



Working Paper No. 565

Analyzing Local Institutional Change

Comparing small farmer participation in high value export chains
in Uganda and Peru

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September 2013



CIRI working paper no. 1



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ISSN 0921-0210

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Abstract

Institutional development has attracted more attention in the past two decades. However, institutional theory finds itself in a pre-consolidated phase and there are various theoretical and methodological challenges. One is to respond to the question whether institutional change is a spontaneous evolutionary or a deliberately designed process or a combination of the two. Another question concerns institutional co-innovation: i.e. the interaction between technological innovations, changes in institutional arrangements and changes in the institutional environment. A methodological challenge concerns the study of common institutional needs, which under different conditions can give rise to various concrete institutional forms. This paper researches how a common institutional need to develop institutional arrangements for rural collective action in order to enable small farmers to participate in newly created export chains in different contexts leads to different institutional arrangements and outcomes. By comparing two cases, the paper seeks to unravel which factors and actors play what roles and how these explain differences in the process of institutional development and in that way to arrive at a better understanding of local institutional change.

After a general introduction, I present an overview of the diverse literature on institutional change. After that, bird's eye views will be presented of the two case studies. The first refers to the development of export agriculture around asparagus in the North of Peru and the second relates to the introduction of new apicultural technologies in the North West of Uganda. In the final section the main commonalities and differences in institutional development are examined and an attempt is made to respond to the main challenges formulated above.

Keywords

Value chains, Institutions, Smallholder agriculture, Uganda, Peru.

Acronyms

BDS	Business development Services
BNP	Bee Natural Products Ltd
CEBEMO	Centrale voor Bemiddeling Medefinanciering van Ontwikkelingsprogramma's (Co-financing donor NGO) later named CordAid
CTTU	Centre for Transfer of Technologies to University graduates
DIPU	Drip Irrigation Production Unit
EU	European Union
GIPA	Gravity Irrigation Association of Producers
LC	Local Council (level 1 - village to level 5 - district)
IFPRI	International Food Policy Research Institute
INCAGRO	Innovation and Competitiveness in Peruvian Agriculture
KTB	Kenyan Top Bar
LRA	Lord's Resistance Army
NAADS	National Agricultural Advisory Services
NGO	Non Governmental Organization
NRM	National Resistance Movement
PMA	Policy for the Modernization of Agriculture
SAC	Sociedad Agricola Cerrada (Limited Agricultural Society)
SNV	Stichting Nederlandse Vrijwilligers (Dutch Development Organization)
UNIDO	United Nations Industrial Development Organization

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1 Introduction

In the past ten to fifteen years, regional and local development studies have experienced an “institutional turn” (Amin, 1999). There has been a growing recognition of institutions that structure the social and economic interactions in the process of local and regional change. This can be considered an important scientific advance since the spatial reductionism and economic structuralism of the early generations of regional studies (Helmsing, 1999).

On the other hand local regional development studies have a more positive perception of the importance of institutions and of the role of local actors in their construction. Local governance is a broader political process, which contributes to generate new institutions, which in their turn constitute a local source of intangible competitive advantage. In this context one can mention several theories amongst which we can mention the role of networks and social capital for local institutional development, the theory of institutional density of Amin and Thrift (1994) and theories concerning urban regimes and growth coalitions (Stoker & Mossberger, 1994, Harding, 1991).

In the last few years also a critique has emerged of this local institutional turn. Macleod and Goodwin (1999) and Macleod (2001) characterised it as ‘soft institutionalism’. Their critique was directed at the lack of institutional political economy and of the fundamental role of the State therein. We agree with these authors that it is important to analyse how institutions are constructed.

Also in institutional economics more generally, most attention has been given to the influence of particular institutions on economic development and not on the reverse causality. Chang (2010) has made this point most effectively. He argued that increased economic wealth leads to demand for better quality institutions with more transparency and accountability; and also makes (new) institutions affordable. Furthermore, economic development creates new agents and activities, which need new institutions.

There is as yet considerable disagreement as to what institutions are, how they come about and what causal relations exist between institutions and economic development. Recently, Maseland (2011) made valuable methodological criticisms on institutional economics. He made three key points: a) there is a focus on differences of degree, rather than differences in kind. i.e. most researchers select a particular institution, examine it across cases, rather than accepting that there may be different institutions at work for a similar institutional need (a point which has been made earlier by Rodrik, 2007); b) institutional economist tend to neglect the interactions (i.e. each case of analysis is taken as independent and in isolation rather than interacting with other institutions and/or with other cases; c) there is a predominant use of partial perspectives; that is to say examining a case from the perspective of a particular institution that has been successful in another (usually one's own) society. This leads to partialism. In his view more attention needs to be paid to the (historical) context of that institution.

To Maseland's critique one can add that institutional change triggered by economic development rarely concerns one single institution or institutional arrangement but almost always refers to a set of complementary institutions in various markets. Furthermore, it concerns frequently a mixture of public and private order institutions. To concentrate institutional change

on one single institution in one market or domain without taking into account the complementary institutional needs in other markets and/or domains could contribute to institutional failure and to poor economic performance. Lastly, the political economic context at the time of institutional change would very much influence the direction of institutional change (along the lines argued by Chang, 2002) and the kind of institutional innovations which would be promoted and which ones would be frustrated.

In this paper I will make a comparative analysis of two cases of institutional change that centres on the need for institutional solutions for organizing small farmers in high value export chains. The issue is constant across the two cases but the precise institutional form varies from case to case. Thus, I will not focus on one particular institution defined ex-ante. Furthermore, and since institutional change often comes in complexes or sets of institutions, I will examine the institution for organizing small farmers in the context of other co-evolving institutions. I will look at how the process of institutional change took place and who was involved at what level and try to uncover the effect of institutions on local economic development as well as the reverse, namely the effect of unfolding economic development on the institution that was introduced, notably its sustainability.

In order to be able to do so, I will start by giving a brief overview of key questions and aspects and elements of theories of institutional change. Here I will focus on three partially overlapping key questions. The first one was originated by Kingston & Caballero (2009) who compared theories of institutional change. It can be formulated as: *with respect to the two cases, can institutional change best be seen as spontaneous rather than an outcome of deliberate design or as a combination of these two?* The first approach argues that institutional change is very much an uncontrolled and decentralised process. In many different corners of the economy institutional change may be instigated and agents facing a specific institutional need have room for making independent choices. The institutional proposal that matches best the individual need and the micro context of that agent, stands the best chance of becoming accepted. Selection from among competing options that fit the local agents' needs and criteria in the best way will survive. The second approach places emphasis on the how institutional change gets engineered. It departs from a more centralised decision making setting. The state performs a key role here but different strands of theory select different elements and aspects of the state to highlight what they see of key functions and mechanisms. This first question raises issues concerning the definition of institutions, the drivers of change, the actors involved and the economic, political and sociological dimensions. These are in essence comparative static questions.

The second question formulated by Kingston & Caballero (ibid) relates to the dynamics of institutional change: *what is the nature of the process in time and space?* Here we raise questions concerning the interactions between the identified factors and actors and examine patterns in time and space and we must deal with issues such as bounded rationality, institutional inertia, path dependence and the distinction between horizontal and vertical competition in processes of 'climbing the institutional ladder'. These issues concern comparative dynamics of institutional change. For each the two main questions a series of sub-questions will be elaborated which together constitute my analytical framework.

To these two I add a third partially overlapping question, which concerns *institutional co-innovation at various levels and between public and private domains*. The literature gives considerable attention to the State which defines the business institutional environment (i.e. a set of institution) within which economic agents and activities can develop and within which private agents can develop their own complementary private order institutions. Is this necessarily a downward process where public institutions provide the framework within which private order

institutions are created or adapted? Can the reverse also happen and if so, under what conditions? How do national and local level institutional change agents and processes interact? Below I will give some conceptual elaborations necessary to answer these questions empirically.

I will then, in section 3, give a bird's eye view of the two cases. One concerns the introduction of an agro-export crop in the Department of La Libertad in Northern Peru by a NGO with a private company as ally and the other concerns the introduction of new beekeeping technologies in the West Nile region of Uganda where a private company played a key role in creating an agro-export chain and NGOs a complementary one. The two cases constitute very different cultural and historical institutional settings (the state being more prominent in Uganda, than in Peru) but cover roughly the same period (2001 – 2008) though with varying preceding periods of institutional experimentation. In both instances the Government, with the support of the World Bank, attempts to introduce market based agricultural BDS. The purpose of the analysis is not to identify a 'superior' institution to be replicated elsewhere but to get better insight in what complex set of factors and actors shape institutional change around a common institutional need (Lawson, 2003). The analysis of the two cases is structured using a time line. Necessarily the presentation of the two cases will be sketchy and cannot be elaborated in all their richness for reasons of space¹.

This presentation will be followed, in section 4, by a discussion of the factors, actors and issues raised in the analytical overview on the process of institutional change by examining commonalities and differences between the two cases and contains some final observations concerning understanding and researching processes of institutional change.

Summarizing, the purpose of this paper is to analyse what actors, factors and forces influence process of local institutional change and explain success and failure of institutional innovation. In doing so, a) we take into account the interactions between institutions and local economic development; b) we do not limit ourselves to one single institution but examine a set of complementary institutions which may be of a public or private order; the State may be centralised and by implication the public institutional construction process may be more or less centralised but private construction of institutions may be more dispersed and decentralised; c) we seek to contribute to the current institutional economic debate concerning the evolutionary or deliberate design nature and dynamics of institutional change processes; and d) we take into account the methodological critiques by making a comparative analysis concerning a particular institutional need recognizing that this implies co-innovation of complementary institutions.

2 Understanding institutional change

Institutions are defined in a variety of ways in the literature. A common definition, states that institutions are *rules* of the game (see also Chang, 2002). North (1990) maintained that institutions are humanly devised *constraints* that shape human interaction and Hodgson (1988, 2006) sees them as durable patterns of human interaction. Here we use the notion of rules, not as constraints but as rules that guide human behaviour. Here we come close to Nelson &

¹ A detailed expose of the Ugandan case can be found in Enzama, W. 2007. Quest for economic development in agrarian localities: lessons from West Nile. It can be downloaded from: <http://repub.eur.nl/res/pub/18742/>; and the Peru case study can be downloaded from: <http://repub.eur.nl/res/pub/.../DIME%20Helmsing%20Co%20evolution.pdf>

Winter's (1982) conception of routines within an organization² and their counterparts of institutions between organizations. Nelson sees institutions as social technologies or "ways of getting things done when human interaction is needed" (Nelson, 2001, 2007). Social technologies become institutions when they have become standard and the expected thing to do, given objective and setting (ibid, 2001:40). The literature identifies different kinds of institutions. The most common distinction is between formal and informal institutions where the former are often associated with written rules. A partially overlapping distinction states that specialised actors or organizations (including judges and courts) enforce formal institutions (like laws). Informal ones are endogenously enforced by members of the associated group (Kingston & Caballero, 2009). Institutions may be voluntary and constitute a private order, while public institutions are normally compulsory for all citizens or functional groups within a designated jurisdiction. Hodgson (2002) distinguishes between habits and conventions, which have evolved over time and which are part of the culture of a place; institutions, which are constituted by local practices; and, lastly, designed institutions, which are the object of (public and private) policies. The internalization of institutional rules by social actors implies that designed institutions can gradually and over time become part of local habits and practices and eventually become part of local culture. The reverse also happens. That is to say when designing new rules, existing local habits and culture can be taken into account so as to improve their match and facilitate the local acceptance of new rules.

Institutions tend to be nested and hierarchical. 'Nestedness' refers the fact that institutions are interrelated and that institutions at one level, set the stage for institutions at another level. For example, Williamson (2000) identifies four types of institutions³ where the time horizon of change is taken as a key criterion: i) institutions of embeddedness, including informal institutions and norms, change in the order of centuries or millennia; ii) high level formal rules such as constitutions, laws and property rights normally change in the order of decades; iii) institutions of governance set the rules for day-to-day interactions and can be modified in the short run; finally, iv) transaction contracts, which set prices and quantities, change continuously. New institutional economists do not study type 'i' institutions but take them for granted. They focus on level 'ii' and 'iii' institutions. In relation to common property problems, Ostrom (2005) distinguishes between a) operational rules that govern day-to-day interactions; b) collective choice rules that enable groups to make operational rules; c) constitutional rules for making collective choice rules. Embeddedness operates in two ways: it implies that for operational rules, higher level rules can be taken as given or as exogenous; but also that for changing operational rules it may be necessary to change also higher level rules. This is one of the causes of institutional path dependence or inertia (see below). The 'nestedness' also explains hierarchy between different kinds of institutions, but there is also hierarchy between rules of the same kind. The constitution takes precedence over any other law but also some laws take precedence over other laws (e.g. criminal over commercial law or children rights over employer rights). The hierarchy of rules is one of the important issues of struggle between groups who stand to gain or lose from particular rules (Chang, 2002).

² This is parallel to North who recognizes that also organizations are specific sets of institutions but organizations tend to have solved their internal collective action and agency problems. Hence intra organization institutional change is of an entirely different nature (even though not entirely separate from patterns of inter-organization and human interaction).

³ North (1990) also distinguished four levels, namely constitutions, statutes and common laws, specific bylaws and individual contracts.

One aspect of hierarchy concerns the scale at which an institution applies. Does it refer to all economic agents or to (self-) selected groups? Do agents have alternative options to deal with a similar institutional need? In some theoretical approaches the process by which the scale of institution rises, is called ‘climbing the institutional ladder’ (see below).

What drives institutions to change? One approach (Hodgson, 2006, Gomez, 2008) assumes that an institutional gap emerges as a result of endogenous or exogenous shocks. That is to say, “when action X does not result in expected outcome Y”. Other authors like Nelson (2001) and Nelson & Winter (1982) see technology as the principal driver of institutional change. A new physical technology (i.e. new ways of producing, new products or new ways of undertaking activities) calls for a change in (internal) routines within the firm and may call for a change in ways of doing things between economic agents (institutions). Ostrom (1990) sees common property resource depletion as a principal driver of institutional change. North (2000) places more emphasis on the advances of cognitive science or the ways in which we interpret the world and its problems.

Institutional change involves actors and the literature puts emphasis on two categories of actors: the catalytic or institutional entrepreneur who acts on his/her own account or in association with other entrepreneurs who face similar institutional needs. They may form a business association and pursue their interests collectively. The second actor is the state. Conceptions of state vary, as does the emphasis on specific state actors and aspects of state functioning and performance. Some authors distinguish between state bureaucrats and politicians and/or political groups, which struggle for control over the institutional design process (Kingston & Caballero, 2009). With regard to late developing countries, multilateral and bilateral aid donors influence the direction of institutional change. Also civil society organizations have become an institutional player, for example, in relation to sustainable development or corporate responsibility. They (are assumed to) have different values that orient their institutional building efforts.

The so-called New Institutional Economists have made important contributions to the economic dimension of institutional change (Williamson, 1975, 2000). They argue that under conditions of competitive markets durable institutional change occurs only when the new institution is efficient. Institutional options that result in less transaction cost reductions will eventually give way as being inefficient. At the micro level, NIE also point to the importance of asset specificities, information asymmetries, adverse selection and moral hazard problems, which trigger specific institutional designs. In many late developing countries markets are far from perfect; thin markets and market failure may be endemic and therefore these problems are much more frequent and as a result inefficient institutions may continue to abound.

Institutional political economists stress that institutional change takes place in an arena where different groups struggle for control over the institutional design process. The reason being that the distribution of costs and benefits of institutional change can (be made to) vary considerably between groups. Furthermore, groups may use different sources of power, such as financial and knowledge resources at their disposal as well as their political and social networks (Helmsing, 2011). Moreover, pre-existing institutions have created a structure of rights and obligations, which confer authoritative resources to particular groups and deny these to other groups. Thus, institutional change is not a voluntary and rational process but implies struggles between groups and can result in imposition. The role of the state, not only as creator of institution but also as provider of legitimacy to institutional change driven by particular groups becomes important (Chang, 2002). In that context, Gomez (2008) argued that the construction of new economic institutions is not only guided by purely economic considerations but that also social relations between actors influence institutional outcomes as do power differentials.

As regards the sustainability of institutions, two perspectives tend to predominate. One emphasizes the existence of competing institutional options and the voluntary nature of acceptance and replication. The instigator of a new rule may have to compensate others who may stand to lose from the new rule in order to prevent their opposition or their switching to another institutional alternative. Other institutional economists stress the role of the state and public enforcement of compliance. In this case the cost of enforcement is often not seen as an overriding consideration, as it remains hidden in overall cost of government. This may also imply that administrative and public policy considerations may have considerable bearing on institutional designs. Bureaucrats may have a different view of the world than do entrepreneurs or politicians. Gomez (2008) argued that the sustainability of institutional change depends on four key governance aspects of the new rule: the first concerns input legitimacy. This is to say to what extent the process of rule definition help to win acceptance of the new rule. The second relates to the enforcement of rules. To what extent do institutional mechanisms of monitoring and enforcement exist and function effectively? Thirdly, to what extent does the new rule achieve (permanent) resource synergies (i.e. delivers results, solves problems and resolves conflicts)? And finally, what are the associated transaction and organizational costs of the new rule? One can argue that the greater the complexity of the new institutional rules (especially when there is less matching with prior institutions and evolving local habits and culture), the more difficult it may be to obtain input legitimacy, the more difficult it would be to police and enforce the new rules of the game, the less self-evident the synergies would be and the higher the decision making costs would be while the transaction costs reductions may not be all directly visible to all parties concerned. Politics, rather than economic considerations, would then become more important but will also be less transparent.

Turning now to the second question on the nature of the change process and the time and spatial dimension, there is also a considerable diversity in the institutional change literature. Some stress that the process is incremental while others argue that institutional change can be radical. In between we find authors who see institutional change as a tectonic process. Slowly tensions in the existing institutional order are building up, as institutions are less and less capable to cope with growing coordination problems, and then a rupture takes place and tensions release energies for radical institutional change. Again others differentiate, like Williamson, between different time horizons of change for different types of institutions. Roland (2004) argues that political institutions can change more rapidly than informal cultural institutions. Brousseau and Raynard (2007) maintain that at early stages a new institutional rule can still be adaptable, as it still finds itself competing with alternative rules, but as its applicability is extended in time and space, it becomes more difficult to change it. The institution 'hardens' like the lava that spreads after the volcano has erupted (Brousseau et al., *ibid*).

There are several factors that have been singled out to explain that institutional change is a path dependent process. The two most important ones are bounded rationality of the actors and institutional inertia. Actors are bounded rational, as learning and search processes are time consuming and costly, information tends to be incomplete and processing capacity is limited. Actors therefore reveal satisficing behaviour. They will accept a 'good enough' institutional option. Pagano (2007) cited by Kingston & Caballero (2009) distinguished between different forms of bounded rationality: Next to the well know bounded processing skills and bounded calculation skills there are also bounded communication skills, bounded preference formation skills and bounded emotional skills. Risk aversion in situations of low trust and failing markets can further compound the selection process and prevent institutional change from becoming sustainable. North (2005) stressed the importance of mental models and ideologies with which actors work and which can influence the perceptions about the effects of alternative institutions.

Institutional inertia can result due to the existence of free rider problems, which prevent collective action to change institutions. Furthermore, informal institutions can be an important source of institutional inertia. Last but not least institutional complementarities or interrelatedness can act as a severe brake on institutional change. Not only in functional terms but also because groups who benefit from the complementary institution can oppose the institutional change desired by others. In all, history or context plays an important role in the process of institutional change.

Brousseau & Raynard (2007) have made an interesting NIE contribution to the analysis of institutional change processes. They argue that institutional change begins as decentralised process of creating localised institutional orders. Local institutions tend to be voluntary as agents have always the option to create or join alternative institutional solutions to their common coordination need. Local institutional orders are therefore in competition with each other. They argue that at the local level economic competition takes place between different and alternative institutional options but at higher and more centralised level political competition between higher order institutions takes precedence. Their central contention is that local institutional arrangements have a built in tendency to seek to expand and 'climb the institutional ladder' and 'like lava, have the tendency to spread out and then solidify to become part of the institutional framework'.

Agents may have different coordination needs and if a particular (small group of) agent(s) creates a particular institutional solution, then this agent will be interested that other agents also adopt that institutional solution as this will lower overall transaction costs. Using a game theory framework the authors show that a private solution of institutional choice is not necessarily an optimal social welfare solution. If more agents follow the same rule, transaction costs decline and thus motivates the originator to improve the institution so as to expand its relevance and usefulness to other agents. This generates a race to cover more agents. An outsider may be tempted to join as the transaction costs of starting an alternative local institution are higher and there are fewer other agents left who could join this alternative order. Thus, the agent will for lack of a better alternative (i.e. reluctantly or not) join that expanding institutional order. Thus, if an institutional club grows larger, it becomes progressively more difficult for others to form an alternative order and even smaller 'clubs' will be absorbed by or merge with another institutional order. In the end one order remains and as there are no meaningful alternatives and hence switching costs have become prohibitive that order becomes de facto the single standard and less willing to adapt to new needs and it 'freezes' up as a mandatory institution. In the process the institution has adapted to coordination needs of a diversity of agents and hence has adapted its content, abstracting from original specific needs. Thus, what begins as a specific institutional arrangement for particular agents, through the competitive process, becomes a generic institution suitable for a range of coordination needs for a more diverse set of agents.

In institutional competition, agents can deploy different strategies. According to the authors, adapting and improving the quality of the institution so as to improve its efficiency; poaching of go-betweens (that is, agents that ascribe to a rival institutional order but with coordination needs that are close to one's own); manipulate switching costs, by making it less attractive for existing members to defect; ex-post retaliation and ostracization of defectors; and lastly, negotiate a merger. Timing and 'first mover' advantages thus play an important role in the process of institutional change.

We began with three main questions: Can institutional change best be seen as spontaneous rather than an outcome of deliberate design or as a combination of these two; what is the nature of the process in time and space, and is there institutional co-innovation between various levels and between public and private domains?

We have elaborated a series of factors, actors and issues under each question. The purpose of this paper is not seeking a theoretical synthesis but to examine our cases in relation to these factors, actors and issues. In order to do so, we continue in the next section to present bird's eye views of the two case studies.

3 Bird's eye views of the two case studies

Institutional change for smallholder participation in export-agriculture in Northern Peru

In the nineteen eighties Peru suffered an economic and social crisis and a rapid rise in violence (Sendero Luminoso). The origins of our case can be traced back a Jesuit priest Jose de Bernardi, who developed the ideas concerning the creation of the Centre for Transfer of Technologies to University graduates (CTTU). Table 1 below presents a time line of the main events of CTTU and its activities. The CTTU targeted graduates of the regional universities and provided them with the opportunity to become young entrepreneurs forming their own agro enterprise dedicated to the growing of a high value export crop, asparagus. The intervention logic was primarily justified on political grounds: how to prevent that frustrated university graduates join the terrorist movements and instead of “promoters of violence” become “promoters of peace”.

However its application was primarily economic: how to form entrepreneurs and incubate their enterprises. Crucial in the germination of his ideas was a chance encounter in 1990 between De Bernardi and the owner/manager of an innovative firm, TAL S.A. In 1991 the CTTU was created. Additional resources were subsequently obtained from a Dutch co-financing agency, which enabled it to expand staff and actually start its activities.

A first land holding was acquired on desert land to begin incubation of agro-enterprises using advanced technology and farm management methods, developed with the ‘foster enterprise’ (TAL S.A.). Drip irrigation technology, which was new to Peru, required a minimum scale of operation in order to be economically viable. Single person enterprises envisaged as part of the incubation process were too small. This problem could be addressed by creating a cooperative in which irrigation assets would be pooled. But since the collapse of the agrarian reform, cooperatives had a ‘bad reputation’. Therefore CTTU choose another collective action solution well-known to the staff: the creation of a non-profit welfare organization. This became the Drip Irrigation Production Unit (DIPU), which owns the irrigation infrastructure serving 15 to 25 one-hectare single person enterprises. The first DIPU started operations in 1995 with 12 university graduates after a long struggle to locate underground water for irrigation. It achieved spectacular yields much higher than large-scale agro-companies in the region.

As the fame of the project spread to peasant communities in the valleys of the Department, these began to pressure the CTTU ‘not to abandon them’. Resource conditions on peasant holdings however did not permit drip irrigation and technological constraints led to institutional adaptation. The Gravity Irrigation Producers Association (GIPA) was a new institutional arrangements created in 1995. This institution does not own any assets but organises groups of rural higher education graduates to facilitate learning, input distribution and group marketing. In the second half of the nineteen nineties a number of GIPAs were created in the valleys of Chao, Virú and Chimbote.

Table 1
Time line of events in La Libertad, Peru

1990	Protagonist meets leading entrepreneur: a learning alliance is formed
1991	Creation of CTTU, Centre for Transfer of Technology to University Graduates
1993	CEBEMO (which later became CordAid) approves the CTTU project for funding (1993-1995)
1993	Acquisition of the land holding 'San Juan' from the CHAVIMOCHIC project (25 has)
1993-5	First promotion of a cohort of (12) young entrepreneurs – Drip Irrigation Production Unit, DIPU "San Juan", Moche
1994	CTTU itself is legally constituted as 'non-profit socio-cultural association'
1995	First promotion of Gravity Irrigation Producer Association, GIPA groups (5) in Chao and Virú
1995	Second promotion of (10) young entrepreneurs – DIPU "San Martin", Moche
1996	CEBEMO agreed to finance a second project phase (1996-1998)
1996	Agreement with the Community of Paijan – CTTU acquires 100 hectares of communally held desert land
1997	Third promotion of (12) young entrepreneurs – DIPU "San Jose", Paijan
1997	CTTU creates an agricultural enterprise "Casuarinas", Moche
1998/9	Serious damages by heavy rains caused by "El Niño" and a drop in asparagus yields
1999	CordAid agreed to finance a third project phase (1999-2001)
1999	CTTU starts a parallel integrated local development project in Paijan, financed by Action Aid
1999	Fourth promotion of (10) young entrepreneurs, DIPU "San Ignacio de Loyola", Paijan
1999	DIPU San Juan creates a Limited Company called "Agro San Juan SAC"
1999/00	Four new GIPA groups are formed in Paijan; two GIPAs formed 1988 close down
2000	Asparagus price drops in the international market (price war initiated by China)
2001	Formation of six new GIPA groups in Paijan; two GIPAs of 2000 close down
2000/1	Export boom becomes a bust: falling prices
2001	Drop in GIPAs (2) and GIPA membership (95) in Virú, Chao and Chimbote
2001	Government policy to create a plural and competitive system of agricultural BDS
2003	Governing Board CTTU: CTTU to withdraw from credit operations
2003	DIPU San Jose, Paijan creates limited company called "Agro Lider SAP SAC"
2004	CTTU secures two government funded projects providing BDS services and chain coordination to contract farmers
2005/6	New model replicated among small producers and companies
2007	Financial institutions accept CTTU model for group loans under export agriculture finance scheme

Sources: Field interviews and internal documents CTTU

A major breakthrough in addressing the land constraint to incubate advanced technology enterprises (DIPUs) was the acquisition of 100 hectares of desert land owned by the community of Paijan (in the North of the Department of La Libertad) on the condition that CTTU would stimulate enterprise development in DIPUs and GIPAs in the Paijan district.

Credit then became the binding constraint. Faced with market failure in the credit market, CTTU addressed this by assuming responsibility for a large loan obtained from the Canadian Counter Value Fund. The number of DIPUs and especially GIPAs increased rapidly. In order to serve the new enterprises with high yielding varieties, CTTU set up its own nursery in 1997 where it produces seedlings under controlled conditions. Seedlings were provided as a service, free of charge, to DIPU and GIPA members.

The asparagus export boom in the Department receives a big stimulus with completion of the CHAVIMOCHIC project. Nine thousand hectares of dessert land alongside a newly constructed irrigation channel were sold by public tender. However tender conditions were such that only large companies could acquire land, many of which invested directly in asparagus production. As a result, the region became a leading exporter. The asparagus boom attracted also related and supporting industries and service providers (input distributors, sale and hire of farm equipment etc.) as well as rural labour that migrated from the peasant community highlands of the Andes to work the fields in this coastal region. Within a period of five years a new regional export base developed around one single crop, asparagus.

In 1998/9 the “el Niño” phenomenon struck causing heavy rains and flooding in the valleys resulting in damages to irrigated fields. Crop yields declined in GIPAs in these valleys but DIPUs situated in the desert were not affected.

In 1999 CTTU applied again to the Dutch co-financing agency for financial support for a third period. Also this third application is successful. In the same year Action Aid contracted the CTTU to implement an integrated local development project in Paijan which was mostly focused on social development and which complemented the income generation cum enterprise development activities already undertaken by CTTU in the area. It stimulated the formation of new GIPAs in Paijan in 2000 and 2001 and a new DIPU took off. The number of applicants to CTTU grew, attracted by the high incomes earned in the export activities. The relative resource abundance of CTTU in those years resulted in less strict selection by CTTU of potential entrepreneurs. Table 2 gives an overview of the evolution of CTTU generated enterprises during this period.

Table 2
Basic data on the evolution of enterprises formed by CTTU, 1995-1999/00

	1995	1996	1997	1998	1999/0
Newly formed DIPUs	2		1		2
Number of existing DIPUs	2	2	3	3	5
Number single-person enterprises in DIPUs	62	22	42	38	70
Newly formed GIPAs	5	5	2	2	4
Number of existing GIPAs	5	10	12	11	13
Number of single-personal enterprises in GIPA	71	141	162	145	169
Total number of single-person enterprises	133	163	204	183	239
Discontinued GIPAs	0	0	0	1	2
Desertion of members from DIPUs	40	30	44	30	40
Desertion of members from GIPAs	0	2	5	33	21
Total number of deserted members	40	32	49	63	61
Number of hectares under DIPU system		12	28.5	28.5	34
Number of hectares under GIPA system	16	70	180	150	186
Average annual yield (ton/ha/campaign) DIPU	-	31.7	9.0	5.9	8.3
Average annual yield (ton/ha/campaign) GIPA	3.5	5.0	5.0	4.0	4.3

Source: Wils y Benavides, 2001, Informe Evaluación Externa;

Note: Figures on desertion among DIPUs were adjusted based on information provided by De Bernardi (interview, June 2006).

An aggressive Chinese export drive in the world market led in 2000/1 to a fall in asparagus world prices and hit the region before it had been able to recover from the ravages of “el Niño”. The number of GIPAs as well as GIPA membership declined rapidly. Members defaulted on their loans and left the CTTU with their accumulated debts. The growth of DIPUs also stagnated as economic prospects had declined.

The institutional change agent, CTTU, suddenly found itself in crisis. Reflections by different related agents, operating with different missions and perspectives advocated different solutions as to how to change the CTTU model. The new institutional choices to be made by CTTU were influenced by three main factors: i) important changes in the broader institutional environment, notably a new agricultural policy of the Peruvian government, which created new opportunities for CTTU based on its acquired reputation, ii) the response of Peruvian export firms to the competitive challenge of China, and iii) the vision of the CTTU about its own future role.

The World Bank sponsored INCAGRO project signified an important change in Peru’s agricultural policy. Its aim was to create a market for business development services for commercial agriculture whereby private firms and NGOs provide extension services to groups of producers, which were co-financed by the Government. The INCAGRO project was a national scheme to which (independent) groups of agro-producers often in association with agro-industry applied⁴. Thanks to its accumulated experience CTTU could organize groups of producers and team up with agro-industrial firms and made several successful bids. At the same time the Peruvian Government created so-called ‘second tier’ funds to finance the expansion of commercial agriculture.

The second factor refers to technological innovations in transport of horticulture exports in neighbouring Chile and their adaptation to the Peruvian asparagus (the use of air controlled containers extending the fresh life of horticulture products by changing the percentage of oxygen) and the extension of this shipping service to Trujillo. Thanks to these technological innovations, the Peruvian firms succeeded to redefine their market niche by switching from preserved white asparagus to fresh green asparagus. Since then they have become world leader in fresh asparagus, leaving China to dominate the world market of preserved (canned) asparagus. The technological innovation in production and logistics related to asparagus also made it easy to adapt the new technology to other high value export crops. This made it possible for Peruvian firms to diversify their export crops. The new crops were annual crops (artichoke, peppers etc.) reducing the high risks associated with investment in semi-perennials such as asparagus.

Based on prior successful collaboration with CTTU, export companies shared their learning experiences and on that basis CTTU could relatively quickly adapt training packages to the new crops.

The Government policy of financing commercial agro-export set the terms for the new contractual arrangements. Banks would provide credit against the presentation of a contract with an agro-export firm. This led to a local adaptation of a contract farming model: CTTU became a chain coordinator, providing chain coordination, agricultural extension and related business services to small producers. For small producers the CTTU provided “transaction opportunities” in markets not accessible to them individually, notably in the markets for export crops, for inputs, and for credit. The risks of operating in volatile export markets were managed by means

⁴ At a later stage INCAGRO opened regional offices so as to improve access and to respond better to diverse regional needs.

of new interlocking contractual arrangements between CTTU and smallholder, between smallholders and export companies and between smallholders and banks with CTTU as co-signatory. In this new institutional set up, CTTU became a non-profit or social enterprise with a mission to serve small producers but charging for its services. Table 3 gives an overview of the growth of agricultural activities under the new institutional arrangements.

Table 3
Development of the new GIPA arrangements: 2004-2006

	2004	2005	2006
Number export of chains	1	3	7
Number of crops	1	2	4
Number of GIPAs	2	7	9
Number of producers	45	66	168
Cultivated area (ha)	66.65	139.1	426.85

Sources: Producer data sheets, CTTU, various years

How successful has the CTTU been in its original objectives? The results are mixed: the original plan of incubation of individual enterprises in combination with a desert land colonization scheme, based on the DIPU model was, in the end, not successful. The chosen institutional arrangement ‘froze’ the incubation process, although selected members succeeded to create new agro-enterprises, alongside and independent from CTTU. CTTU has been most successful with the institutional model it had neither initially designed nor foreseen. This was the new GIPA model (a combination of collective action, contract farming and social enterprise services), creating ‘transaction opportunities’ for educated children of the ‘parceleros of the agrarian land reform’ and incubating their new enterprises on small plots on former irrigated landed estates.

CTTU’s success can be explained by its capacity to adapt to changing circumstances, aided by long term funding from a ‘patient’ donor and by having initiated an alliance with large export companies. The very transformation of the regional economy created ‘a critical mass’, economically and politically. Economically, in so far that the geographical concentration of asparagus production attracted specialised suppliers and services to the region from which also small producers benefitted and because large firms were able to respond successfully to the competitive challenge of China. In political terms in the sense that export business leaders from the region were invited to help give shape to the new agricultural policies of the Government (INCAGRO project) and because large companies were able to lobby the Government for infrastructural improvements (roads and sea and airport).

Table 4 gives an overview of the status in 2008 of all incubatees since 2000. Since its re-engineering, the CTTU has selected more than 420 persons for its entrepreneurship and enterprise development programme. The table gives an overview of their status in 2008. Of these nearly 10% in that year were participating in the programme. Fifty-seven entrepreneurs were engaged in export chains coordinated by CTTU and another sixty were doing so independently from CTTU. Another 30 persons could find employment in the same sector, thanks to the competences acquired through CTTU. In almost one hundred instances, CTTU was unsuccessful. The incubatees, after some time, switched back to traditional crop cultivation and farming practices. Then there are three categories of what we could characterise as unsuccessful

instances as people moved out of agriculture altogether, either they migrated, switched to non-agricultural occupations or social reasons explained their exit. Then there is a significant group of persons (11%) without any information on their whereabouts.

Table 4
Status in 2008 of incubatees since 2000

	2008	%
Currently in process of incubation	41	9.7
Start up enterprise operating in chains coordinated by CTTU	57	13.5
Start up enterprises operating independently in group based agro-export cultivation	60	14.2
Employed in the agro-export sector	30	7.1
Unsuccessful incubation – returned to traditional cultivation	98	23.2
Unsuccessful incubation – moved into non-agricultural employment	39	9.2
Unsuccessful incubation – rural – urban migration	14	3.3
Unsuccessful incubation – due to social reasons (incl. health)	28	6.6
Other	9	2.1
Without information	47	11.1
Total	423	100.0

Source: registers CTTU

In order to conclude on the performance, table 5 below defines ‘success’ and ‘failure’ rates. Criterion 1 is the strictest definition of success: Have incubatees become independent entrepreneurs who now operate their enterprises in agro-export crops on their own or with independently formed groups? Using this criterion only 14% of the incubatees of CTTU can be considered successful. Criterion 2 recognizes that small farm enterprises face systemic market failures and need ‘allies’ who help overcome these. The CTTU performs this role through its coordination of the agricultural production segment of agro-export chains. In this case the success rate rises to 28%. Criterion 3 has the broadest success definition. For people who fail as entrepreneurs but who remain employed within the agro-export chains, one cannot conclude that the investment has been a waste of resources. The investments continue to yield social benefits. In this case the ‘success rate’ of CTTU rises to 35%.

We can also look at the performance of CTTU looking at the failure side. As shown in Table 5, the aggregate failure rate is 42%. That is to say, four out of every 10 persons who participated in the CTTU programmes did not form agro-export enterprises or remained active in that sector. However, only 2 in 10 reverted back to traditional farming practices. The other 2 in 10 for various reasons left the agricultural sector completely. This is a general characteristic of rural processes of change. It would most likely have happened irrespective of the CTTU intervention. In that sense it is a kind of dead weight factor that needs correction in the evaluation of the results. Taking this into account it can be concluded that the overall CTTU performance can be considered positive indeed.

Table 5
Success and failure of the CTTU model

	2008	%
Success		
Criterion 1: independent entrepreneur (without any assistance from CTTU)	60	14.2
Criterion 2: independent entrepreneur (with or without assistance from CTTU)	117	27.7
Criterion 3: active in agro-export chains + agricultural employment	147	34.8
Failure		
Unsuccessful incubation – return to traditional cultivation	98	23.2
Unsuccessful incubation – other employment (non-agricultural)	39	9.2
Unsuccessful incubation – rural to urban migration	14	3.3
Unsuccessful incubation – social factors	28	6.6
Aggregate rate	179	42.3

Source: table 4

Institutional arrangements for beekeeping in West Nile, Uganda

In the nineteen seventies and early eighties Uganda suffered from considerable political turmoil and economic mismanagement but with the National Resistance Movement (NRM) of Museveni taking control, the economy rebounded and political stability improved. The average annual rate of growth in the nineties was 6%. The population below the poverty line declined from 56% in 1992 to 38% in 2003. But in Northern Uganda unrest was not contained and the Lord's Resistance Army (LRA) and the Uganda National Rescue Front (UNRF) continued to create havoc. Only in 2002 the Government signed a peace treaty with UNRF rebel groups and post-war reconstruction began.

In the late eighties and nineteen nineties a new system of local governments was created. It consists of five layers of which the Village (local Council or LC1) constitutes the bottom. The sub-county is the third layer (LC3) while the District (LC5) constitutes the apex of the system. LGs in Uganda provide important social services (especially in education and primary health care). The Local Government Act of 1997 also gave the districts and the communities the legal mandate to initiate partnerships with the private sector (including NGOs) in order to promote local development. In 1997 agricultural extension was transferred from the national level to the districts. However agricultural extension remained a marginal item in most districts, which were spending less than 3% of their budgets on this economic development service.

In 2000 the Government of Uganda launched an ambitious new Policy for the Modernization of Agriculture (PMA) to enhance production, competitiveness and incomes. One of the seven pillars of reform was the delivery of agricultural extension through a new National Agricultural Advisory Services, NAADS. NAADS is considered to be an innovative public-private extension service delivery approach with the aim to increase commercial farming among Uganda's subsistence smallholders. This program was officially launched in 2001 to promote the development of farmer organizations and empower them to i) procure advisory services; ii) to manage linkages with marketing partners and iii) to conduct demand driven monitoring and evaluation of advisory services and their impacts.

Under the NAADS approach, farmers form groups, which contract private sector (on NGOs) service providers, which are awarded short-term contracts to promote specific farm

enterprises and provide advisory services (IFPRI, 2007). The sub-county is the basic operational level of NAADS where it implements and manages its program. At this level, the priority farm enterprises are identified and NAADS manages from here the allocation of contracts, monitors and evaluates performance and accountability of service providers and farmer groups. At LC3 level farmer forums are established, composed of representatives of farmer groups, which operate at village level (LC1). The farmer groups are the basic unit receiving the advisory services. Members are selected from among the economically active poor (i.e. neither the destitute poor nor larger scale farmers). They are encouraged to work together around a particular crop or farm enterprise. The farmer groups are provided advice on how to organize themselves and engage in collective action (e.g. learning how to set themselves up as a farmer group with a constitution and how to make bye-laws), engage the local government and service providers, manage technical development sites and organize demonstration and training sessions.

Arua District in West Nile was one of the six 'trail blazing' districts in which the NAADS program was initiated in 2001. It was rolled out in 24 sub-counties of the six districts. In 2002/3 the program was extended to 10 additional districts and in 2003/4 and 2004/5 another 13 districts were incorporated. In 2005 NAADS was active in 29 (of the then total of 70) districts and 280 sub-counties with some 13,200 operating farmer groups (IFPRI, 2007). In West Nile beekeeping was selected as a promising farm enterprise alongside with the introduction of a new breed of goats and a new groundnut variety. Table 6 below provides an overview.

Table 6
Time line of events in West Nile

Year	Event
1997	Local governments assume responsibility for agricultural extension services; staff transferred from national level to the districts
2000	Policy for the modernization of Agriculture
2001	National Agency for Agricultural Extension
2001	Initiation of NAADS in Six 'trail blazing' districts, including Arua
2002	Bee Natural Products Ltd founded in Kampala
2002	Comb honey processing plant opened by BNP Ltd in Arua
2002	Peace Accord signed for Northern Uganda
2003/5	NAADS expands operations in 13 additional districts
2003	UNIDO begin beekeeping project for ex-combatants
2003	Agreement between NAADS and BNP Ltd
2005	Ugandan Honey certified for EU market
2007	Second agreement between NAADS and BNP Ltd
2008	Factory in Arua closed
2008	New processor starts in Yumbe
2009	Factory in Arua taken over by Bee Natural Uganda Ltd and reopened with new management

Source: compiled from Enzama (2008) and interviews

Beekeeping has since long been a traditional subsistence activity, especially in the highlands of West Nile. The activity is still rudimentary and largely unexploited as a farm enterprise. Mostly it took place in the form of gathering wild honey from caves, trees and anthills as part of collective socio-cultural activities of many communities in the region. Locally self-made beehives were small and made of one piece and were often poorly sited high up in trees to avoid passer-by's and animals being stung. Wild honey gathering consisted of burning the natural colony if one suspected there to be sufficient honey, something, which disrupts or may destroy the bee

colony. The honey then often contained traces of burnt materials and the smell of burnt bees and ashes. Honey was extracted from the comb by squeezing it with a cloth, without control of moisture. Others boiled the comb, altering the chemical composition of the honey. Honey was kept in small sized containers and cans. As a result productivity and quality of honey and beeswax was low and both attracted low prices.

But beekeeping had considerable potential for introducing new technology, raise productivity in beekeeping and improve the quality of the honey. Firstly, there was considerable local and external demand for honey; secondly, the investment and operational costs of beekeeping is relatively low. It can thrive on marginal and infertile land that cannot support crop cultivation, as long as foliage is available. Thirdly, the cost of a beehive is low and other inputs (protective gear and equipment) can be shared with other beekeepers. As upfront costs are low, a farmer can break even within a year if good management practices are adopted. Beekeeping has limited vulnerability to disease and natural calamities; moreover it improves crop pollination and is an environmentally sound investment. Last but not least, beekeeping is not an entirely new enterprise and youth as well as elderly, men as well as women can do it, as it is not physically strenuous exercise. It is a part time and seasonal activity where harvesting takes place twice a year.

When NAADS canvassed the selected sub-counties in 2001, there were an estimated 1,000 households scattered throughout the region regularly undertaking beekeeping activities. The formation and capacity building of farmer groups was the first task of institutional development. This was contracted out to NGOs. In 2001 the District of Arua, NAADS and two NGO signed a memorandum of understanding for the purpose of formation and training of farmer groups.

Institutional change was needed and clearly associated with the introduction of new physical technologies of bee keeping, new farm level routines or practices. In addition new complementary institutional arrangements or 'social technologies' (Nelson, 2007) had to be designed to organize farmer groups and networks with other chain actors, with the purpose to impart knowledge and skills, jointly manage equipment, get access to micro-credit and eventually undertake group marketing.

Implementation however soon ran into problems. Agricultural training institutions in Uganda did not offer course and expertise in beekeeping and related disciplines. In the whole of East Africa there was one such institution in Tanzania. District entomologists stepped in to provide some technical assistance. NGOs had expertise and track records in capacity building in community groups and could engage farmers and provide capacity building in setting up and self management of farmer groups, but were ill-equipped for specialist services in beekeeping. The demand for services clearly outstripped the available supply. As a result few of the contracts could be implemented. Clearly NAADS had not anticipated this.

Beekeeping is more developed in the relatively affluent central and western regions of Uganda. From here the Uganda National Apiculture Development Organization, a business interest association, draws most of its members. At that time, Mrs Maria Odido was its chairperson. She had taken a keen interest in the development of PMA and of NAADS and recognized their potentials. In 2002 and together with Mr Antonio Di Fonzo she established a private limited company called Bee Natural Products Ltd (BNP) in Kampala. In the same year she took samples of West Nile honey to an auction in The Netherlands where it was rated second to Brazilian honey in terms of quality.⁵

⁵ Brazilian honey is generally considered to be of the highest quality.

The demand perspective for honey was generally considered rather positive both domestically and abroad. West Nile produces organic honey, which could potentially penetrate the fast growing demand for organic honey in Europe (Loon & Koekoek, 2006). In 2005 honey from Uganda was certified for export to the EU. Entering this market offered huge opportunities but also enormous challenges. After all, it implied developing a substantial agro-export chain, which would have to handle considerable volumes in order to become sustainable.

So, if demand conditions were favourable, a chain coordinator was needed that would be capable to organize this new export chain. In 2002, BNP Ltd made a first step in this direction by setting up a honey processing plant in West Nile, located in Arua. This plant had an installed annual capacity of 600 metric tons. The plant was opened by the Ugandan President and this gave it high publicity. Locating the plant in Arua near sources of comb honey was a strategic move as comb honey has a low value to weight index, while processed honey has a high value to weight ratio. BNP aimed to produce honey and beeswax finished and labelled to international standards and ready for the consumer market. But setting up a continuous supply chain for a plant of 600 metric tons is quite something else than creating farmer groups to be endowed with new technology and skills to produce better quality honey.

In October 2003 BNP and NAADS signed an agreement⁶, whereby BNP would assist in implementing the action plans of beekeeping farmer groups. The goal of the agreement was to speed up the adoption of improved technology by beekeepers to increase honey productivity and sales so as to diversify sources of household cash income. At the same time, the agreement served BNP to create its own network of suppliers of comb honey. Concretely BNP was to a) facilitate formation and strengthening of beekeepers associations (of beekeeper groups) for organized production and collective access to inputs and product markets; b) offer extension services for commercial beekeeping; c) introduce new technologies and beekeeping practices, notably better yielding and long lasting bee hives and harvesting gear and equipment; and, d) to buy the comb honey produced while beekeepers would reciprocate by selling their comb honey to BNP Ltd.

The first beneficiaries were 42 beekeepers groups in Arua. Groups in other districts were later incorporated into the agreement, covering about 5 groups per sub-county out of an average of 20 groups. The cost of the contract was equivalent to € 40,890.00 which was meant to cover costs of training artisans to make 'improved technology' beehives, extension service, distribution of beehives and demonstrations. This fund was managed by the NAADS secretariat. The contract was additional to that of individual private (NGO) service providers, managed by the respective sub-counties implementing NAADS programme and financed from regular sub-county NAADS accounts.

The formation of beekeeper groups (as a social technology) was for NAADS primarily motivated by the need to reduce the costs of transferring knowledge about improved technologies and associated farm practices. For BNP however the beekeeper groups were critical for the development of its own supply chain, ensuring continuous supplies and reducing logistic and transaction costs. By investing in the relations with beekeeping groups and assisting NAADS with tasks, BNP expected to build up trust with beekeepers for future buyer-supplier relations.

Where NGOs activities in organizing farmer groups ended, BNP could continue imparting skills and technology, and train beekeeping groups in joint marketing, joint management of equipment and of demonstration sites. The formation of associations of beekeeping groups was

⁶ Although the Chairperson of the Arua District Farmer's Forum witnessed the signing of this agreement, the farmer groups were not party of this agreement.

important for BNP. The increased degree of self-organization among beekeepers would reduce the complexity of supply chain management for BNP. This however turned out to be much more difficult than originally foreseen. Joint sales managed by the associations would demand a more complex and transparent management system of accounting for group and individual contributions. Furthermore, associations would also become a stronger party negotiating contracts with BNP. Last but not least the associations required a higher level of trust between farmers and farmer groups. It reality groups turned out to be reluctant to cooperate with each other in associations.

The improved technology centred on the use of a new type of beehive. Under the agreement, the Kenyan Top Bar (KTB) hive was introduced and popularized in the region to replace the traditional log hives. The company set up two apiary technology demonstration and trial sites in each of the 12 participating sub-counties to demonstrate the use of the KTB hive for optimum production. BNP introduced to the use of smokers for harvesting. Using smoke to calm the bees during harvesting does not upset or destroy the bee colony. Producers now wear protective gears, gloves, and gumboots during harvesting to prevent bees from hurting them. In this way, not only the quality of honey is improved but also the quantity that is harvested from one hive rises.

At the time of the agreement in 2003, the beehives were imported from Kenya and brought in from Kampala. This was not only time consuming but also involved high transaction cost. At the initiative of BNP, five artisans were trained and equipped by BNP with all the required tools and machinery to produce hives locally. As a result, in Arua alone, the trained artisans have established three workshops and employ over 30 workers. Farmers and other actors in beekeeping business have been linked to the workshops for hives. The region no longer imports hives. Business for these workshops is set to improve with the neighbouring Sudan and Congo placing orders for hives from West Nile. Under the second agreement between NAADS and BNP signed in 2007 more local artisans were trained to match the increasing demand.

Much as the high price is conducive for the young artisans to increase their earnings from the sale of hives, the farmers cannot afford hives without support from government or other development organizations. Micro-credit is still hard to access for agriculture and related activities from financial institutions. In order to cope with this financial market failure, BNP started making agreements with individual farmers to distribute beehives to them and deducting the cost from the payment for honey over a period of two to three years.

BNP advisory services involved imparting apiary management techniques and production knowledge. The beekeepers were trained how to locate good apiary sites, baiting of bees and techniques of determining the readiness of the honey for harvest, how to maintain apiary site to avoid infections and threats of ants, lizards and snakes. All these aspects of management have a bearing on the quality and quantity of honey. Other advisory services covered were: placing and positing of hives in the apiary or transferring hives from where they can easily be colonized to the apiary for onward management. The field officers of BNP paid regular visits to the apiaries to demonstrate the skills learned in theory and for purpose of comb inspection and quality checks. In this way, BNP was able to trace and control the quality of the production process right from apiary to the factory.

A common problem in beekeeping in West Nile was the low colonization rate, which stood at only 60%. As more hives were being introduced, queen rearing became the answer to raise the colonization rate. In 2007 a second agreement was signed between NAADs and BNP, which apart from up-scaling the previous activities also included the setting up of demonstration sites for queen rearing. By learning how to select new queen bees a beekeeper can speed up the

colonization of his/her hives. This agreement involved a total of €73,293 of which 12.8% was an in-kind contribution from BNP as part of their normal interventions and as a lead firm of the export chain. The remainder came from the NAADS programme. This activity had difficulty getting off the ground due to the lack of BNP manpower with the requisite skills.

The harvested comb honey is immediately stored in airtight buckets for transportation to the processing plant. These buckets were initially provided by BNP from Kampala. They are now available in the local markets. In order to manage its supply chain BNP identified contact farmers to whom supervision skills and logistic management were provided. The contact farmers stored farmers comb honey before collection by the factory. These contact farmers became the first reference point for beekeepers.

BNP constituted the primary link to the market: It was expected that BNP would buy all the honey from the producers. Likewise, producers were expected to sell their honey to BNP in exchange for the support offered in terms of inputs, technology, training and upgrading of products. A win-win situation was envisaged: the farmers would benefit from a ready and predictable market for their honey, reduced transaction costs, while BNP increased its assured sources of quality comb honey. This complex institutional arrangement can be classified as informal relational contract.

Initially, farmers were satisfied and expectant with this arrangement because BNP was seen as a credible firm, with a location in the region, recognized by government and providing opportunities for acquisition of new and improved technologies and practices. However, the beekeepers were not party in the agreement between NAADS and BNP. Moreover the agreement was silent on quality standards, price and delivery arrangements. The grading of the quality of honey was set and done by BNP at the factory and in absence of the producers. There are basically two grades of honey (A and B) according to moisture content, colour and scent. Furthermore, BNP tended to offer lower prices than other traders, which is something the company justified on the grounds of the subsidies in kind in the form of technical assistance, and implied financial costs of providing beehives with deferred re-payment. Initially BNP paid promptly, but as the supply chain became more extensive and complex, it delayed payments by two weeks or more, while other travelling traders paid cash on delivery.

Side selling by beekeepers increased as more traders visited Arua, attracted by its growing supply base, and their higher cash prices. As side selling increased it became uneconomical to send out trucks to collect smaller quantities of honey from distant locations and effectively the spatial range of the supply chain shrank and with it the production supply base. By 2007 the factory was operating at not more than 25% of its capacity. Overhead costs rose, reducing further the ability to raise producer prices.

Clearly, non-core activities started to overwhelm BNP. Not only the number of farmer groups embracing apiculture rose rapidly, but also the number of activities undertaken by BNP to support the expansion and deepening of the honey supply base increased: from technical advice and training, financing and distributing beehives, local production of beehives, queen rearing and setting up the supply chain for processing and sale of honey and beeswax in domestic and export markets. With only two extension staff the quality of service started to decline and eventually stopped in 2005. The company was also hit by high turnover of staff. The company employees complained of poor pay and terms of service (ex-employee) and the director of BNP accused the factory employees of cheating the company and not accounting for some company funds. Employees who were fired became rival traders in honey. Consistency and continuity of service delivery to the beekeepers was thus undermined. The trust beekeepers had

started to build in BNP was rapidly being eroded. In 2008 the company decided to close down the factory as processed volumes became very uneconomical.

What were the effects of the disruption of the West Nile value chain on beekeeping? As a matter of fact, BNP could not continue to remain a de-facto monopsonist controlling the entire value chain. Suppliers became disloyal as evidenced by rapid rise of side selling and by BNP's inability to enforce the informal institutional arrangements with local beekeepers groups. Even beekeepers, who had obtained beehives from BNP were side selling and claimed that they could not deliver honey to BNP and thereby repay the loan in kind.

Clearly, BNP suffered from own management problems as evidenced by a lack of effective costing and contracting of non-core activities with beekeepers (and with which it had no prior experiences), lack of transparent quality assessment and pricing and the inability to manage the expanding supply chain as evidenced by increasing delays in payments and declining levels of service delivery. Supplier loyalty was high at initial stages as the benefits in the form of free services were visible and highly appreciated but declined later on as prices were contentious issue and switching to the alternative option of side selling became easier to realize as more traders visited the area.

Furthermore, other actors introduced different technologies and alternative institutional arrangements to the region. Firstly, UNIDO developed a project in West Nile to promote beekeeping, small-scale processing of honey and marketing under arms length market arrangements for ex-combatants of defunct rebel groups. Secondly SNV, a Dutch development organization, which focused on larger beekeepers associations and provided organizational capacity building and facilitated links with credible (but mostly non-profit) organizations providing tailor made technical, logistical, market and financial support to expand the supported association's operations. SNV has supported 127 groups in the next door Moyo District and the Netherlands Embassy subsidized beehives and equipment. Thirdly, other enterprising beekeeping farmers started investing in forward integration at a small scale. By starting their own small scale processing units, they undercut BNP while benefitting from the development of the improved technologies and production services among beekeepers. One example is the company "Bee for Life" in the nearby district of Yumbe, which buys honey from some 500 beekeepers in the same district.

The local governments have been providing an oversight role and they have mobilized resources from central government and their own local revenue to instigate the NAADS-BNP partnership. In the event that BNP no longer met the advisory and technology needs of the growing number of beekeepers, the local governments through the NAADS started to expand contracts to private service providers to offer supplementary advisory and technology development services to fill the gap. By end of 2004, graduates from Nyabea Training Centre in Masindi, had graduated with elementary certificates in apiculture expanded the advisory services supply. By 2007 some 37 of these graduates were awarded contracts to support the beekeeper groups with advisory services and technology development. The dependence on BNP as a provider of key technological services declined. In 2009 the processing plant in Arua was re-opened under new ownership and new management and it is set to re-develop supplier relationships and re-gain beekeeper's loyalty.

What have been the overall local development results? The sector has experienced steady increase in the number of beekeepers from about 1,000 in 2002, before the agreement, to 4,000 in 2005 and over 6,300 in 2007. Idle resources like land, unsuitable for crop cultivation, has been put to use as apiary sites. Youth, majority of whom do not own and control land, is able to participate in the industry and also elderly members of the community who were unable to

engage in crop agriculture could stay active in apiculture. Detailed figures are hard to get a detailed picture. The industry has created dynamism in the West Nile economy. Backwards and forward linkages have been developed. The local artisans who are making beehives and tailors who make protective wears have created opportunities for raw material input dealers. Additional processors set up operations and new traders arrived. BNP has also extended the honey chain to global markets.

However, despite the partnership with BNP and establishment of the value chain, side selling has increased. Beekeepers have gone back to the arms-length market relations due to attractive prices, incomplete contracts and lack of trust. Notwithstanding, the region's competitive advantages have shifted from possession of basic resources to quality honey and beeswax, which compete favourably in national and external markets.

4 Reflecting on institutional change

What are the main commonalities among and the main differences between the two cases in as far as key aspects and elements of institutional change are concerned? There are at least four common elements and five main differences. Below we will first elaborate on these commonalities and differences after which we will reflect on the three main questions with which we started this paper.

First of all, the key institution itself consists of the rules concerning the formation of similar sized farmer groups (in practice 10-15 members). In both instances the main motivation was to achieve economies of scale in capacity building, imparting new skills and practices around a new physical technology and farm level practices. The social technology (Nelson, 2007) of forming groups, for group-based technical assistance, learning and experimentation, was complemented by use for group level management of joint assets (experimental stations, irrigation) and joint marketing. In both instances, change agents had to overcome market failure in input markets (notably finance, but also key inputs such as queen bees and seeds) in order to enable small farmers to enter the new product market. Both CTTU and BNP undertook micro finance lending to enable small farmers to acquire loans to finance the new activity. In both instances, the innovative agent nearly collapsed under this weight of these 'non-core' activities, which aimed to eliminate critical binding resource constraints of small farmers.

Secondly, in both instances the initial institution - the farmers group for organizing and managing technical assistance - has been adapted to suit the coordination needs of *other* economic agents, something which corroborated the new institutional economic argument (Williamson, 1975). In Uganda, BNP Ltd. transformed the farmer groups into a full-fledged supply chain institution; in Peru the institution was adapted (CTTU ceased forming DIPUs and redefined the GIPAs into a more flexible annual contract farming group operating in export chains).

Thirdly, in both instances the new institution was interlinked with other complementary institutions: in Uganda, there were bi-lateral interlocking contracts between BNP and contact farmers for purpose of supply chain logistics and with beekeepers on distribution of new beehives and on sale of honey; in Peru, the GIPA was the basis for multi-lateral interlocking contracts between small farmer groups – CTTU on the one hand and Agro-export firms and banks on the other hand. In both cases products quality standards were key to access international markets. But the institutional rules on standards were neither negotiated nor independently verified but in both cases set upfront by the dominant buyer(s) of the product: in

Peru the agro-export firms, in Uganda BNP. In Peru there were no collective assets involved in the GIPA⁷. In practice, beekeeper groups in West Nile also did not hold collective assets.

Fourthly, in both instances there were important power asymmetries, which influenced the direction of institutional change (Chang, 2002, Kaplinsky, 2000). In Uganda BNP was initially a monopsonist and effectively tried to turn the beekeeping groups in larger beekeeper associations as key nodes in its supply chain; in Peru the agro-export firms were much more powerful than the farmer groups as the former firms were vertically integrated processing and producing high value crops on their own large-scale farms. But in both instances the market situation strongly influences the degree to which power holders could exploit their power advantage. In Uganda, the growth of the industry attracted new rival traders and some beekeepers moved forward to expand in comb honey processing, thereby opening up new market outlets for other beekeepers, undermining the monopoly of BNP and its associated supply chain institutions. Arm's length market arrangements gradually replaced value chain based networks. In Peru the agro-export firms continued to dominate the export chains but in global markets they were also price takers.

Having enumerated the main commonalities, let us now look at the five main differences between the two cases. First of all, the products for which new physical and social technologies needed to be developed were quite different. Asparagus growing is a full time and perennial crop, while beekeeping is a part-time seasonal activity. This has important implications for the intensity with which agents 'live' by the new institutional arrangements. In the one case these concern the primary occupation of the small farmer, while for the other they relate to a complementary seasonal and part-time activity. The relative importance of the income derived from honey was much smaller than the income generated by asparagus growing and so were the risks. Not honouring commitments with BNP had less social consequences within the beekeeper communities. In Peru poorly performing small farmers were excluded from farmer groups in subsequent rounds. Upfront entry barriers associated with the product also differed considerably. Asparagus growing required minimally one hectare of irrigated land and access to water (tube-well) and a substantial amount of working capital; in beekeeping there was hardly any barrier and it required relatively small cash outlays. Asparagus growing was new for most small farmers, while beekeeping was a traditional practice among many communities in West Nile.

Secondly, there were important differences in the selection process of small farmers. In Peru there was a clear and upfront selection of young and educated small farmers (initially urban professional university graduates, later rural young farmers and graduates of agro-technical institutes). In Uganda's practice any rural household could participate; only large-scale farmers were excluded. In Uganda, the selection process was primarily bureaucratic: the selection of the sub-county in which NAADS would operate. The scale of the process was quite different: in Peru the total number of small scale farmers was less than 500 in 2008; in Uganda it involved an increase from 1000 in 2001 to 6500 beekeepers in 2008; In Peru the same farm level technology and the associated social technology of small farmer groups was replicated to other high value export crops (such as paprika, peppers etc.). This was not the case in Uganda.

Thirdly, and as regards actors, there were also important differences. In Peru the NGO (CTTU) was the principal catalyst, which had a commercial firm as its ally; in the process the NGO adapted itself to changing financial circumstances (the termination of the project subsidy from a Northern NGO donor) and became a non-profit but market oriented NGO or social enterprise. In Uganda, the NGOs played a supportive role. The government NAADS

⁷The DIPU was based on collective ownership of the irrigation equipment but the DIPU model was discontinued.

programme was the principal driver. A commercial firm (BNP Ltd) played a key role in creating and transforming the honey value chain adapting thereby the original institutional arrangement. It assumed initially a social entrepreneurial catalytic role but later backtracked as financial implications became overwhelming, to continue as a purely commercial firm.

Fourthly, government policy in Uganda, and specifically the NAADS programme, played a fundamental role in shaping the institutional arrangements for small farmer groups; These institutional arrangements were centrally decided, designed ex-ante and in detail by public officials with strong influence of the World Bank and with the aim to create market based technical assistance and to reduce the cost of implementing the new policy; Institutional adaptations were made locally, by trial and error and in a decentralised manner involving other economic agents (BNP). Later on in the process, again other agents created locally rival institutional options (UNIDO, SNV), along the lines suggested by Brousseau & Raynard (2007) and rival traders offered arm's length contracts), thereby increasing the choice for small farmers but also undermining the role of beekeeper groups in the production and marketing process. In Peru, the CTTU began an institutional design process in a manner of trial and error, strongly guided by the unfolding technology of irrigated high value export crops growing and adapting the designed institutions along the way, discontinuing the DIPU and developing new and complementary institutional arrangements as the policy environment changed favourably with the new government programme of market based technical assistance (in the form of the World Bank financed INCAGRO program) and complementary financial policy (2nd tier funds for innovative SMEs and commercial small farming). Government policy was not leading but provided an important tipping point in the evolutionary institutional change process led by CTTU.

Fifthly, there are interesting differences as regard the direction of the process. In Peru and much in contrast to established NGO doctrine and practices: economic empowerment was considered fundamental to be achieved first, and political empowerment of disenfranchised groups would come later as an outcome. It should be said that in reality no evidence of the latter was found. In Uganda, the political empowerment of small farmers in order to become a stronger market party was a central feature of the NAADS policy. Without farmer groups, small farmers would not be able to become an active player in the market for technical assistance and engage private sector (and NGO) suppliers of extension services. In practice however, political empowerment also followed economic empowerment: a number of successful men and women active in beekeeping in West Nile became sub-county and district level political leaders. In Peru the process was initially heavily supply driven: the unfolding technology strongly influenced the institutional options that were conceived (the DIPU). But local social demands made CTTU to adapt its institutional arrangements by creating the GIPA. Later on the new policy environment and the market demanded greater flexibility and the GIPA was adapted and farmer groups were formed more flexibly around product specific interlinked contracts. In Uganda, institutional adaptations also occurred: the small farmer groups formed to change the rules of technical assistance were transformed into supply chain nodes with their own specific institutional arrangements. However, the growth of the industry instead of consolidating the new institutional arrangements, led to the arrival of rival institutional agents and alternative options and in the end to the demise of the BNP institutional monopoly. Side selling played a key role: in Uganda BNP contracts were informal and entry of rival agents was much easier. This stood in sharp contrast with Peru where side selling was much more difficult due to the formal contracts and considerable entry barriers in processing and exporting.

Finally, let us consider the three questions, which we formulated at the beginning of the paper. The first question was: 'Can institutional change best be seen as spontaneous rather than

an outcome of deliberate design or better as a combination of these two? In both cases we find a combination of centrally designed institutional changes with complementary decentralised institutional experimentation and adaptation. It should be added that also central government designed policies cannot be created 'tabula rasa' but also needed experimentation and adaptation on the ground in order to make implementation feasible. The very introduction by NAADS in 'trailblazing' districts was meant to experiment with implementation before rolling out the policy nation wide.

The selected institutional arrangement (small farmer groups) is but one of a complex web of new institutional arrangements (creating a market for extension services, setting up a supply chain or operating within export chains, as well as addressing market failure in input markets). The success and sustainability of the new social technologies as a standard way of doing things (a new institutional arrangement) depends on it being accepted by other economic agents. This leads to the question whether the new arrangements satisfy their coordination needs and on how these other agents perceive the associated risks. Unless the institutional champion can centrally impose the new arrangement (Governments have considerable powers to do so as they are ultimate economic regulator and often provide financial incentives such as subsidized extension services in order to make the proposed institutions acceptable to others), the process of acceptance, adaptation and of replication for other purposes is likely to be more decentralised and spontaneous as other private economic agents influence that. Lead firms of captive chains can also impose as long as they can provide sufficient incentive and above all can keep rival buyers cum institutional agents out. BNP did not succeed in that regard due to competition from other agents with rival institutional options. Institutional adaptations and the creation of complementary institutions are very much part of this decentralised process.

The process of institutional change is characterised by high uncertainties and therefore high risks for participating agents. Not all costs and benefits can be foreseen and lack of clarity about their distribution can be detrimental to institutional change, especially when trust is low. BNP suffered from low trust. In the absence of a clear understanding by the small farmers why BNP charged lower prices, farmers ceased to honour their commitment to sell to BNP as soon as the immediate and visible benefits were obtained. CTTU for different reasons had become a highly trusted economic agent, respected by both small farmers and by agro-export firms. But even CTTU saw the importance of formalising the interlocking contracts after the initial debacle of its micro lending program. This together with a direct involvement of the small farmers in the institutional adaptation process and a clearer understanding of the outcomes of the institutional arrangements increased the sustainability of its institutional arrangements. In terms of the criteria specified by Gomez (2008) input legitimacy, outcome specification, enforcement and transaction costs were better specified in the case of CTTU, compared to BNP. To this one should add that for the Peruvian small farmers the high value export crop was a main source of earnings, while in the case of Uganda it was a part time and small complementary source of income. Hence, risks were higher in Peru and agents made more efforts to improve conditions for success. Furthermore, the upfront selection of well-qualified small farmers by CTTU improved chances of making the process work.

In the case of the Ugandan policy, politics played a greater role in the selection of the districts and sub-counties in which NAADS would operate, as well as in selecting potential beneficiaries and economic activities around which the program would develop in the sub-counties. Thus apart from bureaucratic designs, implementation was influenced by local politicians and factions. In Peru groups applying for INCAGRO programme were self-selected and without any direct bureaucratic interference by the Government, increasing the viability of the outcomes and thereby the sustainability of the institutional change.

In late developing countries the introduction of institutional change is even more risky than in advanced countries for reasons of more widespread and endemic market and institutional failures. In our two late developing countries small farmers had no access to loans. In both instances, one of the leading innovating agents (CTTU and BNP respectively) tried to overcome this by providing micro finance. In both cases this turned out unsustainable in the face of economic (and climatic) instability. But in Peru failure in rural finance markets was addressed by a new complementary government policy of 2nd tier funds.

The sustainability can also improve by containing risks by improving the institutions and better specification of the implied rules. Thus by complementing the small group training, production and marketing with interlocking contracts between small farmers - CTTU - agro-exporters and banks - risks were reduced considerably, compared to the informal and incomplete contracts of BNP.

Past practices and trust play an important role. In both countries, negative experiences with cooperatives in the past led to negative dispositions towards such an institutional alternative. It was not regarded as a viable institutional option, but it should be noted that this option also would run counter the private interest of key actors. For different reasons BNP and CTTU were not in favour of it and the governments did not give it priority either. In both cases generalised trust was low, as both regions had recently suffered considerable economic decline and internal strife and violence. However, CTTU was quite quickly accepted as a trustworthy partner (partly because of the pre-existing high reputation of its leadership), much more than BNP (which had its own private interest stake in the outcomes of the institutional change process).

The second question relates to the dynamics of institutional change: what is the nature of the process in time and space? Bounded rationality is evidenced by the extensive trial and error in the design process and by the difficulty to specify and allocate all costs and benefits by and to all parties. These findings corroborate Kingston & Caballero, 2009). The timing turned out to be critical and this did not relate to institutional inertia but to the presence or timely creation of complementary institutions.

In Uganda generic institutions concerning the market for extension services *preceded* the creation of complementary and specific institutions by BNP. The Government policy provided a 'zone of feasibility' within which the institutional design process by BNP could take place and scale up. In Peru the government instigated institutional change process came much later and *after* CTTU has generated the small farmer group institutional arrangements together with its 'allied' private firm. But it should be noted that CTTU could invest in institutional change thanks to substantial project subsidies obtained from a patient Northern donor for a period of nearly 10 years. This enabled CTTU to create an 'island of new institutional arrangements' in an initially hostile institutional environment. Only after some eight years, the institutional innovations instigated by CTTU 'matched' well with the government initiated institutional change. Moreover, the new Government policies came at the right moment, when CTTU's subsidy was about to expire. CTTU could begin to recover the cost of its annual services well after CTTU had firmly established itself and after small farmers had accepted to pay for CTTU services. In Uganda, BNP also co-financed the diffusion of the new technology to small farmers, but it recovered these expenditures by offering lower prices to beekeepers than rival traders who had not incurred these expenses. BNP could not adequately explain the price difference to the farmers at the time when the quality of the services declined as delivery overwhelmed BNP management and operational capacities. Thus, while CTTU had the resources to bridge the mismatch between institutions, BNP did have neither the capacity nor the resources to do so.

The dynamics of the institutional change process are shaped by the development of the related industry (Nelson, 2007). Are the entrepreneurs able to master the new technology and farm level practices? Do they have the required resources to do so? Binding constraints can occur in production and transacting and in other complementary markets, which hamper the original institutional change process. These constraints need not be of an institutional character but refer to available resources. The growth perspective of the new industry is important. In the case of Peru asparagus agro-export quickly reached a critical mass when many larger firms entered the industry thanks to the expansion of irrigated land. This created positive political and economic externalities from which also the small farmers benefitted. This also occurred in Uganda beekeeping but at a much smaller and more modest scale.

In relation to our third question, we find in both instances strong evidence in favour of institutional co-innovation in different aspects of value chain development (in physical and social technologies, organisational innovations for learning, joint marketing, contract for quality products between chain actors, with innovations in complementary markets for inputs and finance). These are mostly of a private institutional order but there is in both instances 'nestedness' of institutions whereby national public institutions give room for private institutions at the level of the chain (respectively level 2 institutions and level 3 institutions as defined by Williamson, 2000). However this 'nestedness' is not always present as is shown by both cases. In Uganda the process was top down and preceded value chain development, while in Peru there was a certain degree of bottom up creation of 'nestedness' as leading entrepreneurs demanded government to support the new export agriculture with institutional innovations in extension and finance. These new policies followed and came for CTTU at the right time.

While specific innovations may be designed upfront, co-innovation of complementary institutional innovations is rarely fully designed upfront but co-innovation implies a certain degree of decentralised experimentation. Co-innovation thus contributes to a more chaotic evolutionary and less centralised designed process. There may be several reasons for this, resource constraints among the principal actors (BNP and CTTU) in the face of market failures arising from the behaviour of other agents (e.g. in credit markets). But in my view the most important constraint on designed co-innovation is 'situated bounded rationality'. Rarely the principal innovation protagonists can foresee all contingencies and considerable 'on the ground' experimentation is needed to ensure that all complementary and co-evolving innovations match.

Is there horizontal and vertical competition between alternative institutional orders in ways as described by Brousseau and Raynard (2007)? The Ugandan case is a clear illustration of horizontal competition between different institutional options: between the BNP large scale supply chain, the UNIDO model of small scale but vertically integrated beekeeping, the non-profit scheme of SNV and the honey traders attracted to the area who maintained arm's lengths relations with local beekeepers. In Peru, the learning process led to more small farmers groups who began to adopt the institution independent of CTTU with the similar contract farming schemes but without the involvement of CTTU. Many of these enterprises had been incubated by CTTU (see table 4 above).

Government policy can create an institutional environment in which compatible institutional arrangements can prosper. In that regard, high-level institutions shape the room for manoeuvre for local institutional arrangements. But the resources made available through government policy are of equal importance as we saw in the case of Peru's second tier funds.

Finally, institutional change is strongly associated with actors/organizations capable to implement, adapt and replicate new institutional designs. CTTU was fortunate to be endowed

with sufficient human and financial resources while BNP was handicapped in terms of its own financial resource base and the availability of trained apiculture staff.

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