

Territorial mechanisms: common goods for undertaking the agroecological transition

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The Green Revolution transformed agricultural production systems in a profound manner in the 20th century (Mazoyer and Roudart, 2006). Based on the use of petroleum products and increasing capital investments, the agricultural models of the Green Revolution were and still are being promoted by proactive public policies, and have become part of complex industrial, commercial and territorial organizations.

The technical and economic efficiency of these models helps them meet the challenge of population growth by offering a wide range of products at low cost to a 7-billion strong population. The lobbies advocating these models have helped make them a pan-global phenomenon and they dominate markets, territories, agri-chains and institutions (Ploeg, 2008).

However, their limitations are becoming increasingly visible. There are negative impacts on the environment and its balance (adverse impacts on biodiversity, land and water pollution, etc.), and the quality of food they produce is being called into question. Furthermore, capital and income are becoming increasingly concentrated, and preventing poverty alleviation (Griffon, 2006).

The agroecological transition positions itself in the backdrop of these effects and negative externalities. It proposes, among other aspects, technical alternatives that mobilize the ecological functionalities of agrosystems to guarantee agricultural production while ensuring a contribution to sustainable development (Gliessman, 2015). Various technical principles and content are being proposed, social groups are adopting them for organizational and policy purposes, agri-chains are being structured, markets are being created, and incentive-based policies are being formulated and implemented. However, such initiatives remain scattered and few in number. They need political and institutional consolidation. Numerous public and private development actors are rallying around this objective (Wezel *et al.*, 2009). This book bears witness to the diversity and multiplicity of the actions being undertaken.

This chapter analyses, in greater detail, the territorial arrangements and organizations needed for this transition. It shows what are their possible contributions, explains methods and limitations, and describes reflections through concrete examples from territories where CIRAD, with its partners, is engaged in pursuing agroecological transitions.

WHY TALK ABOUT TERRITORIES AND MECHANISMS?

In order to contribute to sustainable development, the agroecological transition cannot be limited to a set of individual transitions in innovative farms, even if they are numerous, for two reasons. The first is technical in nature. The landscapes, where agroecological transitions of agroecosystems take place, are continuous. Thus, a single farmer using pesticides can pollute an entire watershed, making agroecological certification impossible. The second reason is organizational and institutional. The territorial and collective footprint of agricultural activities, the externalities and services, the functioning of markets, the management of resources and ecosystems, and the innovation networks all presuppose a coordinated collective and institutional action (Griffon, 2013).

Thus, agroecology encompasses more than just certain technical changes, spatial perimeters of fields and farms and sectoral spheres, agri-chains or categories of farmers (Petersen *et al.*, 2012). The processes of agroecological transition are anchored in territories because they depend, on the one hand, on a coordination between local actors and, on the other, on social and institutional changes that support and encourage learning and the co-creation of knowledge and innovations among farmers and in agri-chains (Piroux *et al.*, 2010).

These processes take place in institutional contexts that are often unfavourable (Knox and Meinzen-Dick, 1999; or Whiteside, 1998). To begin with, conventional agriculture dominates agricultural land, institutions, social networks and mindsets. Furthermore, the agroecological transition is diverse and not very centralized. Projects concerning agroecology come in multiple forms, both from a technical point of view (from reasoned agriculture to permaculture) and from a political one (from a market-integrated agroecology to one that primarily promotes the autonomy of rural communities).

To respond to these imperatives, local actors can rely on 'territorial mechanisms', creating them if necessary. Based on Foucault (1975), we define a territorial mechanism as an institutional arrangement and an intentional assemblage of heterogeneous elements (standards, discourses, practices, instruments, tools, organizational structures, knowledge, etc.). The whole is designed to meet a common territorial goal, in our case that of reinforcing agroecological transitions.

A territorial mechanism is based on participatory and negotiated actions, and its uniqueness lies in its systematic attempts to regulate the social domain (e.g. inclusion of actors) and the political domain (e.g. access to and usage of land). In this case, the creation of standards is intended to manage behaviour and promote the consolidation of new agroecological practices. The mechanism thus formulates the rules

of appropriation and use of resources and space, and also defines the conditions of economic, social and political consolidation of the agroecological transition. To this end, the territorial mechanism mobilizes tools, organizations and specific instruments (charters, certifications, development plans, etc.), designed to first create rules and standards and then to apply them. In so doing, it stabilizes a governance framework for agroecological actions, linking individual, collective and public action. It thus leverages the territory, an institutionalized space that makes sense for local actors in terms of identity and organization, both of which are necessary to mobilize energies for transformation and to define a collective project.

Territorial mechanisms are extremely diverse since the conditions that lead to their creation are always unique. The issue of their specificity arises, nevertheless, with regard to the agroecological transition. Do they possess the same characteristics as mechanisms with other territorial objectives? How are they different from other mechanisms, such as innovation platforms or those for managing common goods? These questions will help us better delineate the territorial mechanisms adapted to the agroecological transition.

This chapter presents an analysis of the objectives, the diversity, the characteristics and the conditions required for the success of such territorial mechanisms. The reflection, intended to be generic, is based on case studies from several countries in the Global South. These cases are presented in text boxes to support and illustrate our observations.

CREATION OF TERRITORIAL MECHANISMS: PRINCIPLES AND SPECIFICITIES

Specific standards to ensure the agroecological transition

Territorial mechanisms most often play a key role in regulating local actors, by setting standards for the appropriation and use of territorial resources. While these standards primarily concern renewable resources, they also touch on land use. Indeed, the implementation of more ecological agricultural practices in a territory is often conditioned by the acceptance of new rules governing the use of space and resources, which must be better preserved. These rules and the associated ecological processes are intended to serve as the pillars and drivers of ecological intensification (Gliessman, 2015). For example, Box 16.1 describes the creation of a municipality-level land charter in Burkina Faso necessary for implementing more agroecological rules in a territory. Box 16.2 describes a similar process in villages in Laos. In addition to pertaining to natural resources, this work of formulating standards also concerns markets (e.g. public market for agroecological products), the production of ecosystem services (e.g. water quality, air quality) and the rules for collective action. These standards create local value. The notion of a specific quality of a product or process becomes central.

To guarantee the success of this regulation, a territorial mechanism ensures coordination between the local actors involved in the transition. It has links to the market, the State and civil society (Figure 16.1).

Box 16.1. Land charter and the agroecological transition

É. Vall (see Chapter 1)

Territories in the cotton cultivation zone of western Burkina Faso have undergone significant changes over the last three decades, largely due to a population that has almost tripled. This demographic explosion has been accompanied by an increase in herbivore livestock, clearing of land for agriculture, and extractive activities for natural resources. In fact, the increased pressure on land makes it impossible for customary rules, which were previously adequate, to manage competition and conflicts over space and resources (agricultural land; pastures; watering points; forest, fish and wildlife resources). The issue of their exploitation and sustainable management has thus become vital. In Burkina Faso, local administrative bodies, which were formed following decentralization, must rework the mechanisms to manage the natural resources of their territory in order to use them sustainably, control competitions and manage any conflicts between users. Since 2009, the evolution of the land law has allowed them to implement local land charters. These charters, inspired by local customs, usage and practices, but in conformance with the laws and regulations of the State, determine specific rules for the proper management of territorial resources at a clearly defined scale.

From 2008 to 2012, the Fertipartenaires project¹ supported the Koumbia municipality in designing and implementing a local land charter to establish rules for the use of resources and space that are compatible with the sustainable management of resources and an agroecological transition (Vall *et al.*, 2015). Given the number of actors involved in the municipality (14 villages, 1358 km², 36,000 inhabitants) and beyond (province, country), a relatively complex mechanism of actors' representation was set up to establish the charter. Transitional consultation frameworks were first mobilized in each village to take stock in a participatory manner and pre-identify resource management rules. Subsequently, a more close-knit *ad hoc* consultation framework helped fine-tune these rules in accordance with the legal framework and formulate a draft charter that was adopted by the municipal council. The aim of the third phase was to set up the commissions responsible for applying the charter. The end of the project in 2012, the wait for decrees on implementation, and the events of 2014 have prevented the charter from being implemented so far.

(1) <http://food-fertipartenaires.cirad.fr>.

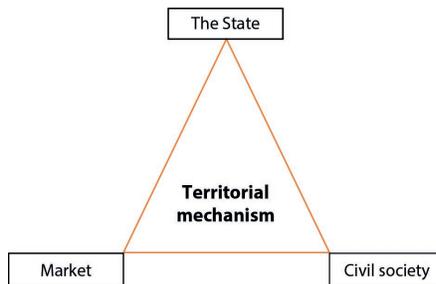


Figure 16.1. Schematic representation of the coordinating role of territorial mechanisms between different kinds of actors in a territory.

Box 16.2. Territorial mechanisms to consolidate the landscape approach in Laos

J.-C. Castella, P. Lienhard, J. Bourgoïn, G. Lestrelin, S. Phimmasone (see Chapter 5)

Many villages in the mountainous areas of northern Laos are engaged in a process of agricultural transition that marks the switch from subsistence farming to commercial agriculture. The conversion of traditional slash-and-burn systems – rapidly becoming obsolete due to the contraction of fallow periods to accommodate intensive monoculture of cash crops such as maize and cassava – is contributing to the disappearance of forest-agriculture mosaics and the degradation of agricultural land, and is increasing the vulnerability of small farms. These changes in practices and in the spatial and temporal organization of farming is leading to adverse impacts on the economic and environmental viability of local ways of life.

Since 2014, the EFICAS project (Eco-Friendly Intensification and Climate-resilient Agricultural System¹) has engaged with village communities in the provinces of Luang Prabang, Houaphanh and Phongsaly to support and help implement territorial mechanisms aimed at an agroecological transition (Castella, 2009). The first step in the collective learning process was to co-design a village-level land-use plan. To this end, a land-use management village committee met for several days with representatives of agricultural extension services and land-registry officials. Together, they marked the boundaries of the village territory on a three-dimensional model of the locality and, wherever necessary, they used GPS readings to locate areas under inter-village disputes and to resolve the issues with representatives of neighbouring villages. Once the boundaries of the village were clearly established, these actors mobilized the socio-economic and environmental data necessary to establish a land-use plan (PLUP or Participatory Land Use Planning). This data was initially used to set up a role play (called PLUP-Fiction) that engaged village participants and local government officials in negotiations on objectives of agricultural production, ecosystem services, preservation of forest resources, etc. Common management and collective actions rules were negotiated between participants as part of the role play, and were then tested and adapted to the three-dimensional model of the village territory (Bourgoïn *et al.*, 2013). This helped visualize the territorial components concerned by the issues of agroecological management of resources, and engage the participants in creating a land-use plan adapted to local constraints and opportunities. The plan thus conceived was then implemented by the same groups of actors.

Annual renegotiations of the management and implementation of rules of action were part of a collective learning path that seeks to move towards the land-use plan that was initially mapped. In reality, getting down to action requires a regular renegotiation of the initial plan, which, when implemented, becomes the ultimate objective of the collective action process. The results obtained within the framework of the EFICAS project call for a major transformation of agricultural extension services in Laos, which would give local agents the role of facilitators in collective learning approaches at the scale of the village territory.

(1) www.eficas-laos.net.

Their interests are diverse and sometimes contradictory: the State's mandate is to satisfy the general interest (maximizing public goods, ecosystem services and not just production); markets seek to maximize private benefits (e.g. profits, reputation); and consumers and citizens can also demand the provision of private and public benefits (e.g. health, biodiversity).

Ensuring coordination amounts to generating coherence between market forces, public policies and community projects. To this end, territorial mechanisms structure specific institutional arrangements, which we consider to be the 'rules of the game', and their conditions of use within these mechanisms. This coordination objective is well illustrated by local productive arrangements in Brazil (Box 16.3). Set up in the context of rural territories policy in 2010, local productive arrangements sought to consolidate the productive inclusion of family farmers and to reinforce the agroecological dimension of these processes. Defined at the level of local productive agri-chains (milk, pineapple, guava, etc.), the local productive arrangements promoted the creation of local networks organized around public agents and social movements. New coordination efforts have been put in place to ensure greater coherence in public action and to orient the financing of productive investments.

In order to create the normative frameworks to structure agroecological transitions, territorial mechanisms propose specific instruments (charters, certifications, specifications, public policy tools, contracts, etc.) that reflect the will to change, and which involve various actors at different levels. These frameworks result systematically from a participatory process to formulate these standards, as shown by the different case studies.

Finally, the territorial mechanisms are part of the politics of agroecological transition, by virtue of their territorial and normative function of regulation. Territorial mechanisms linked to agroecological transitions are still rooted in power relationships, in terms of their attempt to modify the relationships and strategies of rural actors, including of those connected to markets. Power relationships favourable to agroecology must be established to stabilize and reinforce this transition. This is illustrated by the territorial certification process in Paragominas, in Brazil (Box 16.4).

A diversity of conceptions depending on the context

Like any territorial mechanism, those promoting agroecological transitions involve various actors. Indeed, they are the focal point of local inter-relationships between the State, the market and civil society. However, the weightages and roles of different kinds of actors vary depending on the context. Most often, the mechanisms are created by actors who have a high social capital, but who vary from one case to next. However, other actors are mobilized too in every case. Territorial certification in Paragominas claims to involve actors from both the private and public spheres. Other territorial mechanisms, such as the Borborema pole (Brazil, Box 16.5) have greater civil society involvement (union, university, NGO).

Territorial mechanisms address various objectives in order to have effects of regulation. Defining new rules for the use of territorial resources, formulating public policies, creating new markets, and bringing together actors in associations or cooperatives are

essential steps in the agroecological transition. But each mechanism implements them in its own way and at its own pace, by mobilizing specific instruments (territorial or product certifications, charters, land-use plans, etc.).

Box 16.3. Local productive arrangements in Brazil to promote agroecology

É. Polge

Local productive arrangements are defined as a territorial collection of actors focused on a specific set of interlinked economic activities. They are similar to industrial districts or clusters but are adapted to emerging countries as they take incipient interactions into account that can benefit from forms of collective action, and thus contribute to creating local externalities or foster the emergence of development processes. Local productive arrangements have been promoted by the Brazilian government as institutional arrangements structured around specialized production poles. It is a matter of identifying the beginnings of collective actions around a given production, with the aim of structuring the productive landscape. The concentration of institutional efforts is meant to lead to the emergence of an agri-chain, and help create a territorial administration mechanism for it.

Thus, in the agricultural domain, the local productive arrangement promotes the organization of producers and the emergence of a cash crop, in addition to food produced for home consumption. Thus, the challenge of a local productive arrangement that supports agroecological transition lies in its capacity to utilize a primary production as a development lever, even as it increases farm diversity and marketing opportunities for other productions. This was the objective of local productive arrangements created in the eastern Amazon through the territorial development policy launched in 2008, which had the intention of promoting agroecology through, amongst others, the production of dairy, guava, pineapple, and acai. Local productive arrangements were organized with the help of State agencies, the Colleges of Territorial Development (CODETERs), set up at the level of inter-municipal territories, which themselves are consolidated through arrangements and contracts signed with federated States, especially Pará State.

And yet, their implementation, as shown by Polge *et al.* (2016) and Polge and Piraux (2017), has faced several difficulties in balancing the need for specialization and the agronomic and economic need for diversification. Indeed, while territorial governance mechanisms and local and regional institutions that constitute them promoted agroecology, local productive arrangements promoted a specialization in conventional farming with an excessive use of inputs, thus increasing the vulnerability of farms, now dependent on the production of a single marketed product, and with a reduced home-consumption capability, at least initially. Nevertheless, in a second stage, the organization of producers into cooperatives, and the consolidation of commercial channels, encouraged them to diversify again, albeit with more difficulty as they had adopted a conventional farming method. In other cases, the territorial mechanisms' focus on a large diversity of productions discouraged farmers from producing surpluses of any one production, which resulted in a reduced interest by processing and sales collectives. New coordination efforts have been put in place to ensure greater coherence in public action and to orient the financing of productive investments.

Box 16.4. Territorial certification in the Amazon at Paragominas

R. Pocard

The Paragominas municipality, in Pará State in northern Brazil, has managed to reverse its development trajectory within the space of a few years – from being an acknowledged destroyer of forests to a model of ‘green’ territorial management in the Amazon. Paragominas was, until the early 2000s, the capital of forest logging, after having been that of beef production, the two main causes of deforestation and forest degradation at the time. It was then, during the tenure of President Lula, that Brazil saw the institution of a battery of repressive measures throughout the Amazon to halt deforestation. This had major consequences. In general, rural producers, prevented from accessing new spaces and forest lands, were forced to abandon their extensive and extractive production methods in order to manage the available natural resources. The emergence of this agricultural transition could well be the first step towards an agroecological transition. The Paragominas municipality was the only one to react proactively to these measures by the central government, and proposed a territorial action plan to the Brazilian government: the *município verde* (green municipality). It guaranteed a zero deforestation objective for the municipality, and also engaged producers in an environmental regularization process while consolidating the municipal tools for forest protection, in exchange for a progressive abolition of repressive measures.

By accepting this decentralization of environmental responsibilities, through an appropriate territorial mechanism, the municipality opened itself to new and more responsible ways of development. This new trajectory could ultimately result in a certification for the territory, based on specific sustainability criteria that is, above all, defined locally.

The territorial mechanism put in place in Paragominas in 2008 relies to a large extent on the municipal council, as local institutions are still at an embryonic stage in these pioneering territories. The local civil society is not very structured (apart from due to the main conflicts dating back to the pioneering phase of occupation). Consequently, to bring these disparate local actors together around a social pact and a territorial development project constitutes an innovation of strategic importance since higher authorities, whether federal or federated, are unable to promote sustainability. Even by limiting themselves to ‘command and control’¹ actions, these higher authorities seem constrained by the sheer extent of their jurisdictions, the diversity of situations, the lack of structures, and the still precarious functioning of their own institutions.

The municipal council is currently trying to reformulate its territorial mechanism, since the goal of complying with environmental legislation is no longer sufficient to generate development and sustain everyone’s commitment. In addition, concerned about their image or that of their products, agri-chains and, in particular, banks are ready to support territorial projects as long as they are convincing and clear about addressing local challenges of sustainability. Fighting forest fires – a new environmental threat –, greater participation of farming families in public choices, carbon sequestration in soils and vegetation, reconstruction of forest belts and efficient landscapes, and education in rural areas are a few of the priority issues in Paragominas. The agroecological transition is still little mentioned, but the structuring of the territorial mechanism constitutes, in any case, a significant base for promoting or intensifying this transition when it does take place.

(1) These actions are based primarily on satellite monitoring of deforestation, with accompanying control and repression systems.

The system of governance of these territorial mechanisms generally consists of a mix between public and private actors. It can change during the process of its creation as well as during the phase of application of standards. In the case of Burkina Faso, transitional governance bodies were observed. These bodies sometimes remain unchanged until the implementation phase of the standards, as in the case of local productive arrangements in the Amazon. Whatever the case, the system of governance aims to stimulate dialogue and construct shared visions made possible by territorial proximity (Torre and Rallet, 2005). It is also a matter of imparting and building up skills for using information and ensuring territorial management among actors who often have low levels of education.

The mobilized territory is an additional factor of diversity. It appears as a propitious place for a new form of public action, the result of a dialogue between the public and the private sectors (State, market and civil society actors) (Tonneau *et al.*, 2017). The spatial boundaries of the territory, however, vary depending on the mechanisms. Most often, but not always, they correspond to existing decentralized administrative and political levels (municipality, district, etc.) in order to exert a real power of regulation between the actors. Sometimes, as is the case of the Borborema pole, the territory was created by social movements and rural communities. In every case, it is essential to ensure a coherence between the different levels of farms, landscapes, watersheds, municipalities and regions. This is a key element of agroecological transition. We will discuss it in more detail later in the chapter.

Finally, the diversity of territorial mechanisms is the result of specific narratives and intentionalities. Territorial mechanisms are the result of processes of complex interactions between contexts (ecological, social, institutional, political) and between actors mobilized for the transition. The ‘initiating’ actors are diverse: public bodies for the local productive arrangements in the Brazilian Amazon; local, public and private decision-makers in Paragominas; researchers in Laos and Burkina Faso; social movements in Borborema in Brazil, etc. In each case, the initiator develops a social representation capable of influencing the decision-making, i.e. a political representation of the region, and of setting up standards promoting the agroecological transition.

Transitions rely to a very large extent on local production conditions and their socio-economic and institutional environment. Some contexts are evidently more favourable than others, depending particularly on the social influences involved, the degree of resistance of conventional systems to an agroecological transition, the associated economic and political powers, and, more generally, institutional contexts and policies. In Paragominas, Brazil, the mayor and local elites were able to launch the bold ‘green municipality’ initiative in response to the federal imposition of very restrictive standards (zero deforestation, stringent regulations in major agri-chains, closure of illegal sawmills), which led to an unsustainable economic and social local crisis, a context that benefits the current certification experiment. The Borborema agricultural union pole was created in an area in which family farming has historically developed, and now represents the territory’s lifeblood. Local productive arrangements have benefited from a specific and very proactive political environment. While these contexts do not determine the range of possibilities, they do constrain – or facilitate – the agroecological transition, and therefore condition the effectiveness of territorial mechanisms.

All the specificities (objectives, intentionality, types of actors, instruments, system of governance, mobilized territory) impact the methodologies used, the standards created, the range of actors and the various balances of power achieved.

Box 16.5. Borborema's agricultural union pole: a political actor in the service of the agroecological transition

M. Piraux

Many experiments of agricultural transition appear to have been consolidated in the semi-arid areas of Brazil. In fact, for more than two decades, local organizations have been experimenting with a development model based on agroecology and living in harmony (*convivência*) with drought. The Agreste region in Paraíba State, a transitional region between the coastal wetland and the drier hinterland (Sertão), has always been a driving force in these processes.

In the 1990s, the NGO AS-PTA (Assistance and Service for Alternative Agriculture Projects) initiated a process of experimentation with alternative techniques together with agricultural unions in three of the region's municipalities (*municípios*). Assessments of the technical, economic and social functioning of productive units were conducted by promoting intra- and inter-regional exchanges between farmers. A review of the functioning of each agroecosystem in the region sought to identify the major problems, and then to formulate hypotheses to solve them. In the early 2000s, local experimenter-farmer networks disseminated experimental methodologies in the communities of their respective municipalities.

Starting in 2002, the unions and the AS-PTA expanded the scale of intervention of the experimenter-farmer networks. This directly called for a regional actor capable of articulating the social dynamics of the innovation underway, in order to give the family farmers' organizations in the region a socio-political legitimacy. To this end, the Borborema agricultural union pole was created, bringing together the agricultural union and family farming organizations from 16 municipalities. This territorial mechanism was structured in thematic commissions, each responsible for the design, execution and monitoring of the progress of the experimental work, their systematization and the organization of exchanges. It was also legally institutionalized so that it could manage its own financing. Its regional development promotion strategy was based on a training programme.

The agricultural union pole was also established as a decentralized management unit for public policy programmes in Borborema. Its challenge was to maintain the institutional, administrative, financial and political conditions to ensure its position as an agent stimulating the social dynamics of agroecological innovation, while asserting its role as a political actor capable of publicly promoting various family farming proposals for the development of the area.

We note here the importance of the agricultural union pole as a territorial mechanism to anchor innovations in the territory, seen as a space for creating a collective identity, fostering debates and the institutionalization of agroecological transition processes. It has thus supported learning processes, consolidated social networks and changed the conditions of territorial governance to promote the social and political integration of farmers. It is deriving value, in this manner, from a multi-level process for administering the agricultural innovations that are necessary for the agroecological transition.

WHAT ARE THE CONCRETE CONTRIBUTIONS OF TERRITORIAL MECHANISMS IN THE AGROECOLOGICAL TRANSITION?

Territorial mechanisms contribute to the agroecological transition in different ways.

Mobilizing territorial assets

Territorial mechanisms mobilize, in particular, the assets that result from the activation of the territory's own resources, reflecting its uniqueness, and the different forms of territorial capital (Chambers and Conway, 1992). Inasmuch as a locality-specific science, agroecology mobilizes knowledge on the potentials of local agroecosystems, the assets of the territory and on territorial anchoring (linked to local, natural, social or symbolic resources).

This produces the tools and methods that structure the mechanisms' activities. A diagnostic phase assesses the state of the environment's resources (ecological, edaphic, etc.). It characterizes the social forces present, their interests, divergences, and points of convergence. It also describes local practices and deduces from them the potentials of the territory. For example, the development of the land charter in western Burkina Faso was only possible because of a better understanding of the local rationales underpinning the use of fodder resources, revealed through the identification of functional categories of forage plants that livestock farmers use, based on knowledge they alone possess. In the Brazilian Amazon, the creation of local productive arrangements helped identify agri-chains present in the territories, and also to better understand them in order to better support them. Indeed, the agroecological transition is contingent upon the organization of markets and agri-chains.

Territorial mechanisms contribute to the creation of suitable markets and agri-chains. Supplying products of the agroecological transition to traditional markets in fact presents major difficulties in terms of preservation and speed of transport. Moreover, distributors demand large volumes and regular supply, conditions that are problematic for the still-emerging agroecological systems. Finally, certain quality criteria, such as a less homogenous appearance of agroecological products, may constrain their marketing. Furthermore, the production costs in agroecology are sometimes higher than in conventional production. The agroecological transition thus requires access to specific kinds of markets: short circuit, niche or institutional.

For example, local institutional markets, first created in Brazil but now present in several countries, are indeed an effective option. Contractual access to these markets stabilizes practices, funding and collective organizations in the medium term. The territorial mechanism allows these markets to be created and facilitates the adaptation of the actors to particular requirements. This is the case in Paragominas, where, as part of Brazil's National School Meal Programme, the municipal council regularly wins national awards for the best initiatives to supply municipal schools. Short circuits for direct sales to the consumer are also alternatives for marketing agroecological products more effectively. The territorial mechanism contributes to the holding of agroecological markets (e.g. booths were financed in the Borborema territory) and, in this way, imparts legitimacy to the products, and helps build up trust between producers and consumers.

Another possible contribution of the territorial mechanisms to the marketing of products of the agroecological transition is to introduce marks of specific quality that are built locally and which leverage territorial assets. The territorial mechanisms' responsibility includes collective work on quality marks or health criteria related to local practices. Thus the municipal council, livestock farmers, inspection systems and dairy cooperatives have, together, formulated municipal legislation in Paragominas, making it possible to recognize and thus impart value to family livestock farming products in the municipality. The mechanisms can also facilitate more elaborate approaches to promote local products, such as labels.

Managing multi-scalar and hybridization processes

Another contribution of territorial mechanisms to the agroecological transition is the promotion of multi-scalar processes. To manage collective resources, organize actors and govern agroecology-specific processes, it is necessary to link different scales.

The landscape is the most suitable scale to think about the functionalities and the protection of natural resources. However, this scale is inadequate to manage them: most often, landscapes do not correspond to any decision-making structure. The new agroecological rules of resource use are thus multi-scalar. They are legislated at encompassing decision-making levels, such as local authorities, and implemented at lower, operational decision-making levels, such as farms and communities. These frameworks are often legislated at the municipal scale as it corresponds to the most decentralized level of the State. But other territorial mechanisms may concern smaller regions, as in the case of the Borborema agricultural union pole, or the inter-municipal scale in the case of local productive arrangements in Brazil. All these schemes are possible if regulatory frameworks exist and are recognized, allowing decentralized bodies to exercise regulatory powers.

Thus, reconciling local uses with existing regulatory frameworks and combining local or innovative practices with established laws form the essence of action through territorial mechanisms. In this way, they facilitate hybridizations between external standards (established by the State, markets or public policies) and endogenous standards, leading to their mutual recognition and legitimacy. This process also improves the adaptation of public policies to local realities, as has been the case with the Borborema pole which has implemented national programmes ('P1MC' or 'One Million Tanks'; 'P1+2' or '*Uma Terra e Duas Águas* (One Earth, Two Waters)').

Long-term perspective and managing the coexistence of agricultural models

Territorial mechanisms have to embrace a long term perspective as far as agroecological transition is concerned, not only because of the pace of innovation and learning, but also because the impacts of agroecological practices appear more slowly than those of conventional system. However, territorial mechanisms are not immune to the rapid pace of political situations, especially electoral ones. For example, in Pará State in the Brazilian Amazon, local productive arrangements, encouraged in 2010 by a political alliance between the federal State and the federated State, were

profoundly altered after the 2014 elections. The opposition won in Pará, replacing the incumbent disposition, and discontinued the technical and financial support to local productive arrangements. The territorial mechanism ended in failure due to a lack of continuity of public policies.

Another characteristic of territorial mechanisms is that they sometimes seek to ensure the conditions of coexistence between the various methods of agricultural production. Agroecology is introduced to territories in which the forms of agriculture and production techniques are very varied, from the most conventional to the most organic. However, in order to consolidate a real transition over time, the entire territory will have to collaborate. A transition would be incomplete, or even encourage conflict, if it relied on a single farmer category. To this end, information, learning, the creation of standards, the search for compromises and synergies all constitute opportunities for territorial mechanisms to bridge differences. In Laos (see Box 16.2), coherence is built through a village land-use plan that is arrived at in a concerted manner. In the case of Paragominas municipality, presented in Box 16.4, the territorial certification experiment is based on municipal zoning and a coherence between different agricultural systems.

THE CONDITIONS REQUIRED FOR A PROPER FUNCTIONING OF TERRITORIAL MECHANISMS

Similarities with the management of common goods

Can we consider territorial mechanisms to be common goods? Taking the qualities of non-exclusivity and rivalry that define common goods (Ostrom, 1993), the negotiating spaces constituted by the territorial mechanisms are characterized by open access (everyone can participate) but whose resources are limited, especially in terms of funding and projects. These must necessarily be negotiated between the stakeholders. Thus, Ostrom's framework of sustainability criteria for local institutions is also valid for a proper functioning of territorial mechanisms. Let us recall briefly some of these criteria: adaptation of rules governing the use of common goods to local conditions and community needs; right of those affected by rules to be involved in their modification; respect by external authorities of the rights of community members; self-monitoring of the behaviour of community members; multi-level governance of the common resource; and dispute resolution through accessible and inexpensive means.

These precepts are, however, not enough in the case of the agroecological transition. Our conception of territorial mechanisms involves a broader reflection on actors, instruments, learnings, innovations and the nature of the information to be mobilized to help decision-making. The rationale behind the action of territorial mechanisms centred on agroecological transition mobilizes, in particular, very different actors, with interests that are even more disparate than those of communities governing a common good. This transition has to take place in a context of a strong asymmetry of powers and of the abilities of collective organization. Creating a common good around territorial mechanisms is a complex process, but one that should be undertaken. In particular, forging relationships with local elected representatives is crucial. In Paragominas, for example, the involvement of the municipal council is a decisive element of the process, as the council ultimately holds the power to change key standards.

A necessary accompaniment and support

The innovation capacity of the territorial mechanism, which is itself linked to the quality of support the mechanism has received, is another essential factor for success, as it is in the case of innovation platforms. The support received allows territorial mechanisms to organize the transition on the basis of suitable responses to the needs of local populations. This is essential for their appropriation within their territories. In these circumstances, the mechanisms also favour processes for the co-building of knowledge, technical and social experimentation, and co-designing in partnership. Over the long term, these processes aid in raising awareness, appropriation and training. Support by specialists can facilitate, encourage, and promote interrelationships between actors and lead to the building up of social and institutional capital. However, it is this quality of social links, including those established between the private and public sectors, which drives territorial mechanisms on a daily basis. These links help governance processes run smoothly and the mobilization of actors. They contribute to improved decision-making, more balanced power relationships and a genuine involvement of elected officials. Governance structures must therefore function in a clear and transparent manner, where these links can be identified or even encouraged.

The quality of information

Territorial mechanisms depend on the structuring of information and knowledge necessary for the transition, including in their social and political dimensions. They must produce information that is useful (relevant to the questions asked), usable (appropriable by the actors) and actually used (thanks to the actors' learning processes). Communication and transparency of information are important. Pedagogical resources and suitable media must be made available. It is essential to produce summary documents in formats that are easy to understand, for instance as maps. In Burkina Faso, the existence of a simple document explaining the rules governing the use of resources was a determining factor in the appropriation of the land charter. In Laos, 3D representations allow a detailed visualization and perception of landscapes. Production of information and organization of accompaniment and support processes for local policy actors remain specific to territorial mechanisms.

Learning

That said, in addition to the tools, it is mainly the quality of the process of creating the territorial mechanisms that conditions their success, even in contexts that are constraining. Not skipping steps, giving oneself time and creating real learning processes are all factors that influence the degree of appropriation of the mechanisms, and consequently their legitimacy. This is considered a 'social relationship that gives an actor a recognized capacity to engender a harmonious togetherness' (Lévy and Lussault, 2003). Harmonious togetherness reflects a society's desire to turn conflicts of interest into productive, mutually beneficial cooperation. This significant challenge links territorial mechanisms to the municipal approach. The phase of diagnosis and creation of territorial mechanisms must systematically engender reflections on current

productive practices and put them into perspective, whence the obligation and the ability to avoid sanctuarizing discourses, to question, to deconstruct certainties, to transcend rhetorical discourses or partisan politics, and to manage the sometimes numerous conflicts. It is a matter of putting in place a genuine management capability for development and mobilizing the required skills.

The role of mediation and research

In this perspective, the territorial mechanisms could be likened to Living Labs. A Living Lab regards users as key actors in the innovation process (Niitano *et al.*, 2006; Schumacher and Niitano, 2008). This is a generic concept: it has many theoretical and methodological variants, which can be observed in a wide range of experiments.¹

Living Labs organize user communities in order to bring out, co-create and experiment with innovations that address societal issues. Strongly identified by innovation in business, they act mainly in local ecosystems, on specific innovations and on sectoral projects that prevent them from mobilizing communities in a truly comprehensive way. Some Living Labs claim to have a territorial scope (Doyon *et al.*, 2015; Scaillerez and Tremblay, 2017). They are more ambitious, refer to territorial development approaches and adopt a more integrated view of societal issues.

Moreover, Living Labs have often proposed tools, especially from the information and communication technologies, that have overestimated the role of information at the expense of management and facilitation. And yet, this aspect is, in fact, crucial for territorial mechanisms. Indeed, the transition from reflection to action can only be effective when resources are allocated to territorial engineering (the set of human resources, methods and tasks that contribute to the development and conduct of a territorial project, as well as to the definition, assembly and implementation of actions, according to Rey-Giraud, 2012) in order to ensure appropriate management. This management is based on a working method that can be summarized by a few key phrases, characterizing as many stages: starting from past experiences, mobilizing skills and knowledge, managing and disseminating information, defining frameworks for deliberation and for references, formulating specifications, implementing, supporting, and assessing. The role of mediators is crucial here to create learning situations in which the actors can define or redefine their practices, their values and overcome defensive attitudes (Argyris and Schön, 1996). Management techniques can also check the domination of certain groups or people and harmful political influences. Tools are available for facilitation and management.

These tools are more or less sophisticated. In Laos, for example, role plays and work with three-dimensional representations were used to define management rules, providing support for negotiations between villagers and local administration objectives concerning agricultural production and ecosystem services. In Paragominas, a substantial amount of discussions, mobilizations, and capacity building was necessary

1. Living Lab was invented in the late 1990s, at the Massachusetts Institute of Technology's Media Lab, and then developed in Europe with the creation, in 2006, of a European network of Living Labs: European Network of Living Labs.

in order to engage family farmers and their representatives in a learning process. This was necessary to establish relationships based on a balanced partnership with the municipal council, and thus contribute to the territorial certification project.

Adaptability

The long-term success of a territorial mechanism largely depends on its ability to adapt to internal and external changes in the territory concerned. Assessment processes (especially the impacts of standards) need to be implemented to ensure that constraints and standards do not outweigh benefits, and that the diversity of the actors' forms of action is not restricted. It is therefore necessary to conceive of the implementation of a territorial mechanism as a continuous process of assessment and of the creation of common references and flexible standards, underpinned by a 'vision' of the territory's sustainability. This notion of assessment does not pertain to an *ad hoc* judgment of the choices made, but rather to the meaning and import of the actions, which requires the critical analysis of these choices and an understanding of the situations of which they are made part. Training and learning are essential to carrying out this critical analysis. The mechanisms can then evolve towards territorial observatories to constitute what are called 'smart territories', which bring together knowledge-engineering and the mobilization of information technologies, capacity building, public-policy assessments, and the constitution of these observatories. The territory is then established as a permanent construct, constantly being appropriated since the conditions of the environment and collective action are not static over time.

Efficiency and legitimacy

Finally, to ensure the conditions for the proper functioning and success of territorial mechanisms, the institutional arrangements and instruments put in place must be recognized as effective. Does territorial certification make the territory more attractive? Have land charters really led to more efficient management of resource uses? Do land-use plans ensure better adaptation to local potential and uses? Do the standards created make sense for the actors, and are they eventually respected and effective? Do the skills resulting from these processes help create new power relationships that are favourable to agroecology? The issue in question here is the legitimacy of the tools and products in relation to the facts on the ground.

Conclusion

The agroecological transition is a complex process that involves technical, social and institutional changes. Collective and public actions anchored in rural areas have to be strengthened because this transition mobilizes a diversity of actors and social groups at different scales and because the technical changes primarily concern farms even though the impacts are felt at other levels because entire agri-chains are impacted. This is the objective of territorial mechanisms that occupy a predominant place in the process of the agroecological transition.

We have shown that these territorial mechanisms constitute a complex assemblage of interacting elements. They combine both material elements (governance structures, instruments, practices, etc.) and immaterial ones (standards, ideas, knowledge, objectives, etc.). This assemblage must make sense for the actors in terms of the stated objective of an agroecological transition. It must also lead to a coherence with regard to territorial challenges in time (sustainability), in space (landscape organization, city-countryside relationships) and between activities (agriculture and other uses of resources, etc.).

Despite their necessary diversity, four generic elements emerge from the analysis of territorial mechanisms. They are territorial normative systems; they result from an intentionality and have a political dimension; they tend towards a progressive institutionalization; and they want to transform activity systems, collective action and the territory. Let us describe these generic elements.

From a regulatory perspective, territorial mechanisms structure territorial normative systems. For this purpose they determine arrangements between actors (rules of the game) and regulate alternative production systems (rules governing the use of resources). The former decide how the actors organize themselves and how they manage their interactions in order to define resource-use standards and a collective project; the latter correspond to these standards and to the project, and to the results of the organizational process. These normative systems, once established, 'constrain' action through specific instruments.

Territorial mechanisms are based on intentionality and have a strong political dimension where the objective is to involve different kinds of actors, including elected representatives. These two characteristics of territorial mechanisms – normative and political – differentiate them from innovation platforms.

Territorial mechanisms tend towards a progressive institutionalization. They follow a phase of creating standards, and then of their application, by framing and channelling the actors' actions through a process for creating standards and shared values. This progression makes it possible to channel energies, create common reference bases through experimentation, and assess standards. The quality of these processes contributes to the legitimacy of territorial mechanisms, and thus to their level of recognition and appropriation.

Territorial mechanisms endeavour to modify actors' practices and promote collective action. They encourage debates on the functionalities of agroecosystems and associated practices. The analysis of practices remains a basis of debates and negotiations. This makes it possible to construct an agroecological transition project that transcends rhetorical discourses and partisan politics. Territorial mechanisms finally acquire a territorializing dimension (Girard and Rivière-Honeeger, 2014). They empower each user of the territory's space according to his own practices, which helps re-appropriate the space, its resources, and its constraints. In this way, they modify relationships with the territories and bring a territorialized vision of the problems and solutions. This is also the case of public policies for the agroecological transition: they will be better adapted to local realities, and capable of making better technical, financial, economic and logistical choices.

However, beyond these generic elements, the trajectories of each territorial mechanism are very diverse, thus emphasizing the fact that the agroecological transition is not unidirectional, that it is necessary to continually experiment and undertake assessments from a technical, organizational and institutional perspective. Agroecology-promoting territorial mechanisms are therefore not transposable as such, since they result from a localized innovation process, defined according to territorial problems and potentialities. In order to propagate them, it would be better to organize a process of exchange and translation (Callon, 1986) between territories, so as to promote learning, and thus initiate the emergence of a local project.

These considerations reveal a dual reality: 'soft' and 'hard' territorial mechanisms, to use the terms employed by Pasquier and Weisbein (2007). On the one hand, 'soft' mechanisms imply flexibility, continual adjustments, ongoing social experimentation, and flexible perimeters, space and actor sets. On the other hand, the 'hard' in 'hard' mechanisms refers to their instrumentation (Lascoumes and Le Gales, 2004), based on standards and rules. These two realities exist and enrich one another. A judicious balance is one that ensures the conditions of institutionalization and efficiency of the mechanisms. An excess of the 'soft' aspect in mechanisms encourages the dilution of responsibilities and the lack of a framework for action; an excess of the 'hard' aspect in mechanisms closes off the process and limits, or even prevents, change.

The social and political construction of an agroecological transition is the outcome of efforts to share and consolidate a collective identity, forging an alternative territorial development project. The efficiency of territorial mechanisms depends on a profound change in the actors' mindset, especially those of conventional agri-chains, as also of local elected representatives. This change must lead to new societal values and new territorialities. This is the difficult but promising path that will ensure that territorial mechanisms are perceived as a common good, generating confidence and solidarity between territorial actors.

REFERENCES

- Argyris C., Schön D.A., 1996. *Organizational Learning II*, Addison-Wesley, Boston, United States, 305 p.
- Bourgoin J., Castella J.-C., Hett C., Lestrelin G., Heinemann A., 2013. Engaging local communities in low emissions land-use planning: A case study from Laos. *Ecology and Society*, 18 (2), 9, <http://dx.doi.org/10.5751/ES-05362-180209>.
- Callon M., 1986. Éléments pour une sociologie de la traduction : La domestication des coquilles Saint-Jacques et des marins-pêcheurs dans la baie de Saint-Brieuc. *L'Année sociologique*, 36, 169-208.
- Castella J.-C., 2009. Assessing the role of learning devices and geovisualisation tools for collective action in natural resource management: Experiences from Vietnam. *Journal of Environmental Management*, 90 (2), 1313-1319, <http://dx.doi.org/10.1016/j.jenvman.2008.07.010>.
- Chambers R., Conway G., 1992. Sustainable rural livelihoods: Practical concepts for the 21st century, IDS Discussion Paper 296, IDS, Brighton.
- Doyon M., Rochman J., Fontan J.M., Klein J.J., Ducruc S., Xiao J., Yorn C., Fortin J., Dugré S., 2015. L'approche *Living Lab* et l'aménagement des espaces ouverts agricoles : Un exemple en région métropolitaine de Montréal. *Journal of Urban Research* [online], 6.
- Foucault M., 1975. *Surveiller et punir*, Gallimard, Paris, 318 p.

- Girard S., Rivi re-Honeeger A., 2014. En quoi les dispositifs territoriaux de la gestion de l'eau peuvent-ils  tre efficaces ? *Sciences eaux & territoires*, 1 (13), 32-36.
- Gliessman S.R., 2015. *Agroecology: The ecology of sustainable food systems*, 3rd edition, CRC Press, Boca Raton, United States, 371 p.
- Griffon M., 2006. *Nourrir la plan te*, Odile Jacob, Paris, 431 p.
- Griffon M., 2013. *Qu'est-ce que l'agriculture  cologiquement intensive ?* Qu e, Versailles, 224 p.
- Knox A., Meinzen-Dick R., 1999. Property rights, collective action and technologies for natural resource management, CGIAR SP-CAPRI, Policy Brief no. 1.
- Lascoumes P., Le Gales P., eds 2004. *Gouverner par les instruments*, Presses de Sciences Po, Paris, 370 p.
- L vy J., Lussault M., 2003. *Dictionnaire de la g ographie et de l'espace des soci t s*, Belin, Paris, 1127 p.
- Mazoyer M., Roudart L., 2006. *A History of World Agriculture: From the Neolithic Age to the Current Crisis*, Monthly Review Press, New York, 528 p.
- Niitano V.-P., Kulkki S., Eriksson M., Hribernik K.A., 2006. State-of-the-art and good practice in the field of *Living labs*. In: *Proceedings of the 12th International Conference on Concurrent Enterprising: Innovative Products and Services through Collaborative Networks*, Milan, Italy, 349-357.
- Ostrom E., 1993. Design principles in long-enduring irrigation institutions. *Water Resources Research*, 9 (7), 1907-1912, <https://doi.org/10.1029/92WR02991>.
- Pasquier R., Weinstein J., 2007. La « gouvernance territoriale » : une perspective pragmatique. In: *La Gouvernance territoriale : Pratiques, discours et th ories* (R. Pasquier, V. Simoulin, J. Weinstein, eds), 211-235.
- Petersen P.F., Mussoi E.M., Soglio F.K.D., 2012. Institutionalization of the agroecological approach in Brazil: Advances and challenges. *Journal of Sustainable Agriculture*, 37, 103-114.
- Piraux M., Silveira L., Diniz P., Duque G., 2010. La transition agro- cologique comme une innovation socio-territoriale. In: Coudel E., Devautour H., Soulard C., Hubert B., eds) ISDA 2010, June 2010, Montpellier, France. CIRAD-INRA-SUPAGRO.
- Pløeg Van der J.D., 2008. *Camponeses e Imp rios Alimentares: Lutas por autonomia e sustentabilidade na era da globaliza o*, UFRGS, Porto Alegre, Brazil, 376 p.
- Polge E., Piraux M., 2017. Analyse des dynamiques d'interaction dans les dispositifs de gouvernance territoriale en Amazonie br silienne : Position et r le des *gatekeepers*. *Revue canadienne de science r gionale*, 40 (2), 175-184.
- Polge E., Torre A., Piraux M., 2016. Dynamiques de proximit s dans la construction de r seaux socio conomiques territoriaux en Amazonie br silienne. *G ographie,  conomie, soci t *, 18 (4), 493-524.
- Rey-Giraud G., 2012. Ing nierie territoriale :   question technique, r ponse politique, Les notes d'ETD, le centre de ressources du d veloppement territorial, 12 p.
- Scaillez A., Tremblay D.G., 2017. *Coworking, fab labs et living labs* :  tats des connaissances sur les tiers lieux. *Territoire en mouvement : Revue de g ographie et am nagement*, 34, <https://doi.org/10.4000/tem.4200>.
- Schumacher J., Niitano V.P., 2008. *Living labs: A new approach for human centric regional innovation*, Wissenschaftlicher Verlag, Berlin, Germany, 181 p.
- Tonneau J.P., Sautier D., Valette E., Figui  M., Massardier G., Caron P., 2017. The territory: a response to the development crisis. In: *Living Territories to Transform the World* (P. Caron, E. Valette, T. Wassenaar, G. Coppens d'Eeckenbrugge, V. Papazian, eds), Qu e, Versailles, 27-34.
- Torre A., Rallet A., 2005. Proximity and localization. *Regional Studies*, 1, 47-59.

Vall E., Diallo M.A., Fako Ouattara B., 2015. De nouvelles règles foncières pour un usage plus agro-écologique des territoires en Afrique de l'Ouest : L'ingénierie écologique pour les services d'approvisionnement et socio-culturels. *Sciences, eaux & territoires*, 16, 52-56.

Wezel A., Bellon S., Doré T., Francis C., Vallod D., David C., 2009. Agroecology as a science, a movement and a practice: A review. *Agronomy for Sustainable Development*, 29 (4), 503-515.

Whiteside M., 1998. Living farms: Encouraging sustainable smallholders in Southern Africa, Earthscan Publications, London, United Kingdom, 217 p.