

Chapter 9

THE USES OF RESEARCH: ACTION RESEARCHING IN AND ACROSS NINE AGRO-ENTERPRISE DOMAINS. THE EXPERIENCE OF THE CONVERGENCE OF SCIENCES-STRENGTHENING INNOVATION SYSTEMS PROGRAMMES IN BENIN, GHANA AND MALI

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Abstract

This chapter justifies the application of Theory-Guided Process Inquiry (TGPI) to elucidate, with real-time documentation of a standardized set of evidence across nine cases, the process of innovation in contrasting but comparable contexts. There is a significant challenge in coordinating divergent actors' responses to rapidly changing market, climatic and development needs and opportunities in smallholder agriculture in West Africa, so that individual efforts add up to effective governance of their respective domains of interest and efficient value chains that deliver worthwhile returns to small-scale producers. In these situations, rigorous research that is responsive to local histories and contexts, and to evolving events, is needed to underpin innovation policy, practice and theory. At the same time, the research should not be too demanding of scarce research resources and capacities, nor be reliant on unrealistic demands for large sets of quality-controlled statistical data. Research encompassed two mutually informative but distinct activities: (i) research carried out by PhD students and members of the innovation platforms (IPs) established in each domain, in order to inform their own actions; and (ii) research carried out in order to understand the contributions of the IPs and other actors in bringing about transformative change. The chapter concludes with a reflection on what has been achieved through the research practices described.

Keywords: Theory-guided, Innovation platforms, Local contexts, Rigorous research, Small-scale producers, Value chains

Introduction

The Convergence of Science-Strengthening Systems of Innovation (CoS-SIS) programme is about innovation in support of smallholder farmers and associated processors in nine agro-enterprise domains, in Benin, Ghana and Mali. The programme's central assumption, drawn from the experience and analysis of the findings of a previous programme (Hounkonnou et al., 2012; Sterk et al., 2013), is as follows: "Efforts to create new opportunities for small farmers and small farmer communities, and the benefits that should flow from these to the farmers, are constrained by institutions in the communities themselves, and/or at higher levels and wider scales of interaction."

The assumption implies (at least) three things for the design and practice of research. First, interventions that act directly on identified institutional constraints may open the way to systemic changes that allow small farmers to benefit from technical and other changes at the level of the farm and farm community. We can formulate this as an implied cause-effect relationship; the attribution of the observed effects to the interventions must be reasonably evidenced. Secondly, because our interest lies in *purposeful* interventions that benefit a particular social category (various kinds of small farmers), we have to grapple with ideas about the governance of systemic change and innovation processes. Thirdly, these in turn direct attention to the following elements in causation:

- the structure of organizational arrangements and relationships at multiple scales and levels;
- histories grounded in contexts;
- the characteristics of purposeful interventions;
- the techniques in use; and
- the norms, roles, routines and practices of actors, with diverse interests.

The central purpose of this chapter is to describe the main parameters of the research activity that ensued, synthesize some of the main analyses and findings achieved, and discuss the contribution of this way of doing research to the study and practice of innovation in smallholder agriculture. Research in our case encompassed two mutually informative but distinct activities: (i) research carried out by PhD students and members of the IPs established in each domain, in order to inform their own actions; and (ii) research carried out in order to understand the contributions of the IPs and other actors in bringing about transformative change.

We first clarify what we mean by the two main concepts underlying 'systems of innovation' (SI) and 'new institutionalism', before turning to issues of the study design and research practice.

SI: Our interest in SI lies in effecting and understanding transformative changes in socio-economic systems that open opportunities for smallholder development. We have found it useful to adopt Geels' (2002; 2004) multi-level heuristic schema of socio-technical transitions that

distinguishes within a given domain of interest between: (i) *niches* in which novelties emerge within initially unstable socio-technical configurations, with low power to effect systemic change – such novelties are conceived, developed and promoted by small networks of dedicated actors, often seen as outsiders or fringe actors (or as ‘positive deviants’); (ii) *regimes* sustained by shared cognitive routines, practices and activities among broad communities of interest, that over time become stabilized and embedded in formal and informal conventions, norms, regulations, laws, rules, procedures and organizational arrangements (i.e. institutionalized); (iii) *landscapes* that form the exogenous environment beyond the direct influence of niche and regime actors – change in landscapes typically occur slowly (over decades) but also may be driven by ‘surprise’ events.

This schema has undergone numerous modifications (Geels and Schot, 2007) in response to criticisms of the original formulation, four of which we describe briefly here. First, the scheme initially was associated with a socio-political hierarchy of governance (micro-meso-macro levels). Empirical research subsequently suggested that such a neat coupling was unjustified. Secondly, the first studies that applied this schema tended to focus on regime changes forced by novelty originating in micro-level niches. Subsequent research has shown that ‘selection pressures’ on novelties may occur at any or at multiple points in the context (Klerkx et al., 2010). Thirdly, while explanatory diagrams elaborated in early publications drew attention to functional relationships (of assumed purpose), others propose that purpose cannot be the structural property of functional relationships but should be defined by actors (Fløysand and Jakobsen, 2011; Farla et al., 2012). In turn, the use of the language of ‘actor’ draws attention to how individuals and collectives behave in order to advance their purposes. Fourthly, the initial formulation and applications appeared to assume that the proponents of novelty necessarily were ‘newcomers’ seeking systemic transformation in support of their interests. Subsequent studies opened the possibility that incumbents of an existing socio-technical regime, under certain conditions, might also become the originators of novelties. Geels’ modified framework in general appears to be drawing progressively closer to the understanding of soft systems theorists (Ison, 2010; Ison, 2016). The innovation question then becomes how, and under what conditions and purposes, do novelties become stabilized in socio-technical regimes? We return to this question in the discussion.

The ‘new institutionalism’: Political scientists meanwhile have been developing an eclectic understanding of change that re-focuses attention to institutions, and specifically on how institutions shape the way that individuals and collectives mobilize resources and interests in pursuit of their purposes (Stone, 1988). The so-called ‘new institutionalism’ emphasizes power and asymmetrical relationships of power in explanations of change, identifies social causation as path-dependent, and accommodates the notion that multiple interacting factors may drive change in any instance (Avelino and Rotmans, 2009). There are two main reasons why we find this body of institutional theory useful. First, its focus and emphases help us to understand: a) institutional constraints at regime and niche levels, and the fate of technical novelties, in terms of contexts, histories and power relationships; and b) the achievements (or lack of them) of IPs in relation to the dynamic of relationships and events, internal and external to the platform. Secondly, we find the eclecticism appropriate because the social fields in which innovation processes occur are diverse and eclecticism enables CoS-SIS research activities to draw upon the varied disciplines

and research traditions of all those involved. Hall and Taylor (1996) distinguish three main theoretical and methodological contributions to the ‘new institutionalism’: historical institutionalism, rational choice institutionalism, and sociological institutionalism. Table 1 offers an overview of selected characteristics of each. Our research draws on all three (Kpéra et al., 2012; Quarmine et al., 2012).

Table 1. Selected characteristics of three strands of institutional theory

Key assumptions	Historical institutionalism	Rational choice institutionalism	Sociological institutionalism
How do actors behave?	Behaviour bounded by actors’ worldviews. Stabilized in behavioural routines. Act as satisfiers of individual and collective purpose. Act according to degree to which they are able to mobilize resources and coalitions of interest, in ways that presume the logic of power.	Actors’ goals treated as exogenous to the analysis. Actors have fixed sets of preferences. Take instrumental action to maximize attainment of their preferences. Act strategically, in ways that presume use of the logic of calculus.	On basis of shared attitudes and values. Within networks of behavioural routines shaped by cognitive, moral, and heuristic templates. By application of practical reasoning constituted in interaction. Behaviour presumes use of the logic of social appropriateness (in which acquired or inherited cultural authority determines what is considered appropriate).
How do institutions arise? What do institutions do?	Emerge in struggles for power and control. Provide moral and cognitive templates for interpretation, choice and action.	Emerge through voluntary agreement. Provide actors with a greater or lesser degree of certainty. Generate information relevant to understanding the behaviour of others and reducing transaction costs.	Emerge in interactions between organizational structures, attitudes and values, for declared purposes. Provide frames of meaning through which to interpret and act upon the world.
Emphasis on what kinds of institution?	Procedures, rules, laws, conventions, organizational arrangements (‘the polis’).	Property rights. Rent-seeking. Incentives and sanctions (‘the market’).	Frames of meaning encoded in symbolic interactions. Rights, norms, practices, roles (‘the society’).

Key assumptions	Historical institutionalism	Rational choice institutionalism	Sociological institutionalism
Why do institutions persist over time?	Are rarely the outcome of, or instituted by, explicit individual choice (thus escape direct scrutiny). As collective constructions, cannot readily be changed by an individual.	Embody something like a Nash equilibrium. Deviation makes an individual worse off than adherence. The more an institution contributes to resolution of collective action dilemmas, and the more gains from exchange that it makes possible, the more likely it is to persist.	Are distributed among and internalized by individuals and collectives, embedded at multiple temporal and spatial scales.

Source: Constructed at a Research Associate Support Team workshop, Aburi, Ghana, June 2012. Based on Hall and Taylor (1996)

Research Design, Methods and Data Sources

Research Design

The programme sought to contribute to satisfying policymakers' desire to know *what works?* There are major differences in how this question is approached (Anderson and Scott, 2012; Donmoyer, 2012). Those who seek answers through statistical means, for instance, favour research designs based on random assignment of treatments, avoidance of sample contamination (arising, for instance, from purposeful recruitment of targeted participants), clear specification of dependent and independent variables, and large samples. This approach offers the promise of clean, rational, unambiguous policy-relevant research of great analytic power. Its stringent operating conditions, however, mean that in practice it is applied only in relation to certain types of research questions and only where messy real life conditions can to a sufficient (and ethical) extent be controlled. Others note: (i) that because unintended consequences are ubiquitous in the social world, one cannot safely derive or deduce origins from consequences; (ii) social causation is path-dependent so that even if the same forces of change are present in different cases, their effects are mediated by contextual factors inherited from unique pasts; and (iii) assignment of 'treatments' and recruitment of participants typically are non-random in any purposeful action or implementation of policy.

The CoS-SIS programme perceived considerable difficulties in applying the statistical ideal of randomized treatments, or indeed any regression-based analysis. The three main difficulties identified were: the practical impossibility of random assignment of treatments to the study of innovation as a purposive activity; finding sufficiently well matched case controls for, and within, the selected agro-enterprise domains; and the high risk of contamination introduced by purposeful

recruitment of actors into the processes that CoS-SIS aspired to elicit and support. Programme partners also were insistent that the unique histories and contexts of the selected agro-enterprise domains had not merely to be ‘taken into account’ as exogenous factors but included as objects of study within the programme’s research activity. The researchers thus made an initial choice to associate research activity with the body of recent scholarship in governance and development studies that focuses on innovation in terms of “arriving at localized and informed solutions to specific constraints and needs” (Grindle, 2011: 416). This implied an action research design that offered the promise of insight into operationally-relevant policy guidance and of sufficient analytic rigour for decision-making (a tradition that is, we note, already well established in the management sciences) (Hatchuel, 2000).

The common fall-back option for within-case analysis is the case study. Individual case studies are recognized as making robust and richly insightful contributions to innovation studies. However, their limitation in terms of programmatic and policy advice is that, however many cases are included, they risk being non-commensurable, and, as situated in unique histories and contexts, incapable of generalization. There are two main, potentially complementary, responses to the challenges of research where controlled comparisons are not possible and the number of cases is small (George and Bennett, 2005). One is to ensure that the cases generate commensurable information on ‘regularities’ to allow between-case analysis, by means of well-grounded identification of the elements and processes common to each of the cases. The other is to design theory-led research (Faletti, 2006; Faletti and Lynch, 2009). The CoS-SIS programme adopted both responses. TGPI seeks to avoid the common tendency in political, social and development studies for researchers to generate empirical data and then to search around for the explanatory theory that retrospectively seems to best fit the data. On the basis of a literature review the two theories adopted to test explanations of cause and effect within and between cases were: 1) that it was the programme’s main intervention, the establishment of IPs in each domain, that caused the observed effects (i.e. an institutional innovation that creates or supports novelties in niches that could lead to regime changes); 2) that it was power relationships within and external to the IP that best explained the observed changes.

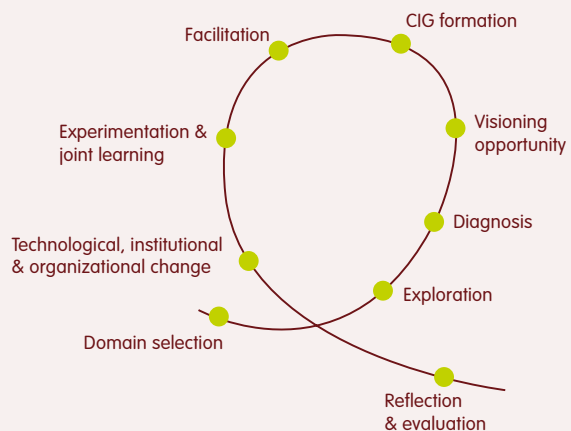


Figure 1. The ‘CoS-SIS cycle’, showing the process that the IP followed in each domain

Note: CIG (Concertation and Innovation Group)

Source: CoS-SIS (2013)

Methods and Data

Figure 1 outlines the main steps taken in the framework. First, agro-enterprise domains of potential national interest were identified in workshops with key stakeholders, policy actors and researchers in each country. Research activity was initiated by *scoping studies* in each of the selected domains (Adjei-Nsiah et al., 2013). The studies provided an initial multi-scale analysis of histories, contexts and issues of general concern. They were followed by *diagnostic studies* (Jiggins, 2012) that laid bare the main socio-technical and institutional reasons for the situations described in each domain. Subsequently, *stakeholder analysis* was applied to identify the actors in each domain who might be interested in establishing an IP (Nederlof and Pyburn, 2012). The stated purpose of the IPs was to generate the information needed to bring about transformative change, and to act upon the potential opportunities identified in the diagnostic studies. As the IPs became established their members further elaborated the reasons that were thought to sustain the institutional barriers to smallholder opportunity, *and analysed what needed to be changed, how and by whom*, i.e. this sequence of preliminary research served to define the *entry points* for action.

Each IP was facilitated by a part-time research associate, who was also responsible for recording a standard set of data, information on the process and analyses throughout the study period (Table 2). The research was operationalized by explicitly linking the two central concepts and TGPI to hypotheses about expected observations of anticipated transitions, by transparent specification of intended causal steps in effecting desired changes, and by sharing and peer reviewing data and information about the causal steps that showed evidence of effectiveness. The data and process information were presented and analysed approximately every 4 months throughout the study period by the research associates, national programme coordinators and supporting researchers at regional workshops (beginning 2010 – end 2013; n=10), encompassing eight agro-enterprise domains (from Benin (three), Ghana (two) and Mali (three) [in Ghana, toward the end of 2011 the research associate working on a ninth domain was re-assigned by his host organization to another position outside the domain and no IP was established]). Within-case analysis proceeded principally on the basis of: written background narratives; de-construction of instructive events; plotting of time paths; inventories of practical strategies adopted for immediate problem-solving; causal analyses based on elaborating alternative explanatory pathways suggested by our two TGPI theories; diagramming the persistence and variations in relationships within and external to the IPs; analysis of the verbal language used by the actors; and specification of the collective actions and decisions taken by identified actors in transitional changes. Between-case analysis was based principally on: learning workshops organized with programme partners and wider stakeholder groups; using within-case materials to draw out regularities and patterns, iteratively refine and eliminate hypotheses of causation bounded by the TGPI theories; and indicate opportunities to apply (as appropriate) mechanisms that proved effective in any one case to others and, as evidence and experience accumulated, to test out extension or expansion of the scale of operation and/or effects.

The work of the IPs was enriched by socio-technical field studies, laboratory analyses and institutional experiments conducted by PhD students working in each domain (Akpo, 2013; Amankwah, 2013; Osei-Amponsah, 2013; Quarmin, 2013; Sidibé, 2013; Togbe, 2013; Totin, 2013; Yemadje

2013; Kpéra, 2015), and by thematic studies (Adjei-Nsiah et al., 2013; Klerkx et al., 2013; van Paassen et al., 2013; Adu-Acheampong et al., 2014; van Mierlo and Totin, 2014; van Paassen et al., 2014; Röling et al., 2014). Analyses of each individual IP, and syntheses of national and programme-level experiences, will appear in *Cahiers Agricultures* (in preparation).

Table 2. TGPI methods and data sets for IPs in each of the eight agro-enterprise domains in West Africa

Phase	Type of information recorded	Means of recording	Period
Initiation	Scoping studies; diagnostic studies; stakeholder analyses; selection of two declared theories to explain cause-effect relationships recorded in TGPI data.	Field surveys led by post-graduate research associates (PhD studies); research associate-led studies and enquiries, in partnership with programme management team and national coordinator (theories used in analysis at regional workshops held approx. every 4 months throughout the programme).	2009-early 2010
IPs	Justification and organization of IPs in agro-enterprise domains; processes, and events related to IP activities; research assistants' observations related to these; narratives describing as factually as possible what has occurred in the IP and domain context; snapshots of power relations among key domain organizations; snapshots of inter-personal power relations; characterization of the exercise of power.	Programme documentation; IP meeting minutes; narrative reports; process analysis (whose/which decisions/actions the IP tried to change, the effects, immediate outcomes and intermediate outcomes); snapshots of IP memberships; external and internal actor linkage diagrams; matrix analyses (using six variables – one-sided dependence, mutual dependence, synergy, cooperation, competition, antagonism); critical incident analyses (based on mini-cases characterized in terms of timing, resource mobilization, skills and strategies deployed, motivations and willingness to act).	Reported and analysed every 4 months approx., from the beginning of 2011 to the end of 2013, at regional workshops.
Facilitation of IPs	Facilitation of: IP meetings and study visits; internal power dynamics of IPs and trust building measures; institutional experiments; shared learning processes.	Facilitator's diaries; minutes of IP meetings and study visit reports.	Reported and analysed every 4 months approx., from the beginning of 2011 to the end of 2013, at regional workshops.

Phase	Type of information recorded	Means of recording	Period
Institutional experiments undertaken or commissioned by the IP	IP institutional experiments based on action research.	PhD studies; research associate research records; minutes of IP meetings.	Tracked, reported and analysed by research associates; every 4 months approx., from the beginning of 2011 to the end of 2013, at regional workshops.
Context data and analysis	Narratives of changes in context, and the processes, events, decisions taking place in the domain and larger policy environment, at national and international levels; field studies of specific local socio-technical and institutional changes within the domains and wider contexts; participation of farmer-based organizations in the IPs (Benin and Ghana).	Narrative reports and timelines, maintained by national coordinators; minutes of national programme management team meetings; PhD studies; research associate studies; thematic studies (researchers from partner universities in-country).	Reported every 4 months approx., from the beginning of 2011 to the end of 2013, at regional workshops.
Institutional impacts	Institutionalization of CoS-SIS concepts and practices in policy, university and domain-level organizations, value chains, and governance agencies at various levels.	Thematic studies, led by Research Associate Support Team and research associates working groups on the: <ul style="list-style-type: none"> • Role of national coordinators, programme management team, domain advisory groups, and IP ‘champions’. • Dynamics within IPs. • Interactions among multi-stakeholder IPs. • External influences on IPs. • Management of power relationships. • Facilitation. 	Key informant interviews; text analysis; Research Associate Support Team meeting minutes: from programme initiation to mid-2014.
Programme-level data review and analysis	CoS-SIS programme: regional/international workshops and conferences	Proceedings	Four reports (2010, 2011, 2012, 2013)

- The IPs were: Ghana – a) improving smallholder palm oil processing to attain export quality oil, and b) national cocoa sector developments; Benin – c) national cotton sector and by-pass strategies in the northern cotton zone, d) development of an oil palm seed system for smallholder plantations, and e) inland valley water management and domestic rice-market value chain development; Mali – f) value chain development for women’s sheanut cooperatives, g) crop-livestock integration, and h) tertiary canal water management.
- The Research Associate Support Team was composed of researchers from WUR in The Netherlands, University of Abomey-Calavi in Benin, Science & Technology Policy Research Institute in Ghana and the Royal Tropical Institute in The Netherlands.
- Regional workshops: 3-day workshops for the research associates, national coordinators, and Research Associate Support Team, held approximately every 4 months from the beginning of 2010 to the end of 2013, in Benin, Ghana or Mali.

Synthesis of Findings and Analyses

We report the main findings emerging from this research process under three headings: situating the IPs in processes of multi-scale institutional change; the institutional experiments; and the contribution of TGPI.

Situating the IPs in Processes of Multi-scale Institutional Change

Four findings stand out under this heading. The first is that the initial choices concerning the positioning of the IPs in the hierarchy of domain governance and public administration were based on scoping and diagnostic studies (Nederlof and Pyburn, 2012). Multi-stakeholder platforms often are positioned on the basis of the pre-analytic choices of supporting agencies with instrumental agendas (Nederlof et al., 2011). Attempts to use such platforms as instruments for ‘going to scale’ in the transfer of technologies, for instance, seems quite common (Röling et al., 2014). We later discuss the implications of this distinction for innovation processes.

Secondly, analysis of the individual narrative reports of the IPs throughout the study period reveals the extent to which the research associates, the IP members and programme leaders within each country responded to the dynamic of events in the domain context and in national political and economic developments in their drive for institutional change. In Benin, for instance, throughout the period of national elections in 2011 the three IPs could not function lest their role became ‘contaminated’ by accusations of political bias. The three IPs (for the cotton industry, which is a clearly structured domain and dominated by influential national interests, oil palm seed nurseries in a largely un-organized smallholder sector, and water management/rice value chains in an inland valley), all opted to base themselves away from national arenas, but for different reasons:

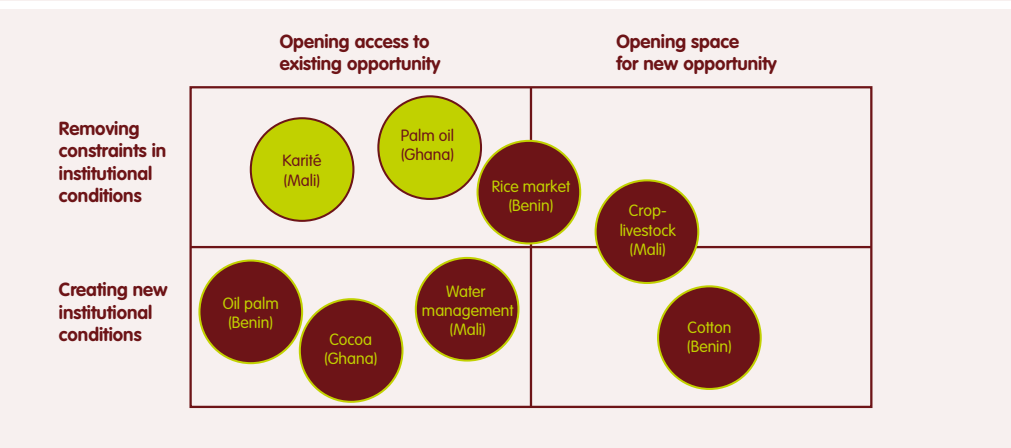
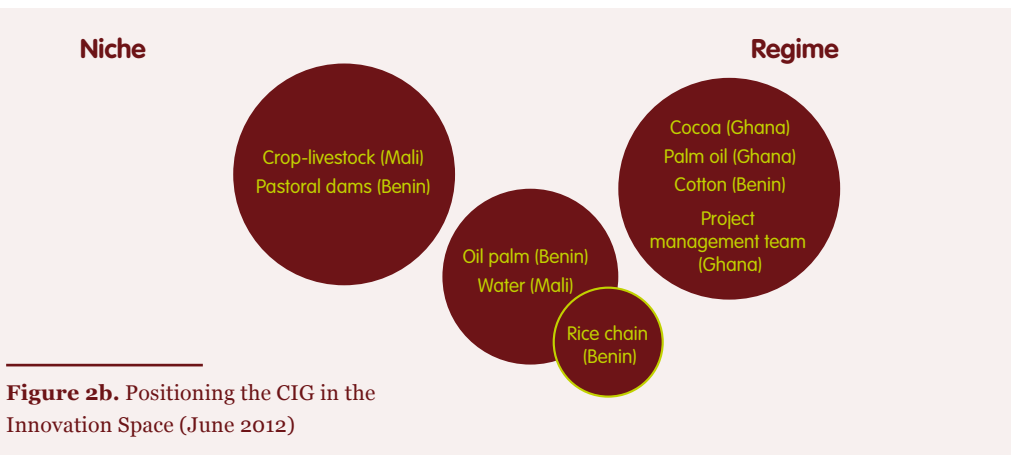
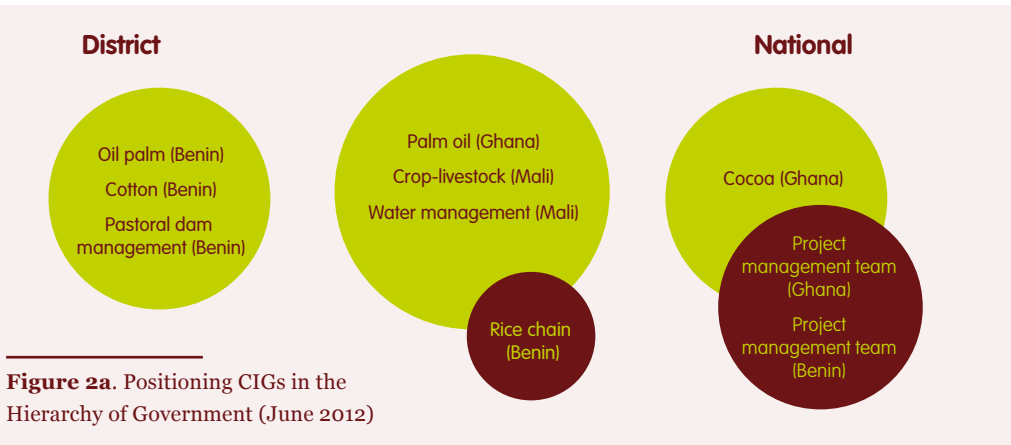
- Because the cotton sector is highly politicized and, at the start of the study, was grappling with sector-wide reform efforts, the cotton IP was located at the central district of the northern cotton zone where many farmers, despite the reforms, were abandoning the cotton industry. The dramatic intervention of the President in mid-2012 into the organizational arrangements for the cotton sector, which led to the dis-establishment of the coordinating body (the inter-profession, AIC) and the withdrawal of the import licences of the entrepreneur – who had

acquired near-monopoly control over cotton input supply and transport logistics – opened new opportunities for the members of the northern cotton IP to support the participation of farmers in national dialogues about the future of the cotton industry. The members also used their own networks of influence to push forward a ‘by-pass’ strategy to reduce northern cotton farmers’ dependence on malfunctioning national arrangements, building on two entry points: identifying, together with cotton researchers, seed varieties that farmers could multiply themselves, and that, because farmers are paid on the basis of the weight, had a higher seed cotton weight than the recommended variety; and helping women’s groups to form cooperatives to produce neem oil for pest management, in association with a locally-based private cotton entrepreneur who had set up a cotton value chain independent of the national structure.

- In contrast, because smallholder production of oil palm in Benin is largely unorganized, the IP was positioned in the heart of the main production area, as a district platform in association with the local government and oil palm research station. The impossibility of visually identifying a seedling of high productive potential had led to widespread mistrust, poor coordination and ‘suspect’ business practices among the stakeholders in the seedling supply system. Many farmers had been buying and planting seedlings that turned out to have low productivity. In order to reduce mistrust, the IP first sought to improve the transparency and sharing of technical information about seedling varieties among all concerned local actors. Only then could the IP begin to explore with stakeholders in local government, research and extension services, and the individual seedling nurseries, how to re-organize the seedling supply system. Armed with grounded empirical data on the importance of the seed system to the future of the industry, and information on how to go about setting up a reliable seed system with integrity, the IP over time began networking with higher level officials and other influential individuals to share the data and information. Eventually, development of the oil palm seed system was included in the country’s 2013 Five Year Plan, and funds were allocated to continue the work initiated by the IP.
- Stakeholders in water management and the local rice value chain in an inland valley had to take account of various ongoing contextual changes from the start, including: the government’s domestic rice pricing and staple food purchasing policy; renewed provision of food subsidies for low income households; the effect on domestic demand and supply of rice imports; and the entry of private commercial competitors, such as China, into the rice sector. It was the local municipality and NGOs that took up the challenge to find a way to develop new relationships and structures to support the production and marketing of local rice in this rapidly changing public and private commercial environment, leading to the positioning of the IP at local government level.

Thirdly, as the work of the IPs progressed they turned out to be occupying different spaces in Geel’s niche-regime-landscape schema. Novelty, it seems, can be developed in a wide range of spaces, even – as has been the case for the cocoa IP in Ghana – from within the existing institutional regime. The ‘innovation space’ appears to be related also to the degree to which the IPs have been trying to bring about institutional changes that opened access for small-scale farmers and processors to potential opportunities in the existing regime (as in the sheanut and the palm oil cases) or to create new opportunities through change in the regime itself (as in the cocoa case).

We present these three points as visual analyses (Figure 2) of the contrasting positions occupied by the IPs.



Fourthly, the TGPI data demonstrates that the scope for institutional change is determined to a considerable degree by context and thus each IP has had to ‘find its own way’ toward transformative institutional change that is achievable and meaningful in its own context by working on different institutional elements, and by strategic appreciation and response to local power dynamics (van Paassen et al., 2014). Table 3 presents the spread in the focus of each IP in terms of the institutional elements that it has tried to change. This analysis suggests that it is not enough to make general statements about ‘institutions’ when describing how transformative change can be brought about because it seems different IPs have been dealing with different elements in the change process. Table 3 none the less also suggests that while the particulars are specific to each case, regularities and patterns do emerge, that can be used in between-case analysis.

Table 3. Which institutional elements have the IPs tried to change?

Country		Mali			Benin		Ghana	
Domain		Sheanut	Crop-livestock integration	Water management	Oil palm seed system	Cotton	Palm oil	Cocoa
Official and informal rules	<i>Legitimation</i>		x	x	x	x	x	x
Norms	<i>Legitimation</i>		x		x	x	x	
Socio-technologies	<i>Material structures</i>	x	x	x	x	x	x	
Practices	<i>Material structures</i>	x	x	x	x	x	x	x
Incentives	<i>Material structures</i>	x						x
Relationships	<i>Significance, sense-making</i>			x	x	x	x	
Rules for interpretation of meaning and knowledge development	<i>Significance, sense-making</i>		x		x	x		x

Source: Analysis made at Research Associate Support Team workshop, February 2013 using TGPI data. Based on institutional elements identified in Avelino and Rotmans (2009) and Fuchs and Glaab (2011)

The Institutional Experiments

The institutional experiments broadly speaking were based on the development and strategic sharing of new information so that decisions were made by key actors in the domain in order ‘to do different things’, and on actually trying to ‘do things differently’. Analysis of the TGPI data for the cocoa IP in Ghana reveals the interplay between these two (Adu-Acheampong et al., 2014; Adu-Acheampong et al., 2016). The members – drawn from all the main cocoa organizations – discovered early in their work that none of them knew what costs were taken into account in deciding the price paid each year to farmers for their beans. They set about filling the information gap by using their networks within Ghana to retrieve the information lodged in various organizations, and the access that one member (Cargill, the world’s largest cocoa trader) had to comparable information for all cocoa-exporting countries in West Africa. By sharing the information with the highest level of government – that the margin between costs and export prices would allow a higher price increase to farmers than the government was considering – the IP members contributed to the government’s decision in 2011 to raise the producer price considerably. The cost analysis, however, also had revealed that the centrally-controlled input supply system and annual mass spraying campaign against cocoa pests were the major cost elements, and these became the targets of the next round of investigation by the IP. The information the IP presented to the government contributed to the government’s decision to progressively privatize input supply in the cocoa sector, to change the timing of the annual price announcements to match the main harvest period of the modern cocoa tree varieties that had become widely planted, and to halt the mass spraying campaign. The spraying campaign, for instance, was shown to be based on recommendations that had not changed since the 1950s, and to be not very effective in any case, for both technical and organizational reasons (Adu-Acheampong et al., 2014). Meanwhile, a PhD student (Quarmin, 2013) set up and monitored a local experiment to show how ‘things might be done differently’, based on differential pricing for purchasing beans of different qualities, in order to determine: i) the feasibility of arrangements for doing this; ii) farmers’ response to the price incentive; and iii) the disposability of beans of lower quality. Since Ghana’s export premium on world markets is sustained by the quality of its beans, there is considerable interest in mechanisms that can maintain bean quality.

A summary of the main institutional experiments undertaken by the IPs, and their immediate effects, is presented in Table 4.

The Contribution of TGPI

We have indicated that TGPI supports within-case analysis of evidence that allows reasonable attribution of change and its effects to identified causal processes. It draws on well-established longitudinal, ethnographic practices (Hoholm and Araujo, 2011). We have also indicated that TGPI, to a considerable degree, also supports between-case analysis, in that it allows regularities and patterns to be observed and analysed for a small-N sample, generating ‘lessons’ that can be extrapolated (applied) with caution to similar situations and purposes, and used to generate hypotheses in new situations (interpolated). Our experience suggests that TGPI is well suited to situations where there are presumed to be interactive effects over space and time between actions

and context, and path dependence (Bennett and Elman, 2006), and where the researcher is interactive with the context. We have found that its limitations include the following:

- Observations cannot simply ‘include everything’. There must be explicit prior selection of what types of data to register (risking a decision that might, in retrospect, exclude the very processes that turn out to have explanatory power), and of where the boundaries are to be drawn around what counts as ‘context’;
- If interpreted literally, continuous real-time observation swamps the researchers’ capacities to register and analyse data. The period chosen for data registration means that some of the information is not recorded as processes happen. Retrospective documentation does not have equivalent status to continuous data monitoring.
- Even within agreed protocols for what data to register and when, each researcher is left pretty much on their own to make acts of selection and judgement. This means that care must be taken to make transparent the basis of such choices (especially because the research associates were not engaged full-time in this work).

TGPI has also been criticized for its presumed costs. The approximate figures extracted from the CoS-SIS programme’s financial records are as follows:

- €7,500 (US\$10,000) operational costs per year per IP;
- €3,100 (US\$4,000) in allowances per year per part-time research associate;
- €3,500 (US\$4,750) per year for each research associate’s functional costs;
- €45,500 (US\$61,000) scholarship per PhD student per year (WUR carried the coursework costs, whenever the students were in The Netherlands);
- €32,300 (US\$44,000) per PhD for field and laboratory work, and experiments, over 3 years.

By way of comparison, the Swedish University of Agricultural Sciences estimates a full PhD scholarship at €239,000 (US\$324,000), while *icip*e (the International Centre of Insect Physiology and Ecology, based in Nairobi, Kenya) estimates a full PhD scholarship at €250,000 (US\$334,000). Thus the research costs of the design adopted by CoS-SIS seem well within the normal range of expectation.

Discussion

Grindle (2011: 417) posed a number of questions that empirical research based on process inquiry has to answer: does it lead to better decisions about what to do and how? Does it identify important constraints and next steps? Does it provide effective guidance on what is likely to work, and what is not, in terms of reform of policy and institutions? Does it indicate what has to be changed, can be changed, and is resistant to change? And, where the constraints have been removed, mediated or by-passed, have the results in fact been better (however better is defined)? We examine the first three questions in turn below (see page 118).

Table 4. Summary of main institutional experiments, CoS-SIS, 2011-2012

Agro-enterprise domain	Focus	Effects	Focus	Effects	Focus	Effects	
Mali							
Sheanut	Searching for micro-finance loan to bypass gender and procedural blocks to accessing bank credit for women's co-operative in an indigenous sector disregarded by banking interests.	Working capital enabled organization of harvesting, processing, marketing chain, and training to improve co-operative management. Loan re-paid in full, on time; after second loan re-paid, co-operative no longer needed loan support.	Changing co-operative membership rules to allow access to services and income by more women harvesters and processors.		Membership increased; supply from non-members increased; collection and processing centres rationalized.	Changing harvesting advice and size of catchment areas to accommodate natural fluxes in nut yield.	Supply more stable, increase processing efficiency and secure market opportunity.
Crop-livestock integration, Office du Niger	Documentation, information sharing and public discussion of official and informal rules on cattle-keeping, herd movements and grazing to address causes of increasing conflict, violence and legal cases.	Interdependence and mutual interest recognized in developing and enforcing of local conventions; number of legal cases declined to almost zero; other incidents resolved at village level based on the negotiated conventions.	Local conventions presented to Office du Niger during negotiation of the next 5-year Contrat Plan; livestock and dairying recognized officially for the first time; conventions adopted into new Contract Plan; mayors outside the experimental area request similar assistance.		Field experiments on inter-season fodder cropping, to support emergent dairy industry in association with private milk processing centre; results indicate significant income potential even for small-scale tenants.		
Water management, Office du Niger	Joint field experiment to discover the productivity and income gains from carrying out 'obligatory' tertiary canal cleaning; discussion of the reasons why farmers do not comply with the rules, and of the effects of status and power of richer farmers.	Farmer organizations begin to motivate and organize members to clean canals and sanction non-participants to reduce 'free rider' effects; rice harvest increases; other issues are surfaced.	Based on issues raised, joint field surveys of the negative effects of the application of tenancy rules, sanctions and fees imposed by Office du Niger were initiated; discussion of findings with farmer organizations and Office du Niger.		Application of official rules and procedures adjusted; changes adopted into provisions of new Contract Plan.		
Benin							
Cotton	Measuring effect of seed choice on farmers' income when payment is based on weight of seed cotton; researchers engaged in participatory variety testing with farmers.	Promotion of a new variety that optimizes seed cotton weight and lint; opportunity for farmers to multiply own seed, by-passing malfunctioning official supply system.	By-pass of malfunctioning official input system and pest management controls by supporting and training women's groups to produce neem oil; researchers conduct efficacy tests and initiate registration procedures.		Women's groups producing, promoting and selling neem oil in increasing quantities; private sector cotton gin entrepreneur offers to promote use of neem and integrated pest management (IPM) as standard practices, as soon as registration process completed.		
Oil palm seed system	Sharing of information from field surveys concerning malpractices in existing seed system, and the technical and organizational challenges of securing integrity in the system, with all actors.	Discussion about the information helps to create shared norms, reduce mistrust and motivate willingness to work together to build a seedling system with integrity.	Inventory made of locations of existing nurseries; training provided to existing and new nursery owners/workers; new register and licensing of all seedling nurseries.		Spatial gaps closed in nursery coverage; organization of value chain between research station and nurseries guarantees quality and reduces buyers' risks.		
Ghana							
Cocoa	Generating and sharing information on: (i) timing of harvest periods consequent on widespread planting of new varieties; (ii) price composition for cocoa in Ghana, and other West African producer countries, showing margins for adjusting the prices paid to farmers.	Adjustment in timing of annual announcement of prices paid to farmers; higher price payments for farmers; input supply and mass spraying costs identified as major cost elements in price formation.	Analysing the technical and organizational scope for changing the input supply and pest management systems.		Information contributed to government decision to progressively privatize input supply and pest management; adopt IPM as standard practice.	Pilot testing of effects of incentive pricing on farmers' delivery of export quality beans and on behaviour of Licensed Buying Companies.	Analysis motivates further testing of differential pricing.
Palm oil	Information is presented to local government showing the harmful effects on health, environment and oil quality of local palm oil of processors' use of old tyres as fuel.	Local government adopts new by-law to ban the use of tyres as fuel, and regulate the location of processing centres.	Testing of processing waste as a fuel demonstrates its cost-effectiveness; local processors are supported to adopt local 'best processing practices' based on a study of the effects of duration of fruit storage on quality, and lab analysis of oil quality.		New income opportunities are created for selling waste products of oil processing; local processors are shown to be able to achieve export quality palm oil; negotiations are opened with Export Promotion Council and entrepreneurs to supply export quality oil.	Local processors decide to organize themselves to meet export delivery targets and standards, register a co-operative, and take a loan to up-grade their processing equipment to meet volume and cost-efficiency goals; domestic market opportunities for oil of different qualities also increase.	

Source: TGPI data, 2011-2013; Akpo (2013); Quarmin (2013); Osei-Amponsah (2013); Sidibé (2013); Togbe (2013); Struik and Klerkx (2014)

Does TGPI lead to better decisions about what to do and how? Does it identify important constraints and next steps? The evidence provides a strong case for concluding that it was the combination of scoping and diagnostic studies, TGPI, and institutional experiments that enabled members of the IPs and the national programme teams to function as champions of socio-technological and institutional changes. That is, the innovation processes recorded by the research associates were *research-driven in the context of a new kind of social arena that enabled diverse actors to make effective collective demands for research-based information and to make use of the information generated*. Since longer-term impacts have not yet been recorded or assessed, we cannot claim that the decisions and actions were ‘better’, beyond the intuitive sense that if, for instance, cocoa farmers receive higher payments, they are presumably ‘better off’. We can claim that the documented immediate effects are positive for smallholders and for the efficiency and effectiveness of the systems of interest. The way in which members of the IPs became actively engaged in searching for transformative responses to the challenges constituted in the context seems comparable to others’ experiences of ‘research for innovation’ (Lessem and Schieffer, 2010).

Has this way of performing research provided effective guidance on what is likely to work, and what is not, in terms of reform of policy and institutions? The answer here is clearly ‘yes’. By working explicitly on what has to be changed, can be changed, or by-passing what is resistant to change, significant new opportunities have been opened up in each agro-enterprise domain. While the IPs, as platforms that created new social spaces in which to deliberate and guide innovation processes, are the most noteworthy intervention created through the programme, we also acknowledge the contributions of individual IP members, the members of the national programme teams, the national coordinators and the regional coordinator, as champions, using their own networks of influence in the transitions documented by the programme (Klerkx et al., 2013). We further note that the destabilizing effects of other events in the regime – such as the Presidential intervention in the cotton sector in Benin – mean that IPs cannot be seen to offer automatic solutions to messy problems.

We further argue that while there is evidence, for each domain, to support substantive recommendations for policy and practice, when we aggregate the evidence for the IPs’ performance what stand out are the processes and procedures adopted. This resonates with the traditions in political philosophy that favour procedural over normative policymaking. Debates about this balance stretch back to Solon of Athens, and have been debated heatedly again since the late 18th century in the UK, European continent and the Americas (Elster, 2013; van Middelaar, 2013).

How, and under what conditions and purposes, do novelties become stabilized in socio-technical regimes? The ‘how’ was not prescribed in advance. The IPs in each case have *learned* their way to: i) moderating the effects of bias, arbitrary use of power, inefficiencies and ill-informed decisions that block opportunity for smallholders; and ii) creating the impetus for well-grounded decisions and actions to bring about institutional changes that open access to existing opportunities, or create new ones for smallholders.

The detailed information on the IPs' individual experience of 'how' will soon be presented (*Cahiers Agricultures*, in prep.). However, we have provided a partial synthesis in this chapter that suggests the following:

- Pre-existing tensions might be replicated in the membership of an IP, or might emerge as individuals seek to take self-interested advantage of the opportunities that develop or protect their existing interests. The tensions can be managed through skilful facilitation.
- The 'how' is not a pre-determined pathway. It is the diagnosis of the starting situation in the context of the domain of interest, and the purposes and entry points that members of an IP (and any supporting programme) set themselves on the basis of the diagnostic studies that begin to inform the path taken.
- The generation and sharing of a flow of information among diverse actors, and at a range of levels, iteratively determines next steps in the process of purposeful change.
- Effort to achieve open communication, transparent procedures and agreed norms of interaction are needed to create sufficient trust among members to support the functioning of an IP. This is not a 'starting condition' but an emergent property of facilitation and knowledge management efforts.
- Novelties can be created anywhere in a hierarchy of governance. IPs need to be situated in an innovation space that has potential in the context to lever the novelties that benefit smallholders, into changes in the institutional regime. The aim is to normalize such novelties in routine practice, procedures, regulations, administration, organizational arrangements, and so on.
- IPs also can work directly on changing the existing regime, on the basis of evidence showing how the system as a whole loses from the prevailing situation (although a privileged few might benefit), and proof from institutional experiments that alternative arrangements are achievable and beneficial.
- IPs are not a cure-all for governance failures. They function optimally, and their effects are sustained, to the extent that there is stability in the overall political system (or by-pass strategies can be arranged).

Conclusion

The research effort undertaken by CoS-SIS indicates that there is another way of thinking about, researching and achieving scale effects with domain-wide impact in smallholder agriculture. Research can be organized cost-effectively so that it supports processes of innovation, shared learning, and capacity-development, and yet still generates data and information of sufficient rigour to support policy processes and governance of agriculture in ways that benefit small-scale farmers and processors.

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