneering Farmer Field School programme in Indonesia (Rölling & Van de Fliert, 1998) convincingly demonstrated the effectiveness of this approach in combating pesticide-induced Brown Plant Hopper outbreaks in rice. Currently the Brown Plant Hopper is as much of a threat to Java's food security as in the early 1980s (Fox, 2014). Vested interests, including pesticide companies, thwarted best practice. Andy Hall's (e.g. Hall et al., 2003) influential work on Innovation Systems has been massaged into e.g. 'Integrated Agricultural Research for Development' (IAR4D), and most programmes that use innovation systems assume that agricultural science is the driver of agricultural development and hence seek to enhance science impact or 'valorisation'. Innovation system has come to mean the National Agricultural Research System. Meanwhile, the potential of Innovation Systems thinking for prioritising institutional bottlenecks is ignored because they are a blind spot in agricultural science. Innovation platforms (e.g. Rölling, 1994), again based on soft systems' ideas about stakeholder interaction, are usually translated into programmes to strengthen the value chains that, often with a substantial subsidy element, support the adoption of packages of high yielding varieties, fertilisers and pesticides.

A final example refers to the very argument of the current paper, which was raised eloquently by Clark (2002) 15 years ago: *"Contrast is made with more conventional approaches that take institutional structures as given and focus more on factors such as price regimes, policy weaknesses and political will. The paper argues that so great now are the problems in this area (particularly in Sub-Saharan Africa) that there is a clear need for institutional reform to accompany relevant technological changes. In the absence of such reform, innovative (and hence economic) potential is likely to be compromised"*.

West Africa (WA) has a rapidly growing population, a labour force largely engaged in agriculture, growing cities that import most of their food, and stagnant or slowly growing agricultural productivity. Yet in terms of potential, the region has an eager rural population and

vast under-utilised land, water and genetic resources; albeit that climate change and resource degradation pose disproportionate threats. Given that yield gaps in industrial agriculture, e.g. in the US and Europe, are rapidly catching up with the potential 10 tonnes/ha or so grain equivalent, WA with its one or two tonnes/ha is one of the world's regions with potential to help feed the expected additional billions in a sustainable manner. Yet the policy instruments thrown at this challenge have singularly failed to deliver impact. The Green Revolution has not taken hold (e.g. Djurfeldt et al., 2005). Investment in agricultural research and technology development over fifty years has not led to spectacular change in practices (except for outgrower export industries). Yet, when it comes to farm innovation, the initiative at the national, regional and international levels remains with agricultural research, as if technology development were the bottleneck. The key argument of the current paper is that this focus is too limited, if not mistaken, to the point where it has held up agricultural development in WA and elsewhere.

This paper is based on the experience of a 12-year (2002-2014) multi-disciplinary WA research programme called 'Convergence of Sciences' (CoS), in which the author has had the privilege of participating as 'science adviser'. Its first phase (2002-2006) operated on the hypothesis that the disappointing impact of science was due to the inappropriateness of the technology promoted. Hence that phase focused on Participatory Technology Development (PTD) with farmers. It led to the conclusion that, however appropriate the technology, smallholders' windows of opportunity, in terms of e.g. markets, access to resources and rule of law are too small to capture its benefits (Van Huis et al., 2007; Sterk et al., 2013). The second phase CoS-Strengthening Innovation Systems (CoS-SIS 2008-2014) was based on this experience as well as on a painstaking review of the literature on agricultural development in Sub-Saharan Africa (Hounkonnou et al., 2012) and, therefore, worked on the premise that, in the current historical context in WA, it is not so much technological innovation that drives farm development but the institutional context that sets disabling or enabling conditions for such development.

This view is supported by our realisation (Hounkonnou et al., 2012) that in industrial agricultures such as those of the US and The Netherlands, major institutional changes *preceded* the phenomenal rise in productivity by at least 50 years. They included tenure laws, the emergence of farmer cooperatives and organisations, regulatory frameworks, education for farm men and women, land improvement, research support, market organisation, integration of value chains, access to credit, domain governance, control of corruption and product adulteration, and fiscal policies. When I was a student in Wageningen in the fifties, the introduction to agricultural economics still focused on the enabling institutions that had been created since the 1880s. Later the focus shifted to farm management.

Where current agricultural development practice tends to focus on productivity per hectare and/or livelihoods of *individual* farm families, and uses *aggregated* data on individual productivity or livelihoods as indicators of success (i.e. methodological individualism), in this paper we shall focus on institutions as attributes of collectivities, and therefore look for mechanisms for *systemic* change that explain the emergence of shared rules and practices that underpin concerted and distributed action to achieve collective goals.

Now that the CoS-SIS has ended and its results have been and are being published, the present paper seeks to pull together its lessons for extension studies.

Nature of the evidence

CoS-SIS operated across three countries, Benin, Ghana and Mali, in nine agricultural domains, which were short-listed by teams of national experts as being national priorities. The programme management committee (PMC) made the final selection. Table 1 presents them and the specific entry point each eventually worked on.

Table 1. Countries, domains, and entry points

Country	Domain	Entry Point and RA
Benin	1. Oil palm	Integrity of system for distributing hybrid (<i>Tenera</i>) oil palm seedlings
	2. Cotton	Access to affordable less harmful plant protection (Integrated Pest Management)
	3. Water Management	Rice production in inland valley bottoms. Helping rice producers capture expanding national market*
Ghana	4. Palm Oil	Artisanal processing. Helping women processors improve quality of crude palm oil (CPO) and access domestic and export markets for quality CPO
	5. Cocoa	Formation of prices that farmers receive for their cocoa beans
	6. Food Security	Marketing of small ruminants in Northern Ghana*
Mali	7. Shea Nut/Karité	Improving the inclusiveness of women's cooperatives involved in buying and refining Shea butter
	8. Crop/Livestock integration	Conflict resolution; breakdown of discipline following devolution of the <i>Office du Niger</i> **
	9. Water management	Maintenance of tertiary canals by Water Users' Groups; breakdown of discipline after devolution of the <i>Office du Niger</i> **.
* For various reasons, this domain could not be used to assess the influence of Innovation Platforms on institutional change.		
** A large irrigation scheme in Mali		

The question can be raised why the entry points mentioned in Table 1 can be called 'institutional'. I take the oil palm domain in Benin as an example. For farmers, the hybrid *Tenera* oil palm has real advantages: it bears fruit early and is much more productive in that its oil bearing fruit flesh is much thicker than in traditional varieties. Small farmers increasingly started planting the hybrids, leading to rapid diffusion and accelerated demand for seedlings. This demand was not met by official sources and soon the system for supplying seedlings was corrupted, aided by the fact that it is visually impossible to distinguish hybrid seedlings from those of traditional varieties or from sterile offspring of hybrids. The CoS-SIS PhD student had established that the younger the plantation, the higher the percentage of non-hybrid planting material that the farmer had used. Thus the system for distributing seedlings was increasingly becoming corrupted as unofficial nurseries, often in cahoots with corrupt extension workers, jumped into the opportunity that had opened up. There is no technical solution to this problem. It requires institutional mechanisms, such as regulation, certification, inspection, licensing and training.

Bold et al., (2015) describe similar outcomes for hybrid maize seed and chemical inputs in Uganda: urea fertilisers contain 33% less nitrogen than what is on the label, and 'hybrid maize

seed' contains only 50% genuine hybrids. The authors conclude that, with this quality of inputs, it is entirely rational for farmers not to adopt HYV technology.

CoS-SIS was a partnership of the Université d'Abomey Calavi in Cotonou, Benin, the University of Ghana in Legon, Accra and the Institut Polytechnique Rural de Formation et de Recherche Appliquée (IPR/IFRA) at Katibougou in Mali, and in The Netherlands, Wageningen University (WU) and the Royal Tropical Institute, Amsterdam. In each domain, the Programme installed a PhD student, who was supervised by a team composed of natural and social scientists. The PhD students played a special role: although their doctoral trajectories were between them and their academic supervisors, two of their dissertation chapters served the Programme as a whole: a diagnostic study of the constraints and opportunities of smallholders in the domain (Jiggins et al., 2012) and an assessment of institutional change in the domain (Struik & Klerkx, 2014). The annual meeting of all PhD supervisors played an important role in deciding the course of the whole Programme.

In each domain, a post-doctoral Research Associate (RA) was appointed with three tasks: (a) to carry out a scoping study of the domain to identify suitable entry points for programme intervention (synthesised in Adjei-Nsiah et al., 2013); (b) to facilitate the Innovation Platforms (IPs) of which more below (see Nederlof & Pyburn, 2012 for their facilitation); and (c) systematically to track main events concerning the IPs so as to be able to link institutional effects (if any) to the interventions of the IPs. This third task was supervised by a team of social scientists from the four countries, the RA Support Team or RAST which, from early 2012 to early 2014, met three times a year at a workshop attended by all RAs. The third task was crucial for testing the hypothesis of the second phase of the programme. The results are published as Jiggins & Jamin (2016 in press) and are the basis for the conclusions reached in the present paper. A comparative overview of the empirical outcomes of the programme has been published in Houkonnou et al. (2016 in press).

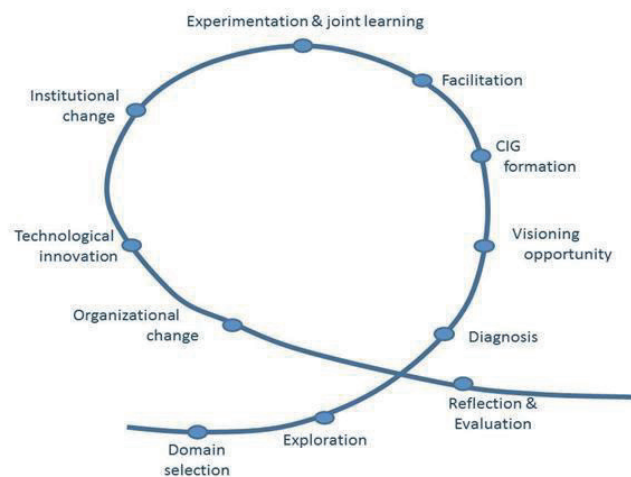


Figure 1. The CoS-SIS process (Source: CoS-SIS, 2013)

Figure 1 presents the (idealised) process of the CoS-SIS Programme. Domain selection, exploration, diagnostic studies, visioning and agreeing on entry points for intervention took a

year after the appointment of PhD students and RAs, setting up Programme Management Teams (PMTs) in each country, etc. The key vehicle for affecting institutional change was an innovation platform (IP), a group of key stakeholders in the domain (called Concertation and Innovation Group (CIG) in Figure 1), convened on the basis of an actor analysis in each domain. IPs became quite independent in their decision-making. Even when at first convened at the municipality, commune or district level, in most cases they eventually incorporated key actors from the national level, including banks, government authorities, research institutes and parastatals. In the initial budget of the Programme, considerable outlays had been allocated to each IP to finance experimental interventions (in addition to operational costs for meetings, travel, board and lodging, facilitation, etc.). As it turned out, none of the IPs used these experimental funds and the Programme used them for mounting the research capacity represented by the RAST and its workshops with RAs and National Coordinators, without which the *comparative* conclusions about institutional change would have been impossible.

In all, the CoS-SIS focused on creating space for farm innovation in specific agricultural domains. Its main hypothesis was that the institutional context is the key bottleneck in creating opportunity and enabling conditions. Specifically, the Programme tested the idea that innovation platforms (IPs), informed by careful scoping and diagnostic studies, can lead to institutional change. As such it experimented with a quite radical departure from the normal focus of extension interventions in that it deliberately focused on institutional entry points that emerged from scoping and diagnosis (Table 2). Platform initiatives that represented conventional extension activities, such as introducing parboiling of rice, were discouraged. It is this deliberate focus on institutional change that makes the Programme interesting for extension studies.

Table 2. Comparison of Innovation Platforms that promote adoption of High Yielding Varieties (HYVs) and those convened by CoS-SIS (Hounkonnou et al., 2016 (in press)).

	IPs that promote adoption of HYVs	CoS-SIS IPs promoting institutional change
<i>Entry point</i>	Preconceived: adoption of science-based technologies	Semi-open: depends on scoping, diagnostic studies and system analysis but focus on institutional context
<i>Actors</i>	Pre-determined: scientists, input suppliers, credit and marketing organisations create conditions to make adoption possible	Open: depends on scoping, actor analysis, strategic selection of champion stakeholders in domain, and entry point
<i>Subsidy element</i>	(Usually) free package of seeds, subsidised fertiliser, facilitated access to credit and markets	Investment in exploratory research, convening and facilitating of IPs and interaction on IPs, but no development funding
<i>Target unit of change</i>	(Selected) farmers in selected rural communities	Agricultural domain as unit of concerted action

<i>Criterion variables</i>	Farm-level adoption, yields, and incomes	Domain-level changes in laws, rules, norms, governance, organisation, power that enable farm innovation
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The study had a comparative case study design across the nine independent domains. In two domains, the Programme failed to establish an IP. In one, the agency employing the intended RA did not assign him part-time to the Programme and later transferred him out of the area; in the other the PhD student started a year late so that the diagnostic study was not available for entry point selection and specification. For each of the seven remaining domains, its RA over two years regularly recorded the events relating to IP activity and process. These were presented, compared and compiled in regular workshops of all RAs with the RAST. The outcomes of the event recordings were assessed against two declared alternative theoretical explanations: (a) the events can be explained by use of power by some individual or group; and (b) the events can be explained by the intervention of the IP. Jiggins et al. (in press) explains this Theory-Guided Process Tracing (TGPT) in detail.

Results

The results are presented as short vignettes, which describe the context and main outcomes for each domain, as well as the transformations that the IPs wrought during their two years of operation. Programme funding stopped at the end of 2014 and some of the IPs no longer meet. Information on impact on productivity or farm incomes, or on persistence of effects beyond 2014 is not available.

Oil Palm Benin. The entry point has been described above: the seed system had become corrupted, frustrating the country's aim to revitalise the industry. As a result of the CoS-SIS programme, the following occurred: two IPs were formed at the Commune level. They trained five new nurserymen and ensured a limited number of hybrid seedlings for them. Some took out loans to buy more. Through the work of the IPs, but also because of the involvement of *Centre de Recherche de Plantes Pérenness* (CRA-PP), micro-finance organisations and members of the PMT, nation-wide attention was drawn to the problem. CRA-PP was made responsible for supplying hybrid seeds to official nurseries and for annually inspecting and certifying them. Seed system integrity was incorporated into the 5-year agricultural plan.

Cotton Benin. Structural adjustment led to devolution of the parastatal organising annual cotton campaigns to an 'Interprofession' composed of farmers, pesticide and fertiliser providers, ginners, transporters, supervised credit providers and researchers. It became monopolised by a businessman who acquired control of pesticide supply, transport and most ginneries. He refused to sell ingredients for an officially propagated integrated pest management approach, which were cheaper and less toxic than conventional pesticides.

The PhD student, who established this in his experiments with farmers, started testing alternative methods, focusing on Neem oil, which is readily available in the production zone. Meanwhile, the businessman fell out with the authorities, had to flee the country, stopped pesticide delivery and cotton transport, and left the industry in chaos.

A district-level IP was started with empowered experimental farmers, district authorities and researchers, which focused on by-passing the official system by training women's groups in

producing Neem oil, helping a local entrepreneur to distribute it and working with national research to (a) get Neem officially recognised for cotton, and (b) test and release a variety preferred by farmers.

Palm Oil Ghana. The RA had established that artisanal women's groups processed the bulk of the palm fruits produced in the country but could not access remunerative markets because of the low quality of their oil. Experimenting with local women and millers, the PhD student proved that artisanal processors could produce good quality oil by manipulating fruit storage times.

An IP, initially at the District level, soon incorporated representatives from the Quality Control Board, Export Promotion Authority and Research Institute. The IP prioritised termination of the use of discarded lorry tyres as fuel for boiling nuts. Apart from poisoning the processors, the fumes also affected the quality of oil. The IP's lobbying of the District Assembly and the Chiefs led to a ban on using tyres. The processors' representative in the IP had established that pressed cake, a waste product, was an excellent alternative fuel. The IP is promoting contracts between artisanal processors and exporters. Meanwhile, the Ministry started forming processors into cooperatives that could access government funds for improved processing equipment. The experience drew the attention of Government and the Research Institute to the potential of artisanal processing, where policy had earlier favoured large-scale factories.

Cocoa, Ghana. Cocoa is a major export crop. Farmers used to be paid as little as 30% of the Free On Board price. This led to decreasing production and smuggling to Ivory Coast. Under pressure from international financial institutions, the percentage was increased to 70%, doubling national production. Farmers receive the fixed price, whatever the quality of their beans. The PhD student examined these relationships between price formation and smallholder response. The IP, convened from among stakeholders at the national level, started with a 'member sourcing' examination of the price formation process. It was not transparent. It was not based on actual costs. The time of announcing the producer price did not fit farmers' production decisions. A public programme of mass spraying paid out of deductions from the farmer price was not transparent and effective. Members of the IP subsequently influenced government decisions to pay farmers higher prices, to announce them at a different time, and to publish in local newspapers the exact amounts of pesticides and fertilisers that were to be delivered to a District. Mass spraying is on its way out.

Shea Butter, Mali. Shea butter, or Karité, is produced from the nuts of a tree that covers vast swathes of the Sahel as a result of selective weeding. It is the main source of cooking oil and cosmetics and a major cash crop. The nuts are collected and processed by women. Their butter is sold to itinerant merchants, and increasingly to cooperatives, for refinement and export. The PhD student analysed one cooperative and concluded that foreign support had led to inequity in terms of access to the benefits of the cooperative. The IP initially was composed of the management of the Coop, a representative of the Ministry of Women's Affairs and the RA. The IP helped the Coop to access official credit, so far unheard of for local women's groups. It allowed the Coop to buy a lorry and take institutional measures, which greatly expanded access of local women to the lucrative markets for the Coop's products. As a result, the IP took on more official members and assisted eight other cooperatives to access credit, and shifted the focus from exclusive exports to satisfying national demand for improved Shea butter.

Crop/Livestock integration, Office du Niger (ON), Mali. Climate change is forcing pastoralists to move south into arable farming areas. The ON, officially dedicated to rice production, is affected: many plot-holders own flocks of cattle, which graze outside the scheme during cropping, and keep dairy cows. Structural adjustment enforced devolution. Rice is now commercially marketed but scheme discipline broke down, leading to conflict, (official) court cases and (local court) litigation that paralysed tenant communities. An IP was started with two objectives: to explore the feasibility of stall-feeding and fodder production instead of rice, and to reduce conflict. Experiments with farmers proved stall-feeding to be attractive. The IP invested in meetings to explain in local language the provisions of the 'Contrat Plan', the official agreement between plot holders and ON management, to the tenants and herders. The meetings brought to light required adjustments of the Plan. Agreement on common rules reached in these meetings, and their publication in the local language on billboards in the communities led to an end of court cases and a vast reduction of litigation. The results led to ON-wide demand for the same approach to be used in other 'Cercles'.

Mali, tertiary canal maintenance. The devolution of the ON also led to breakdown of tertiary canal cleaning by farmers. The water user groups became dysfunctional, absentee plot holders did not contribute, and general resentment of the neglect of secondary canals by ON management and the high fees demanded for it added to the implosion of irrigation, already weakened by continued plot fragmentation. The IP initiated a tertiary canal cleaning demonstration. It promoted understanding of the rules in the 'Contrat Plan' dealing with responsibilities of respectively water users and ON management. It renegotiated the fees plot holders had to pay the Scheme, and stimulated revival of the associations.

Conclusion. Across a wide variety of contexts and issues, the seven independent cases show remarkable institutional change in support of smallholder entrepreneurship that seems entirely attributable to the IPs. Some of the changes seem irreversible; irrevocable processes have been set in motion. The main instrument for intervention was a platform for concerted action among key stakeholders in the domain with an entry-point based on scoping and diagnosis.

Implications for extension studies

*Institutions matter*². The overriding implication is the need to recognise the importance of institutional, as separate from on-farm technological innovation. While thousands of agricultural scientists the world over promote technological change, institutional innovation has few champions apart from institutional economists. Yet farming everywhere is embedded in dense networks of institutions, which can be enabling or inimical to farmer entrepreneurship. Industrial countries have developed such networks to support the ever-smaller number of farmers to compete with each other on the treadmill of technology adoption and increasing economies of scale ('the race to the bottom') and are now struggling to develop institutions that support ecologically 'sustainable intensification'. In WA, equally dense networks of institutions exist that are usually designed to cream off the wealth that farmers generate, be it through parastatals, police roadblocks, corrupt politicians, profiteering in the absence of farmer countervailing power, policies that favour transfer of rural wealth to urban and industrial development, or other mechanisms (e.g. Blundo & Olivier de Sardan, 2006). They all stifle entrepreneurship and impede the realisation of the tremendous productive potential of WA

² This was the title of the Medium-Term Plan published by The International Service for National Agricultural Research (ISNAR 2000) shortly before CGIAR's decision to abolish ISNAR as an independent institute. It is now part of IFPRI. This publication is another example of the persistence of the dominant paradigm for agricultural development.

agriculture. The exploitative networks are short-sighted in that all stakeholders, including urban consumers, would be much better off if the institutions enabled farm innovation. The experience of CoS-SIS suggests that, in the current phase of WA agricultural development, institutional innovation is essential, much as it was in industrial countries prior to the phenomenal rise of productivity enabled by it.

Institutions are difficult to talk about and many people find it hard to 'see' them. We tend to think of traits of the collective as aggregations of individual traits. As a consequence we are blind and inarticulate when it comes to traits of collectivities that affect the behaviour of individuals. The CoS-SIS experience is that WA agricultural professionals, usually born on smallholder farms, do not have that problem; every day they are involved or implicated in institutional dynamics that are inimical to farmers' interests. Yet this understanding tends to remain within the realm of informal discussion and separate from their professional behaviour. In CoS-SIS we found that a two-day training in value chain management can surface this understanding and bring to life the institutional dimension. For example, such training emphasises the need to create synergy among key complementary actors, their commonality of interest, the vulnerability to rogue or corrupt actors, and the notion of emergent properties that emerges when things gel. Of course, institutions embrace much more than value chains, but they are a good start.

Domains. A key condition for institutional innovation is the focus on agricultural domains, such as specific industries, cropping systems, value chains, water catchments or other entities that (potentially) have stakeholders interested in their development (Röling, 2014). Such intervention domains are, therefore, very different from 'recommendation domains', categories of potential adopters who are similar in that a given technology can be assumed relevant for them. A domain has given (i.e. not natural or 'hard') boundaries, which might change as one begins to understand it. It has a diversity of actors, not only along the value chain but also in policy making, regulatory, juridical, educational, consumer and other positions. One important function of scoping a domain is to map the key stakeholders, and among those the ones that can be considered potential champions and the ones that can be considered 'wreckers'. In the case of domains for institutional innovation, stakeholders not only include primary producers, but all actors whose positive or negative contribution can make a difference. These actors change as the intervention progresses. Diversity of stakeholders is essential for building synergy, self-organisation and concerted action, but can lead to conflict. Institutional change always has a 'political' dimension involving such issues as access and allocation. Interactive processes might lead to rule of law, transparency and a voice for smallholders, but can also lead to consolidation of exploitative situations.

Scoping and diagnostics. Most WA agricultural development programmes, including many that deploy IPs, assume that the restraining factor is technology and focus on inputs, credit and markets to make its adoption possible. CoS-SIS found that consultants engaged to carry out exploratory studies of such domains as cocoa or cotton regurgitate 30-year old issues. In WA very little current information exists on the state of agriculture. Farmers have no voice or political clout. In such a vacuum of information on which to base interventions, it is essential to invest in broad (i.e. agronomic, economic, sociological) scoping studies of domains, in diagnosis of specific issues from the perspective of specific categories of smallholders, such as artisanal palm oil processors, and in analysis of actor networks. Such studies throw up entry points that replace pre-conceived problem identifications based on myths, private or professional interests, or selective perception. The field of extension studies needs to embrace

practical methods for domain scoping, diagnosis and network analysis that go beyond Participatory Rapid Appraisal (PRA), or rich pictures created by stakeholders.

Innovation Platforms. The main instrument for institutional change is the IP. It brings together key domain actors for interaction, negotiation and concerted action. This is very different from the conventional focus of extension on individual or organised primary producers or processors. It is also much broader than the value chain approach. Instead of following pre-conceived entry points, IPs that effectively foment institutional change make their own decisions based on information provided by scoping, diagnostic, or their own studies. In CoS-SIS' experience, guidance is required to prevent IPs from taking 'the easy way out' by choosing some technical issue to increase yields/ha, instead of focusing on domain governance. IPs involve actors from different levels. In this respect, CoS-SIS has used the distinction between niche, regime and landscape (Geels, 2005). IPs are niches in which experimentation is possible. Regimes are more stable institutional conditions, while landscapes provide the rather unchangeable context provided by climate, world markets, national politics, etc. A key issue is to ensure that niche experimentation affects institutional regimes. In CoS-SIS, even when experimentation started at a local level, it proved necessary to incorporate or create linkages with regime actors who could take issues to national forums. It is clear that IP facilitators need a good understanding of domain networks based on actor analysis.

Facilitation. The extension workers who can facilitate IPs are quite different from 'front line' staff who have been trained in some agronomic specialism to demonstrate technologies for increasing productivity/ha on individual farms. IP facilitators must be strategic operators whose criteria for success include evidence of learning, enthusiasm, synergy, empowerment, self-organisation, initiative and concertation. Facilitation is a process of identifying, convening, and guiding groups towards negotiated agreement, synergy and concerted action, through providing networks analysis, information, social learning, monitoring and evaluation, etc. The experience of CoS-SIS was that post-doc researchers, officials and lecturers in national organisations, usually with an agronomic background, with guidance and training were perfectly able to facilitate IPs in promoting institutional change.

Establishment. An extension service with a capacity to facilitate such IPs would need to establish a cadre of trained staff who could be deployed from time to time to operate special projects or programmes of institutional change. Budgets would need to allow investment in scoping, diagnosis and network analysis in collaboration with national universities and research institutes, effectively using requirements that students and researchers engage in field research as part of their training and career planning. Open-ended investment in interaction without pre-conceived technical goals would be a necessary condition for effectively fostering institutional change. An advantage of institutional change, e.g. a tenure law, is that it is fairly irreversible and affects all those concerned in one fell swoop, i.e. without having to inform, educate, convince, or train each individual agricultural enterprise.

Conclusions

WA's farmers have been the recipients of a deluge of well-meant but ill-conceived development interventions based on the experience of industrial countries after the take-off of the incredible growth of their farm productivity just before or after World War 2, and codified in such iconic studies as Evenson et al. (1979) on the high internal rates of return on investment in agricultural science in the US. As a result, the inimical institutional contexts in

which African smallholder farming has been embedded since colonial times have been ignored (e.g. Clark, 2002). For example, CoS-SIS researchers found that the deregulation, devolution, and privatisation that were imposed by Structural Adjustment programmes in the 1990s have strongly affected institutional contexts for farm development in the cases of the governance of the cotton industry in Benin, access to veterinary services in Northern Ghana and the discipline in irrigation schemes in Mali. Twenty years later, private enterprise had not stepped in to replace the services and supports and the public sector had not developed new roles.

In WA a host of enlightened individuals and organisations seems ready for radical change and is beginning to develop African responses to agricultural stagnation. For example, as a result of participating in CoS-SIS, three Ghanaian agricultural research institutes decided to adopt the programme's approach to improve their science impact. Universities in Benin and Ghana developed MSc/PhD course curricula for training professionals in the approach. CORAF/WE CARD, the WA regional agricultural research organisation, adopted the approach as the basis for its second Strategic Plan.

The bad news is that institutional change continues to remain a blind spot. Changing this would be the task of a science of agricultural research and extension (R&E) that learns from the poor impact of R&E on the productivity of smallholder agriculture. Yet it is that every R&E, on the one hand has an interest in promoting cutting edge (natural) science as the driver of farm development, and on the other, in most countries, is also expected to take the initiative and give direction to farm innovation. It is this (institutional) context that explains the persistence of more-of-the-same and failure to learn from feedback.

But there is also good news. The recognition of the poor track record of the current approach is affecting where it hurts most, R&E funding. The focus of conventional agricultural economics on methodological individualism, internal rates of return on investment in R&E, and on technology development as the engine of development has been challenged by institutional economics ever since North (1990). The increasing tendency to see agriculture as part of a food system forces rethinking of narrow productivist perspectives in favour of wider concerns with food security and sovereignty and food safety (e.g. Tansey & Worsley, 2008). There is increasing attention to the counter-strategies of small farmers to create styles and livelihood niches, irrespective of the dominant market forces that neoliberal policies and the food industry have put in place (e.g. Van der Ploeg, 2012, Hazareesingh & Maat, 2016). Finally, in many fields of agricultural science, such as plant protection, plant breeding and animal health, impact is so closely interwoven with institutional issues that they cannot be ignored by the discipline itself. For example, the conventions governing breeders' rights and access to genetic diversity, as well as the methodologies governing participatory plant breeding, have been legitimate subjects for research.

The field of Extension Studies has a key role in a much-needed transformation towards recognition of the key role of institutional reform in agricultural development, not only in WA but also in industrial countries that are struggling to put in place a post-productivist agriculture. This transformation means engaging with the fundamental mechanisms of agricultural innovation beyond technology. Once that engagement is there, a whole set of consequences will emerge for institutional innovation within extension itself. Of course, the author has no expectation whatsoever that this piece will affect the dominant paradigm that determines thinking about R&E.

Matters arising

- Is institutional the same as systemic?
- How can innovation system thinking incorporate institutions?
- What are the entry points for institutional innovation of R&E and what IPs would it require?

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Evaluating public participation by the use of Danish water councils - prospects for future public participation processes

Graversgaard, M., Thorsøe, M.H., Kjeldsen, C. and Dalgaard, T.

Department of Agroecology. Aarhus University, Denmark

Abstract: With the introduction of the Water Framework Directive (WFD) in 2000, a significant shift in the European water planning tradition occurred. Public participation became a key part of the WFD as an important element in improving regional water planning, strengthening the local involvement and increasing public support for the implementation of the Programme of Measures (PoM). To fulfill article 14 of integrating public participation in the WFD planning process, a paradigm shift happened in Danish water planning in 2014. Water councils in all 23 River Basin Districts were established to provide input on how to improve the physical conditions in Danish streams. The water councils were to advise the local municipalities on developing PoM as part of the implementation of River Basin Management Plans (RBMPs) in Denmark. The results indicate that Denmark complied with requirements for making important background information available to the public and ensuring public consultation of the second cycle of RBMPs. However, article 14, stating that member states should encourage active involvement, has only been complied at a very basic level and the public participation process has not been institutionalised and anchored in the policy process. The water councils are presented as the “new option governance” in Danish water planning; however, the water council process was limited and controlled by the competent authority, the Nature Agency. Thereby the water council process can only be characterised as an expanded stakeholder consultation part of the policy process and only touching very little upon active involvement, with future consequences for public participation in Denmark.

Keywords: Public participation, water council, water planning, governance

Introduction

For centuries, the physical conditions in watercourses have been affected by urbanisation, agricultural intensification and intensive drainage activities with straightened and regulated streams in poor ecological condition as a result (Brookes, 1987; Iversen et al., 1993; Aarts et al., 2004). In Denmark, numerous stream restoration projects to improve the physical conditions have been initiated (Pedersen et al., 2007). With the introduction of the Water Framework Directive (WFD) in 2000, public participation has become a key part of the WFD. This new water management regime has resulted in a higher need and encouragement for voluntary actions, where engagement of the public is recognised as a necessary policy instrument in reaching the environmental objectives of achieving good ecological status in waters and increasing public support for implementation of the Programme of Measures (PoM) (European Commission, 2003).

It is also recognised in the Danish policy context that further improvement of the ecological conditions in our streams and rivers call for a wide array of targeted policy instruments, effective mitigation and restoration actions, and innovative solutions that involve the affected

stakeholders are required (Natur og Landbrugskommissionen, 2013). However, such innovative solutions to complex “wicked” system problems are challenged by complexity and multi-stakeholder interdependencies, and require participation, multi-actor collaborations and new interactive governance networks and processes (Rittel & Webber, 1973; Folke et al., 2005; Hofstad & Torfing, 2015). Since the implementation of the WFD there have been a number of studies and evaluations of public participation and collaborative processes in Europe. Most of these evaluation studies have concluded that the implementation and level of public participation varies across the EU Member States (Hering et al., 2010; Nielsen et al., 2013). Evaluation studies of the implementation of the first generation of Danish RBMPs (2009-2015) (see Petersen et al., 2009; Uitenboogaart et al., 2009; Wright & Jacobsen, 2010; Wright & Jacobsen, 2011; Liefferlink et al., 2011; Bourblanc et al., 2013; Nielsen et al., 2013), conclude that there has been a very low level of public participation in the Danish implementation of the first RBMPs. The level of public participation was characterised by very little or no involvement of the public and local authorities. The first plans were made at central government level with a typical “top-down” approach.

The planning phase of the second cycle of RBMPs (2015-2021) has just finished in Denmark, and the Danish government has initiated a new experiment with the formation of water councils. Before water councils can be used as a new governance option, evaluations of the policy design, process and outcome is needed. In this study, we investigate water councils as a form of public participation, with a focus on institutional forms of governance, process outcome and prospects for future public participation frameworks. Specifically we assess the extent to which Denmark have complied with Article 14 about actively involving the public (European Commission, 2003).

Theoretical framework for evaluation of participatory processes in water management

In evaluation studies of participation in water management and sustainability, there are different ways and types of evaluating (process, intermediary, output and outcome evaluations) (Conley & Moote, 2003; Carr et al., 2012). In another study the output and cost-effectiveness of the Danish water council work have been evaluated, compared and analysed (see: Graversgaard et al., submitted), showing that the use of water councils have been cost-effective. Because the time horizon is too short to make any real environmental and intermediary outcome evaluations, we will in this paper specifically focus on the policy process and related process evaluations from the water council work.

Evaluation criteria

Evaluation of participation means comparing reality to a set of criteria (Conley & Moote, 2003). In this public participation evaluation, we have made a list of criteria and related indicators (see Table 1) for developing successful collaborative processes, including those process that are able to integrate multiple stakeholders’ interest and knowledge, build trust and legitimacy and develop mutually acceptable solutions. The criteria and design of the evaluation framework for this research are illustrated in Table 1.

Table 1. Framework for the process evaluation of participatory processes. Describing evaluative criteria, related indicators, success measures and methods.

Criteria	Indicators*	Success measures	Methods
1. Policy design and institutional arrangements	- To what extent has Denmark complied with Article 14 and under which Institutional form of interactive governance	Active involvement; Collaborative governance	Surveys, interviews, observations and document analysis
2. Collaboration	- Process outcome - Representativeness	Satisfaction; Equity	
3. Prospects	- Adaptability and institutional compatibility	Increase input and output legitimacy; Lessons to be learned	

*Sources: Hanley et al., 1997; Conley & Moote, 2003; Sabatier et al., 2005; Leach et al., 2005; Koontz & Thomas, 2006; Benson et al., 2014; Hofstad & Torfings, 2015.

Based on a review of evaluation studies and theoretical frameworks for evaluating policies and governance networks in environmental public policy research, we have suggested a set of 3 criteria with 4 key indicators for evaluating the process outcome of public policies in environmental management (Table 1.). In this conference paper, only the first criteria and indicator is analysed and presented to evaluate the requirements in article 14.

Policy design and institutional arrangements

In the policy design and institutional arrangements analysis, the typology developed by Hofstad & Torfing (2015) of different forms of interactive governance is used to frame, analyse and identify the predominant institutional form of interactive governance in the Danish implementation of the second RBMPs as part of implementing the WFD. Specifically, in Hofstad & Torfing (2015) three different institutional forms of interactive governance are presented: stakeholder consultation; relational contracting; and collaborative networking (Hofstad & Torfing, 2015). Collaborative networking is the highest form of involvement and in this paper equivalent with active involvement. In the guidance document, describing the new water council act and framework for the water councils, it was stated that: water councils will strengthen local involvement in water planning; have a greater local presence and greater local ownership than under the previous legislation; and that water councils will ensure less bureaucracy and greater local involvement in achieving good ecological status in all the targeted streams (Nature Agency, 2014). In the analysis, we investigate the integrative mechanisms, the form of governance and the institutional design, that the Danish government

(via the use of water councils) have delivered regarding public participation in relation to the requirements from the WFD article 14.

Evaluating public participation – active involvement

In article 14 and the related guidance document no. 8 (European Commission, 2003) three different types of involvement of stakeholders are mentioned:

- Information supply, where people participate by being informed what has been decided or has already happened (shall be ensured);
- Consultation, where administrative bodies consult stakeholders to learn from their knowledge, perceptions, experiences and ideas (shall be ensured);
- Active involvement (shall be encouraged).

Article 14 states that all member states should encourage the active involvement of the public in the production, review and updating of RBMPs (European Commission, 2003). The view taken in the WFD is that encouraging a high level of participation in the development and implementation of plans should be considered the core requirement for active involvement (European Commission, 2003). Although the latter form of participation is not specifically required by the Directive, it may often be considered as best practice. However, it can be debated what is meant by active involvement and when is a stakeholder actively involved? In Bishop & Davis (2002) active involvement is described as when partnerships are developed in planning and implementation; where stakeholders are invited as part of the process to give their perception of the problem or vision and possible solutions. This seems more of an expanded consultation form. In Shand & Arnberg (1996) the highest level of public participation is where the responsible authorities actively involve stakeholders in the decision-making process in 'self-determination' of water related issues (Shand & Arnberg, 1996). Self-determination implies that at least parts of water management are handed over to the interested parties. In article 14 it has not been stated if active involvement means delegation and shared decision making, where the administrative bodies share responsibility with the stakeholders, or if active involvement means partnerships with perception sharing of the problem or vision and possible solutions?

Data and Methodology

This research builds on a larger study of stakeholder involvement in Denmark, using mixed methods by combining quantitative and qualitative data gathering, which includes document analysis, observation studies, face-to-face semi-structured interviews and two online national surveys. In this initial conference paper, the main data and methods used were document analysis of all 23 submitted water council proposals of the PoMs as well as the 23 RBD draft RBMPs (2015–2021). All official documents from the water council process have been analysed and supplemented with interviews with water council members and public administrators.

The background for the case study is that in 2013 the WFD competent authority (Nature Agency) put forward a new Act on water planning (*Lov om vandplanlægning*) (FT nr. 1606 26/12/2013). In this new act, it was prescribed that 23 new water councils (*Vandråd*) should be established, one in each River Basin District (RBD). In 2014, 23 water councils were established to undertake public participation. The water councils could only consist of a

maximum of 20 members from different interest groups (organisations): agricultural organisations, nature and environmental organisations, water quality and utility service organisations and recreational organisations. No private persons could attend the water councils. The water councils were to advise the local authorities (municipalities) on the preparation of PoMs for the hydromorphological conditions in the Danish watercourses. The main task of the water councils was in advance delimited to giving guidelines and counselling the municipalities on which of 16 hydromorphological measures to use in the streams and where to place them in an overall level (Nature Agency, 2014). Together with the municipalities, the councils had six months (April 7- October 7, 2014) to come up with a thorough PoM for the watercourses at stake and provide input to the PoMs. After the six months, the municipalities forwarded the revised input to the Nature Agency as part of preparing for the second cycle of RBMPs.

Results and Discussion

Evaluating public participation – information and consultation

The institutional arrangements of the second RBMP planning process were split into different platforms and stages. The Nature Agency prepared and made a draft working programme (*arbejdsprogram for vandområdeplanerne*) for the implementation and involvement of the public in the second RBMPs (2015-2021) available on an established webpage. The draft working programme was in a six month public consultation. Twelve responses were made to the working programme. The Nature Agency used websites in order to provide more general planning- relevant information to the wider public. For example, main planning documents representing the different stages of the planning process were made public online. This source included background information on the WFD and regional facts about the planning process. More detailed technical data on the status of various water bodies and risks to water quality was made available in:

- i) a 'baseline analysis' document (*Basisanalysen*);
- ii) an 'economic analysis of water use in the baseline' (Vogdrup-Schmidt & Jacobsen, 2014) (*Økonomisk analyse af vand anvendelsen*); and
- iii) the 'overview of significant water management tasks' for every RBD and nationwide (*Væsentlige vandforvaltningsmæssige opgaver*).

The documents were also in public consultation for six months in 2014. A WebGIS interface (*MiljøGIS-kort*) of the baseline analysis and the draft RBMP were made available for the public at the before mentioned webpage. Finally, the draft RBMP was made public. Furthermore, the Nature Agency made additional material available on the webpage, for example a water-area planning library with key documents and agreements. The Nature Agency could have prepared more information about the process, made accessible via for example public libraries or other institutions. Moreover, the Nature Agency could have used more effort to inform the public through local and regional media such as newspapers, newsletters, magazines, TV and radio. Much of the information available was only directed to the various organised stakeholders (interest groups) and not to the wider public. Thus, the Nature Agency seemed to comply with the first two requirements in article 14 of the WFD: to provide information and organise public consultations on RBMPs.

The Nature Agency invited public comment on three RBMP related consultation documents: the 'working programme document'; a document concerning 'overview of significant water

management tasks'; and the draft RBMP. This form of governance in the initial stage of the RBMP2 process was purely a basic mode of hierarchical governance with only information supply and stakeholder consultation as the interactive governance form. In this institutional design, the Nature Agency holds the key responsibility with consultation from stakeholders in both the policy formulation and implementation phase. In summary, the institutional design and governance structure in the second RBMP has delivered information supply and consultation as required in the WFD. It is more unclear if active involvement of stakeholders has also been encouraged in the Danish water planning process.

Evaluating public participation – active involvement

The water councils were initiated as a way of fulfilling the encouragement requirements in article 14. In the new water council act, water councils should be part of the policy design of delivering PoMs for the ecological (physical) improvement of targeted streams. The announcement about water councils was presented and communicated via media and on the Nature Agency's webpage. The institutional arrangement and policy design for the water councils' work were however already fixed:

- A limited number of stakeholders could participate (up to 20 members in each council);
- There was a limited timeframe of six months (April 2014-October 2014);
- The water councils were given a specific economy for the work differentiated in each main RBD;
- The water councils were appointed specific measures, with 16 measures to be used in the streams to achieve the goal of good ecological status;
- The water councils could only consist of stakeholder organisations (interest groups), who had to apply for membership of the councils themselves.

The institutional design of the water council set-up was thus, as detailed above, specified and fixed around how and what the water councils were to deliver. The purpose and task of the water councils was to advise the municipalities in their work to develop PoMs' proposals for streams, as well as advise, based on local knowledge, on the measures to be used. However, there was no room for innovative solutions; the council members could only propose the use of 16 pre-determined measures. The integrative mechanisms and the legal and procedural framework are specified in detail, giving no room for self-regulated negotiation between stakeholders and collaborative networking and hereby limiting the potential for innovative collaboration. In collaborative approaches, the argument is to find win-win solutions to a variety of problems facing different stakeholders (Sabatier et al., 2005). The lesson from this planning phase of the second RBMP is that the Nature Agency could have used the momentum generated by many knowledgeable members who were gathered in the water councils, and were in possession of local knowledge which could have assisted with identifying interesting sections of water courses, where good holistic environmental initiatives could have been developed (Graversgaard et al., 2015). Especially when, in the next generation (2015-2027) of RBMPs, there is a requirement to integrate climate change concerns into the RBMPs (European Commission, 2009).

In delivering PoMs for the physical conditions in the streams, the local authorities (municipalities), in collaboration with the interest groups in water councils, were responsible for developing the POMs together. This in itself is a novelty in Danish water management and has secured cost-effective solutions (Graversgaard et al., submitted), however the Nature Agency did not have any plans for continuing the water councils after their six months of work,

and the initial plan was that they would gather again for the third generation of RBMPs (2021-2027) in 2018. This could potentially be problematic because there may be a relatively long time between the water council work taking place and the efforts being implemented. One can question if the water council members will, in a few years, still remember what they recommended in 2014, when no follow-up has taken place. However, if the members still are in support of their recommendations later on, then according to Sørensen & Torfing (2005) one of the benefits of collaborative networks is that stakeholders are less likely to resist implementation. As the water councils only had six months (April 7 2014 to October 7 2014), including the summer vacation period and allowing for political considerations and approval of PoM proposals in all 98 municipalities, this was a very short period in which to undertake such an enormous process with the engagement of multiple stakeholders.

In a review study of participation, it is argued that success with long-term participation depends on reorganisation and changes in government institutions (Reed, 2008), and another important part of this reorganisation is that participation is institutionalised. Experiences from Sweden, where water councils have existed since 2005, also indicate that the institutional setup of water councils is essential for successful participation (Franzén et al., 2015). With a limited timeframe and limited institutionalisation, reorganisation and changes in government institutions is minimal. The narrow frame for the water council policy design and institutional arrangements, even though it is 'sold' as a new active involvement implementation, replacing the old paradigm of top-down water planning, still can be considered a hierarchical governance form. However, in late 2015 the former Environmental and Food minister announced that water councils are to begin working on the implementation of the RBMP in 2016. If this happens, some changes to the institutional design of the water council process will have occurred.

If we look at the type of interactive governance, the water councils are characterised as an expanded stakeholder consultation part of the policy process which only touches to a very limited extent upon collaborative networking and active involvement, which thus is encouraged in the WFD. This is a problem in the long-term delivery of sustainability, mainly because stakeholder consultation, with a limited timeframe, fails to engage stakeholders in the design of novel solutions. This means there is a relatively low capacity for mutual learning, risk sharing and the development of joint ownership of co-created solutions, when the Nature Agency have already identified the solutions and only need stakeholders to consult on them. It seems that the main focus for the Nature Agency has been stakeholder interaction, with a focus on solving a specific task between typically conflicting interest groups. Successful collaborative networking can enhance the conditions and opportunities for future use of networks in the management of environmental and political challenges (Sørensen & Torfing, 2005). One recommendation is that the future of Danish water councils is formulated in a different type of constellation, where the involvement of those with local interest and knowledge is actively encouraged in an optimal way at both regional and local level, and with possibilities for synergies in the water, energy and food nexus.

Conclusion

The requirement to make important background information available for the public and ensuring public consultation of the plans has been complied with in the second RBMP period. The encouragement of active involvement has only been fulfilled at a very basic level. If we look at the interactive governance form, the water councils can be characterised as an expanded stakeholder consultation part of the policy process that only touch to a very limited

extent upon active involvement, which thus is encouraged in the WFD. The Danish water planning tradition has historically been centralised and coordinated from the central government (Nature Agency). With the introduction of water councils this could have been the start of a change from a hierarchical governance structure towards more collaborative networking in the policy process and governance form, if continued and institutionalised. However this research shows that the water councils' institutional design and arrangements fits very well into the Danish established model for regulation, which for decades has been top-steered and where the government in detail describes and regulates what the stakeholders can and cannot do. The water councils have been presented as the "new option governance" in Danish water planning; however, the water council process was limited and controlled by the Nature Agency. Recommendations suggest that future water councils represent a more nuanced and holistic approach to water planning where members together with policy-makers handle tasks where interaction with other agricultural, water and nature management issues are central. The institutional framework provides an incentive for participation. However, this alone is not sufficient for successful collaborations. Since the main goal of the water council work was to involve stakeholders, a full paper will investigate a detailed evaluation of the collaboration experiment with involvement of stakeholders; with process outcome and a representation evaluation analysis.

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Performing and orchestrating governance learning in practice

van Bommel, S.¹, Blackmore, C.² and de Vries, J.^{1,3}

¹ *Wageningen University, The Netherlands*

² *Open University, United Kingdom*

³ *Tilburg University, The Netherlands*

Abstract: “Nothing less than a systemic transformation of our societies, our economies and our world will suffice to solve the climate crisis and close the ever-increasing inequality gap.” That was the key message of a new document - “The People’s Test on Climate 2015” - endorsed by an unprecedented coalition of civil society organisations from around the world and sent to world leaders ahead of United Nations climate talks as well as ahead of the widely-anticipated UNFCCC’s ‘Conference of the Parties in Paris’ (COP21) at the end of 2015. It is also becoming increasingly recognised in academic literature that effective responses to complex environmental issues require such systemic transformations. But how can systemic transformation come about when institutions are deeply embedded in dominant norms and beliefs, seemingly naturalised and difficult or impossible to influence in particular locations? How can more respectful and less dominant alternatives be generated in such circumstances? How can new ways of organising and doing grow in influence to shape socio-technical change in water management and climate change adaptation? Little is known how this is actually done in practice. This paper contributes to this by analysing the enactment of governance learning for systemic transformation in practice and its intended and unintended consequences, drawing on examples of the international CADWAGO project; a three year project that aimed to address the global challenge of water security in the context of climate change by promoting systemic and adaptive transformations in water governance. To contribute to transformation of the European water governance context a series of governance learning events were organised that brought together CADWAGO researchers and European water governance practitioners. The case study demonstrates that governance learning does not merely serve as a neutral place in which reality is represented and actors learn about the state of affairs from each other during exchange of knowledge, but instead it serves as a place where a certain reality is created. Recognising this means reconceiving governance learning as performative practice. Such a perspective goes beyond overly optimistic views of governance learning as a technique whose application can be perfected, as well as pessimistic views that see this as repression or domination. Instead, it appreciates both intended and unintended forms of learning as meaningful and legitimate ways to bring about change, and recognises knowledge and reality as being constituted in interaction in the context of these co-creation processes.

Keywords: CADWAGO project, governance learning in practice, systemic transformation, European water governance, boundary work

Introduction

“Nothing less than a systemic transformation of our societies, our economies and our world will suffice to solve the climate crisis and close the ever-increasing inequality gap.”¹ That was the main message of “The People’s Test on Climate 2015”. This document was sent to world

¹ See <http://peoplestestonclimate.org/>

leaders before the 'Conference of the Parties' - or COP21 - in Paris as well as before the climate talks of the United Nations. Over recent years discourses on vulnerability, resilience and sustainability have begun to overlap around issues associated with climate change adaptation (Turner et al., 2010; Adger et al., 2009). A common thread exists in the way this is increasingly viewed as a governance learning process for systemic transformation that moves complex socio-ecological systems towards a sustainable trajectory. There is a growing acknowledgement that barriers to climate change adaptation may not lie so much in the "gaps" in the scientific or technical understandings, but rather on account of the complexities within the social, institutional and cultural changes in climate change governance (Ison et al., 2007; Godden et al., 2011).

It is also becoming increasingly recognised in academic literature that effective responses to complex environmental issues require learning for systemic governance transformation (Leeuwis, 2002; Pelling & High, 2005; Wals, 2007; Ison et al., 2007; Hounkonnou et al., 2012). Literature shows that limiting our ideas about these transformations to processes of adoption and diffusion of research findings is no longer useful. Numerous studies have shown that research findings are often not taken up by policy makers and practitioners, and that transformations are usually based on an integration of knowledge from multiple actors, including scientists. However, co-learning for systemic governance transformations still remains poorly understood. Little is known about how policy makers, practitioners and researchers together can learn their way out of anthropogenic issues such as climate change (Tschakert & Dietrich, 2010; Ison et al., 2011; Powell et al., 2014).

To address this issue, this paper analyses the performance and orchestration of governance learning for systemic transformation in practice, drawing on examples of the international CADWAGO project. The CADWAGO project was a three year project that aimed "to address the global challenge of water management in the context of climate change by promoting systemic and adaptive transformations in water governance"². One of the special characteristics of the CADWAGO project was its explicit engagement in co-learning by means of the design of a series of so called 'governance learning events'. This means that alongside the research, the research team invited practitioners and policy makers from the European water governance context to be joint "co-learners" throughout the various stages of the project.

Co-production of knowledge and boundary work at the science, policy and practice interface

In this paper we link up to the growing body of literature on the relationship between science, policy and practice. Traditionally, science, policy and practice are conceptualised as domains that are separate and disconnected. Science is conceptualised as a 'place of knowledge production' (Gibbons et al., 1994) in which value-free facts are produced. Policy on the other hand is seen as a 'place of knowledge use' and is supposed to use the facts that are produced by science in policy processes. In this 'knowledge utilisation model', knowledge is 'disseminated' from science to society. Communication is seen as the means to bridge the gap between these two domains (Bulkeley & Mol, 2003).

This linear model of knowledge production and use is questioned in science and technology studies (e.g. Funtowicz & Ravetz, 1993; Gibbons et al., 1994; Jasanoff & Wynne, 1998) as well as in interpretive policy analysis (e.g. Fischer, 1998; van Eeten, 1999; Hajer & Wagenaar,

² See <http://www.cadwago.net/>

2003). This literature argues that an increase in the complexity and uncertainty of scientific questions should likewise result in an increase in the democratisation of procedural rules as to how to do science. Thus, when complexity and uncertainty are low, science can proceed in a more orthodox manner. In the face of uncertain, complex questions (e.g. environmental risks), however, scientific ways of knowing break down as values and uncertainty require scientists to look beyond the facts to include other thoughts, observations and data - and therefore include practitioners and policy makers - in the production and use of knowledge. This co-production of knowledge model challenges the traditional conceptualization of science as a practice that produces facts to fill knowledge gaps. Instead, encounters between science, policy and practice are seen as social processes that involve dynamic co-construction processes of knowledge production and use.

Research shows that despite the fact that many co-production of knowledge processes are attempted, in practice many of these end up reproducing a linear conceptualisation of science with its strict separation of knowledge production and use (Maasen & Weingart, 2006; Turnhout et al., 2013). This resonates with studies on participatory approaches that show that participation often unintentionally results in the marginalisation of the very people it aims to empower (Cooke & Kothari, 2001; Aarts & Leeuwis, 2010; Turnhout et al., 2010). This results in a call (see Turnhout et al., 2013) for going beyond good intentions and ideals about co-learning and co-production of knowledge to how these work out in practice.

In this paper, we use the concept of boundary work to investigate how boundaries between science, policy and practice are negotiated in practice. Boundary work was originally introduced by Gieryn (1983) to describe the discursive practices in which boundaries between different kinds of knowledge are demarcated and/or co-ordinated. This draws the attention to boundaries as barriers. Gieryn's work (1983, 1995, 1999) shows that boundaries can separate and protect in three different ways, namely by means of 1) expulsion, 2) expansion and 3) protection of autonomy. However, more recent work (Guston, 2001; Metze, 2010; Quick & Feldman, 2014) shows that boundaries need not be barriers; they may also be junctures that join and connect. Their work shows boundaries can connect in three different ways, namely by means of 1) decentring differences, 2) translating across differences and by 3) aligning among differences. This shows that the barriers and junctures are not an intrinsic characteristic of boundaries but boundaries are enacted in practice when people take specific actions. In this article we therefore conceptualise boundary work as a dynamic site with the potential to separate as well as connect.

In this paper, we investigate specific boundary work practices that either create barriers that separate or junctures that connect. In line with Quick and Feldman (2014) we recognise that some of the practices we describe as boundary work are characterised elsewhere as negotiation, translation, demarcation, bridging, or coordination. These concepts indeed apply to many of the practices that we describe. However, conceptualising these practices as boundary work draws attention to the practices that determine whether and how to make boundaries into sites of separation where differences are established, or whether and how to make boundaries into sites of connection where junctures are established. This can help to get insight into how co-learning and co-production of knowledge processes work in practice.

Methods

Our analysis is based on materials from the CADWAGO governance learning events. The data were collected by means of participant observation by the authors who were all part of the CADWAGO team that designed and organised these events. During the events we divided our attention between facilitation and organisation, and observation and recording of reactions, questions and conversations of the co-learners (both researchers and practitioners). The latter observations were recorded by means of note taking and audio recording when possible. The field notes were divided into categories related to 'context', 'interpretations' and 'direct observations'. The field notes were compiled both in and out of 'the field' during the design and organisation of the events as well as during the reflections on the events afterwards. As such, the notes included in-situ observations as well as post-hoc interpretations of materials (documents, powerpoint slides, flipcharts) and conversations about the learning events (both from notes and from audio recordings).

Following the approach of hermeneutic interpretative analysis (Yanow & Schwartz-Shea, 2012, 2015), analysis of the content took place during the learning events, at night following each learning event and 'out of the field' in the weeks and months following the events as well as during the writing process. By reading and re-reading the material that was collected, patterns started to emerge. Particular attention was paid to boundaries and boundary work. Furthermore, due to the use of ethnographic methods, the researchers themselves served as primary tools of measurement, and so our own reactions to the learning events also served as an input to understanding the process. The analysis presented below is the result of this iterative process.

Background to the case

CADWAGO: *Climate change adaptation and water governance - reconciling food security, renewable energy and the provision of multiple ecosystem services* - is an international project that aimed to improve water governance by developing a more robust knowledge base and enhancing capacity to adapt to climate change (CADWAGO, 2013). It was a three year international project that brought together 10 partners from Sweden, the UK, Italy, the Netherlands, Australia and Canada. The project followed a call put out by a trio of European Foundations - including Compagnia di San Paolo from Italy, Volkswagen Stiftung from Germany and Riksbankens Jubileumsfond from Sweden - as part of a Europe and Global Challenges Programme. The project was designed initially to include a series of case studies from Europe, Australia and Canada and three work packages that focused on:

- Framing of ecological components of ecosystems (WP 1)
- Climate change adaptability in water governance institutions and organisations (WP 2)
- Systemic governance practices (WP 3)

When designing CADWAGO, engagement with practitioners was already recognised as an important element of the project. The original project document noted that "*The lessons from the cases, the evidence from the cross case synthesis and the facilitated policy learning is intended to answer CADWAGO's research questions.*" The process was 'framed' as 'policy learning'. It was envisioned as an iterative process consisting of three so-called 'Policy Analysis Workshops'. These events were envisioned to take place once a year with the first one planned in Sweden in 2013, the second one planned in the UK in 2014 and third one

planned in Italy in 2015. Policy learning was mostly conceptualised as a linear, transfer of knowledge process in which the participating practitioners would learn about the new insights from the CADWAGO project and would then implement these in the European governance context. The Policy Analysis Workshops were to coincide with existing events such as conferences or symposia. Claims were made to funders in the presentation of the bid that CADWAGO would hold 'large' policy learning events.

During the inception phase meeting of the CADWAGO project - which was held on 18th and 19th October 2012 in the sustainability Research Centre, University of the Sunshine Coast, Queensland, Australia - the idea of 'policy learning' was re-conceptualised and a fourth work package was created. It was recognised that a linear, transfer of knowledge process was inconsistent with the theories on learning and change used by the project in its other work packages. It was decided that 'we need to walk our talk'. First of all, in order to get away from linear connotation associated with 'policy learning' literature, 'policy learning' was re-framed as 'governance learning'. The process was then re-conceptualised as a two-way co-production of knowledge process that would provide an opportunity for CADWAGO to secure feedback on the design, purpose and results of the project from stakeholders working with change processes linked to water governance issues in Europe. It would also provide an opportunity for the stakeholders to learn from CADWAGO experiences and incorporate new insights into their practice. A fourth work package (WP 4) was desirable to work at a meta project level.

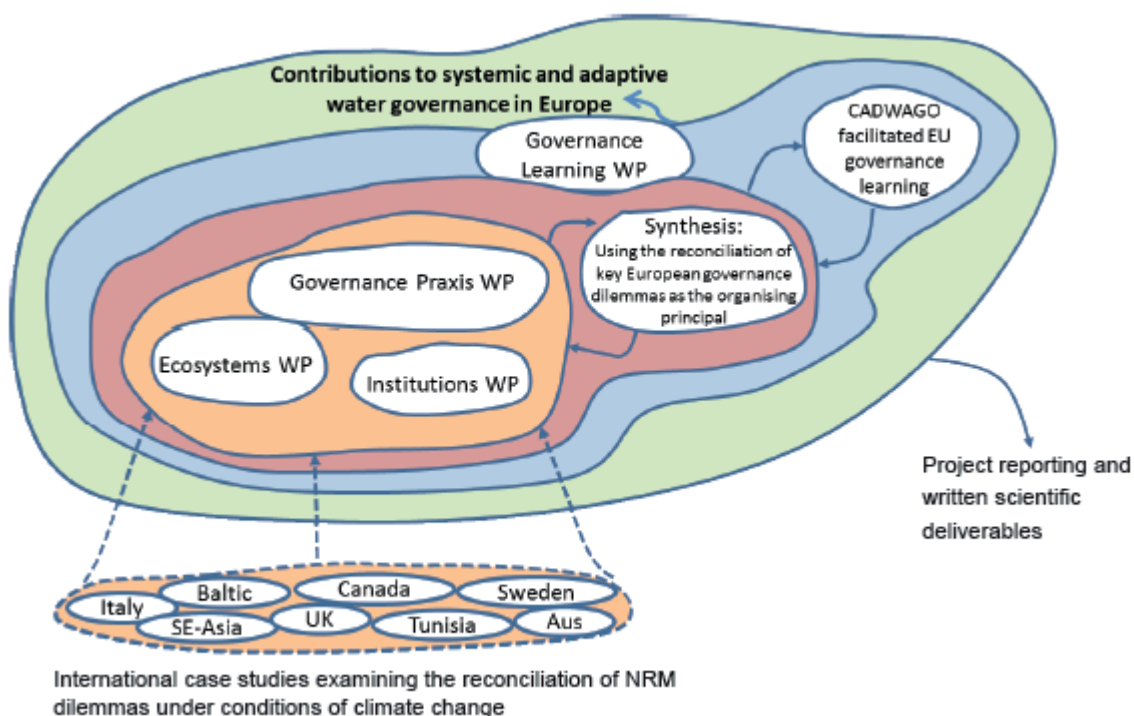


Figure 1. the CADWAGO research process (CADWAGO, 2013)

Figure 1 shows how three of the work packages applied their theoretical lens (inner circle) to a set of case studies to reflect on water dilemmas manifest in a diverse set of transnational contexts. These lenses enabled a cross-case narrative describing the orchestration of a

diverse set of governance performances (second circle). Dialectic between the cross case narratives and co-learners of European water dilemmas was facilitated by CADWAGO's governance learning WP (third circle). The emergent governance learning enabled conceptual, institutional and practice innovations to support systemic and adaptive water governance in Europe (outer circle).

WP4 would focus on governance learning by facilitating CADWAGO's learning relating to governance beyond the project staff to the wider European water governance environment. In WP4 we wanted to do this by (i) designing and operationalising an enabling environment for co-production of knowledge processes to emerge, (ii) analysing these processes and reflecting on them, and (iii) using these findings to contribute to increased governance learning which can help to bring about desirable change in the European water governance domain.

In the initial CADWAGO project proposal, support had already been included for three European governance learning events. But we quickly recognised that a yearly one-day governance learning event alone would not necessarily provide the level of engagement and continuity that might be required for co-learning to develop. Additional funding was applied for in year 2 to organise interim governance learning events on a national or regional level to keep co-learners engaged in between the yearly face-to-face European Governance Learning events. This additional funding came in at the beginning of year 3 and provided some dedicated staff time for WP4 to work on supporting governance learning for transformation for year 3. In addition to the Governance Learning events that were organised or co-organised by WP4 (see Figure 1), co-learning also occurred on case-study level and during non-CADWAGO led events - such as conferences or symposia – that involved CADWAGO researchers as well as practitioners and policy makers.

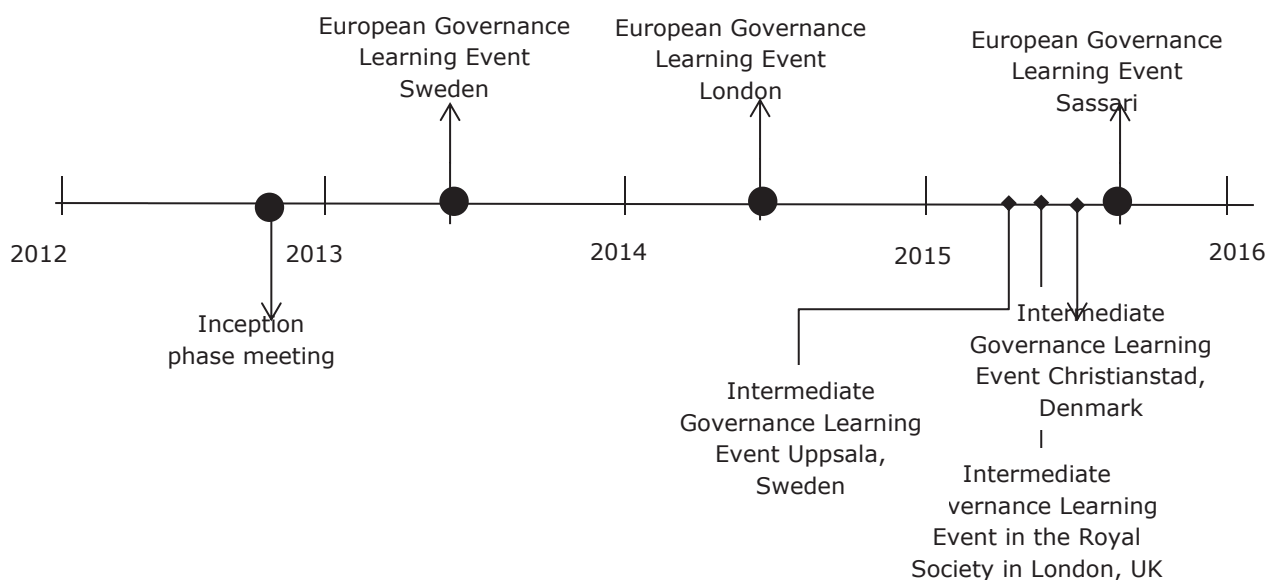


Figure 2. Timeline of Governance Learning Events organised and/or co-organised by WP4 during the CADWAGO project.

The CADWAGO 'Governance Learning' experience

Creating a shared identity

A lot of thought was given to how to design the process as well as whom to invite. In terms of inviting participants, we decided to work with practitioners and policy makers already involved in promising change processes related to water governance at different levels of organisation (local, regional, national, European) of the European network. They were thought to be in the best position to operate at the boundary between the project and the other stakeholders in the broader European water governance context. These practitioners were referred to as 'champions', 'change agents', 'critical friends', 'co-learners' or as 'folk who are at or near some tipping point towards our approaches and who can effect changes in water governance through their work'. All participants were invited as "co-researchers", and were able to contribute to the design (first learning event), the findings (second learning event) and the conclusions of the CADWAGO research (third learning event). During the governance learning events, everyone was referred to as 'co-learner' including the CADWAGO researchers. This removed the attention from the previous difference among the domains of 'research', 'practice' and 'policy' thereby effectively blurring boundaries between identities and organisations to such an extent that it was often difficult to distinguish between CADWAGO staff and engaged stakeholders during the learning workshops.

In terms of design, we used a methodological lens that drew on a range of social and environmental learning traditions, and it drew on past and ongoing experience in relation to system theories, methodologies and techniques, community of practice work and other participatory approaches. In each workshop we started with an interactive session which aimed to explore the participants' experiences in water governance, for example, by developing rich pictures, or conversation maps. The process of collectively creating a rich picture or a conversation map entailed either drawing or writing as well as describing what was being drawn or written to each other. It created a dialogue among participants and it allowed them to share their experiences of water governance while 'feeling heard' by the others. Through reflecting back and open questions, the other participants communicated their genuine interest in what the speaker had to say. As such, the interactive sessions were designed to involve all participants as equals.

Language also played an important role in drawing different boundaries between the CADWAGO project, including its co-researchers, and its perceived environment. Those involved in the CADWAGO project all shared an interest in transformative change. The environment was thereby framed as 'business as usual'. The project used a specific language connected to transformative change such as 'system of interest', 'emergence', 'social learning', 'concerted action' and 'promising configurations'. To some of the co-learners this language was new. Others were already familiar with these concepts from earlier case-study workshops. This conceptual, scientific language could have resulted in a boundary between the CADWAGO researchers and the other co-learners, excluding the policy makers and practitioners from scientific practice, but it did not. At the beginning of each governance learning event, the project leader introduced the CADWAGO project and implicitly explained the meaning of the concepts to all co-learners. This translation allowed all participants in the room to engage with these notions. Many co-learners were attracted to the CADWAGO Governance Learning workshops because of their experience of running into the barriers of 'business as usual' when trying to initiate transformative change in their own environmental

contexts. Many welcomed the new vocabulary as it gave them a shared sense of community as well as new ways to understand the context that they were operating in.

This shows the way in which boundaries of identity, organisation and discourse were blurred during the design of the co-learning events. By framing everyone as a 'co-learner' and by designing the process in a way that allowed everyone to contribute equally, differences among participants were decentred. The creation of a shared language also contributed to this by translating across differences and thereby bypassing pre-existing discursive divides and barriers. Instead boundaries were re-drawn - not along organisational or discursive divides – but along a shared interest in the issue of 'transformative change' thereby connecting co-learners and excluding 'others' with an interest in 'business as usual' through boundary work practices of expulsion.

Co-production of knowledge

The Governance Learning events were explicitly designed as co-inquiries - also referred to as collaborative inquiries - into European water governance in a context of climate change. Entering the workshop space of the European Governance Learning event in London in June 2014 (see Foster et al., 2014), the chairs were arranged in different groups around tables and all co-learners were encouraged to take a seat at one of these tables. During the general welcome and introduction by the project leader we learned that the aim of this particular learning event was to get feedback on the first preliminary results of the CADWAGO project. During the 'first iteration' of the project, the post-doc researchers from WP 1, 2 and 3 had analysed the ten case studies, and identified common themes that emerged from them. The Governance Learning event provided the opportunity for co-learning intended to engage with these themes and further advance them. During the 'second iteration' of the CADWAGO research, the emergent themes would then feed back into the CADWAGO research where these themes would be used as cornerstones for further investigation in the next round of research.

After the introduction, we were asked to create a conversation map with our group (5-6 people) in an interactive working session. There was a large piece of empty paper in the middle of the table and there were markers in various colours waiting to be used. The conversation maps exercise comprised two parts. The first part comprised a conversation 'trigger'. This trigger was the same for all groups, namely 'our experiences with water governance'. We were asked to write this down in the middle of the piece of paper and to put a circle around it. The second part comprised our responses to the trigger, which we were requested to write down and link together with a line as the conversation progressed. Each of us had a marker of a different colour and that is how it was possible to trace 'who said what in relation to what' in the conversation (see Figure 3). This first interactive working session initiated dialogue among us and it helped us to develop systemic awareness of the issue by exploring our experiences of water governance.



Figure 4. The six themes that were jointly identified by all co-learners on the basis of their conversation maps (Foster et al., 2014)

This discussion was mainly dominated by CADWAGO researchers. This probably also explains the similarities between some of the emergent themes from the first iteration of the CADWAGO research and the emergent themes from the Learning Event (see Table 1). Nonetheless, some new themes also came up such as ‘planning under conditions of uncertainty’. All co-learners supported the six themes that were identified during the learning event.

Table 1. Clusters of themes identified by the CADWAGO researchers before the Learning Event and the themes identified by co-learners - including CADWAGO researchers - during the CADWAGO learning event.

Emergent themes CADWAGO	Emergent themes Learning Event
Inter- and intra- action in levels of governance in the context of water governance dilemmas	Breaking-out of siloes and governance structures
Reconciling new and existing roles and responsibilities in the context of water governance dilemmas	Roles and responsibilities in changing dynamic of water governance
Learning for transformation/adaptation	Knowing and learning about water and its purpose
Power and social justice	

Masculine governance structures and reconciling water governance dilemmas	
Water crises as catalysts for change	Water crises as opportunities for governance change
Exportation of environmental issues (trans-sectorial and trans-national)	
Target-oriented versus process-oriented policies	Mismatch between expectations of new processes and the outcomes
Commodification of water and water resources (PES)	
Role of third sector organisations (non-state actors)	
Perceived knowledge gaps as opportunities/barriers to action	
	Planning under conditions of uncertainty

The conversation maps and the clustering of themes created space for integrating different types of knowledge in a patchwork of co-produced knowledge that partly validated the findings in the first iteration of CADWAGO research as well as creating space for the development of new insights and new understandings.

After a break, we continued with the second interactive working session which focused on 'issues and opportunities for change'. In this session, we selected one of the six themes that we wanted to explore. In the middle of table we had a large sheet of paper. We also had a number of sticky notes for capturing the issues and opportunities for change for our theme. During the discussion these issues and opportunities were written down on the sticky notes and put on the paper. The discussion was facilitated by a researcher of the CADWAGO team. After the allocated time for discussion had passed, we were given five sticky dots per person and we were asked to use them to 'vote' for the issue or opportunity that was most important for us in relation to change that we envisioned and desired in water governance. The issue or opportunity that received most dots was taken forward as a 'system of interest' to be investigated further in the next interactive session (see Foster et al., 2014).

In the third session, we identified the actions required if the water governance system were to function as intended. Again, we wrote down the activities on post-it notes and then we clustered them on a large sheet of paper. We then compared these actions to the situation in practice through questions such as: "If this activity is missing in the real-world, is that a good thing?" "For whom?" "Does it matter?" "What are the implications of filling a gap?" "How might it be filled?" We shared these findings in a plenary session in which it became clear that various actions would have to be taken to improve the situation. Some of these actions could be taken on by the participants in our own capacities and in our own organisations, but others required action by other people.

The second and the third interactive session helped the participants to slowly move away from the situation in which differences between types of knowledge were collapsed and into a situation in which these differences mattered again. This allowed them to step back into their own roles and reflect on their own responsibilities as well as their own response-abilities. Differences were not a barrier but a resource for concerted action.

The learning event ended with a plenary evaluation session. During this session only a small number of participants reported learning in relation to new information. Those that did, reported new insights such as “Issues are so similar across EU and Canada” or they reported “Better understanding of water governance dilemmas/issues”. This learning was related to the substantive content of the discussions. Others reported that what they were taking out of the workshop was learning about dynamic and inclusive processes, methods and techniques that facilitated and enabled the sharing of knowledge and experiences amongst the participants. They reported new insights such as “Useful – methodologies. Useful - the design of the learning event that promoted very much the dialogue with and among invited guests. Going to use this myself” or “New creative methods / ways of co-learning. Can blend well with otherwise scientific/ technical issues (such as nitrate pollution).” What these participants took out of the workshop had little to do with the content but was rather related to participatory design and techniques. Third of all, new networks were a valued outcome of the workshop by several participants. They reported issues such as “supportive forum” or “continue own learning process and engage with others working with similar change processes”. Again this had little to do with the content but was rather related to communication and networking. Last but not least, some participants reported validation when asked about learning. This included learning “That the barriers we are experiencing in terms of WFD delivery are a systems and governance problem - and that they have parallels across other cultures and scenarios. Understanding (these) brings some sort of acceptance and allows space and development of solutions (instead of just ‘giving up’)” or “Validation of approach from experts” or “Themes emerging from CADWAGO case studies reinforced by workshop”. So emotional support and validation were also mentioned as important outcomes of the workshop.

This description of the learning event in London shows that the boundary between scientific knowledge and ‘other’ types of knowledge (local, political, practical) collapsed during the interactive sessions of the learning event. All knowledge counted and all knowledge had equal value. At the end of the learning event, the boundaries were put back in place. That is when each participant reflected on their own position and the sort of action that they could take to improve the situation. For the CADWAGO researchers their responsibility as well as their response-ability translated into taking on board the input of policy makers and practitioners in the remainder of the research process. For other participants, other actions were more appropriate. This shows that co-learning in practice was far more than learning only about content. Putting the organisational and discursive boundaries back in place allowed co-learners to align their differences. By recognising differences and making use of them to achieve complementarity, the participants combined their efforts to create a loosely organised network of concerted action for improving and transforming water governance.

Challenging boundaries of science

The last issue that stood out during the Governance Learning events was their focus on ‘performing science differently’. This is best illustrated by the Intermediate governance learning event which was held on 16 September 2015 in the Royal Society in London (see Foster et al., 2015). This event had elements of a symposium and it also had elements of a co-inquiry. The aim was to discuss the past, current, and future of water governance in the UK and the EU. CADWAGO researchers from the Open University in WP3 had been working with a range of actors in the UK - such as policy makers, representatives from NGOs, researchers

- to gain insight into water governance in the UK and how this could be improved in practice. The results of this process were used as a point of departure for the learning event in the Royal Society. Between 50 – 80 people participated in this event which aimed at developing an agenda for transforming water governance in the UK and the EU. Getting a co-inquiry into the Royal Society in London felt like a challenge to the ‘normal’ boundaries of science and a call to expand the traditional boundaries of science by making a claim on a different kind of expertise.



Figure 5. CADWAGO symposium, The Royal Society London, 16th September 2015 (Foster et al., 2015)

In addition to this, the metaphor of ‘performance’ in relation to enacting an expansion of the boundaries of science also came out strongly during the third and final Governance Learning Workshop between the 14th and 16th October, 2015 in Sassari, Italy (de Bruin et al., 2015). The aim of the event was to: 1) showcase and discuss project findings and insights; 2) engage in co-learning processes to enable critical reflections on our collective learning; and 3) formulate actions for transforming water governance in our different contexts. The workshop was designed around an on-going Italian case study concerned with sustainable water management in Arborea, Sardinia. The event started on the evening of the 14th of October when we were invited to the concert “Music Acqua”: musical variations on climate, a piece composed by Sante Maurizi and inspired by the context of CADWAGO. It was organised by Conservatorio di musica Canepa and the CADWAGO partner Nucleo di ricerca sulla desertificazione dell’Università di Sassari (NRD). It combined instrumental and vocal music, performed by the Sardinian Youth Orchestra and the Canepa youth choir, and spoken theatre (de Bruin, workshop report).

The following day we prepared for the field trip to Arborea. In the afternoon, we travelled by bus through the Sardinian landscape to the central part of Sardinia where we participated in a live debate, known as ‘La Rasgioni’³, staged in the Municipal hall of the Arborea district. La Rasgioni is a traditional form of peaceful conflict resolution which had operated in Gallura until 50 years previously. It aims not only to solve disputes peacefully but also to restore pre-existing relationships that had been negatively affected by a conflict, thus preserving the community cohesion. Inspired by La Rasgioni the event in Arborea comprised a debate

³ translated into English as ‘the water court’

between representatives of all the regional, national and international institutions involved, and representatives of the entrepreneurs in the area including farmers and fishermen. The 'judge' allowed all representatives to speak. We, as CADWAGO co-learners, played the part of the 'jury'. Both the Music'aqua and la Rasgioni enacted the performance metaphor by including an orchestrated musical performance as well as a theatre performance into the co-learning event. Similar to the co-inquiry at the Royal Society in London this challenged the 'normal' boundaries of science by re-drawing them and including practices not usually associated with 'normal' scientific practice.

Governance learning as an orchestrated performance

CADWAGO started from a conceptualisation of change and governance learning as an interactive co-production of knowledge process. What was intended was much more than simply co-designing research questions and communicating the research findings, but rather coproduction of questions and findings and joint learning and reflection about implications, lessons and future outlooks. This called for highly interactive forms of knowledge generation where multiple stakeholders (including researchers) engaged in transdisciplinary joint knowledge production, dialogue and learning processes. This paper investigated the enactment of governance learning for systemic transformation in practice by investigation the co-production of knowledge process by means of an analysis of the boundary work practices and their potential to separate and/or connect.

Using the boundary work practices for creating junctures (Metze, 2010; Quick & Feldman, 2014) and divides (Gieryn, 1983, 1995, 1999) we have shown that making boundaries into junctures went hand in hand with the creation of boundaries as sites of separation. In agreement with Quick and Feldman (2014) our analysis shows that during the co-learning events junctures were constructed by decentering differences, translating across language and aligning differences. At the same time, in agreement with Gieryn (1983, 1999), our analysis also shows that during the co-learning events separations were constructed and traditional boundaries were challenged through expansion, expulsion and protection of authority. Both practices of separation and connection were important elements of the co-production of knowledge process.

The creation of junctures did take place at other moments in time and in different places than the creation of separations. Within the group of co-learners, the junctures were mostly created during the interactive sessions at the beginning and in the middle of the learning event. The separations were put back in place at the end of the learning event. The invitations and the design of the interactive sessions blurred boundaries between science, policy and practice in terms of identity, discourse and knowledge. At the end of the learning event, the opposite happened and differences were re-established and aligned to allow for self-organised, concerted action. As such the practices of separation and connection were able complement each other.

The creation of junctures along a shared interest in the issue of 'transformative change' resulted in a re-drawing of the boundaries between the group of co-learners and 'business as usual', including 'business as usual' science - thereby creating separation. Inspired by Gieryn's metaphor of cartography, we could say that the map of water governance was re-drawn, challenging the existing organisational, discursive and knowledge boundaries associated with 'business as usual'. As such, the practices of separation and connection were also able to

complement each other 'spatially'. All in all, they functioned as two sides of the same coin - as a duality instead of a dualism (see also Ison et al., 2011).

We suggest that the boundary work practices of separation and connection are central to the creation of an orchestrated performance aimed at governance transformation in the European water management landscape. Boundary work served important functions: 1) it contributed to the creation of a network of co-learners with a shared interest in transformative change; 2) it re-defined identities, discourse and knowledge along the boundaries of this system of interest; and 3) it allowed for the identification of concerted action as well as the alignment of differences required to bring about the desired change. This illustrates the argument by Ison (2010 p. 249) of what the metaphor of an orchestra can help to reveal in relation to co-production of knowledge or social learning. *"An orchestra is something that can be invested in; it is thus referred to and understood as an entity. At the same time what is being invested in is the on-going capacity to create, adapt and deliver performances by a group of people with different instruments, skills, perspectives, histories and so on, that satisfy some socially determined purpose."* During the co-learning events, the boundaries between science and society were both re-produced and challenged. The flexibility and fluidity of boundaries - and playing with those - helped co-learners to rehearse their orchestrated performance as well as to gain access to practices and resources in ways that would allow them to address the envisioned water governance transformations in practice.

Conclusion

The co-learning events and the co-production of knowledge process did not merely serve as a neutral place in which reality was represented and actors learned about the state of affairs from each other during exchange of knowledge. Instead it served as a place where a certain alternative reality - or subaltern reality - was created. Recognising this means reconceiving co-learning and co-production of knowledge as performative practice. Such a perspective goes beyond overly optimistic views of co-production of knowledge as a radical process of democratisation of science in which traditional science-society relations are transformed. It also goes beyond the critical views that see co-production of knowledge as the mere reproduction of the traditional linear model of science in which knowledge production and use are reproduced as separate processes and strict boundaries are reinforced. Instead, it appreciates both the re-production of science-society boundaries as well as the challenging of those in co-learning events as meaningful and legitimate attempts to simultaneously bring about a particular sort of change, namely: 1) social change or "coherence" (the ability to harmoniously live with ourselves and others); and 2) socio-environmental sustainability or "correspondence" (people interacting with the environment in ways that builds resilience). According to Maturana and Varela (1987, cited in Capra, 1996 p. 330) this requires a diverse, resilient community *"capable of adapting to changing situations. However, diversity is a strategic advantage only if there is a truly vibrant community, sustained by a web of relationships. If the community is fragmented into isolated groups and individuals, diversity can easily become a source of prejudice and friction. But if the community is aware of the interdependence of all its members, diversity will enrich all the relationships and thus enrich the community as a whole, as well as each individual member. In such a community information and ideas flow freely through the entire network, and the diversity of interpretations and learning styles - even the diversity of mistakes - will enrich the entire community"* An orientation to boundaries and boundary work in co-learning to practices of connection as well

as separation can support the creation of such a resilient community and thereby support the performance and orchestration of effective governance transformations in practice.

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Renegotiating boundaries for systemic water governance: some experiences from the implementation of the Water Framework Directive in England

Foster, N., Blackmore, C., Ison, R. and Collins, K.

Applied Systems Thinking in Practice, Department of Engineering and Innovation, Faculty of Mathematics Computing and Technology, The Open University, UK

Abstract: Water governance is becoming an increasingly important issue as climate change, population growth and changing demands for water are predicted to exacerbate potential and actual threats to food, water and energy security. However, the current lack of progress towards achieving the environmental objectives of the Water Framework Directive in the UK and EU raises many questions and concerns about how we think and act in relation to water governance in a changing world, and in particular about the implications of boundary choices. This paper reflects on the implementation of the Directive in England. The evidence demonstrates that the implementation process failed to start out systemically. There have been some changes in the water management regime which emerged from the adoption of the Catchment-Based Approach, but the overall water governance regime continues to be encompassed within the top-down implementation process operated by the Environment Agency. New pathways and options for change have recently emerged from a systemic co-inquiry, which emphasise the importance of institutionalising community action at catchment scale and re-framing the enactment of the Directive as part of an iterative social learning system.

Keywords: Water, governance, boundaries, Water Framework Directive, England, UK

Introduction

Water governance is becoming an increasingly important issue as climate change, population growth and changing demands for water are predicted to exacerbate potential and actual threats to food, water and energy security (Defra, 2011b; Jenkins et al., 2009). The need for systemic and adaptive approaches to water governance is well recognised in some sectors (CADWAGO, 2013). Indeed, the Water Framework Directive¹ at its outset appeared to be far sighted in the way that it recognised multiple stakeholders and approached planning at the level of the river basin, and it was welcomed as a radical improvement on earlier, piecemeal EU water legislation (Environment Agency, 2002). However, the current lack of progress towards achieving its environmental objectives in the UK and EU raises many questions and concerns about how we think and act in relation to water governance in a changing world, and in particular about the implications of boundary choices on the past, present and future trajectory (Ison, 2010).

Dealing with extensive flooding in England provides a case in point. Floods in Somerset in 2013/4 and in Cumbria in 2015 had major adverse effects on lives and livelihoods in sectors

¹ Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Official Journal L 327, 22/12/2000)

ranging from agriculture to tourism to commerce and industry and at different levels (BBC, 2014, 2015). But the factors contributing to these effects were many and various, including the way land and water had been managed, and choices made about settlements and how communities and NGOs as well as different levels of government responded. There was a clear need to link up policies and practices that enhanced and maintained not just the quality of biophysical processes associated with water, but also the social processes, recognising that human social systems and biophysical systems are coupled in a mutually influencing co-evolutionary dynamic (CADWAGO, 2013).

This paper reflects on the implementation of the Water Framework Directive in England from the perspective of a group of researchers who have been working in the field of water governance for more than a decade (Blackmore et al., 2007). It presents an overview of the Directive and its implementation in England, then considers the implications of some of the boundary choices made and how new pathways and options for change are being opened up through systemic approaches.

Overview of the Water Framework Directive

In recognition that 'water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such', the Water Framework Directive establishes a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater in the EU. It was adopted on 23 October 2000, and entered into force on 22 December 2000. It committed EU Member States to develop river basin management plans (RBMPs) and accompanying programmes of measures by 2009; and in making operational the programmes of measures, to achieve 'good' water status by 2015. However, the time limit may be extended up to 2027 for the purpose of phased achievement of the objectives where it has been determined that it is technically infeasible or disproportionately expensive to complete the necessary improvements within the timescale, or natural conditions do not allow timely improvement. Furthermore, a less stringent objective may be established where human activity or the natural condition of the water body is such that the achievement of the objectives would be infeasible or disproportionately expensive. The RBMPs must be reviewed and updated every six years, and the Directive sets out a structured, iterative process and deadlines by which specific actions must be taken to this end (represented in Figure 1).



Figure 1. Water Framework Directive implementation process and deadlines by which specific actions must be taken

In practice, Member States have found the implementation of the Directive challenging. The European Commission’s assessment of the RBMPs indicates that ‘progress towards the objective is expected, but good status will not be reached in 2015 for a significant proportion of water bodies’ (European Commission, 2012, p.6). Furthermore, that ‘the approach taken by many Member States - of ‘moving in the right direction’ based (largely) on business-as-usual scenarios - is clearly not sufficient to achieve the environmental objectives for most water bodies’ (European Commission, 2015, p.18).

Implementation of the Water Framework Directive in England

The implementation of the Water Framework Directive in England has not been without its own challenges, and consequently the story is complex and dynamic, particularly where devolution² is concerned, which has led to different principles and practices in different parts of the UK. This section makes no attempt to comprehensively describe the implementation process, but it highlights the perceived landmarks and trends in the situation.

Transposition into national legislation - 2000 to 2004 - a slow start

Member States were required by Article 24 of the Directive to bring into force the laws, regulations and administrative provisions necessary to comply with the Directive by 22

² Devolution in the UK created a national Parliament in Scotland, a national Assembly in Wales, and a national Assembly in Northern Ireland. The process transfers varying levels of power from the UK Parliament to the devolved institutions, whilst retaining the UK Parliament’s authority over the devolved institutions

December 2003. To this end, the Department for the Environment, Food and Rural Affairs (Defra) and the National Assembly for Wales (Welsh Assembly) led a series of three 3-month consultations between March 2001 and October 2003 on the implementation of the Directive. The consultation papers respectively gave their intention to implement the Directive by means of secondary legislation, explained how it would be transposed, and set out the draft Regulations and an accompanying partial Regulatory Impact Assessment (Defra, 2002, 2003; DETR, 2001). The Regulations to transpose the Water Framework Directive for the river basin districts wholly in England and Wales³ (Anglian, Dee, Humber, North West, Severn, South East, South West, and Thames), and for the Northumbria⁴ river basin district which is mainly in England and marginally in Scotland, were laid before Parliament in December 2003 and entered into force on 2 January 2004. An updated RIA was published at the same time. A further set of Regulations⁵ for the Solway Tweed river basin district, which is mainly in Scotland and marginally in England, were laid before Parliament in January 2004 and entered into force on 10 February 2004.

Pursuant to Article 3 of the Directive, the Regulations designate the competent authorities responsible for ensuring the application of the rules of the Directive within each river basin district. General responsibility for ensuring the Directive is given effect is placed on the 'appropriate authority'. Responsibility for producing and updating the river basin management plans is placed on the 'appropriate agency'. These roles are respectively undertaken by the Secretary of State and the Environment Agency acting solely in relation to the Anglian, Humber, North West, South East, South West and Thames river basin districts, and acting jointly with the Welsh Assembly and Natural Resources Wales in relation to the Dee and Severn river basin districts, and with the Scottish Ministers and Scottish Environmental Protection Agency in relation to the Northumbria⁶ and Solway Tweed river basin district (Defra, 2004). The Regulations also define the river basin district boundaries, which correspond with the Environment Agency's regional operating areas, originating from the privatisation of the water industry in 1989 and the establishment of the National Rivers Authority (now the Environment Agency) (Watson, 2014).

First planning cycle - 2004 to 2009 - top-down river basin management approach

Characterisation, impacts, economic analysis, protected areas and monitoring

Alongside Defra's consultation on the policy-related issues of transposing the Directive, the Environment Agency led a preliminary consultation from June 2002 to September 2002 on guiding principles for the implementation of the key technical issues of transposing the Directive. The consultation paper gave their interpretation and proposals relating to Annex II and Annex V of the Directive, which set out how the water environment will be assessed, classified and monitored (Environment Agency, 2002). Subsequently, for each river basin district, the Environment Agency carried out an analysis of characteristics and a review of the impact of human activity on the water status (regulation 5). They presented the results of their

³ *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003*

⁴ *The Water Environment (Water Framework Directive) (Northumbria River Basin District) Regulations 2003*

⁵ *The Water Environment (Water Framework Directive) (Solway Tweed River Basin District) Regulations 2004*

⁶ *Except for river basin planning duties for which responsibility lies with the Secretary of State and the Environment Agency but with requirements for consultation with the Scottish ministers and the Scottish Environmental Protection Agency*

analysis for consultation from September 2004 to November 2004, just prior to the deadline on 22 December 2004. Summary reports for each river basin district were submitted to the Commission in March 2005 as required by Article 15 of the Directive (Defra, 2005). By the same deadline, the Environment Agency also identified certain water bodies as new 'drinking water protected areas' (regulation 7) and established a register incorporating those areas along with other existing protected areas (regulation 8) (Environment Agency, 2004). On the basis of the characterisation analysis and impact assessment, the Environment Agency was required by 22 December 2006 to design and make operational programmes of monitoring in order to establish a coherent and comprehensive overview of the water status within each river basin district, and to permit classification of water bodies consistent with the normative definitions set out in Annex V of the Directive (regulation 9). The monitoring programmes were reported via WISE (Water Information System for Europe) to the Commission in March 2007 in accordance with Article 15 of the Directive. All of these tasks were underpinned by the work of the UK Technical Advisory Group (UKTAG) which was established in 2001, inter alia, to produce guidance papers to support consistent implementation of the Directive across the UK. During 2003 - 2004, they published a series of guidance papers supporting characterisation analysis, pressures and impacts assessment. Subsequently, during 2004 - 2005, they published guidance documents on an overall monitoring framework, as well as classification tools and methods to support monitoring of water status (UKTAG, 2011c).

In January 2004, in preparation for carrying out an economic analysis of water use in river basin districts set out in Annex III of the Directive, Defra commissioned three studies: Economic Importance and Dynamics of Use for River Basin characterisation; Cost Recovery and Incentive Pricing; and Cost-Effectiveness Analysis and Developing a Methodology for Assessing Disproportionate Costs. A further study on Private Water Supplies was also commissioned later (Defra, 2008b). These studies were overseen by the UK Economics Steering Group (ESG) and an Economic Advisory Stakeholder Group (EASG), who published a progress report in September 2004 which summarises the findings from the studies (EASG, 2004). Based on these studies, Defra led a consultation on an approach to meeting the Directive's requirements for economic analysis in September 2004, in parallel with the Environment Agency's consultation on the results of their characterisation analysis. Drafts of the supporting documents required by Article 5 of the Directive were then developed in close collaboration with the Economic Advisory Stakeholder Group. Final summary reports were published in March 2005 for each river basin district, and submitted to the Commission in accordance with Article 15 of the Directive (Defra, 2008b).

Environmental objectives and programmes of measures

Taking into account the characterisation, impact assessment and economic analysis of water use, the Environment Agency was required to prepare and consult on proposals for environmental objectives and programmes of measures (regulation 10). These objectives translate the generic environmental objectives set out in Article 4 of the Directive to the particular situation in each river basin district. The programmes of measures set out the measures to be implemented in order to achieve the objectives. As with the previous technical analysis, this process was underpinned by UKTAG's guidance papers. In 2003, UKTAG initiated the development of methodologies for assessing the condition of biological quality elements (fish, invertebrates and algae/macrophyte), which are set out in a series of method statements for rivers, lakes, transitional waters and coastal waters (UKTAG, 2011b). In 2004,

they also initiated a phased approach to the development of environmental standards and conditions for non-biological quality elements (physico-chemical, hydromorphological and specific pollutants) for rivers, lakes, transitional waters and coastal waters, as well as for groundwater quantity and chemical quality elements. Following two 3-month stakeholder reviews (consultations) between February 2006 and August 2007, UKTAG published its recommendations for environmental standards and conditions for surface waters and groundwater (UKTAG, 2011a). These recommendations were formally adopted⁷ following a further public consultation led by Defra and the Welsh Assembly from October 2008 to December 2008 on 'Directions to the Environment Agency on Classification of Water Bodies' (regulation 20) (Defra, 2008a). The Environment Agency's proposals for environmental objectives and programmes of measures were published for public consultation in the draft River Basin Management Plans for each river basin district.

River Basin Management Plans

The Environment Agency was required by Article 13 of the Directive to prepare and publish River Basin Management Plans for each river basin district by 22 December 2009 (regulation 11). To initiate the process, the Environment Agency led a consultation from January 2005 to April 2005 on a strategy for river basin planning. The consultation paper set out the Environment Agency's proposed approach for developing the River Basin Management Plans, in particular how it would engage with stakeholders at national, regional and local level, and how it would integrate different aspects of managing the water environment (Environment Agency, 2005). Subsequently, as required by Article 14 of the Directive, they led a series of three 6-month consultations between December 2006 and June 2009 which respectively set out: a timetable and work programme for the production of the plan, including how people could participate in the process; an interim overview of the significant water management issues identified in the river basin districts; and the draft River Basin Management Plans (regulation 12) (European Commission, 2009). These plans bring together the results of the prior technical and economic analysis, along with the proposed environmental objectives and programmes of measures. Following approval by Defra, the final River Basin Management Plans for the first planning cycle were published in December 2009, and copies sent to the Commission in accordance with Article 15 of the Directive (regulations 11 to 14) (Defra, 2009).

Second planning cycle - 2009 to 2015 - bottom-up catchment management approach

Legal challenge and the Catchment-based Approach (CaBA)

In March 2010, WWF-UK and the Angling Trust initiated legal proceedings against Defra by applying for a judicial review of the 2009 River Basin Management Plans. They challenged the legality of the plans because "*they do not set specific targets or a coherent timeframe to address the poor ecological status of many rivers and lakes in England [and] rely heavily on a wide range of reasons for inaction which the Directive only allows to be used in exceptional circumstances*" (Angling Trust, 2010). After extensive talks between the organisations, the

⁷ *The River Basin Districts Surface Water and Groundwater Classification (Water Framework Directive) (England and Wales) Direction 2009, and The River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2009, entered into force on 22 December 2009. The latter was subsequently revoked and replaced The River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010 for the purpose of completing transposition of the Priority Substances Directive (2008/105/EC)*

matter was settled before reaching court in March 2011 with the publication of a 'statement of position' by Defra. The statement set out principles for river basin planning guidance, and the future direction for implementing the Directive. Significantly, Defra asserted a commitment to undertake more actions at catchment level, and announced a pilot phase to test the longer term viability of a 'catchment-based approach' in 10 catchments hosted by the Environment Agency (Defra, 2011a). A further 15 catchment pilot projects were hosted by other organisations including rivers trusts, regeneration organisations, national park authorities, water companies and wildlife trusts (Cascade Consulting, 2013). The pilot phase concluded in March 2013, and subsequently Defra published a policy framework to encourage the wider adoption of the catchment-based approach (Defra, 2013). They anticipated that this approach would contribute to the implementation of the Directive rather than replace the existing process, although it was not made clear how they would be effectively linked in practice (Watson, 2014).

River Basin Management Plans 2

In parallel to the pilot phase of the catchment-based approach, the Environment Agency commenced the process of reviewing and updating the river basin management plans (regulation 15). Again, they led a series of three 6-month consultations which respectively set out: a timetable and work programme for the production of the plans; an interim overview of the significant water management issues identified in the river basin districts; and the draft River Basin Management Plans (regulation 12) (Environment Agency, 2013). The draft plans set out the updated characterisation, impacts assessment and economic analysis (regulations 5 and 6), along with revised proposals for environmental objectives and programme of measures for each river basin district (regulation 10). In support of the technical work, UKTAG published revised environmental standards and conditions following a 3-month stakeholder review in 2012 (UKTAG, 2013). These standards and conditions were formally adopted in new Directions to the Environment Agency in 2015⁸. Following approval by Defra, the River Basin Management Plans for the second planning cycle were published in February 2016, and copies sent to the Commission in accordance with Article 15 of the Directive (regulations 11 to 14) (Defra, 2015).

Third planning cycle - 2015 to 2021 - reconciling the gap between top-down and bottom-up approaches?

In 2016, the UK finds itself part way through the implementation of the Directive with still much to do to achieve the objective of 'good' water status so far as is reasonably possible (Table 1). Although more than 98 percent of the measures summarised in the 2009 River Basin Management Plans were completed by 2015, along with a significant number of additional measures, there was about a 4 percent decrease in overall water status during this time period (Environment Agency, 2015). Furthermore, it is evident that there remains an implementation 'gap' between the top-down river basin management approach led by Defra, and the bottom-up catchment-based approach led by the 100+ catchment partnerships across England. It is unclear how this gap will be resolved in practice during the third planning cycle (Foster et al., 2015; Watson, 2014).

⁸ *The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015, which revoked the 2009 Directions and 2010 Directions with effect from 22 December 2015*

Table 1. Comparison of 2009 baseline with 2015 results and longer term objectives
(Environment Agency, 2015)

Water bodies	Percentage of water bodies at good or better status			
	2009 (%)	2015 (predicted %)	2015 (actual %)	Objective (%)
Surface water ecological status	26	30	21	75
Surface water chemical status	8	9	14	>99
Groundwater quantitative status	61	61	72	82
Groundwater chemical status	58	59	53	87
Overall status	26	30	22	75

In light of the current situation, the section 4 reflects on the implications of the boundary choices that have been made by those involved in the process of implementing the Directive. In doing so, some potential ways of ‘minding the gap’ in future water governance are elucidated.

Reflections on the implications of boundary choices

Administrative and operational boundary choices - maintaining ‘business as usual’

The adoption of the Directive offered the opportunity to fundamentally transform water governance in England (Environment Food and Rural Affairs Committee, 2003). But, in deciding to use secondary legislation to implement the Directive and to appoint the Environment Agency as the sole competent authority responsible for producing the river basin management plans in England, Defra closed down so many options that a ‘business as usual’ approach was almost inevitable.

The top-down approach adopted by Defra and the Environment Agency for the implementation of the Directive in England has been subject to some intense debate and strong criticism, particularly regarding roles and responsibilities, and the scale and urgency of the of the task (e.g. Cook et al., 2012; Mostert et al., 2007; Orr et al., 2006; Watson, 2014; Whaley & Weatherhead, 2016). For example, an inquiry by the Environment Food and Rural Affairs Committee (2003) found that the views of witnesses were mixed regarding the appropriateness of Defra’s intention to appoint the Environment Agency as the sole competent authority under the Directive. The RSPB said that the Government had done little analysis of the strengths and weaknesses of this option, and set out a range of possible alternatives which it considered to be more preferable choices. In contrast, British Waterways welcomed the choice of the Environment Agency as competent authority, but raised concerns regarding conflicts of interest arising from this choice in relation to the regulation of navigation and flood defence. Some witnesses also raised concerns regarding a perceived lack of resources and democratic mandate within the Environment Agency to enable it to fulfil the requirements of the competent authority. In this context, the Countryside Council for Wales and English Nature argued to be given competent authority status in relation to specific parts of the Directive. Moreover, the inquiry also highlighted particular concern about the optimistic statements made by Defra and the Environment Agency about the state of water bodies in England given the limited evidence available at the time, which some witnesses perceived might lead to complacency about the scale of the task involved in implementing the Directive. The inquiry concluded that:

“the Government appears to believe that the Water Framework Directive is just another piece of environmental legislation from the European Union, which it can implement with the minimum fuss. We do not agree. [...] Bearing in mind the work to be done, the timetable for implementation is quite short. Therefore, we urge the Government to address the Water Framework Directive with more urgency” (Environment Food and Rural Affairs Committee, 2003, p.35).

These concerns were upheld by the WWF-UK and the Angling Trust in jointly seeking a judicial review of the 2009 River Basin Management Plans. The introduction of the catchment-based approach in response to these concerns offered a second opportunity for transformation in water governance in England. However, as Watson (2014) notes, the emergence of the catchment-based approach in parallel with the existing process for implementing the Directive suggests that, while changes have occurred in the water management regime, the more fundamental structures and power relations pertaining to water governance which determine how decisions are made and which interests are represented have not changed at all. In practice, the water governance regime is still defined by and encapsulated within the top-down implementation process operated by the Environment Agency.

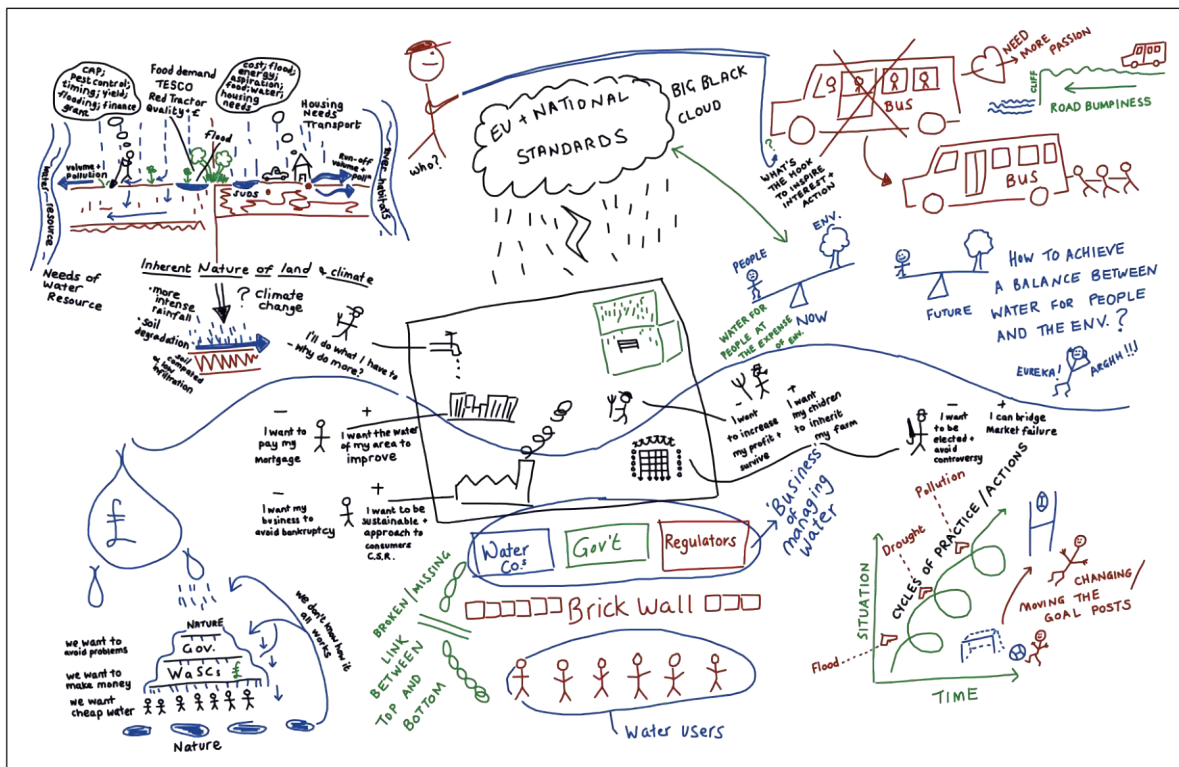
Systemic co-inquiry - opening up new pathways and options for change

Despite significant investment in implementing the Directive by many people over more than 15 years, there is still no clear progress in England towards meeting its environmental objectives. The catchment based approach continues to evolve in parallel with the existing process for implementing the Directive, and alongside other significant reforms to the water sector brought about by the enactment of the Water Act 2014, including putting in place measures to tackle unsustainable abstraction, the introduction of competition in the retail market, and provision for a cross-border market between England, Wales and Scotland (HMSO, 2014). Each of the changes is a response to the specific challenges that fall within the realm of improving water governance. But, they also raise many questions: How will the changes play out in practice? Will they work together to form a coherent ‘whole’? Can collaborative and competitive approaches really co-exist?

In this context, researchers from the Open University have been engaging in a systemic co-inquiry with Government bodies, NGOs, consultants, water industry, academics, and others to collectively develop a better understanding of the current water governance situation, and how it can be improved in practice (Foster et al., 2015). Co-operative (or collaborative) inquiry was proposed by John Heron in 1971, and subsequently developed with Peter Reason. It involves researching with people, rather than on people. Thus, participants are able to be involved as co-researchers, and may contribute to the design, implementation, monitoring and evaluation of the research (Heron & Reason, 2001). Systemic co- inquiry is a specific type of co-inquiry which draws on systems theories, methodologies and techniques (Blackmore, 2009; Checkland, 2002; Dewey, 1933; Ison, 2010; West Churchman, 1971). It is a mode of investigation that is open to changing situations, pursuing new directions, and engaging with new or different theoretical/methodological frameworks. The inquiry focuses on processes of social learning and the emergence of opportunities, rather than on pre-defined timelines and outputs (Ison, 2002; Ison et al., 2004; Wallis, 2015).

Two workshops were undertaken as a part of the systemic co-inquiry, which focused on the current and future water governance situation in England respectively. Each workshop comprised an informal introduction, a series of three participatory sessions, and short presentations. The participatory sessions were designed to interactively engage participants in systems thinking, modelling, negotiating and evaluating in order to explore water governance, to formulate problems and opportunities, to identify feasible and desirable changes, and identify opportunities for concerted actions. The short presentations enabled the participants to contribute different perspectives of the current and future water governance situation.

The participants depicted the current water governance situation as a dynamic and complex 'mess' of actors and elements. For example, their rich pictures show conflicting interests within and between different stakeholder groups, cycles of activities triggered by water crises such as floods, droughts and pollution, as well as governance structures, and the influence of EU and national standards on water governance practices (Figure 2a). In their analysis of the rich pictures, they came to appreciate that few people had an overall understanding of the



(a) Participatory session 1: the current water governance situation from the perspective of a group of workshop participants

Beneficiaries	Politicians, ministers, bill payers, fish and shellfish industry, water users/consumers, some ecosystems, recreational users, irrigators
Actors	Press (media), academics, teachers, farmers, NGOs and other third sector volunteers, water and sewerage companies, Environment Agency, Natural England, OFWAT
Transformation	Public water supplied and waste water treated
Worldview	Provide goods and services to society, provide clean drinking water, natural capital under-valued
Owners	Property owners, water and sewerage companies, Government, voters, regulators, EU Parliament and Council
Victims	Ecosystems, current citizens, future generations
Environment	Climate change, capitalism dominates, risk aversion
Root definition	A disconnected and opaque system, nominally owned by everyone but managed by EU, Government and water companies, to provide goods and services by delivering public water supply and waste water treatment using inefficient high energy, engineering, top-down regulatory approaches in order to support economic growth and welfare

'Is'	'Ought to be'
Natural capital/ services under-valued or un-valued	Fully valued natural capital and services
Belief in 'hard' engineering solutions	Belief and trust in catchment management
Market failures	Markets working for ecosystem services (incentives)
Focus on compliance with EU and national standards	EU and national standards is one of many drivers/ measures of performance
Disconnected system	Link between water 'users' and providers/managers

(b) Participatory session 2: BATWOVE and root definition applied to an 'ideal' water governance situation by a group of workshop participants

(c) Participatory session 3: 'is' versus 'ought to be' in the context of water governance from the perspective of the workshop participants

Figure 2. Workshop 1 - current water governance. Example outputs from the participatory sessions, redrawn from the versions created at the workshop (Foster et al., 2015)

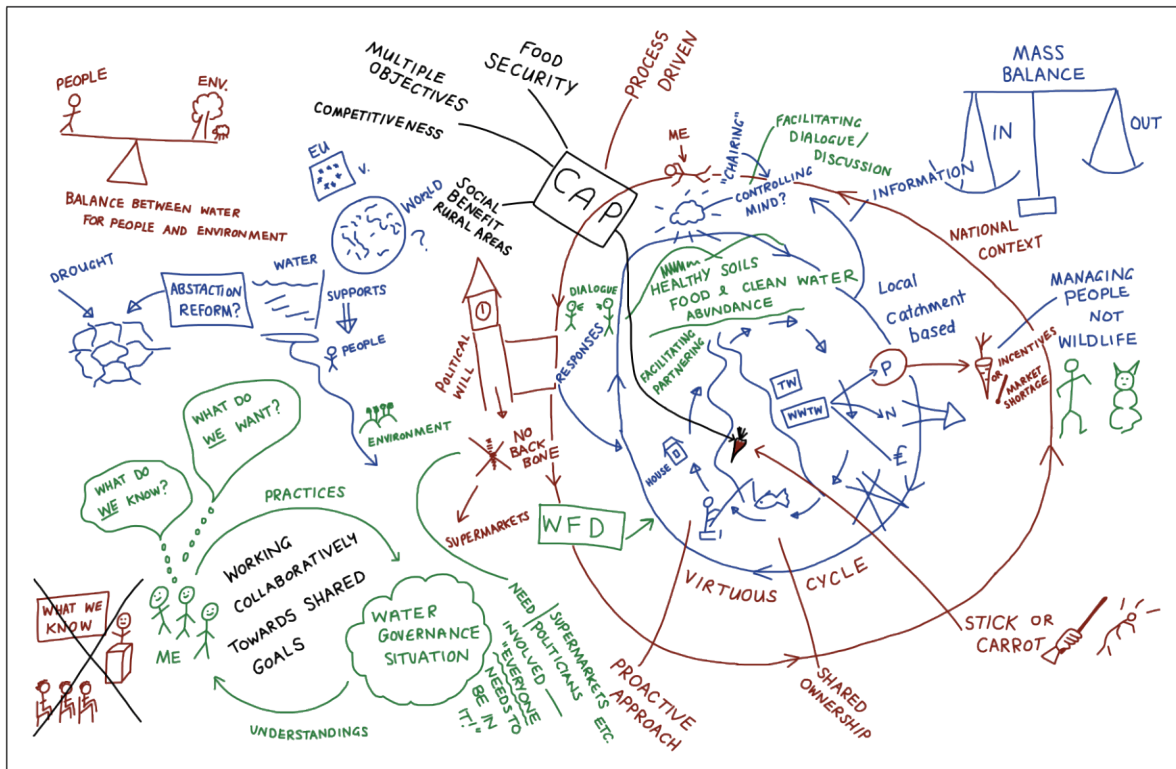
elements in the water governance system (or the system as a whole), and they did not always agree on where the boundaries should be placed. Nonetheless, there were some significant areas of overlap and consensus about the aim and objective of the current water governance system, as well as about the persons involved and the constraints imposed upon it (Figure 2b). Subsequently, the participants used these systems models (and the insights that emerged from them) to inform and structure a discussion about the current water governance situation and the actions required to improve it (Figure 2c).

Building on these outcomes, the participants depicted the 'ideal' water governance situation again as a dynamic and complex 'mess' of actors and elements. However, in contrast to the rich pictures from the first workshop, these rich pictures show water governance as a virtuous circle (or cycle) in which the various different actors and elements in the situation work together towards shared goals. For example, there is a distinct focus on social/community-led learning and action, shared ownership and responsibility, and collaboration. There is also more emphasis on recognising (and measuring progress towards) multiple benefits of water governance, including human health and well-being, in addition to water quality and other legislative standards (Figure 3a). In the subsequent analysis of the rich pictures, there were mixed perspectives between the different groups of participants about what the aim and objective of the 'ideal' water governance should be; but, there were also some notable similarities, particularly regarding who should (or could) be involved or affected by the system,

and to a lesser extent, about the constraints imposed upon it. Consequently, they were able to formulate a collective definition of the 'ideal' water governance situation (Figure 3b), and hence, to create conceptual models representing the sequence of activities that would have to be undertaken if the 'ideal' water governance system was to function in the real-world (Figure 3c). It is notable that each of the conceptual models recognise that 'delivering human health and well-being' is not something that can just be done, but rather that it is an emergent outcome of the system as a whole; and at least one of the models recognises that it is also an input to engaging people in water governance. In addition, the models show water governance as an iterative learning system, i.e. not something that can be done once to solve the problem situation, but rather something that is ongoing and adaptive to the changing (improving) water governance situation.

In between the participatory sessions, some of the workshop participants presented their perspectives on the current and future water governance situation to the other workshop participants. The participants were asked to consider the presentations as a key part of their inquiry and use them to explore their own thinking and ideas in the discussions. Thus, the presentations contributed new perspectives, evidence and understandings of different aspects of water governance. Collectively, the presentations covered a diverse range of topics including:

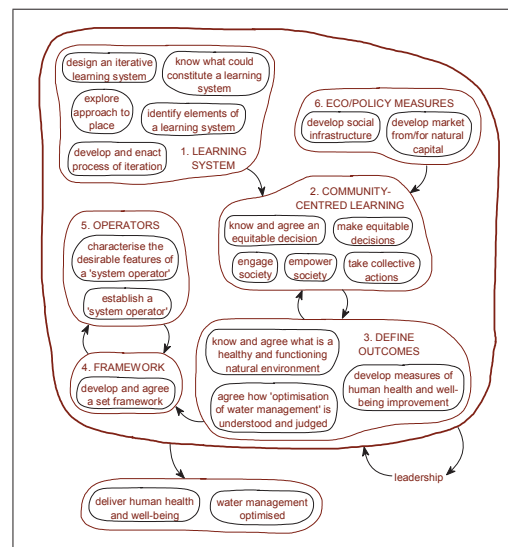
- the impact of the Water Act 2014;
- water abstraction reform;
- the 'gap' between top-down and bottom-up governance approaches;
- communication and language issues;
- challenges and concerns about how forthcoming water retail markets will operate in practice given the perceived need for further collaboration rather than competition in water governance;
- the history of water governance in England, and in particular the proposed solution of a 1927 Royal Commission to have 100 Catchment Boards responsible for each main river, with powers over individual Drainage Boards;
- Thames Conference 2015 - 'A Better River; A Better City' - held at Fishmongers' Hall in London on 9th June 2015; and
- contribution of the Catchment Systems Group (an affiliation of academics from various organisations across the UK) to the OECD's recent consultation on draft Water Governance Principles, leading to some significant changes; and new opportunities such as funding bids, other consultations etc.



(a) Participatory session 1: an 'ideal' governance situation from the perspective of a group of workshop participants

Beneficiaries	Citizens (people) and the environment upon which the depend
Actors	Society (with multiple/specific roles)
Transformation	Optimize the management of water in all its forms
Worldview	Human health and well-being
Owners	Everyone
Victims	People whose current granted rights/interests will be adversely affected by the 'ideal' governance system, e.g. water abstractors
Environment	social, environmental and economic capital
Root definition	An iterative, place-based, reflexive, English learning system operated by a 'system operator' on behalf of everyone and within a set framework, to optimise the management of water in all its forms by: engaging and empowering society to make equitable decisions and take collective/concerted actions; developing new markets for valuing natural capital; and developing social infrastructure for knowing the value of natural capital, in order to deliver human health and well-being (with recognition that health and well-being depends upon a healthy, functioning natural environment) within the constrains of social, environmental and economic capital

(b) Participatory session 2: BATWOVE and root definition applied to an 'ideal' water governance situation by a group of workshop participants



(c) Participatory session 3: conceptual model of an 'ideal' water governance situation constructed by a group of workshop participants

Figure 3. Workshop 2 - future water governance. Example outputs from the participatory sessions, redrawn from the versions created at the workshop (Foster et al., 2015)

The actions to improve water governance which emerged from the workshops fall broadly into four categories: stakes and stake-holding; facilitation; institutions and policies; and knowing and learning about water governance (Figure 4).

STAKES AND STAKEHOLDING

Identify stakeholders

- map and analyse the local/national/global actor network in relation to target beneficiaries, e.g. NIP

Build stakeholding

Reconciling new and emerging roles

- re-frame catchment co-ordinators as learning system facilitators
- re-frame the role of perceived 'sneaky civil servants' as civic entrepreneurs
- re-organise Environment Agency [and other] departments to facilitate collaboration and learning within and between organisations

Develop shared ownership and responsibility

- establish and institutionalise social [learning] processes e.g. CaBA, adaptive management
- consolidate NGOs voice in institutionalising CaBA
- form a group of cross-sectoral water entrepreneurs
- build a coalition of water users in the environment (e.g. anglers, canoeists, swimmers)
- establish a clear feedback process between local, national and international level governance

Raise awareness about water issues

- enhance the role of media for common engagement
- produce a UK rivers programme (similar to Coast) led by the BBC/OU
- 'rolling thunder' place-based roadshow, i.e. places with water issues, to fill knowledge gaps, avoid myths

Meaningfully engage people in water governance

- engage people in things that they really care about, e.g. local park, bird watching, health and well-being
- better engage with actors for whom water governance is one of many issues, e.g. farmers
- engage more people in real-time monitoring of the water environment, e.g. collection of data/experiences

FACILITATION

Identify facilitation needs

- seek examples/stories of getting hi-level buy-in to a change strategy
- tune change strategy to audience e.g. businesses, new markets
- develop an engagement strategy for Government, e.g. Ministerial visit

Provide facilitation

- facilitate learning spaces more strategically
- academic community to galvanise interested parties, e.g. by providing/presenting evidence to critical NGOs/businesses/others for them to choreograph their own responses for lobbying

IMPROVING WATER GOVERNANCE

INSTITUTIONS AND POLICIES

Develop conducive institutions

Institutionalise systems thinking and practice

- develop systems language so that it's accessible to everyone
- develop technologies to enable/facilitate system thinking and practice across organisational, geographic and temporal boundaries
- make reports more accessible to people, e.g. change of language, open access to data
- teach system approaches in schools/colleges/universities, as well as in other organisations, e.g. private, public, commercial, etc.

Institutionalise catchment science

- add catchment science to school syllabus

Develop conducive policies

- develop a manifesto for better water governance outcomes
- re-frame Water Framework Directive enactment as part of an iterative social learning system
- create a systemic experience of water governance for policy-makers and advisors (in Whitehall)

KNOWING AND LEARNING

Co-produce knowledge

- organise a systemic inquiry between CaBA, Catchment Systems Group and National Capital Committee
- design learning journeys to experience valuing natural capital, optimising water management, and delivering human health and well-being
- innovation 'machine' comprising public, private, corporate and 3rd sector organisations

Jointly identify what constitutes an improvement

- establish the 'multiple benefits' that will engage society in water governance
- articulate benefits to wider society
- define/map opportunities for improvements
- explain the risks

Figure 4. Actions to improve water governance in England (summarised and redrawn from the versions created at the workshop using an adapted version of a framework developed by Ison et al., 2004) (Foster et al., 2015)

Many of the actions bear significance to changing (transforming) the implementation of the Directive in England, particularly with regard to institutionalising community/social learning processes (e.g. catchment-based approach, adaptive management) and re-framing the enactment of the Directive as part of an iterative social learning system. Since the workshop, these actions continue to be further developed. For example, some of the participants have initiated systemic inquiries or other social learning processes within their own organisations and projects; others are collaboratively developing ways of integrating the implementation of the Directive with other policies and initiatives through community action at catchment scale. Thus, although the participants openly stated that they found the workshop tasks challenging because it was difficult to decide what was relevant or not, the overall systemic inquiry process has opened up new pathways and options for change that have the potential to fundamentally transform water governance in the UK and elsewhere.

Conclusions

At the time of its adoption in 2000, the Directive was hailed for its ambitious and holistic approach to managing Europe's waters. But 15 years later, England's waters are still in need of increased efforts to get them clean and keep them clean.

The evidence demonstrates that the process of implementing the Directive in England failed to start out systemically. Defra and the Environment Agency made optimistic assumptions about the status of water bodies in England based on the limited evidence available at the time. Consequently, they underestimated the scale and urgency of the task involved in implementing the Directive. Defra explicitly chose to transpose the Directive via secondary legislation, and to mobilise their own existing bodies and resources to meet the Directive's obligations, with seemingly little consideration for alternative options suggested by others. Following the initiation of legal proceedings by WWF-UK and the Angling Trust for a judicial review of the 2009 River Basin Management Plans, Defra asserted a commitment to undertake more actions at catchment level, and in 2013 formally launched the 'catchment-based approach' in parallel with, and to contribute to, the existing process for implementing the Directive. However, an implementation 'gap' has emerged in practice as a result of failing to make clear at the outset how the two approaches would be effectively linked. Thus, although there have been changes in the water management regime, the more fundamental structures and power relations pertaining to water governance have not substantially changed, and the water governance regime continues to be encompassed within the top-down implementation process operated by the Environment Agency.

New pathways and options for change have recently emerged from a systemic co-inquiry which engaged Government bodies, NGOs, consultants, water industry, academics and others in collectively developing a better understanding of the current water governance situation and how it can be improved in practice. The outcomes and learning from the systemic co-inquiry process emphasise that water governance is not just about managing water, but about engaging with people across all scales, levels and sectors to develop shared understandings, shared responsibility and shared goals, which recognise and bring about multiple benefits of water governance, including improvements to human health and well-being, as well as water status and other legislative standards. Institutionalising community

action at catchment scale and re-framing the enactment of the Directive as part of an iterative social learning system are perceived to be key steps towards this end.

Looking to the future of water governance in England and elsewhere, it is important to recognise the fundamental difference between 'Community action' at European scale and 'community action' at catchment scale. The Directive places an explicit focus on Community action, bringing together nations to address transboundary water management issues; and although it requires public participation in the development of the River Basin Management Plans, there is no requirement for community action at local level in their implementation. Nonetheless, as evidenced in this paper, community action at local level through a partnership approach is of equal importance to the successful implementation of the Directive. The Directive's motto of 'Getting Europe's waters cleaner. Getting the citizens involved' is perhaps more relevant now than ever before.

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Mediating boundaries between knowledge and knowing: ICT and R4D praxis

Reichelt, N.T.¹, Wallis, P.J.², Ison, R.L.³, Davies, J.⁴, Carberry, P.⁵, Sparrow, A.⁶, Hall, A.⁶, Maru, Y⁶.

¹ *Rural Innovation Research Group, University of Melbourne, Australia*

² *Monash Sustainability Institute, Monash University, Australia*

³ *ASTiP (Applied Systems Thinking in Practice) Group, School of Engineering & Innovation, The Open University (UK)*

⁴ *Formerly CSIRO Land and Water; The Northern Institute, Charles Darwin University, Australia*

⁵ *ICRISAT, Hyderabad, India*

⁶ *CSIRO Biodiversity and Ecosystems Programme; CSIRO Agriculture and Global Change Programme; CSIRO Adaptive Social and Economic Sciences Programme*

Abstract: Research for development (R4D) praxis (theory-informed practical action) can be underpinned by the use of Information and Communication Technologies (ICTs) which, it is claimed, provide opportunities for knowledge working and sharing. Such a framing implicitly or explicitly constructs a boundary around knowledge as reified, or commodified – or at least able to be stabilised for a period of time (first-order knowledge). In contrast ‘third-generation knowledge’ emphasises the social nature of learning and knowledge-making; this reframes knowledge as a negotiated social practice, thus constructing a different system boundary. This paper offers critical reflections on the use of a wiki as a data repository and mediating technical platform as part of innovating in R4D praxis. A sustainable social learning process was sought that fostered an emergent community of practice among biophysical and social researchers acting for the first time as R4D co-researchers. Over time the technologically mediated element of the learning system was judged to have failed. This inquiry asks: How can learning system design cultivate learning opportunities and respond to learning challenges in an online environment to support R4D practice? Confining critical reflection to the online learning experience alone ignores the wider context in which knowledge work took place; therefore the institutional setting is also considered.

Keywords: Boundary judgements, collaborative wiki, learning systems, action research, institutional constraints, social learning systems

Introduction

Contemporary practices, including research for development (R4D) praxis (theory-informed practical action) is underpinned by the use of Information and Communication Technologies (ICTs) which, it is claimed, provide incalculable opportunities for communication, knowledge

sharing and social networking by collapsing time and space (Simons & Laat, 2002; Cummings & van Zee, 2005). Such a framing implicitly or explicitly constructs a boundary around knowledge as reified, or commodified – or at least able to be stabilised for a period of time (first-order knowledge). In this paper we offer critical reflections on the use of an online platform for collaboration (Confluence®, Atlassian Pty Ltd – referred to herein as the ‘online platform’), as a data repository and mediating technical platform as part of innovating in R4D praxis. We address the question: How can learning system design cultivate learning opportunities and respond to learning challenges in an online environment to support R4D practice?

We draw on the shift from first to third-order knowledge/known concerns that has occurred in several fields, including technologically mediated, supported and open distance learning (Cook & Brown 1999; Blackmore et al., 2014). Klerkx et al. (2011) note that “*KM4D [knowledge management for development] has developed from linear ‘knowledge transfer approaches’ often focusing on information and communication technology (ICT) for storing, managing, and transmitting knowledge (1st generation KM), to enhancing the capacity of individuals and groups to produce new knowledge that they need to achieve their goals (2nd generation KM) but still with often a clear distinction between formal ‘knowledge producers’ and ‘knowledge users’. In the latest generation of KM4D approaches (3rd generation KM) there is a focus on ‘situated mutual learning’, in which different groups and organisations with different interests and social positions interact with one another to generate commonly shared knowledge, and co-produce new knowledge..*”. A shift from first to third order KM involves a boundary expansion that entails more elements including greater awareness of the situatedness of practice - theory dynamics and the importance of making explicit the operating conditions that shape knowledge/known practices. The significance of this epistemic shift alongside the development of ICT- enabled social networks is that there are conflicts in terms of epistemological commitments, resource investment (time, effort, money) and appropriate praxis (e.g. greater value on participatory and collaborative practices in online environments to co-create social life including, for example, innovation platforms and research communities of praxis).

The challenge we sought to address was to co-construct a sustainable social learning process in emerging communities of practices involving a group of biophysical and social researchers who came together as co-researchers in 2011-2013. We experimented with using wiki technology embedded in an online platform as part of ‘The Learning Project’ (LP), contracted to researchers from the SGRP (Systemic Governance Research Programme, at Monash University) and part of AFSI (the Africa Food Security Initiative), funded through Australian Government aid and managed by CSIRO (Commonwealth Scientific and Industrial Research Organisation). The LP was set up as an innovation system to support institutional learning based on research for development (R4D) practice experiences (Hall et al., 2016; Ison, 2016); AFSI comprised a complex programme partnership between Australian, West African and East African researchers (Ison et al., 2014). The questions posed stem from the realisation that designing online collaborative processes is complex, particularly where there is disparity between the initial design ideas and what actually happens in practice. The success and failure of online collaboration is linked to both software design and user practices, therefore the research focuses on the functionality of the online learning platform i.e. wiki technology, and the user practices and experiences of the research-based learning community. However, confining critical reflections to the online learning experience alone ignores the wider context

in which this knowledge work took place, therefore the institutional setting is included in the inquiry.

In this paper we first outline the R4D setting in which this inquiry is embedded. This includes how we have attempted to create a bricolage between practice and theory (Cleaver, 2002) drawing on empirical evidence through examining the activities, materials and communications within the online platform as well as communications about the online platform (i.e. emails). We then reflect on the adequacy of our designs to deal with our experiences and conclude with a reflection on lessons for R4D practice and future project/programme/inquiry governance.

Inquiry elements and relationships

Despite sitting within a larger R4D project, AFSI, the LP was mainly, though not exclusively, an in-country (Australia), cross-organisational collaboration involving from 15-20 geographically dispersed CSIRO staff sitting across a CSIRO internal organisational matrix structure and five university-based staff. This inquiry emerged from our experience of enacting the LP; we asked why was it difficult, outside of email, to foster research collaboration in an online environment? Our sensitivity to this issue arose from experiences in supported open learning (Blackmore et al., 2014) and research experience of attempting to foster a reflexive community of R4D practitioners in an organisation that historically valued 'research for research' (R4R – see Ison et al., 2014).

Our methodological approach in the meta-project (i.e. the LP) is first described; it was a form of collaborative co-research from which this inquiry emerged. Activities conducted as part of the learning system design of the LP are then described. We then describe the design of the online community (wiki-based) 'sub-system'. The final part describes the assessment and evaluation of the online community sub-system.

Doing co-research

Co-research is generally understood as a particular form of participatory or systemic action research (Ison, 2008). This research tradition positions academic researchers and host organisation representatives (practitioners) as co-researchers who design, execute, analyse and author collaboratively throughout the life of the project (Hartley & Benington, 2000; Mathiassen, 2002; Ison, 2008). In addition the LP (see Ison et al., 2014) drew heavily on traditions of systemic inquiry based on a lineage from Dewey (1933), Churchman (1971), Checkland (2002) to Ison (2010). Churchman (1971, p. 17) articulated the essence of inquiry when he said:

“[inquiry] is reflective learning in the literal sense: it is the thinking about thinking, doubting about doubting, learning about learning, and (hopefully) knowing about knowing”.

Put another way inquiry facilitates a particular way of knowing which, when enacted, makes a difference; when explicitly drawing on systems understandings it becomes systemic inquiry (Ison, 2010). Collaborative co-research can be difficult to enact as most mainstream institutional settings and incentive schemes are not designed to support collaborative work between researchers and practitioners (Lyytinen, 1999; Ison & Russell, 2011). Though there is a persistent lineage of collaboration between researchers and farmers (e.g. Feldstein & Poats, 1989), to our knowledge little has been reported on co-researching with researchers as R4D practitioners (but see Klerkx et al., 2011). In addition, tensions can exist between the

time-scales, styles of discourses and competing work responsibilities of academics and practitioners which can become constraining factors (Hartley & Benington, 2000). The co-research approach of the LP was motivated by previous positive experiences of action research approaches within CSIRO (Carberry, 2001; Ison et al., 2012). Our research principles were based on an openness towards the many and varied dimensions of learning through a series of self-determined learning inquiries (Ison et al., 2013). However, the research process was influenced by a set of pre-determined project milestones, which had implications for the overall design of the learning system, as discussed in the following section.

Overall learning system design

The 'learning system', design for the LP is described in detail in Ison et al. (2012; 2014). The key elements were formalised in a negotiated contract which included: (i) the preparation of a theoretical framework as a basis for action and assessing impacts; (ii) a system for collecting, managing and analysing data to demonstrate learning; (iii) assisting participants in pursuing emergent action research inquiries and documenting reflections at the time of action; and (iv) reporting so that effectiveness and efficacy of investment in R4D could be enhanced. In theory these 'deliverables', were negotiated in a context of collaborative co-research where responsibility for delivery was held collectively by Monash and CSIRO participants. However, the role of the Monash participants was to facilitate these activities in a situation where the stake-holding of most CSIRO researchers had not been built.

A primary consideration was to be attentive to boundaries; in other words, clarifying who was and who was not involved in the research. This was guided by the negotiated design of the 'project' and the ethical requirement for voluntary participation. In the end, five Monash researchers were involved, along with 17 CSIRO participants and one external consultant (n=23) out of approximately 40 potential participants involved in the overall AFSI programme. A subset of those 'signed on' to participating were active participants and contributed to the framing, conduct and steering of the research. A set of sub-inquiries emerged from the main inquiry (Ison et al., 2014) that can be understood as sub-systems of the overall learning system; these included: (1) the role of 'Integrated Agricultural Research for Development' (IAR4D) and Innovation Platforms (IP) in the context of farming systems research; (2) the relationship between good science and enhanced food security; (3) the integration of social, economic and biophysical sciences; (4) power relations and ethics within project teams and R4D; and (5) this inquiry, which came to be regarded as an exploration of the systemic failure of an online learning sub-system.

Creating an online environment

Contract points (ii) and (iii) were interpreted by the Monash participants, and most of the active CSIRO participants, as developing an online ICT environment as a tool to support data collection and storage, knowledge sharing and collaborative analysis. An imperative of the CSIRO-based LP champion was that in action research all trips to the field as well as group interactions were potential sources of data and the LP should facilitate collection, analysis and reporting based on reflections in and on practice. Here we note that this imperative was not supported by all CSIRO participants, with some indicating very early on that they were resistant to the use of an online environment; in addition, from the start, there was no formal relationship between the LP and the monitoring and evaluation (M&E) components of the overall R4D programme. We return to these issues later.

Following the decision to employ an online environment for collaboration, a range of design parameters were considered to be essential by active participants: (i) the online environment had to be hosted on a private and secure server; (ii) this meant that it needed to be password-protected; (iii) in effect the data could only be hosted on one of the participating research institutions servers; and (iv) the ability for individual users to have full control of privacy settings for information they posted was required (including the ability to create space for fully private content, or shared with a limited number of participants). The ability for participants to edit any fully-shared content was also important as was the desire that many types of content could be shared, for example text, images, audio, video and embedding of various file formats. To serve research it was important that this content was able to be tagged and searched.

The main design limitation in the specified requirements was the need for private and secure hosting, and as such only collaboration tools (wikis) hosted by the two research institutions were considered. The possibilities included a CSIRO-hosted instance of Microsoft SharePoint, a Monash-hosted instance of the Sakai Collaborative Learning Environment, either a Monash-hosted or CSIRO-hosted instance of Atlassian Confluence®, or a shared Google Site, Group and/or Drive under a privacy agreement with Monash. After discussion, the Monash-hosted instance of Confluence (version 3.2) was chosen.

A wiki is a website that allows editing of content and control of access to a series of 'pages' via a web browser i.e. a collaborative online environment in which there are several different platforms. The chosen wiki supported all of the desired design characteristics. Access to the wiki was made available in three phases. Firstly, Monash researchers logged in to the wiki with existing institutional credentials, created a set of pages, and set them to private among Monash participants. The initial content and structure of the wiki, as designed by Monash researchers, was a simple landing page with a photo-grid listing participants and the latest posts in a blog, which at the time included a short 'welcome' message and a link to the outcomes of a previous workshop. Secondly, a workshop was held with a subset of AFSI participants on 5 October 2011. In advance of the workshop, access rights were granted to enable these external participants to use the wiki. A short session at the workshop was held to demonstrate the features of the wiki, and to enable participants to test it out. Finally, accounts were created for all remaining participants and for additional participants as they opted-in to the LP.

Inquiring into the systemic failure of the online environment

During the early stages of the project, the research community was encouraged to visit and use the wiki as part of a regular practice of reflection and collaborative learning. Framed as a system for storing personal reflections and sharing learning experiences as a fundamental component of the LP it was argued that content could feed into the M&E of the overall R4D initiative. There was in theory substantial professional incentive to engage with the wiki platform. The Monash researchers regularly visited the wiki to update pages and monitor the frequency of usage and authorship of any postings. Based on 18 months of observation, it became evident that most LP members were not storing, posting or sharing their personal reflections or learning experiences. The Monash researchers sought verbal feedback from the LP membership during a workshop session in February 2013 following a presentation from the wiki administrator. This solicited feedback and provided some clues as to why the wiki failed to generate an active online learning community. Towards the end of the LP, we collated AFSI email correspondence including comments made about the wiki – all data were coded. Our analysis draws on these observations, email correspondence and feedback using an

adapted grounded theory approach (Charmaz, 2008). We situate our reflections on the outcomes within a synthesis of literature related to online environments for research.

Inquiry results

Here we summarise some of the main emergent themes from the inquiry into wiki 'systemic failure'. These include: (1) considering design elements in establishing a collaborative online platform; (2) encouraging participation within ethics' protocols; (3) facilitating online learning practice; and (4) critically examining barriers to institutionalising online learning practices.

Designing and establishing a collaborative online platform

The requirement for an on-line platform was established through the contracting process (CSIRO and Monash) and involved a limited number of especially CSIRO staff; the setup was not without tensions between different perspectives on the perceived value of a LP. Despite initial conversations to scope how the wiki could be used in research situations throughout the LP (e.g. an early workshop involving all AFSI participants in late 2011), there was limited stake-holding by CSIRO staff in this aspect of the LP at the start. In other words CSIRO staff in committing, or being committed to, the AFSI project had not signed up for either the LP or its constituent elements. Thus the initial starting conditions were not favourable and explain much of what happened subsequently. Further workshops and invitations to LP participants to join a range of training opportunities including written instructions, video-based tutorials and over the phone or face-to-face training did little to overcome the limitations created from the start. There was a low uptake of individual training, and for those who did have a phone-based tuition session, it did not translate into the regular use of the wiki as a repository for personal learning reflections or as a communication tool.

Encouraging participation within ethics protocols

The LP was approved as a low risk project by a human research ethics committee (initially at Monash and then also in CSIRO), but to satisfy the Monash ethics procedures the LP had to be designed to engage those involved in AFSI on a voluntary basis so as to avoid participation through coercion. While coercion would be ethically challenging, the context of the project, as an effort by a research organisation to learn more about and get better at interfacing research and practice, should have been considered. However, in the first instance, participants from within CSIRO were recruited through an email invitation issued by a senior manager to AFSI members:

"Please note this email makes no assumption about your participation, though of course we in the AFSI management team see many advantages that can flow from involvement" (AFSI LP Member 12).

Unfortunately the ethics protocols did not reflect a co-research setting and emanated from a framing of CSIRO co-researchers as research subjects in a Monash research project, rather than active participants in research design and implementation. Originally the standard consent forms did not specifically reflect the co-research situation. This points to the *ex ante* constraints to designing and enacting a joint inquiry between two collaborating organisations when institutional arrangements reinforce organisational boundaries and research praxis stereotypes.

The extent of sharing individual and collective experiences (documented as recorded conversations, self-reflections, email correspondence and meeting notes) was extremely

limited over the life of the LP. Unfortunately the project's ethics protocols required ongoing consent from participants to share research 'data' with others involved in the project creating a lingering perception that data (reflections, etc.,) were being transferred from participants (CSIRO) to researchers (Monash), whereas the intent of the co-research dynamic was that data would be created and shared for the collective use of all participants:

"If we are doing action and co-research, then we need ethics protocols that work to engender trust and open communication among co-researchers. Elements of the Monash protocol (esp. around confidentiality and anonymity of CSIRO and Australian Affiliate AFSI participants) presented barriers to trust and open communication, truncated the 'data' potentially available to the LP 'researchers' and to participants (from CSIRO and affiliates working in AFSI) for shared learning and thus compromised the very aim of the learning project". (AFSI LP Member 12)

In line with reflexive practice, the Monash team liaised with their Human Research Ethics Committee and AFSI LP members to clarify the situation. The strongly supported view that emerged was that the LP was designed to be a social learning experience therefore as long as individual identities remained anonymous in publications, emails and other documentation they should be understood as shared resources to be accessible across the AFSI LP membership (AFSI LP Member 7). The Human Research Ethics Committee confirmed that such material should be able to become research data once the LP members agreed to these conditions. Yet there is a legitimate concern that if all conversations, personal reflections and email correspondence were framed as potential data, people may be less inclined to engage with each other openly knowing these interactions could be potential sources of conflict, undermine trust and be subjected to differing interpretations in data for analysis.

Facilitating online learning practices

In order to foster online learning practices, certain AFSI LP members prompted other members to use the wiki in a variety of ways. AFSI LP Member 14 encouraged the use of the wiki in real-time during a scheduled telephone conference, however this did not eventuate. AFSI LP Member 13, in the role of wiki administrator, created a suggested format for all members to record their reflections. A template was uploaded to the public space to motivate usage and to assist in transforming wiki content into shared research data in a convenient manner. AFSI LP members were advised how they could share their contributions or keep such reflections private (Ison et al., 2013a). Therefore, participants had the opportunity to manage their own content. This reflective space was used sparingly, however in one instance the wiki was used to share trip notes that were initially part of email correspondence and reports from CSIRO researchers about fieldwork with African research partners. The content provides a talking point about the realities of researching for development in-situ, for example:

"My further travels through Burkina last week were very busy and fruitful...One of the sites (Bouna) is very close to the Ghanaian border...At the Bouna site I had a good chat with the farmers about what traits they liked from the trials they had witnessed and whether they would buy seed from what they had seen. Encouragingly many farmers would buy seed of the improved varieties, although at the moment seed is subsidised by the government, so that will skew any thoughts. The conversation was quite long, because we have to translate from English, through French to the local language and back again, so I may well have been asking them what their favourite colour hat was. (AFSI LP Member 19).

AFSI LP Member 12 considered such content a prime example of how AFSI LP members might consider recording and sharing learning experiences with others.

“Great report and material for the Learning Project...Also thanks for your serious adoption of the need for documenting our experiences and reflections – this is [an] excellent example of what we as a team need to do.” (AFSI LP Member 12)

Unfortunately the wiki posting did not receive any comments or lead to any online discussion. Instead the wiki has been primarily used as a repository for documents and communications: email communication, AFSI newsletters, AFSI LP administration documents and AFSI LP meeting minutes. The wiki was also used as a common area to display the evolving structure of the LP Inquiries.

In summary, there was limited use of the wiki across the AFSI LP membership as a space to post comments, conduct text based dialogues or add content to share i.e. to practice collaborative learning, or in the words of Cook & Brown (1999) *“to engage in the generative dance between organisational knowledge and organisational knowing”*. It was used for storing project documents and correspondence, and displaying the evolving themes of the LP Inquiries, so in this regard it fulfilled an important function. Planning how the wiki could be used in the planned second phase of the project was shaped by asking the question:

“How do you make it part of daily/integrated practice?” (Confluence, 20120309 - critical friends meeting)

This question was an acknowledgement that using the wiki had not yet become an embedded, everyday practice. Unfortunately the second phase of AFSI did not come to pass because of political changes in Australia’s development assistance programme.

Barriers to institutionalising online learning practices

Towards the completion of the AFSI LP it was generally recognised that the wiki had been used in a very limited sense; only a small subset, 5 out of 22 LP members, actively contributed to the wiki. A range of possible social and technical issues were identified during an AFSI LP workshop held in January 2013 that provided important insights into the AFSI LP experience. A key issue identified was the high transaction costs involved in creating and maintaining an additional login to access the Monash-based wiki site, which was an external site for the CSIRO based researchers. It also became apparent that CSIRO LP participants had little time because their time was mapped to other projects. Participants also had variable time allocations and conversations need engagement of more than one person; one might be keen and have time, but if not all do, then there is no interaction. AFSI LP members also expressed privacy concerns associated with openly sharing opinions, ideas and research data in a collaborative, online environment, in a space that was also accessed by senior managers and colleagues.

The success of online communities are also dependent on the self-efficacy, motivation and ability of community members to self-regulate their practice/behaviour in an online environment. No doubt ‘digital natives’ will be more adept in future but efficacy will, we suggest, still require conducive institutional arrangements if participants are to exhibit transformations in learning.

Internet connections in some countries are intermittent and not conducive to working online; this was the case for AFSI researchers when outside Australia. The online platform itself was sometimes unstable or unreliable, and did not always receive adequate attention from technical support staff (AFSI LP Member 13).

In response to some of these technological issues, AFSI LP Member 13 suggested migrating the wiki pages to an internal system at CSIRO using existing authentication if the LP was to transition into Phase 3 of the AFSI. A further attempt to engage the LP membership in online collaborative practices was initiated by AFSI LP Member 4 through the provision of access to a CSIRO hosted web application platform (Sharepoint). The platform supports document and file management, online collaboration and social networking and intranet portals. Similar to the experience with the Monash-based wiki, the web application was primarily used as a repository for relevant CSIRO based documents (e.g. reports), as an information source rather than a place to interact and co-generate knowledge.

Collaboration and learning did emerge but outside the boundary of the wiki in offline situations. Collaborative practices transpired through email correspondence, telephone conversations, face-to-face meetings and through the co-authoring of research papers which is the principle practice of the group (i.e. R4R) in Wengerian (1989) terms.

Making sense of our experiences

Mediating collaborative practice within an institutional ecology

The biggest technological constraint was the requirement for CSIRO staff to use an external login to access the space. However, it was not the technology *per se* that failed but the institutional ecology in which it was deployed, including how ICT, or indeed any technology, is perceived systemically in relation to practice. By institutional ecology we mean the set of arrangements, rules, contracts, project elements (e.g. M&E) that characterised the LP at inception as well as the historical practices and arrangements that researchers brought with them from their organisations. Design tensions and concerns about purpose existed from the start. These included:

- i. upon returning from the field all CSIRO staff were expected to deposit trip reports on the CSIRO project and fieldwork management system but no provision was made for sharing these with the new wiki augmented data - at least not until 2015 after the termination of the AFSI programme - see McMillan et al. (submitted);
- ii. no internal staffing were available to manage an online platform within CSIRO (which had its own collaboration tools), and had staff been available, this would have presented access problems for Monash researchers (i.e. protocols for reciprocal access were an issue);
- iii. ethics protocols were new to many within CSIRO and lagged behind on-the-ground developments and, as discussed, were not well suited to co-research between different researcher groups i.e. research data (emails, meeting notes, reflections) could not be freely shared between AFSI LP members without prior consent according to Monash University Human Research Ethics protocols;
- iv. there were no institutional links built between the wiki and the formal M&E requirements of AFSI, despite efforts to address this issue;

- v. as with the whole LP, participation by AFSI researchers in the use of the wiki was voluntary;
- vi. AFSI participants with varying managerial responsibility and seniority probably considered the online space as unsafe for maintaining confidentiality and/or being open when storing and sharing content;
- vii. the learning context was a challenging one i.e. two organisations coming together from different learning cultures and practices to jointly use an online platform with few incentives; and
- viii. CSIRO researchers had to deal with the complexities of different line and project managers, insufficient time allocations in their workload matrices, performance metrics and the overall political tension within the organisation over doing R4D rather than R4R.

Epistemic struggles

There was however, another level of systemic failure that pertains to understanding how the co-production of knowledge happens, or could happen, and thus the practices upon which co-production rest. In the literature this arena of contested understandings is in part captured by Cook and Wagenaar (2012, p.3) when they say:

“..it is commonly said that knowledge is applied in practice. Professionals can be distinguished from lay people in that they have acquired through training a body of tested and proven specialised knowledge that enables them to resolve problems in their given field..... Numerous writings have brought us valuable insights into the importance of practice and have done a great deal to erode the Received View of practice as explicable wholly in terms of applied knowledge. However, our understanding of how exactly practice, as a distinct phenomenon, generates knowledge and how knowledge functions within practice is underdeveloped”

It is the ‘received view’ that underpins enduring commitments to the linear knowledge-transfer-model (Ison & Russell, 2011). In contradistinction to what they label as the ‘received view’, Cook and Wagenaar (2012) explain how *“knowledge and context can be explained in terms of - and are evoked within - practice, and not the other way round, and that this transpires within real worlds each of which has its own unique constraints and affordances, histories and futures.”* Knowledge was framed from the start of the LP in terms of the Received View, as being managed in application to generate practice. This was limiting. So too were the limitations in investment (budget) and staff that precluded more active processes of ‘knowing management’. To appreciate what knowing management could be in contexts similar to our own the concept of what online communal R4D practice ‘is’ or ‘can be’ needs to be explored.

Before undertaking this exploration it is important to appreciate the shift from first to third order knowledge management (KM) as described by Klerkx et al. (2011). ‘Third-generation knowledge’ now emphasises the social nature of learning and knowledge-making i.e. we learn through interacting with one another in dialogue and shared practices; this reframes knowledge as a negotiated social practice, thus constructing a different system boundary (Cook & Wagenaar, 2012). In their framing of the 1st to 3rd order distinctions it is not clear whether Klerkx et al. (2011) go as far as Cook and Wagenaar (2012) in seeing knowledge production and knowing enabling as a duality, albeit one in which the received view currently dominates the other. From this perspective third order KM, or preferably knowing/knowledge,

managing is more than a “negotiation process to reconcile different interests” (Klerkx et al., 2011).

Understanding knowledge communities metaphorically

Two prominent metaphors can be used for further exploration: communities as a physical place and communities as a network (Figure 1). Both metaphors can co-exist in understanding online communities.

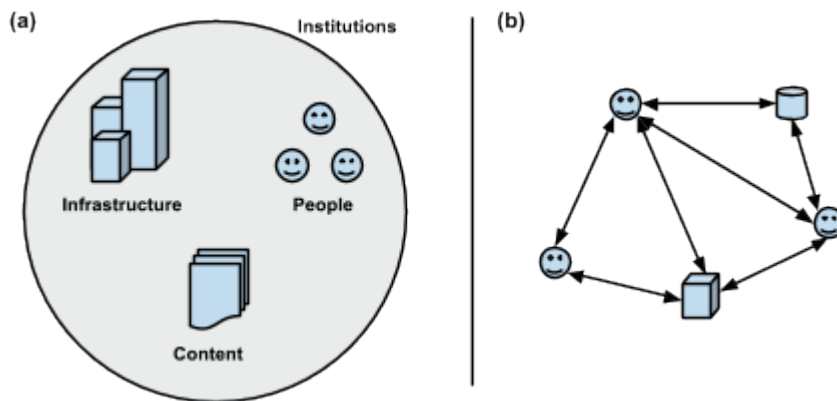


Figure 1. Metaphors of online community as (a) physical place and (b) network

In an online community represented as a physical place, people inhabit infrastructure, interact with others, express meaning through their practices and objects, and are shaped by their context. As with town planning, one does not simply create a community by providing the infrastructure; a community emerges from a combination of infrastructure, people, objects, meanings, relationships and other variables. Generating ‘content’ in an online space is like furnishing a home with material artefacts; in many ways this was the main motivation for pressing ahead with the wiki, though it also had to have the facility to track artefacts and assemble them in new ways to meet the needs of emergent inquiries and research questions. Online content generation provides visible evidence of being active in the online environment (Hemetsberger & Reinhardt, 2009).

An online community represented as a network is differentiated from a physical, place-based community because interactions mediated through ICT transcend location, allowing people to connect across space and time from the local to the global scale. Online relations are described as spontaneous and particularised to create heterogeneous communities of interest that have variable longevity. Perhaps there was not enough focus on strengthening the ability of individual AFSI LP members to connect through their existing networks i.e. employing a network metaphor involving fluid configurations of individuals, compared to the place metaphor which tended to emphasise a stable group involving all LP members.

The quality of online social networks emerge and are demonstrated through specific roles people adopt throughout the life of the network. Despite advances in network communications globally AFSI members working in spatially disparate sites in Australia and East and West Africa were often constrained in the technologies they were familiar with and prepared to use; email was generally the most reliable, satellite phones were required for safety protocols and attempts at inviting researchers in the field to record reflections when fresh were not successful.

However the network metaphor also warrants critique. A key limitation with the network approach to understanding social realities is a tendency to focus on the structure at the expense of giving significant attention to the cultural and intersubjective dimensions of social relations (Yuan, 2013). Network theory is criticised for accentuating individualism in social theory, which plays out in targeting the individual as the unit of analysis i.e. the social network is reduced to the ties between the individual actors (Postill, 2008). Gurstein (2001) contends that reducing ICT-supported societies to individuals simply connecting with other individuals disregards the potential for people forming digitally enabled communities capable of taking collective action and forming powerful social identities. This also applies to the possibility of people coming together to undertake co-research using an online environment where collective action and social identity would be expressed in a culture of sharing and institutionalising collaborative practice.

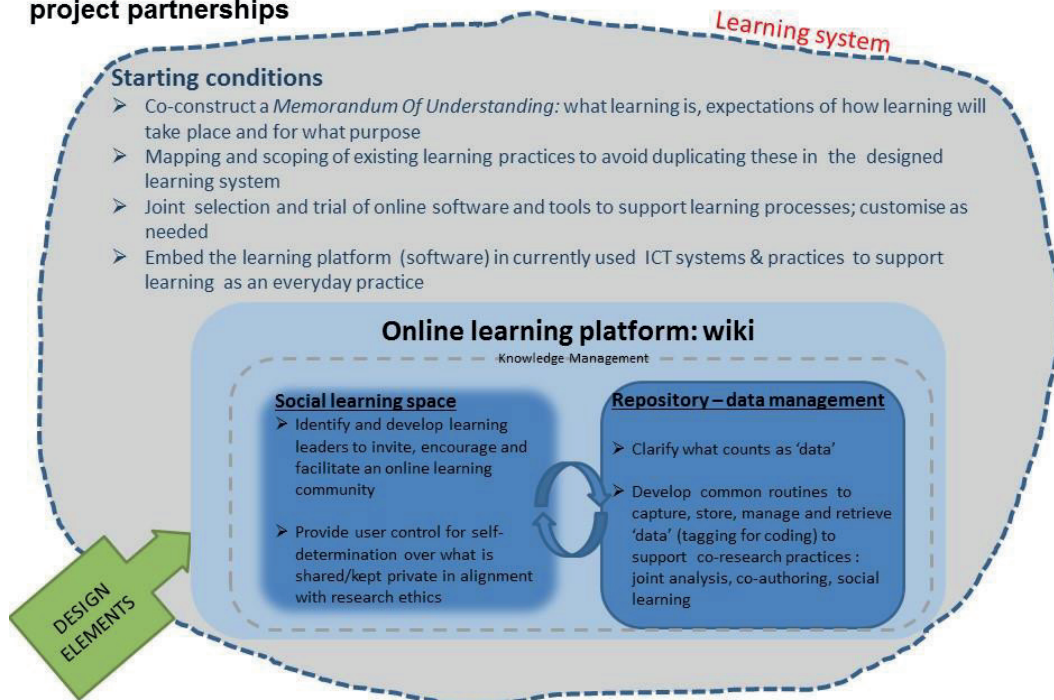
Designing online spaces for collaboration is a complex process where there can be great disparity between the original design ideas and what actually eventuates in practice (Barab et al., 2004). An obvious strategy is to include users in the design process based on the situated needs and limitations of the users (Barab et al., 2004); in our situation this was only partly achieved and began with what can now be understood as the wrong institutional ecology and conceptual understanding and unexpressed epistemological commitments. In hierarchical research organisations, programmes or projects the realisation of virtues associated with open source collaboration, emergent communities of practice and self-organising inquiries seems a long way off and probably requires capacity building efforts that explore new metaphors (Hall et al., 2012). Where there is a genuine desire to shift focus from R4R to R4D there is much to be gleaned in experiences from technologically mediated learning in school and higher education (e.g. Laurillard, 2012; 2013) and from activity system design (Engeström, 2006).

In Figure 2 the learning outcomes from this inquiry are summarised in terms of: (i) creating the starting conditions for designing an online learning system to enable co-research practice in complex project partnerships (Figure 2a); (ii) responding to emerging 'real-world' issues (Figure 2b); and (iii) aligning ethics protocols with desired practices (Figure 2c). The figures were generated to show the positioning of our online learning innovation (wiki) within the larger learning system; that practice and experience is embedded within the starting conditions (framings, assumptions, institutionalised practices) of the project process and the differentiated 'spaces' in the wiki between the learning space/data management space.

Figure 2. Learning system design features with on-line elements for enabling R4D as co-research: (a) creating the starting conditions for designing an online learning system to enable co-research practice in complex project partnerships; (b) responding to emerging 'real-world' issues; and (c) aligning ethics protocols with desired practices.

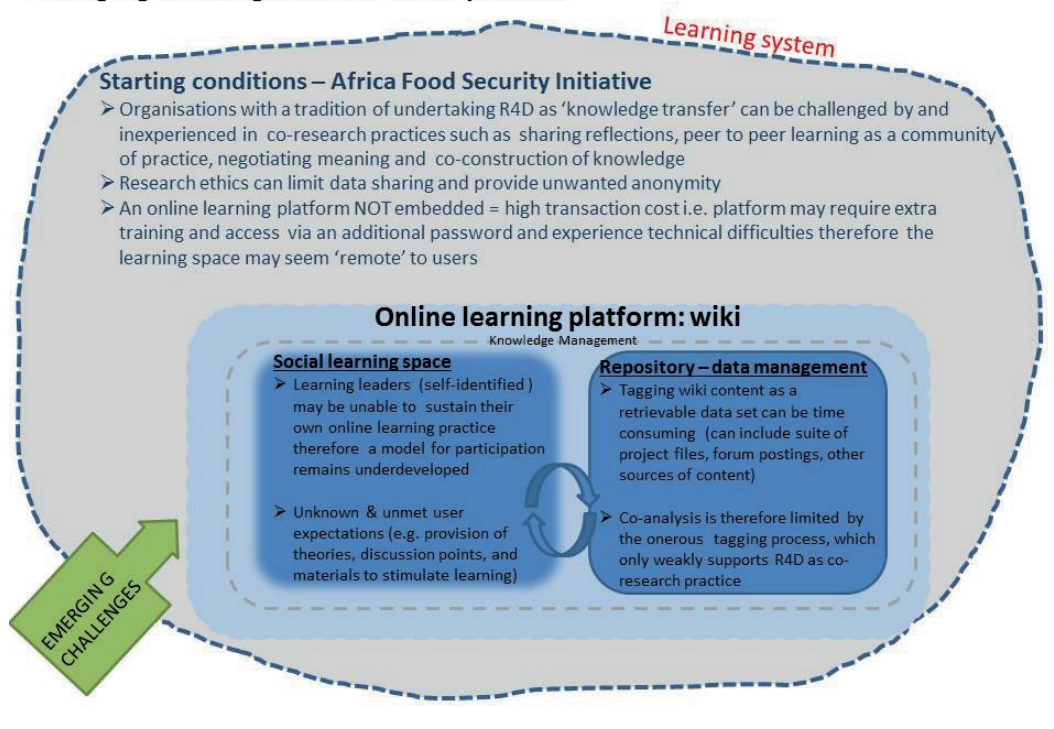
R4D as co-research practice

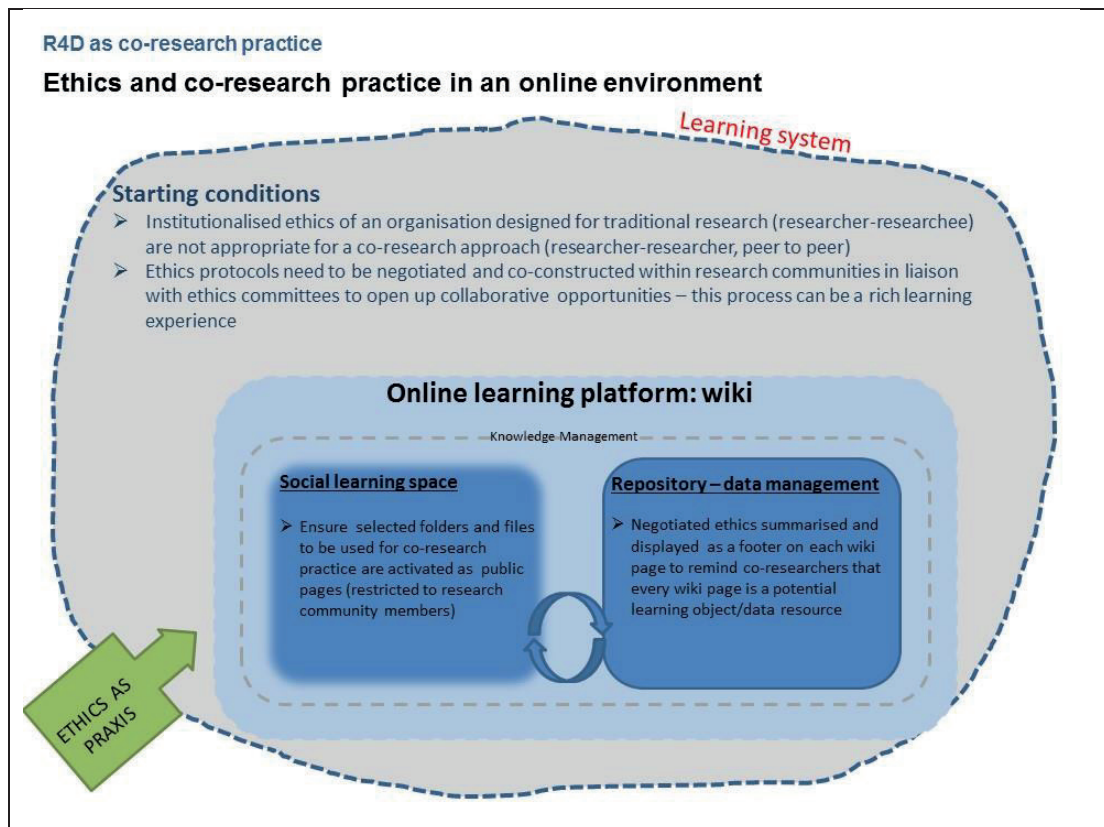
Designing an online learning system to enable co-research practice in complex project partnerships



R4D as co-research practice

Emerging challenges in real-world practice





Conclusions and future directions

The lessons we can draw overall from this experience highlight the importance of:

- dedicating time to critically assess and customise online technologies to facilitate a shared learning environment including how the design may influence whether or not online participation becomes a part of everyday research practice;
- initiating discussions and deciding upon an ethical framework to align with the research principles (in this case co-researching as a social learning process in an online environment);
- developing knowledge management practices to support co-research activities i.e. tagging data, including stories (see Ison et al., 2013) as a collective practice to enable joint analysis;
- actively adopting online community roles to demonstrate collaborative and learning capacities as an innovative platform; and
- nurturing social relations/building trust online and offline as part of a ‘seamless’ learning system rather than framing the online environment as a differentiated (disconnected) space from offline research practices and social relations.

If systemic innovation is to be achieved, the system of concern must be framed to encompass external research organisations as well as project recipients and collaborative partners (Ison et al., 2014).

What else could have been done differently? Negotiating ethical protocols as a collaborative exercise would seem a necessary undertaking to situate ethical practice appropriately and to provide an occasion to learn about designing an ethical framework. AFSI LP Member 7 suggested that the research process should avoid a “predetermined structure” and explicitly invite members to reflect as a free-form contribution to a shared site, where facilitators actively offer their interpretations to the community as a discussion forum, possibly conceived as a digital commons. Alternatively CSIRO might have invested in, and institutionalised, an R4D digital commons. Possibly social networks could have been exploited as a potential means to bypass or work outside bureaucratic structures as a means to operate in an emergent way alongside the established social structures.

A co-researcher dynamic avoids academics acting as ‘experts’ conducting research ‘on’ practitioners; this is a profound shift in boundary conditions associated with R4D practice and is a far cry from mainstream R4R practice. It encourages joint learning through interest-based inquiries drawing on a diversity of perspectives and harnessing skills and roles from both parties along the way (Hartley & Benington, 2000). Co-research helps to deal with tensions between meeting organisational goals and pursuing research-driven goals (Mathiassen, 2002) but to succeed conducive institutional ecologies and safe learning environments have to be created and sustained.

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Sustainable food and nutrition security: is there a need to pay much more attention to smaller farms, smaller food businesses and local food systems?

Knickel, K., Correia, T. and Almeida, M.

Instituto de Ciências Agrárias e Ambientais Mediterrânicas (ICAAM) at Universidade de Évora, Portugal

Abstract: This paper brings together relevant theoretical perspectives and insights that we want to test in the new Horizon 2020-funded research programme ‘*Smaller farms, Small Food Businesses and Sustainable Food and Nutrition Security (SALSA)*’. We briefly outline the novel integrated multi-method approach that we want to apply at international and regional levels in Europe and Africa. Explicit references will be made to the particular values and goals that underpin smaller farm systems, small food businesses, their role in local food systems and their capacity to contribute to sustainable food and nutrition security (FNS). In doing so we pay particular attention to boundary issues and the way we want to address them. The main part of the discussion focuses on the need for gaining a better understanding of the idiosyncrasies of smaller farms and more localised food systems with their relative strengths and weaknesses. The general background for our discussion is the increasingly globalised, uncertain and resource-constrained world. In the discussion, we pay particular attention to the capacity of smaller farms to contribute to FNS in different regions and contexts. Related to this we examine the dynamic properties of smaller farms and their capacity to adapt to changes in their economic, social, technological and natural environment. We explore the balance between the social, environmental and economic dimensions of sustainability in the development of smaller farms and the potentially higher resilience of smaller farm production. We expect that the feedback received from workshop participants will contribute to finalising our implementation planning and open up numerous opportunities for cooperation with the Farming Systems Research and Extension community.

Keywords: Agriculture, sustainability, governance, development, transdisciplinary

Introduction

Sustainable food and nutrition security

Following the recent global crises, which also affected food distribution and prices, food and nutrition security (FNS) has become a major concern not only in developing countries but also in Europe (EU SCAR, 2012; FAO et al., 2014). According to the Food and Agriculture Organisation of the United Nations (FAO), FNS is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (WFS, 1996). FNS is widely recognised as having four components: the availability of nutritious and safe food, food access (including affordability), food utilisation, and food stability (WFS, 1996; FAO, 2006, 2008).¹ To date, most attention has focused on food availability, i.e. increasing the production of food. This in turn is most commonly envisaged through the intensification of production on large-scale farms,

¹ http://www.gecafs.org/research/food_system.html;
http://ec.europa.eu/agriculture/rural-area-economics/briefs/pdf/02_en.pdf

through implementing technological advances and achieving economies of scale. Sustainable intensification is a key notion in the more recent discourses (EC, 2014a).

What is often neglected is food access, especially for low-income groups (HLPE, 2013). Closely related with this is the important role that smaller farms might play in local food systems related to food access and utilisation. A closely related question is the resilience of the population in the face of systemic shocks (e.g. climate change, commodity price fluctuations). FAO stated in its annual flagship publication ‘The State of Food and Agriculture’ (FAO, 2014b) that there are more than 570 million farms in the world, and that about 94% of the world’s farms are less than 5 hectares in size. Quite a few recent studies have argued that smaller farms, smaller food businesses and local food systems might play a rather significant role in FNS. Some studies go further arguing that smaller farms and food businesses play an even larger role for the resilience of these systems and sustainable FNS, and that this role could be strengthened further if smaller farms and food businesses were adequately supported.

The questions we want to raise in this paper focus on the position and role of smaller farms and smaller food businesses in food systems. We will examine the importance of the socio-economic, sustainability and resilience dimensions of FNS and challenge the conventional productivist view that emphasises the supremacy of commercially focused, capital-intensive and often large-scale agriculture. The main part of the discussion focuses on the need for gaining a better understanding of the peculiarities of smaller farms and more localised food systems with their relative strengths and weaknesses. The general background for our discussion is the increasingly globalised, uncertain and resource-constrained world. The discussion in this paper and feedback received from the Farming Systems Research and Extension community will help to shape the implementation of the new Horizon 2020-funded research programme ‘*Smaller farms, small food businesses and sustainable food and nutrition security (SALSA)*’ that is co-coordinated and managed by the three authors.

The SALSA project

The new SALSA research programme (2016-2020) is to contribute to a better understanding of the current and potential contribution of smaller farms and food businesses to FNS. Table 1 provides some basic information.

SALSA pays particular attention to effectively engaging with stakeholders to cut across classical boundaries in food system structures and situations, Europe-Africa relations, research, policy and practice.

Table 1. Some basic information about SALSA

Smaller farms, small food businesses and sustainable food and nutrition security (SALSA)	
Funding	European Commission, Horizon 2020, SFS-2015-2, SFS-18, 5 million Euro
Period	April 2016 – March 2020
Project type	Research and Innovation Action (RIA), multi-actor
Co-ordination	University of Évora - Instituto de Ciências Agrárias e Ambientais Mediterrânicas (ICAAM), Évora, Portugal

Other countries involved	Cape Verde, Ghana, Greece, Italy, Kenya, Latvia, Norway, Poland, Romania, Spain, UK, Tunisia
International organisations	African Women in Agricultural Research and Development (AWARD) Food and Agriculture Organisation of the United Nations (FAO)
Practice partners	Savannah Young Farmers Network (SavaNet) Federation of Italian Farmers (Coldiretti)
Central work planning component	A set of 30 reference regions where standardised information on small-scale farming, other small food businesses and FNS will be compiled both for SALSA related analyses and consultations as well as ongoing monitoring

Note: For more information or a document where the project is presented in more detail, please contact the authors.

SALSA will pioneer a novel integrated multi-method approach that combines quantitative, qualitative and discursive approaches. The project will start by kicking off a transdisciplinary process of review and theory building. This is followed by an initial spatial assessment that will include innovative methodological pathways and more effective uses of existing databases (including the use of SENTINEL-2 satellite images for acquiring detailed spatial information about smaller farm distribution). This first assessment will be complemented by a transdisciplinary in-depth assessment of food systems in 30 reference regions that will feed into the participatory multi-scale analysis as well as providing the basis for the analysis of governance systems and support frameworks. The in-depth analysis focuses on the relations between smaller farms and FNS in different contexts. The 30 regions will be selected based on the analysis of spatial and statistical data to represent the range of situations in all of Europe and, to a lesser extent, Africa. The selection will also pay attention to the spatial types of region in socio-economic terms and the urban-to-rural spectrum (ESPON, 2011).

An assessment of governance frameworks related to smaller farmer organisation and food chains is to support policy development and enhance the contribution of smaller farms and small food businesses to all four aspects of FNS. We aim at an effective collaboration and exchange between European and African research and practice partners in order to identify similarities and differences in food systems, improve mutual understanding and enhance future EU-Africa initiatives.

In SALSA, we will essentially need to tackle a number of challenges in a systemic way - in each one of them we will be confronted with very significant boundary issues:

- recognising the tremendous heterogeneity in smaller farm and farm household situations;
- taking the four dimensions of FNS into account and applying a systems perspective;
- exploring the precise linkages between smaller farms and FNS;
- understanding the peculiarities of smaller farms and local food systems;

- addressing vulnerability and resilience;
- based on a better understanding of the functioning and organisation of (local) food systems in the 30 regions, deriving recommendations regarding improved governance systems and support frameworks at relevant levels.

In order to manage the related challenges in project implementation, we think that a meaningful interaction between research and practice is central. The basic idea is that it will only be possible to better understand the role of smaller farms and small food businesses in FNS if practice and research make a joint effort to exchange and learn from each other. The interaction with smaller farmers, rural entrepreneurs engaged in the food sector and their representatives will play an important role throughout the project. The same applies to the EU-Africa collaboration envisaged. These basic orientations acknowledge the fact that the different regional contexts and differences in situations play a major role, and that exchange and joint learning is possible.

Structure of this paper

The subsequent analysis starts with a brief discussion of the theoretical perspectives that influenced our project planning. The central chapter focuses on the way we want to address the key questions and challenges referred to before, and the related boundary issues. The concluding section focuses on the potential significance of more localised food systems, the lessons learned so far about boundary issues and the implications for our implementation planning.

Our paper sketches out an integrated systems perspective for assessing the role of smaller farms and local food systems in sustainable FNS.

Relevant theoretical perspectives

Our analysis is based on a number of theoretical frameworks because while most frameworks can support particular components of the planned research, none is sufficient on its own.

Brookfield and Parson (2007), Davidova et al. (2013), FAO (2014a) and others have shown that smaller farms encompass a wide range of organisational and structural patterns across Europe and around the world. Bryden et al. (1993) and others point out that, differently to larger and more specialised farms, farm families tend to make decisions and behave partially independently from the signals and pressures of the market economy. Bryden et al. (1993), EC (2011), FAO (2014a,b) and others have argued that the main common feature of smaller farms tends to be the significant direct involvement of family labour in farming operations, that often - though not always - other household income sources are important, and that farm production tends to play a significant role in family food consumption.

Knickel (1994), Knickel et al. (2004, 2013), van der Ploeg (2013) and Caron et al. (2014) argued that smaller farms have the capacity to mobilise social capital and local knowledge, which has major implications for levels and types of market integration as well as transition pathways. Chayanovian models stress the trade-off between need for income and drudgery related to work (Schmitt, 1992; van der Ploeg, 2013). Models inspired by Polany highlight how market and non-market logic (such as reciprocity and redistribution) are mobilised in reaction to specific situations (Brookfield & Parson, 2007). Neo-classical models use the concept of marginal utility of family labour to explain the mix of on-farm, off-farm and hired labour.

Sustainable livelihood approaches underline the multiple sources of livelihood and the role of 'vulnerability context' (Ellis, 1988), and farming system approaches investigate the implications of multiple feedbacks between social, economic and environmental subsystems (Darnhofer et al., 2010, 2014). Actor-network approaches study the role of non-human factors in social organisation, in social change and in innovation (Brunori & Rossi, 2000).

Relevant institutional theory that gives body to the notion of system, and food system in particular, includes Blay-Palmer (2010) who asks how food systems can be more inclusive, how local and global scales interact and how power flows within food systems. In particular, the work on institutional frameworks shows that theory in the fields that are central to food, agriculture, change and development and its implementation is strongly affected by interests at stake and by context sensitivity. Theory development in the project is therefore conceived as a multi-actor process aimed at integrating different types of knowledge and interests around concrete policy-driven problems. Where and how these different theoretical frameworks enter the analysis, will become clear in the following discussion.

Discussion: key questions, the way we address them and the related boundary issues

Recognising the heterogeneity in smaller farm and farm household situations as well as their peculiarities

The most common criteria used to define smaller farming are land area, labour units, size of production, economic size - alone or in combination (Brookfield & Parson, 2007; EC, 2011; Hubbard, 2009; Davidova et al., 2013; Lowder et al., 2014; FAO, 2014a). While their main common feature tends to be the direct involvement of family labour in farming operations, often - though certainly not always - other household income sources are important (Knickel et al., 2004). Most importantly, small size confers additional particularities to farms (Bryden et al., 1993; Davidova et al., 2013). A very significant difference is the capacity of smaller farms to mobilise resources additional to those procured through market exchange, such as social capital and local knowledge (Knickel, 1994; van der Ploeg, 2013).

In SALSA, we explicitly recognise the tremendous heterogeneity in smaller farm situations and related concepts and discourses. The underlying idea is to facilitate a more comprehensive analysis that crosses different discourses, and will be able to accommodate very different social, cultural, economic and historical situations. We therefore use "smaller farm" as a more generic term. Focus in the analysis will be on farms in which family labour tends to play a significant role and where self-consumption by the farm family, local sales, short supply chains and collective marketing tend to absorb a noteworthy part of production. Figure 1 illustrates that in SALSA we will focus on smaller farms in which particular conditions and (social) relations play a major role.

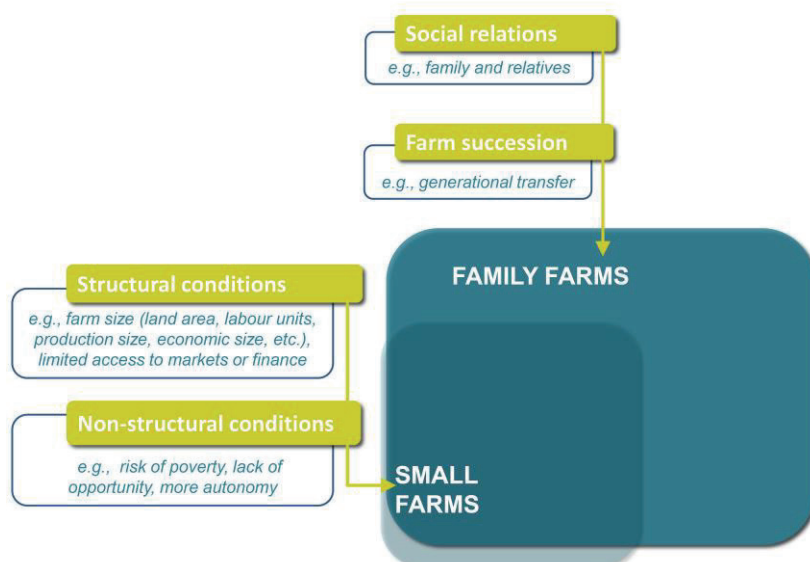


Figure 1. Smaller farms as a subset of family farms, with particular characteristics related to farm succession, social relations, and particular structural and non-structural conditions

SALSA not only focuses on smaller farms but also on their relation with (small) food businesses. These have been defined as any undertaking, whether for profit or not, and whether public or private, carrying out activities related to any stage of production, processing and distribution of food (GECAFS, 2014). Important for our analysis is that small food businesses also tend to be more directly linked with smaller farm producers, e.g. smaller farmer cooperatives, marketing cooperatives or small food enterprises sourcing from smaller farms.

Taking the four dimensions of FNS into account by applying a systems perspective

SALSA bases its analysis on the four components identified by WFS (1996): the availability of nutritious and safe food; food access (including affordability); food utilisation; and food stability. In the empirical analysis, we will adopt a food systems perspective in order to simultaneously explore the four dimensions of FNS and the connections between them. As food systems theory is broad and cross-cutting, employing it as a conceptual framework allows us to expand the scope of inquiry to include issues linked to land, economy, access to resources and food, production, processing, regulation, and politics. Particular attention will be paid to the question of food access and the role that smaller farms *can* play in local food systems.

Exploring the linkages between smaller farms and FNS in a food systems perspective

It seems to be rather counter-intuitive that smaller farms, smaller food businesses and local food systems are of critical importance for global level FNS. Closely related is the belief that the mere existence of local food systems is completely against the logic of free trade. The related suppositions are that smaller farms can hardly compete anyway and that they do not play a significant role in terms of food quantities. The latter is in line with the conventional productivist view that emphasises the important role of commercially focused, capital-intensive agriculture.

The European Commission (2014c) adopts a different perspective by directly connecting FNS to the role of smaller farms: *"Ensuring food security requires access for smallholders, particularly women, to land, resources, investment and markets, access to nutritious food and adequate health systems, plus multi-sector action on behaviour and dietary patterns. The framework needs to promote sustainable agriculture, fisheries and aquaculture practices, the efficient use of resources and enhanced resilience."* In line with this, the High Level Panel of Experts on Food Security and Nutrition (HLPE, 2013) as well as others (e.g. Hazell et al., 2007, 2014; Bryden et al., 2011) also emphasise the role of agriculture in terms of employment and income, highlighting the importance of smaller farms in addressing both production objectives and development goals, including the fight against rural poverty and food insecurity.

SALSA aims at exploring this further by identifying and describing in 30 reference regions the precise linkages between smaller farms, smaller food businesses and the four dimensions of FNS. In the analysis, we will apply a food systems perspective and examine market relations (Tansey & Worsley, 1995; Ericksen, 2008; Ingram, 2011; GECAFS, 2014). Common methodological guidelines for the description and mapping of the food system, and reporting templates, will ensure comparability across regions.

The questions that will guide our empirical analysis of the organisation of production, processing, distribution and consumption of food, and the related hypotheses are:

- *How and to what extent can smaller farms contribute to food availability?* Our hypothesis is that smaller farms can be rather efficient in the production of specific commodities although they have a much weaker position within food chains, especially those led by large-scale retailers or processors. New forms of collaboration are relevant, which enable small farms to persist. Smaller farms might also have a particular role in producing food on land that has been marginalised (e.g. in remote and mountainous areas).
- *In what ways and to what extent can smaller farms improve access to food?* Our hypothesis is that their involvement in local food production and distribution can play a very significant role. Smaller farms are in many regions probably also important as farming is a key component of household income generation and stabilisation, in particular in periods of crisis. Smaller farms also have the potential to connect more directly with smaller food businesses (processors, retailers, restaurants, caterers, etc.) and consumers, establishing local and niche markets.
- *How and to what extent can smaller farms and small food businesses contribute to food utilisation?* Our hypothesis is that smaller farms and the related food businesses contribute to ensuring the stability of supply, including through their relationships to urban consumers. Apart from market opportunities that can emerge, direct producer-consumer links might also contribute to new urban-rural relations (e.g. food co-operatives) and sustainable consumption practices.
- *In what ways and to what extent can smaller farms contribute to the stability of local and regional FNS?* Our hypothesis is that smaller farms are less exposed to and dependent on international markets, and that this serves as a buffer in particular in situations of sudden shocks (e.g. economic crises, price fluctuations) or cyclical events (e.g. seasonal food insecurity). We also assume that smaller farms can more easily mobilise non-market resources and adapt their development pathways. Systems

based on optimising profitability alone may not have this capacity. Households with smaller farms tend to diversify their activities in order to manage risk and benefit from economies of scope by creating synergies between different activities (Knickel et al., 2004), thus increasing their own resilience as well as the resilience of local communities.

Figure 2 sketches out the food systems approach adopted in SALSA. It pays particular attention to the complexity of our food systems and provides an integrated systems perspective that includes issues such as the need to better understand the match or mismatch between what smaller farms are producing and, particularly, urban consumption patterns and trends.

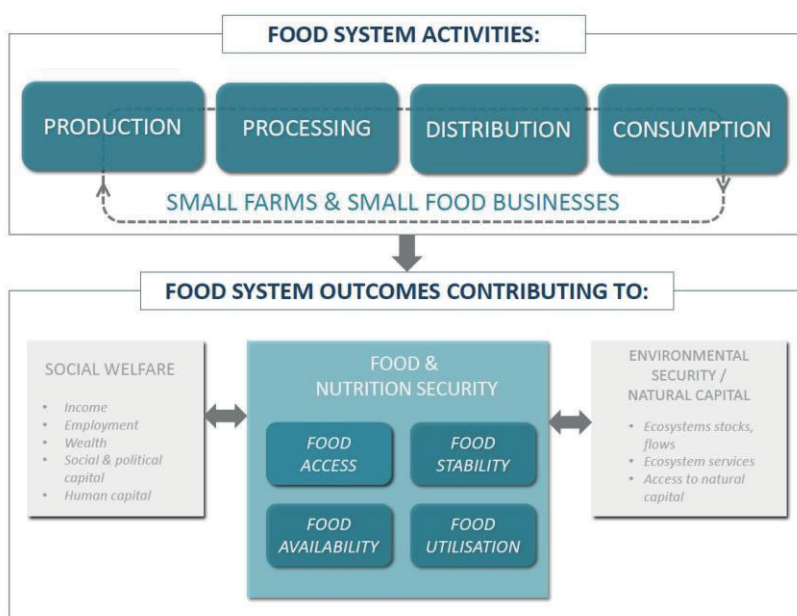


Figure 2. The food systems approach: smaller farms and food businesses contribute to food availability, access, utilisation and stability (adapted from Eriksen 2008)

Addressing vulnerability and resilience: dynamic properties of smaller farms and their capacity to adapt

The recent crises in food security and price spikes are increasingly related to resource scarcities and the growing competition between food, feed, bio-based products and bioenergy (EU SCAR, 2011, 2012; Knickel et al., 2013; EC, 2014a). To ensure the sustainability of the food system it will therefore be more and more important to 'optimise' it as a whole with all its constituent parts.

SALSA therefore also examines the (relative) vulnerability² of smaller farms and of the related food businesses, and how this affects FNS. Closely related is the question of the resilience³ of smaller farms and small food businesses. Why is it that small farms manage to persist? Our approach draws upon Darnhofer (2014) and covers the buffer capability or ability to assimilate

² Adger (2006) defined vulnerability as “the state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt”.

³ Folke et al. (2010) described resilience as “the capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function, structure and feedbacks”.

a perturbation without a change in structure or function; the adaptive capability or ability to adjust in the face of changing external drivers and internal processes; and the transformative capability or ability to adapt alternatives and possible futures.⁴

In the analysis, we will explore the social and agro-ecological distinctiveness of smaller farms. Our assumption is that the distinctiveness of smaller farms finds its expression in the means by which they can potentially respond sustainably to the expected growth in demand for food, feed and fibre. We will examine whether and in what ways smaller, locally embedded (family) farms can be seen as a potential source of resilience. An example might be their aptitude to use limited resources efficiently or their role in territorial development as a buffer and in providing work, incomes and food. We hypothesise that the development of smaller farms can also be an important factor in countering land abandonment, rural out-migration, and that it can help to create new urban-rural alliances, thus providing a necessary foundation for sustainable FNS.

The in-depth analysis will pay particular attention to the dynamic properties of smaller farms and their capacity to adapt to changes in their economic, social, technological and natural environment. The ability of smaller farms to activate non-market resources and the possibility to adapt pathways are important in this respect, both in respect of the potential for endogenous learning and innovation. Structures and systems based on optimising profitability alone may simply have compromised this capacity.

Towards improved multi-level governance systems and support frameworks

Building on the findings obtained regarding limiting and enabling factors, and the importance of the particular regional conditions (all validated in a series of workshops at the level of the reference regions), we will then move towards deriving concrete recommendations on how to improve governance systems and support frameworks at relevant levels. Some of these arrangements will relate to the regulation and functioning of local food systems, chains and networks; others will concern the organisation of smaller farms and other small and micro-sized food businesses as such.

The aim is to identify and assess, based on the insights gained from the in-depth analysis of local food systems and small farm situations, those governance frameworks that influence, positively or negatively, the contribution of smaller farms and related small businesses to FNS.

The analysis will therefore pay particular attention to:

- the strategies of smaller farmer to participate in both short food supply chains and conventional value chains with large processors and retailers;
- the possibilities for collective action (e.g. self-provisioning and mutual food support, particularly in remote rural areas) and access of smaller farms and small food businesses to public programmes (including the impact of gender-focused interventions);

⁴ When analysing the resilience of small farms and of local and regional food systems, we will build on the recent work carried out in the RETHINK research project (see <http://www.rethink-net.eu/home.html>).

- the governance and regulation of local food systems, chains and networks (including legal frameworks, public policies and programmes, private food chain governance, local and customary arrangements and collective action processes);
- the adoption of private standards, access to national and global food chains and agency implications of different governance arrangements, i.e. how power is redistributed among participants;
- the buffer, adaptive and transformative capacity of different governance arrangements.

Building on the above, the types of tools and mechanisms that are most appropriate for enhancing the contribution of smaller farms to sustainable FNS will be identified. The guiding questions are:

- How can smaller farms and other small food businesses best be enabled to capitalise on their distinctive assets and particular efficiencies, and contribute to sustainable FNS?
- How can agricultural knowledge and innovation systems become supportive of smaller farms?
- In what ways can EU policy best support relevant mechanisms?

The discussions aim at actively involving relevant institutions and decision-makers. Four specially convened policy workshops at the level of macro-regions will be organised. In these workshops, requirements for enhanced support frameworks, policy instruments and governance systems in the European, the African and the international cooperation context will be formulated.

Conclusions

Need to explore the potential significance of more localised food systems

There is little doubt that sustainable FNS requires a more significant rethinking of the food system as a whole as well as all its relevant constituents. We contemplate that the particularities of smaller farms and of the related food and farming systems might very well become more important in an increasingly globalised, uncertain and resource-constrained world. This is in line with IAASTD (2009) who came to similar conclusions based on a very comprehensive global level analysis as well as with FAO (2014b) who concludes that small farms “*can be protagonists of bottom-up food security strategies, if they are enabled to do so*”.

Global markets and relations tend to have a major influence on most local and regional food systems, including on consumption patterns (often even of rural communities and farm households). The assumption that we want to test in SALSA is that smaller farms play in many regions an important role in food access and utilisation as well as social value and the resilience of parts of the food system (IAASTD, 2009; Caron et al., 2014; EC, 2014c; FAO, 2014a,b). We think that the intrinsic embeddedness of small farms in local communities, food systems and markets is one main reason for this.

The chance of a more holistic food system based analysis of the role of small farms in FNS is that it opens pathways towards transformational change and more resilient futures. Processes that build on an active involvement of relevant civil society organisations, institutions, private

sector actors and other key stakeholders have a much higher chance of identifying such pathways for a particular context.

“Systemic transformations require attention to the procedures and processes through which system boundaries are determined and governed, and by whom” (from: workshop description). The discussion put forward in this paper provides a stunning illustration of this point as we completely miss the enormous potential and significance of more localised food systems, and of smaller farms and small food businesses, if system boundaries are drawn inappropriately.

What we learned so far about boundary issues

“Particular attention is [to be] paid to how system boundaries are determined, and by whom, because what is taken into account is constitutive of the kinds of innovation that emerge, who benefits and who loses from the change process, and how the governance of such change processes is performed” (from: workshop description). The questions raised in this statement have been central in the design of the SALSA project.

In this paper (and in the project planning) the word ‘system’ is used rather liberally. We for example refer to farm systems, (local) food systems and governance systems. During implementation, we will have to more precisely define all of these, including their ins and outs and dynamic elements, which will be a complex challenge that in many respects produces boundary questions.

There are at least four dimensions where boundary issues are particularly important:

- What is a “small farm”, and what is a “small food business”? What is our study object in more operational terms? Recognising the tremendous heterogeneity in smaller farm and farm household situations and seeing this is an opportunity to gain deeper insights, helped to overcome the rigid classifications that many studies use. In SALSA, we aim at facilitating a more comprehensive analysis that crosses different discourses, and that will be able to accommodate very different social, cultural, economic and historical situations. We will therefore operationalise the notion of small farm in different ways, depending on the goals and requirements of the particular analysis.
- What does it mean to apply a systems perspective in the analysis of food systems? Our intention is to take the four dimensions of FNS into account (availability, access, utilisation and stability). We will pay particular attention to the complexity of the problems facing our food systems and aim at providing an integrated systems perspective. Assessing the role of smaller farms and other small food businesses in food systems and FNS needs to include issues such as the need to better understand the match or mismatch between what smaller farms are producing and, particularly, urban consumption patterns and trends.
- Are smaller farms and the related food businesses only associated with more localised food systems? In our analysis, we will explore if, and if yes, in what ways small farms are also ‘connected’ to global markets. The idea of newly emerging ‘nested’ markets (Van der Ploeg et al., 2012) is relevant. We will therefore need to examine the organisation, production, processing, distribution and consumption, and the governance systems shaping the relations between producers and consumers, price formation and the distribution of value added. We also need to pay attention to the fact that farm households are both producers and consumers.

- At what level does FNS need to be achieved? In one way or another we will need to more precisely define the notion FNS. Is the mere existence of a local food system contradicting the logic of free trade? Maybe the very large number of small farms that exists contributes very substantially to total food quantities produced, and access, affordability and stability. Is it enough if rural households have enough income to have access to food even if they do not produce it themselves? Are the wider commodity markets for food that important or is it only the power of the large food corporations that plays out strongly?

Very clearly in the past too many approaches to the study of food and agriculture have tended to focus on single issues or characteristics of food (Lien & Nerlich, 2004), neglecting that the related activities are interconnected and sometimes closely integrated. By focusing on a single issue, we do not always grasp the systemic character of problems, and consequently miss opportunities for integrated responses.

The SALSA project builds very significantly on an active involvement of relevant actors and stakeholders. We consciously decided on this as it matters indeed “how system boundaries are determined, and by whom”. By involving stakeholders at multiple levels, at different steps of the project and profiting from the long lasting experience of many partners with stakeholders’ interaction, we hope to produce insights that are truly relevant for decision-making.

Implications for our implementation planning: overcoming structural divides

We think that boundary issues can be best addressed in discursive approaches and based on a meaningful interaction between research and practice. The underlying idea is that it will only be possible to really understand the role of smaller farms and small food businesses in FNS if practice and research make a joint effort to exchange and learn from each other.

In SALSA, we will therefore be implementing a transdisciplinary, mixed-methods approach that builds on and connects relevant theoretical and analytical frameworks and models, and uses qualitative, discursive and quantitative methods in an integrated way and at multiple scales.

Figure 3 illustrates how a continuous process of consultation with stakeholders will accompany all empirical work.



Figure 3. The structure of expert and stakeholder involvement in SALSA

In each of the 30 reference regions, we will together with practice partners and stakeholders examine food systems in terms of the position and role of smaller farms and of small food businesses. We will consider the relative weight of smaller farms to food availability, access, utilisation, stability - examined over time, which will allow us to judge vulnerability. The analysis will provide ranges in the contribution of smaller farms to FNS as well as insights into key determinants. Both will support decision-making in private and public sectors related to smaller farm development and FNS.

Particular attention will be paid to the diversity, complexity and context-specificity of food systems and FNS, as well as the region-specific connections between local resources, production, processing, retailing and consumption, and how smaller farms relate to the food system. The discussions will also include the specific livelihood and development strategies of small-scale farmers and families. In each reference region, a detailed map and description of the regional food system will be produced.

In the more policy-oriented work, we will pay particular attention to the access of smaller farms and small food businesses to public programmes, the regulation and functioning of local food systems, chains and networks, the adoption of private standards, the access to national and global food chains, and the impact of gender-focused interventions.

Central to our approach to overcome structural divides is emphasis on the role of and interplay between very different markets, chains, networks, actors etc. in food systems (with consumer-producer relations, nested markets, processors, retailers, small food businesses, etc.). The same applies to the diversity in local and regional farm household and food systems that range for example from subsistence and semi-subsistence farm household and food systems to commercial farms fully integrated into larger (international) food markets. The aim is to identify

and assess differences and complementarities between smaller farms and larger farms and to compare their particular relative strengths, weaknesses and support needs, highlighting how farm families use resources of different nature and origin. Particular attention will be paid to understanding the co-evolution between smaller and larger farms and their context (including food businesses), and relating this to the four dimensions of FNS.

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