Agricultures
et défis du monde
Collection Cirad-AFD

Living territories to transform the world

P. Caron, E. Valette,
T. Wassenaar,
G. Coppens d'Eeckenbrugge,
V. Papazian,
Coordinators

éditions Quæ

Living territories to transform the world

Patrick Caron, Élodie Valette, Tom Wassenaar,
Geo Coppens d'Eeckenbrugge, Vatché Papazian,
coordinators

Éditions Quæ

The *Agricultures et défis du monde* (Agriculture and Global Challenges) collection publishes a book every year that showcases Cirad's research into the sustainable development of tropical agricultural systems. It is co-published by Éditions Quæ, AFD and Cirad. The collection is coordinated by Cirad's Patrick Caron.

Cirad (Centre for International Cooperation in Agricultural Research for Development) is a French research centre which, in association with countries of the Global South, tackles international issues of agriculture and development. In partnership with these countries, it generates and disseminates new knowledge to support agricultural development and to inform the debates on the major global issues concerning agriculture, food and rural territories. Cirad has a global network of partners and regional offices from which it conducts joint operations with stakeholders in more than 90 countries.

Cirad
42 rue Scheffer, 75116 Paris
www.cirad.fr

AFD, the French Development Agency, is a public institution that has been working for 70 years to fight poverty and promote development in countries of the Global South and in French overseas departments and territories. AFD implements the French government's development aid policies.

With a presence in more than 50 countries and nine French overseas departments and territories, AFD funds and supports projects that improve the living conditions of local populations, promote economic growth and protect the planet. These projects concern education, maternal health, support for farmers and small businesses, water supply, preservation of tropical forests, the fight against global warming, etc.

Agence française de développement
5 rue Roland Barthes, 75598 Paris Cedex 12, France
www.afd.fr

Éditions Quæ
RD 10, 78026 Versailles Cedex
www.quae.com

 ISBN: 978-2-7592-2731-0

Version française : « Des territoires vivants pour transformer le monde »

 ISBN : 978-2-7592-2654-2

CHAPTER 34

Territorial observatories: a tool for development?

Jean Philippe Tonneau, Philippe Lemoisson, Magalie Jannoyer, Pierre Maurel, Philippe Cattan, Marianne Le Bail and Vincent Bonnal

OBSERVATORIES: NEW TOOLS FOR THE PRODUCTION OF FINALIZED KNOWLEDGE

The word 'observatory' originally refers to a mechanism for understanding and predicting a physical phenomenon (Piron, 1996). In recent decades, in a rapidly changing world of uncertainty and over-information, States and local authorities have set up observatories to compensate for 'a marked deficiency in knowledge or expertise'[1]. Observatories are also seen as new forms of knowledge production through a renewed relationship between research and action.

Among the numerous existing observatories (on prices, secularism, public tranquillity, etc.), some support territorial development with the aim of reshaping public action and addressing major societal challenges (see Chapter 1). Such observatories have proliferated in recent years, both in the countries of the North and the South, and multiple functions have been assigned to them. They include knowledge production; capacity building; aid for decision-making and action; collection and organization of data and information; organization of communities for research, reflection, debate or action around a shared project; communication; etc.

The goal entrusted to territorial observatories makes their implementation difficult. CIRAD has proposed an original approach to accompany this implementation. This approach forms the basis of this chapter. We introduce it by describing the notion of the territorial observatory and defining its specificities. These specificities justify a process of co-construction of tools that can help to observe a territory and steer collective action. We chose two observatories to describe these tools: one in the French West Indies and the other in the Bassin de Thau, a lagoon in southern France. These two situations are put in perspective to draw some lessons.

1. Jospin L., 1996. Response to questions from the French Senate. http://www.senat.fr/questions/base/1996/qSEQ960515509.html

Territorial observatories: specificities and requirements

We distinguish the notion of 'territorial observatory' from that of 'observatory of the territory'. An observatory of the territory organizes and makes available information on the territory (maps, databases, indicators, monographs, statistics, studies, surveys, etc.), most often through a website or a data portal with mapping functionalities. An observatory of the territory is thus primarily a means for disseminating data, information and tools to various audiences (Académie des sciences, 2006). These mechanisms are not designed to address specific issues. Territorial observatories, on the other hand, are specifically built around a socio-technical response to a given issue, which could be as diverse as urban growth, water pollution, youth unemployment, etc.

A territorial observatory is thus always organized around three characteristics: the explicit and shared identification of a priority issue for the territory, the active presence of a community of actors and decision-makers gathered around this issue and the will to build a permanent information system dedicated to this issue. Territorial observatories are thus diverse according to the nature and scope of the issues they are dealing with, the extent of territories and their modes of governance, and the size and composition of the communities involved. However, features common to various situations can be identified.

First of all, a territorial observatory is always created at the initiative of a sponsor, a funding entity, a politician, a scientist, a group of citizens or an institution. An 'observatory' dynamic, resulting from analyses of ground reality, exchanges and debates, allows a community to explore an issue identified as a priority by producing appropriate knowledge for the public good. This dynamic is based on a social and organizational dimension that brings together the community of actors around a common effort to address the issue concerned.

A second dimension of the observatory is technical. It allows the management, preparation, organization, formatting, sharing, analysis and discussion of data, information and knowledge in order to monitor the development of the territory that is facing the problem in question. It takes the form of a multi-partner and horizontal information system, i.e., a mechanism in which the actors are both data providers and users of decision-making information.

On the basis of these common features, CIRAD has developed a method called CoObs (Lemoisson and Passouant, 2012) to accompany the design and implementation of territorial observatories. After introducing the co-construction process that forms the basis of this approach, we will provide details of some methodological tools.

Introduction to a co-construction process

Let us recall the triptych that constitutes an observatory: an issue, a community and an information system. To summarize, the implementation of a territorial observatory amounts to defining a project around an issue, forming a community for reflection and action, and building a long-term technical observation mechanism.

The selection of the issue is always the result of an overall diagnosis of the territory. This diagnosis provides an outline of the situation and describes the territory and its dynamics. It identifies a diversity of issues and justifies the selection of a high priority issue by the community of actors involved in the diagnosis. The choice is, of course, not neutral, but the continuous analysis of the issue allows a fine-tuning of the choice as the work progresses.

The actor community involved in an observatory project does not necessarily meet the definition of Brown *et al.* (1989), for whom the community denotes a group of people sharing the same values and points of view. In our view, collectively appropriating a territorial issue means to be aware of the opportunity of a gain or a loss for the territory. This does not necessarily imply identical values, similar visions of the territory, or even similar objectives. Indeed, the exercise of co-construction of the observatory is difficult because it requires taking into account perceptions of actors with diverse and sometimes conflicting interests, who are engaged in some kind of 'obligatory communication' (Duran and Thoenig, 1996). Moreover, the constitution of the community encounters the well-known problems of participatory representativeness. How to prevent the issue from being appropriated by a group for its own benefit? In Brazil, for example (Chapter 29), the quality of the implemented territorial engineering allowed the inclusion of the 'voiceless'.

In addition to the collective consciousness of an issue, a territorial observatory presupposes awareness of a strong link between the strategic component ('What has to be done?'), the operational component ('How to do it?') and the informational component ('What information is required for action?') (de Sède Marceau *et al.*, 2011). The production of information supports the implementation of an action that was chosen to address the issue. It is a matter of establishing, in a collective process in which observations are shared, an observation-action-observation cycle. Sharing observations thus leads to transforming measurements into information, i.e., to ensure that the data collected makes sense to all the actors.

In the CoObs approach, actions are identified by sharing individual understandings of territorial dynamics. This collaborative work of representing the dynamics at play (model of territorial dynamics) leads to a prioritization of the actions to be carried out (action model), as well as to the definition of the tools for steering these actions (observation model).

The quality of the co-construction process of the models determines the success of the observatory project, since it represents the opportunity to create a common culture in collective learning situations. The process of co-creating the tools for reflecting on and steering the development of their territory gives the actors space for negotiating their individual objectives in the face of a common issue.

CIRAD and its partners have recently implemented this approach in several locations, most notably in the Bassin de Thau (Lemoisson *et al.*, 2016) and the French West Indies (Cattan *et al.*, 2014), presented below, as well as in Senegal and Brazil (Tonneau *et al.*, 2011).

Tools to reflect on and steer development

In this section, we first present the 'territorial dynamics model' and illustrate its importance for a project in the French West Indies. We then present the action model and the observation model, and illustrate them using the example of the Bassin de Thau where the technology associated with the territorial observatory is being used.

The territorial dynamics model: the example of an observatory centred on the 'water quality' issue in the French West Indies

At the very beginning of the initial stages of the co-construction process, the territorial dynamics model establishes the basis of a common understanding, and confers coherence to observation and action. The community of field actors, institutional partners and scientists refine the initial diagnosis that helped select the high-priority issue, while paying special attention to cause and effect relationships. On the basis of relatively formalized elements of analysis, three types of variables are identified and linked: the territorial constraints (or drivers) forwhich it is not possible to take significant measures during the project (e.g., climate change, demographic structure, international regulations, etc.); the variables describing the state of the territory in terms of its social, economic and environmental aspects (e.g., land use, water quality, etc.); and action variables describing practices and transformations that have an impact on the territory (e.g., irrigation, use of inputs, creation of a protected area, etc.).

In order to illustrate this step, let us look more closely at an issue that has, of late, become a priority in the French West Indies: water quality. Because the tropical humid climate favours bioaggressors (pests, diseases and weeds), horticultural agrosystems regularly use pesticides. In the case of the Galion river watershed in Martinique, the quality of watercourses has been seriously degraded by such agricultural pollution. Researchers have been monitoring this phenomenon for over 15 years. Good practices (active ingredients, doses, frequency of treatments) have been laid down and are being applied by farmers on their plots. This, however, does not translate into compliance with current environmental standards[2] for groundwater and river water contamination (Raimbault, 2014). An explanation is that a large amount of sub-surface water flow discharges into watercourses (Mottes *et al.*, 2015; Charlier, 2007). The polluted plots in a watershed generally affect the quality of all water that flows through it (Della Rossa *et al.*, 2014).

This diagnosis calls for the management of water and soil quality at the territorial level of the watershed, i.e., for the collective management of cultivation strategies, for which we know how to calculate the phytosanitary pressure (Houdard, 2005). This is the reason why different actors (producers, technical advisers, water-quality managers, territorial managers, politicians, researchers) came together to set up an observatory to help organize and monitor the territorial management of crop strategies to reduce the use of pesticides (Cattan *et al.*, 2014).

2. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for the Community action in the field of water policy. *Official Journal* no. L 327 of 22/12/2000 p. 0001 – 0073; http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1489508220310&uri=CELEX:32000L0060

The development of the territorial dynamics model will lead, in particular, to consolidating the analysis of the relationships between the practices and the measured impacts, taking into account all the complexity of the pesticide transfer processes, in terms of temporality and heterogeneity. In addition to this analysis, by bringing together actors of the watershed, the observatory could enable the implementation and assessment of innovations capable of providing sustainable solutions.

The action model and the observation model: the example of the Bassin de Thau observatory centred on the issue of 'land use'

At the end of the co-construction of the territorial dynamics model, the participating actors identify regulatory and corrective actions, and organize them into an action plan. At the same time, they outline their requirements for information to steer these actions. It is the set of actions decided on the basis of the territorial dynamics model, associated with an initial specification of their monitoring, that constitutes the model of action.

The model of action raises a question about information: 'What information is needed to steer and assess collective action in order to address the issue?' This entails specifying, in a comprehensive manner, indicators for long-term monitoring of the state of the territory and the actions, as well as the constraints that weigh on the territory. Also, it is necessary to define the information services that will provide adequate information to each category of actors to steer their objectives. These two elements are closely linked because information services derive their information from the system of indicators and present them as thematic maps, dashboards, numerical charts, etc. Together, they constitute the observation model.

The design phase of the observatory is complete once the two models have been defined. What remains is to design and execute the technical mechanism, the basis for information management, and to assist actors in implementing it. Following a period of operating the observatory, the actors assess the relevance of the planned actions, check if the model of the dynamics is robust, and propose possible changes to the models. The CoObs approach is iterative, as shown in Figure 34.1.

To illustrate the interweaving between the models of action and observation, we take the specific case of a 'land use' issue in the Bassin de Thau territory, in southern France. This territory is characterized by great biodiversity, a large variety of landscapes and a multiplicity of economic activities: fishing, viticulture, hydrotherapy, tourism and recreational activities. The territory is under severe demographic pressures and is witnessing a growing urban sprawl. These dynamics are not only impacting the equilibrium of the environmental system, but also generating tensions between activities as well as social inequalities arising from the sharp rise in prices of built-up land. Climate change is also affecting this territory with coastline erosion and the risk of marine submersion. The Joint Association for the Bassin de Thau, which has coordinated the lagoon's management since 2006, has adopted the CoObs approach to develop its information system. In this case, the action model already existed at the beginning of the collaboration, in the form of a Coherent Territorial Planning Scheme (French acronym: SCoT) supported by its action plan. Correspondingly, an impressive system of several hundred indicators had already been specified, some of

which were regularly supported by measurements and statistics. Work pertaining to the iterative CoObs approach began directly with the observation model, notably on the definition of information services to steer SCoT actions (Lemoisson *et al.*, 2016).

Figure 34.2 illustrates an online multimodal information service for viewing the indicators. The image was obtained from a screenshot of the online platform, which was in its test phase at the time of writing. The service produces a set of indicators to gauge population pressures, urban sprawl and the instability of the environmental system. A set of alternate representation options (maps, diagrams, numeric charts, diachronic diagrams, etc.), which is linked to this generic nucleus and to a geographic layer management system, provides each category of users with the desired information in the form most useful to them.

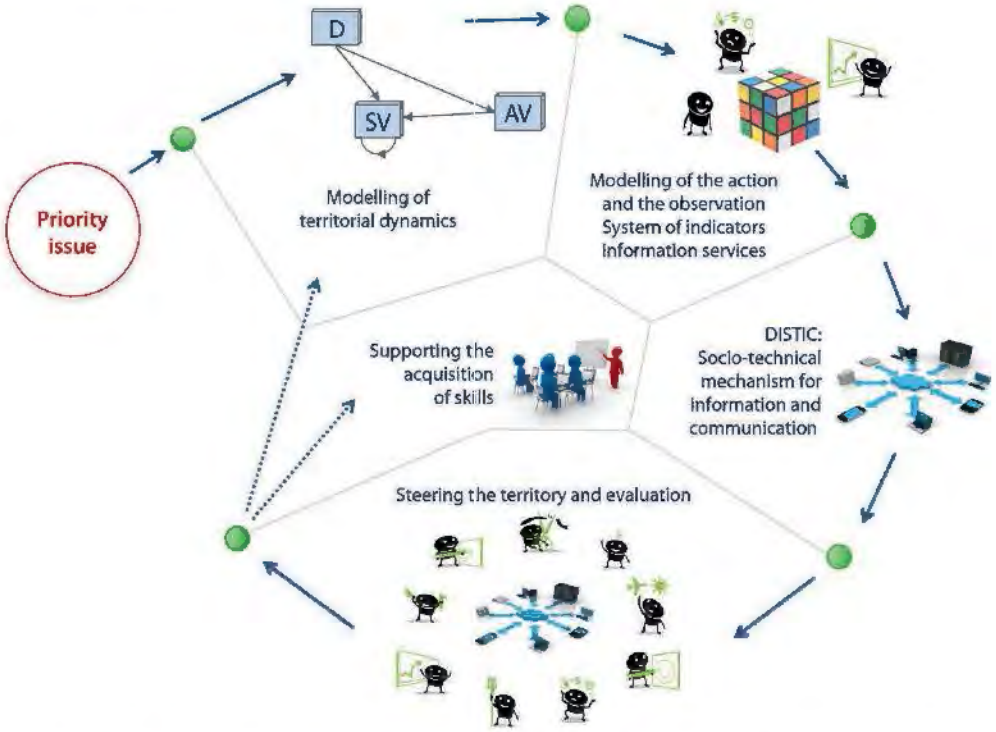

Figure 34.1. The construction of an observatory based on the CoObs approach.

Figure 34.2. Multimodal information service for displaying indicators.

In conclusion

Under the term 'territorial observatory', we have presented mechanisms in which a high-priority territorial issue is clearly identified, and a community of actors is actively addressing it, with the aim of building a permanent sustainable information system to monitor it. We presented the main points of a co-construction process, where the work on models precedes a socio-technical mechanism dedicated to the management of the action, illustrating them with two experiments at different stages of advancement.

It is too early to claim complete feedback on this approach as the observatories mentioned have not been evaluated yet. A first lesson to be learned concerns the 'time of collective action'. The process of designing, implementing and institutionalizing a territorial observatory is drawn out and takes place over several years.

The first experiment (observatory of water quality in the French West Indies) has reached its initial milestones. The presentation of the approach and the preliminary work have attracted a great deal of interest from the actors, but this does not necessarily mean they will have a lasting motivation to continue. Nevertheless, the need for tools to monitor the development of the territories is real, and the interest in collective learning through co-construction seems to encourage fruitful collaboration for the next steps.

The observatory of land use in the Bassin de Thau is an institutional observatory (since it is implemented by a territorial public organization of the lagoon) in a rapidly developing territory. It is at the deployment stage of the technical mechanism. The quality and efficiency of the technical mechanism, which must meet the needs of the partners, are essential here. Although it is too early to assess its relevance in supporting territorial development, the presentation of the technical mechanism to other territorial managers, notably in the Pays de Gâtine, has led to the idea of creating a 'user/contributor club' of the platform originally designed for the Bassin de Thau. It is a matter of joint investment on a software tool to handle any system of indicators. The partners of this club would then considerably shorten the time of the design-development cycle associated with the CoObs method. This would allow them to dedicate their energies entirely on the social and organizational mechanism that is at the heart of the territorial observatories. The whole approach will become more responsive to the emergence of new development challenges.

References

Académie des sciences, 2006. *Sciences et pays en développement : Afrique subsaharienne francophone.* Rapport sur la science et la technologie n° 21, Les Ulis, EDP sciences : available online: http://horizon.documentation.ird.fr/exl-doc/pleins_textes/divers16-04/010041184.pdf (retrieved 2 April 2017).

Brown J.S., Collins A., Duguid P., 1989. Situated Cognition and the Culture of Learning. *Educational Researcher*, 18 (1), 32-42.

Cattan P., Lesueur Jannoyer M., Andrieux P., Angeon V., Arnaud L., Blazy J.M., Bonnal V., Bricquet J.P., Charlier J.B., Colin F., Devault D., Ducreux L., Grünberger O., Lagadic L., Le Bail M.,

Macarie H., Rinaudo J.D., Samouelian A., Tonneau J.P., Voltz M., Woignier T., 2014. RIvAGE, un projet sur les pollutions agricoles aux Antilles et la gestion de la contamination par la chlordécone. *In: 3e rencontres nationales de la recherche sur les sites et sols pollués*, 18-19 November 2014, Paris, Ademe.

Charlier J.B., 2007. Fonctionnement et modélisation hydrologique d'un petit bassin versant cultivé en milieu volcanique tropical. Doctoral thesis, Montpellier, Université Montpellier II.

de Sède-Marceau M.H., Moine A., Thiam S., 2011. Le développement d'observatoires territoriaux, entre complexité et pragmatisme. *L'espace géographique*, 40 (2), 117-126.

Della Rossa P., Lesueur-Jannoyer M., Mottes C., Plet J., Baziz A., Arnaud L., Gentil C., 2014. Caractérisation et représentation des pressions dues aux pesticides agricoles : intérêts et limites de l'utilisation de l'indicateur de fréquence de traitement (IFT) en zone tropicale. Le cas du bassin de la rivière Pérou en Guadeloupe. Rapport de fin d'étude, Angers/Montpellier, École supérieure d'agriculture d'Angers/Institut des régions chaudes/SupAgro Montpellier.

Duran P., Thoenig J.C., 1996. L'État et la gestion publique territoriale. *Revue française de science politique*, 46 (4), 580-623.

Houdard M. 2005. Organisation spatiale des activités agricoles et pollution des eaux par les pesticides : modélisation appliquée au bassin-versant de la Capot, Martinique. Doctoral thesis, Université des Antilles et de la Guyane.

Lemoisson P., Passouant M., 2012. Un cadre pour la construction collaborative de connaissances lors de la conception d'un observatoire des pratiques territoriales. *Cahiers Agricultures*, 21 (1), 11-17.

Lemoisson P., Tonneau J.P., Maurel P., 2016. L'intelligence territoriale dans le bassin de Thau : un observatoire pour penser et piloter l'action. *In: Partenariats pour le développement territorial* (Torre A., Vollet D., eds.). Versailles, Éditions Quæ, Collection Update Sciences & technologies, 59-73.

Mottes C., Lesueur-Jannoyer M., Charlier J.B., Carles C., Guéné M., Le Bail M., Malézieux E., 2015. Hydrological and Pesticide Transfer Modeling in a Tropical Volcanic Watershed with the WATPPASS Model. *Journal of Hydrology*, 529 (3), 909-927.

Piron M., 1996. Systèmes d'information et observatoires en sciences sociales : quel impact sur les démarches de recherche ? *Cahier des sciences humaines*, 32 (4), 765-784.

Raimbault M., 2014. Diagnostic des pratiques phytosanitaires à l'échelle d'un bassin versant et pression potentielle sur la qualité de l'eau de rivière : cas du bassin versant du Galion, Martinique. rapport de master sciences et technologies du vivant et de l'environnement, Paris, AgroParisTech.

Tonneau J.P., Piraux M., Coudel E., 2011. Quelles innovations territoriales dans des territoires marginalisés au Nordeste du Brésil. *Cahiers Agricultures*, 20 (3), 235-240.