

Chapter 8

Innovative Governance and Participatory Research for Agriculture in Territorial Development Processes: Lessons from a Collaborative Research Program (PSDR)



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Abstract We analyze the contribution of the PSDR (For and About Regional Development, in French) program in the construction and diffusion of agricultural and rural development models. PSDR is the largest French research program focused on analysis of rural and peri-urban dynamics. It is designed as a process both for producing scientific knowledge and for building methods and tools for decision and action in territories within French administrative regions. We also analyze unique characteristics of PSDR research instruments and their integration in regional arrangements for research and action for regional development. We show what kind of knowledge is produced, how it raises questions about agricultural practices and rural development policies of administrative regions, and how these processes influence structuring networks and cognitive communities at local and interregional levels. In this way, we assess the innovative role of the PSDR program and draw conclusions about its influence on diffusion of organization standards and the transition process. The data used to perform our analysis consist of detailed knowledge of the PSDR program from our experience of managing it and documents produced by projects and action teams in each of the ten French administrative regions involved in the program.

Keywords PSDR program · Innovative governance · Agriculture · Rural development · Partnership · Territorial development

8.1 Introduction

In this chapter, we analyze the contribution of the PSDR (*For and About Regional Development*, in French) program in the construction and diffusion of agricultural and rural development models. PSDR is the largest French research program focused

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on analysis of rural and peri-urban dynamics. It is designed as a process both for producing scientific knowledge and for building methods and tools for decision and action in territories in French administrative regions.

Program management consists of implementing an original method and a sequence of specific steps: multidisciplinary partnership between local actors and researchers, co-construction of research questions by researchers and partners, common production of the shape of and calls for proposals, co-definition of experimental fields, collaboration in the framework of partnership projects, production of scientific results based on interaction between laboratory and field research, valuation and dissemination of results in scientific publications, teachable content, management tools for partners, and action rules for policy makers.

We analyze unique characteristics of PSDR research instruments and their integration in regional arrangements for research and action for regional development. We show what kind of knowledge is produced and how it raises questions about agricultural practices and rural development policies of administrative regions. We also assess how these processes influence structuring networks and cognitive communities at local and interregional levels. By doing so, we assess the innovative role of the PSDR program, drawing conclusions about its influence on diffusion of organization standards and the transition process. Faced with the limitations of dominant productive models and the need to adapt to constraints related in particular to climate change, territories and agricultural production systems are forced to experiment to find new solutions. Unusual techniques, but above all innovative practices and organizational forms (e.g., agroecology, circular economics, short food chains), tend to constitute new standards for development, favoring the transition of agricultural systems and territories toward models of sustainable development.

These processes reaffirm the central role of innovation as a driver of regional development and reveal that innovation practices themselves tend to change, redefining expectations and forms of intervention in academic research. In fact, as a participatory research program, PSDR aims not only to increase scientific knowledge but also to play a role in development of rural territories and farming systems.

The data used to perform our analysis consist of detailed knowledge of the PSDR program from our experience managing it and documents produced by projects and action teams in each of the ten French administrative regions involved in the program. The chapter first reflects on innovation in regional development analyses and policies. It then highlights the main unique characteristics of the PSDR program and its growth from the late 1990s to the early 2010s. Next, it assesses the main results of the PSDR 3 program. Finally, its conclusion opens the way for the new PSDR 4 program and its recent developments.

8.2 Innovation in Regional Development

8.2.1 *Development as a Dynamic Process Related to Innovation*

For two decades, scientific studies have increasingly examined the idea that regional or territorial development is closely related to innovative or creative processes, at the origin of the varying speeds and amounts of development of different regions or territories (Dunford 1993; Scott and Storper 2003). Analyses of regional development based on innovation and regulation processes conclude that local systems are subjected to successive phases of growth, stagnation, and even recession (Colletis et al. 1999). Internal shocks have an impact on systems: they lead to spatial concentrations of people and wealth and to zones of social and spatial exclusion. These processes are thus driven by innovation and its creation and dissemination (Cooke and Morgan 1998).

The evolutionary economic geography (Frenken and Boschma 2007) considers that uneven spatial distribution of activities results from largely random historical processes. It accords a predominant place to the entrepreneurial dimension, based on genealogy or on processes of emergence, growth, decline, and cessation of business activity (Boschma and Frenken 2011). This approach insists on the roles of spin-offs (e.g., new firms issued from the main enterprises) and labor mobility in territorial development (Maskell 2001) and puts the stress on the role played by routines within the local industrial system. These technologies take advantage of geographical, industrial, and technological proximity among sectors (Torre 2008), of institutional mechanisms, and of network structures. They diffuse through the industrial systems via snowball effects between businesses and technologically related industries and eventually lock local systems into spatial dependencies on the growth path (Torre and Wallet 2014). This process works particularly well in new technological industries, especially when they are based on related technologies. They generate knowledge “spillovers,” e.g., local spread of knowledge, ideas, or innovations, between firms and lab with short cognitive distances meaning sharing same technological or education values (Nooteboom 2000).

8.2.2 *Technological Innovation Within Development Clusters*

The approaches dealing with innovation in territorial or regional development are partly inspired by Schumpeter’s research. Based on the importance of research and development (R&D) or innovation in local development, they rely on the idea that innovations are key to development processes and that R&D efforts and incentives for innovation have a huge impact on growth dynamics. Innovation transfer and dissemination at the local level are then related to systemic approach (Feldman 2000; Autant-Bernard et al. 2007) and stress on the importance of face-to-face relations and

of expansion phases by setting up spin-offs and supporting creative efforts (e.g., nurseries, incubators). As a result, territorial development is related to localized spillovers of innovation or knowledge, which diffuse within the local system, and to the existence of local innovation systems, such as technology hubs and competitive clusters. Innovation is at the origin of this process and differentiates systems that are dynamic from those that are not.

Given these approaches, the perception of innovation processes changes, from a purely linear model to an interactive one (Lundvall 1992), but remains the question of the level at which innovation occurs in association with development dynamics. The studies which examined how these systems are implemented at the regional level sought to understand how local and regional networks and institutional mechanisms favor innovation and its adaptation and permanence over time (Lundvall and Maskell 2000). They gave birth to regional innovation systems approaches (Cooke and Morgan 1998) that seek to identify ways to anchor innovations in territories and to lead to efficient and successful systems. In this respect, territorial or regional institutional mechanisms appear essential in order to reduce uncertainty and support coordination and collective action conducive to innovation (Gertler 2010; Rodriguez-Pose 2013).

8.2.3 Innovation from Creating Knowledge

The central role of knowledge and its implications for regional and territorial development in association with innovation processes is highlighted by recent studies. They consider development as the transformation of a set of assets consisting of products poorly developed and exploited by an underqualified workforce into a set of knowledge-based assets exploited by skilled labor (Lundvall and Maskell 2000). Here, information is regarded as an essential raw material, and collective learning ability promoted to enhance the adaptive potential of regions and territories and their development. This collective, social and geographical process (Mobius and Rosenblat 2014) is then supposed to improve individual or organizational understanding and capacities (Wolfe and Gertler 2002) at the local level.

Nonmarket relationships among institutions are the key factor. They help in increasing and improving the territories' or regions' performances measured by innovation, productivity growth, and development. Trust, high levels of tacit knowledge, and the existence of routines are associated to this effort and determine the structure of local mechanisms of cooperation and coordination. These relational resources lead to an increase in learning abilities and the creation of benefits difficult to replicate by other territories. This is neither to say that, in this conception, urban spaces or territories are viewed as favorable to innovation and to knowledge creation with regard to the cognitive externalities they can generate (Scott and Storper 2003), but such possibilities are nonetheless accessible for some rural areas able to promote

their unique characteristics and especially their local resources (Gumuchian and Pecqueur 2007).

It appears clear that innovation, knowledge, and learning play a central role in regional and territorial development and influenced the evolution of development and infrastructure policies (e.g., transport, high-speed telecommunications). These policies are also based on less tangible elements such as network structuring and knowledge transfer, in the aim to strengthening collective capacities of knowledge creation and learning (McCann and Ortega-Argilès 2013). But the main challenge remains to build endogenous assets to the territory (Camagni and Capello 2013). As a matter of fact, all the studies drawn at the territorial or regional level reveal that the solutions have a low content in terms of creativity (especially when located in the same country) and that most territories have difficulties in differentiating themselves in a clear and sustainable manner.

8.2.4 Toward Territorial Innovation?

All these models have something in common. They are based solely on high-tech activities, oriented by technology and by a market-focused corporate culture, and they conceive innovation only in its most technological of dimensions. By doing this, they ignore incremental or modest innovations. But they also bypass many territories whose development is not based on high-tech activities but still has other vibrant innovation resources (e.g., social, organizational, and institutional). Moreover, they strongly neglect the extent of the potential that local products offer for territorial development that are part of industrial manufacturing or modernization of traditional crafts, for example, which appear as keys to improved competitiveness of some urban and rural areas.

Territorial innovation, in all its dimensions, appears one key to solve these problems, and in particular to consider different types of innovation in all territories, including rural ones. This effort should lead to more credible and accessible models of innovation and to improve understanding of human progress at the territorial level (Moulaert and Sekia 2003), for the sake of local communities. Some approaches, such as that of the GREMI (Group for European Research on Innovative Environments to the “innovative milieu”) (Camagni and Maillat 2006), have investigated this way of thinking in developed, rural, or underdeveloped territories, based on organizational innovations and mobilization of local populations. Their spirit has been maintained and broadened in rural areas by the European Union (EU) *LEADER* program and other community initiatives for the local level, which are based on local initiatives and intense collaboration between local producers and stakeholders (Dargan and Shucksmith 2008).

But rules for collective action and institutional mechanisms need also to be considered as crucial factors that explain innovative territorial dynamics. In this respect, innovation is viewed as a social construct and conditioned by the geographical context in which it occurs, rooted in practices and therefore necessarily located

in space. Territorial innovation is also related to social and solidarity-based economies and sustainable development (Zaoual 2008), or to social innovation (Klein and Harrison 2007; Hillier et al. 2004), which describes corporate innovative practices in response to social needs. This increased complexity requires that it has to incorporate not only the emergence of innovative processes but also the various aspirations and wishes of local populations and relate them to overall policies and regulations, especially by means of territorial governance. The latter shapes phases of territorial innovation and thus constitutes an engine of development, like production or technological innovation, in rural and urban territories. Both can be viewed as laboratories of change: they accompany and sometimes anticipate changes underway in the territories by giving them shape, helping maintain a dialogue and expressions of opposition, and preventing violent confrontations or development failures due to sluggishness or expatriation. Recent researches open way to the idea that these changes are based on the opposing and twin forms of conflict and consultation. They constitute modes of expressing and vehicles for transmitting ongoing innovations at the territorial level (Torre and Wallet 2016).

8.3 The PSDR Program: A Collaborative Research Instrument for Regional Development

These issues have stirred the scientific community for a long time, and many researchers have been interested for many years in the integration of the innovation dimensions and in their operational translation in terms of development. At the same time, there appeared a concern for a more involved, more partnership research, which takes into account the relations with the productive sector and society, as exemplified with the approaches of the triple helix, for example (Leydesdorff and Etzkowitz 1998). This dual concern is illustrated by the implementation, in France, of PSDR programs by public research actors, in agreement with large local and regional authorities in the French administrative regions. To this interest is added here a consideration of the local and territorial dimensions, with the idea that the research involved must first be anchored and become operational on the ground, in order to contribute to regional and territorial development processes.

PSDR examines the role of economic activities (primarily agriculture, agro-food, and transport) and rural and peri-urban areas in territorial development dynamics. Supported by two large public research bodies, INRA¹ and Irstea,² in collaboration with the regional councils of ten French administrative regions, PSDR is intended to contribute to regional and territorial development through research and development operations conducted in partnership with local actors. PSDR, started in 1996,

¹Institut National de la Recherche Agronomique: <http://www.inra.fr/>.

²Institut National de Recherche en Sciences et technologie pour l'Environnement et l'Agriculture: <http://www.irstea.fr/>. As of 1 January 2020, IRSTEA and INRA merged to become INRAE, the French National Institute for Research in Agriculture, Food and the Environment.

analyzes dynamics at work in territories, including innovation processes in the fields of resource development, competitiveness of supply chains, ecosystem preservation, adaptation to climate change, changes in urban-rural relations, and development of territorial governance mechanisms and their integration into public policy.

For the last decade, PSDR has been in line with instruments strengthening integration between research and development. These interdisciplinary instruments have a close relationship with practices and techniques, corresponding to “Mode 2” of knowledge production, compared to the more traditionally academic “Mode 1” (Gibbons et al. 1994). The relationship between these two modes of knowledge production unfolds through redrawn organizational forms among research organizations, higher education, economic actors, and public authorities in territories, as formalized in the “triple helix” model (Etzkowitz and Leydesdorff 2000). Indeed, these approaches emphasize that development and innovation processes are based on intense collaboration among three main spheres: academic research, firms and industry, and institutions (both local and global).

Since the first generation of the PSDR program, to ensure that knowledge is incorporated into practices and policies of regional development, the goal has been to give this policy instrument the ability to define collaborative research configurations that allow for both a variety of useful knowledge for action and innovation and mobilization of business and institutional actors in regions and territories (Sebillotte 2000; Lacour 2006). The third generation of PSDR (PSDR 3) began in 2007 and ended in 2012;³ in it, scientific contributions and recommendations for regional development were provided and applied at regional and territorial levels.

8.3.1 Analysis of Regional and Territorial Development Processes: Methodological Foundations of PSDR Research Projects

In operation since the 1990s and continually being improved, the PSDR program differs from other research instruments in that it uses a method and engineering approach that ensure joint development of partnerships, as well as evaluation by an independent scientific body. It also helps monitor research progress at each stage of the project and make it possible to develop tools to promote knowledge transfer and use. The originality of the PSDR program lies in its being designed and developed within the administrative regions and in relation to concerns of their stakeholders (Mollard et al. 2007). The profile of the PSDR program in each region depends on two major dimensions: (1) priorities identified by the regional council from preliminary assessments and (2) the region’s organization of R&D and research financing. This approach offers a wide range of integration methods among regions, from

³ A new generation (PSDR 4, 2016–2020) is underway, with 33 new projects in 10 enlarged French regions.

collaborative research in a regional framework to integrating PSDR into the region's R&D policy, or even positioning PSDR as one of the spearheads of new R&D practices.

Collaborative research aims to describe and analyze processes of regional development and provide tools to development actors. The research is based on selecting and evaluating the quality of the research performed.

Project selection and the research performed during projects follow a specific order:

1. Research themes and projects are discussed and selected in regional forums. The call for proposals is addressed to all interested researchers at large research organizations (e.g., CNRS),⁴ universities, and engineering schools. The projects are co-developed by researchers and local actors, under the guidance of local coordination units.
2. Teams are invited to respond to the national call for proposals, which includes regional components that consider local characteristics. Research and project proposals are rated by an independent scientific council composed of international experts in social sciences and biotech. It selects the best projects (i.e., graded A or B) on a scientific basis, declining the others (graded C).
3. A second round of selection occurs, in which the projects graded A (excellent) and B (very good) are examined by each region's steering committee, which determines their eligibility and the amount of funding to allocate to them.
4. A team of permanent partners monitors the projects regularly throughout the 4 years of the program. The scientific council monitors the progress and quality of the research and performs the final evaluation. Interdisciplinary teams promote exchanges between regions and disciplines, strengthen the program's coherence, and help create a common culture.
5. The use of standardized materials (e.g., common templates for all projects) facilitates dissemination of results and their understanding by partners and researchers. Posters summarize questions raised in a project and present methods and resources used to address them. Four-page papers concisely describe research objectives and main results of a project.

8.3.2 PSDR: A Multidisciplinary Approach to Understanding Territorial Dynamics

In each region, PSDR involves joint participation of researchers from universities, engineering schools, and institutes. It is based on a complex multidisciplinary approach, involving three main mandatory layers:

⁴French National Center for Scientific Research (CNRS in French).

1. Identification of key regional and territorial development issues. PSDR projects provide insight into regional and territorial development processes and in-depth analysis of the role and place of agriculture and the food industry in rural and peri-urban areas. They have increased scientific knowledge, at the local level, about key societal issues associated with global and environmental change.
2. Development of analytical approaches to regional development combining multiple scientific disciplines. Combining biotechnology and social sciences, the projects provide frameworks for understanding and results of interdisciplinary analyses. The diversity of regions' approaches to the same issue helps broaden understanding of development challenges in their territories.
3. Interregional scientific activities. The desire to promote knowledge exchange, in order to develop a common culture and interdisciplinary collaboration among research teams in the regions, led to the creation of several parallel permanent workshops (i.e., in PSDR 3, "Governance and development of territories," "Partnerships and working methods within PSDR," "Forms of regional and territorial development"). They were intended to coordinate the groups of researchers and partners involved in the projects around a framework of topics considered of major interest.

8.3.3 Knowledge Transfer and Use at the Regional Level: At the Heart of PSDR's Mission

Approximately 300 partners in the 10 regions of the PSDR program were involved in the projects selected. They worked mainly in agriculture (54%), followed by territorial development (28%), the environment (8%), industry (6%), and forestry and fishing (6%). Others were affiliated with business and institutional organizations for agriculture in France (4%). Referring to the triple helix model, one unique characteristic of PSDR is to associate mainly academic researchers and public and semi-public sector actors, with fewer business and industry actors, except in agriculture. In other words, the PSDR program does not focus on R&D collaboration with the actors usually involved in triple helix models (small- and medium-sized businesses) but more on rural and agricultural activities that generally have more difficulty accessing R&D and relations with research organizations.

The collaborative research describes and analyzes regional development processes and provides tools to development actors, both private-sector partners (e.g., farms, businesses, cooperatives) and public actors (e.g., local and regional authorities, decentralized state services, training institutions). The PSDR program is a collaborative framework. Over the generations a device has gradually been built and perfected that uses a method and engineering approach ensuring joint development of partnerships, helping monitor progress of research at each stage of the project (from elaboration to dissemination and evaluation), and making it possible to develop tools to promote knowledge transfer and use.

Co-construction starts before each project begins. It is founded in collective viewpoints of field partners and institutional actors such as regional councils and in exchanges between researchers and local actors during discussion forums. Each project is jointly developed by those directly collaborating. The selected projects are monitored regularly throughout the 4 years of the program by a team of permanent partners that ensures aspects such as the effectiveness of the partnership, conformity of the scientific work performed to the stated goals, and budget compliance. Monitoring is based on writing a report for annual review and to forecast activities for the following year. This report allows researchers and project stakeholders to reflect on the work performed and the governance, and for steering bodies to verify compliance with commitments, with the ability to intervene, if necessary, to make rapid adjustments. In the event of an excessively large default, the termination of projects before term can be considered.

The development phase consists of producing standardized dissemination tools, which preserve the identity and coherence of the program. Technical data sheets describe the main operational tools designed for use by the partners in each project. Several focus groups provide more detailed insights into project methods or results and offer many technical documents for use by partners in the regions.

8.4 PSDR 3: An Assessment

Over its 4 years, the PSDR 3 program involved the participation of 320 researchers and engineers, 240 lecturers/researchers, 60 staff on fixed-term contracts, 53 Ph.D. students, 10 postdoctoral researchers, many interns, and approximately 300 master's students. They participated in 36 research projects conducted in 10 regions, representing a total of 650 FTE years. Of the 204 teams and laboratories involved in the program, 38% belonged to INRA, 10% to Irstea, 23% to agricultural engineering schools, and 29% to universities or the CNRS.

PSDR 3 held two main scientific events. The end-of-program symposium, held in Clermont-Ferrand, France, from 19 to 22 June 2012, served to present results of the 36 projects and provided an overall perspective of PSDR's contributions to knowledge in the service of regional development. In it, 145 oral or poster presentations were presented, involving almost 400 participants. The researcher-training workshop "For and about regional development: collaborative and interdisciplinary research pathways" was held from 25 to 28 May 2010 in Carcans, France. It helped increase knowledge about regional and territorial development and strengthen collaboration between researchers and other PSDR 3 partners.

8.4.1 Main Scientific Results of PSDR 3

The PSDR 3 program contributed to the production of several scientific publications. Assessment at the end of 2012 revealed the following publications: more than 400 articles in peer-reviewed journals, 156 of them in English-language journals; nearly 150 book chapters; 5 books in French (on short producer-to-consumer food chains, climate change, territorial engineering, rural development policies, and territorial development), and 53 theses (from 24 projects). Five special issues of scientific journals were published on the following topics: land and development of rural and peri-urban areas, decision-making support in territorial development, agriculture and territorial development, agro-food businesses' locations and ties to the territory, and environmental issues at the heart of regional development. Three collective books were published on the following topics: one on partnerships for territorial development and two on challenges of regional and territorial development in rural areas.

The main scientific results are related to several main fields of regional and territorial development (Torre and Vollet 2016).

Some are related to the combination of environmental and societal topics, for the sake of territorial development, such as analysis of peri-urbanization processes, new sources of wealth creation (e.g., services, tourism, and residential economy), efficient use and preservation of natural resources, location strategies, and spatial mobility.

A second set of results is related to use of local resources, such as consumption-related issues and distribution channels, short producer-to-consumer food chains, innovation processes, land use, sustainability of farming systems, creation of new activities, strategies of businesses and cooperatives, functioning of commodity chains, and management of local resources.

Some projects aimed to identify key regional or territorial development issues, given common concerns but a diversity of situations, such as development of analytical frameworks to better understand and measure impacts of climate change on water use and farming systems and pest risks for tomato production.

Other projects aimed to promote regional development by producing agronomic and economic models that help actors better understand effects of activities and their geographical expansion, such as development of forecasting scenarios and tools for analyzing territorial governance and planning, construction of indicators (e.g., for sustainability) that consider the territorial dimension, regionalization of databases on climate change, and innovation in small- and medium-sized agro-food businesses.

These analyses gained insight into territorial dynamics using a combination of disciplinary approaches. For example, many studies examined land use, combining development of economic models addressing land use regulation or analyzing geographical, sociological, and legal dimensions of land management.

Some conclusions about the conduct of multidisciplinary research can be drawn from PSDR 3.

Mutual recognition, constructing a common language, adjusting the timing of research and action, and legitimizing the investment of each partner in a project and within his/her institution play a key role in the joint dynamics required for success of the project. Trust appears to be essential, but the dynamic character of partnerships throughout the project, exemplified by key moments during which roles and expectations of each partner can be redefined, is also crucial. Presenting intermediate results or drafting value-added reference documents enters into this category. Thus, project dynamics have phases of increasing closeness and strengthening of partnerships, followed by moments of increasing distance and less implication of partners, thus influencing knowledge creation.

Thus, the PSDR program highlights that despite being anchored in a governance structure and defined by formalized relations, the search for partnership remains strongly dependent on the contingencies of and uncertainty specific to any project of territorialized innovation. In particular, the latter require an engineering framework that can accompany bifurcations and adjustments that may occur at each stage and partly participate in a stepwise adjustment process (Chia and Soulard 2010). This engineering framework receives support from three complementary figures: the “broker,” who ensures interface among different socio-economic worlds, favoring translation because of its existence outside of the project (e.g., Ph.D. student, intern), hybrid career, membership in an interface structure, or technical facilitation or managerial skills; “binding assets” (Latour 1995), composed of objects (e.g., maps, tools) that help knowledge exchanges crystallize and become more effective; and finally the “instrument,” which structures and organizes a meeting space that associates researchers and actors.

8.4.2 Partnership Assessment

Analysis of concrete situations of partnership in PSDR projects highlights the role of relational paths rooted in the long term and the context in which the partnership fits (Torre and Vollet 2016). Thus, the first steps in building a collaborative project and forms of inter-existing knowledge (often from previous projects or common pathways), as well as partners’ organizations, thematic concerns, or use of methodological tools, are all common terms of proximity that will guide the shape and direction of the project and partnerships within it. The process of mutual recognition, common language building, adjustment of timing between research and action, and legitimization of human investment in the project and within their own institutions also contribute to dynamics required for effectiveness of the project.

Knowledge construction in partnership relies on complex translation and hybridization of existing knowledge (Chia and Soulard 2010) to allow it to pass between disciplines but also between research and practice in response to needs of stakeholders. These needs are of two kinds: (1) distancing and better explanation of stakeholders’ practices, or understanding of the evolution of the systems and contexts in which the stakeholders work, and (2) more technical aspects, seeing

collaboration with researchers as an opportunity to develop new tools and enhance technical skills.

Analysis of the PSDR program makes it possible to understand how the partnership research processes contribute to innovation in the regions highlighted by the literature. It underlines the importance of adapted relationships between researchers and local actors, which is built and maintained over time around relationships of trust, construction of a common language, and frames of reference, but also of support objects from collaborative research processes that foster interactions. These results underline conditions for a good adequacy of these results for the resolution of the particular problems of the actors involved in research, as well as the challenges of their deployment in other contexts and on a larger scale. The dissemination of knowledge between peers within professional networks appears important, as does the influence of technical leaders. The role of knowledge smuggler that certain technical organizations can play is also to be emphasized in the sense that they perform the function of innovation broker in the regions. In other words, we can consider that the funding of partnership research by the regional authorities promotes both the production of new scientific knowledge but also innovation and the acquisition of skills by the actors which can be useful for the realization of public policy objectives for the development of territories.

8.4.3 Examples of Tools Developed and Operations Conducted in the PSDR Program

Several tools were produced during the PSDR program, especially in the dissemination phase (see examples in Kirchner et al. 2012). Some were related to territorial engineering systems, such as a guide to help actors in action situations develop a regional planning program: this guide combines reflective summaries, concrete examples, and tools for monitoring actions engaged at the territorial level in order to facilitate initiatives in situations of multilevel and multi-actor governance (Rey-Valette et al. 2011). Another tool was a practical guide for farmers (e.g., cooperatives), agricultural technicians (e.g., Chambers of Agriculture), elected officials, local community representatives, and planning consultants on construction of multi-partner biogas projects at the territorial level (Beline et al. 2011). It provides territory-specific repositories of information on management of organic waste and residues and estimates of environmental impacts of biogas production. It also proposes adaptive methods for each stage and operation of the biogas project.

Several models were used to help local farmers, agricultural technicians, and teachers, such as a patented tool for adapting farming and forage systems to climate change and hazards: *Rami fourrager*© (i.e., “fodder board game”) (Martin et al. 2011), which combines a board game and a Microsoft® Excel interface. This group facilitation tool helps initiate reflection on how to reduce sensitivity to climate

variability and achieve fodder or protein self-sufficiency. It is used in particular to train individuals in businesses and agricultural colleges.

Another model (Colomb et al. 2011), designed to assess organic cropping, was developed in a partnership between researchers (management and agronomy) and advisors from Chambers of Agriculture. Constructed using 49 indicators, it helps consider many components of farming systems' sustainability, including social acceptability and health risks for farmers. In particular, it provides knowledge to help lift barriers to development of more environmentally friendly systems.

Finally, short producer-to-consumer food chains were also studied and developed. One project created a tool to assess relations between consumers and actors in short food chains (Prigent-Simonin and Hérault-Fournier 2012). Another project established a system for governing short food chains, in consultation with a tripartite advisory committee (elected representatives, traders, consumers), as well as a simple labeling system (*Ici.c.Local*©) for indicating geographical and social origins of products (Chiffolleau et al. 2013).

8.5 Conclusion: Toward a Fourth Generation of the PSDR Program

After more than 20 years of experience in participative research, the value of the PSDR program can be summarized in five complementary domains:

- Understanding of technical, economic, social, and environmental processes that impact territories
- Construction of tools and action instruments for local actors, through contribution to regional development by producing analytical, management, and support tools built in partnership, favoring knowledge creation and transfer for evolution of local practices and organizational innovation in particular, in rural and peri-urban areas
- Mobilization and organization of territorial actors, in the form of contribution to identification of regional and territorial development issues but also to structuring and organization of groups of actors
- Acquisition of skills by territorial actors (e.g., continuing or basic education, transfer of results)
- Support for management of public action, by contributing to design or implementation of regional policies

INRA and Irstea have continued the PSDR program, launching a new generation of projects (PSDR 4) to address current challenges related to agricultural, territorial, and regional development and evolution of public policy. The main topics addressed have evolved to reflect concerns of economic, social, and public actors at the territorial level while considering main structuring orientations of EU regional policy, for example, by dealing with issues on “smart specialization” (Foray et al.

2009; Torre and Wallet 2015, 2016), bio-economic challenges in the context of its Horizon 2020 program, and transport infrastructure projects but also Common Agricultural Policy (CAP). They also consider drivers of wealth creation in territories, such as residential economy and tourism, and the transition of agriculture and rural areas in a context of climate change. The PSDR program thus intends to contribute to new debates about the understanding of innovation in territorial development processes. From this perspective, one can emphasize the convergence between principles of the PSDR program and measures of the recent reform of EU policy, showing to some extent the pioneering nature of the PSDR program when these measures were created. Indeed, by making regional councils the new policy management authorities and focusing on the regional level to consider regional characteristics better, EU policy strengthens a more decentralized model already present in previous generations of the CAP and follows the logic of PSDR.

Similarly, implementation of operational groups in European Innovation Partnerships (EIPs), launched in 2010 as part of the Europe 2020 Strategy, has the same rationale as the cooperative approach among researchers from different disciplines and fields of innovation. Established on themes reflecting strong societal issues (e.g., water, agriculture), EIPs are intended to mobilize actors in the research and innovation chain at different levels (e.g., regional, national, European) around many objectives defined to stimulate production and enhancement of knowledge for innovation. As policy coordination mechanisms of existing programs—which differentiate them from PSDR—EIPs seek coordination of investment in public and private stakeholders to increase leverage, accelerate definition of standards, and demand for mobilization. Some of the ten participating French regions have chosen to label their PSDR 4 program as one of the operational groups (OPs) being set up at the regional level.

PSDR 4 will strengthen partnerships and knowledge transfer. Closer ties are developed with the French Rural Network and its regional affiliates, and projects will be extended by 1 year (from 4 to 5 years) to promote knowledge transfer and use. The new projects are organized to promote interregional interaction among participants and maintain cooperation between a national steering and coordination mechanism and regional mechanisms. Finally, particular effort is made to meet scientific quality requirements while ensuring that useful solutions are provided to the regions. Multidisciplinary partnership, a strong defining characteristic, will be strengthened.

PSDR 4 aims to strengthen the goal of using scientific knowledge better and converting it into effective tools and mechanisms that help address concerns of stakeholders, while considering the development issues identified in each region, and of supporting definition and implantation of rural development policies at the regional level. Another goal, related to key issues common to several regions, is to articulate the results better in order to consolidate scientific gains and transform them into operational tools that are transferable between regions.

Several new research themes have been developed for PSDR 4 that outline the future PSDR project for 2015–2018: land uses and pressure in rural and peri-urban areas; greening agriculture and global change; territorial autonomy and agricultural

development; innovation in different dimensions, food supply sectors, and territories; territorial development, urban-rural relations, and strategies for increasing territorial attractiveness; and new challenges and forms of public intervention and territorial development.

The new PSDR program intends to meet four main goals: strengthen the means of transferring scientific results to territorial actors, improve co-construction of projects and conversion tools, articulate PSDR projects with other research mechanisms (e.g., CASDAR,⁵ GIS,⁶ UMT,⁷ and RMT)⁸ to better identify the former's characteristics and added value, and finally raise awareness of research teams and partners about challenges of knowledge transfer and innovation.

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⁶ Groupement d'Intérêt Scientifique (Scientific Interest Group).

⁷ *Unités Mixtes Technologiques* (Mixed Technological Units).

⁸ *Réseaux Mixtes Technologiques* (Mixed Technological Networks).

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