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Creating innovative sectors in a territory for deriving value from biomass: Valosorgho in Occitania, an ongoing project

Sophia Alami and Danièle Clavel

AN UNPRECEDENTED CHALLENGE

The use of sorghum biomass can form the basis of a potentially innovative sector that can generate economic value and employment in a territory. The ongoing project, Biomass For the Future (BFF)¹ (Inra, 2012-2019), is working on varietal and technological solutions for deriving value at an industrial scale from sorghum biomass. The strategic approach adopted, through the Valosorgho concept in Occitania, originates from a desire for the territorialization of the BFF project.

To this end, we adopt a pragmatic approach in which action fuels reflection, and conversely, in which a constant dialogue is maintained with the reality of the situation. The approach is all the more novel as the targeted territory (Occitania) is itself being formed within the context of the recent mergers of French administrative regions. Occitania is the leading sorghum producing French region. The sector's territorial anchoring is therefore essential, and its creation was the challenge entrusted to CIRAD in the form of a specific mission. This chapter presents our progress in this regard.

FROM THE 'BIOMASS FOR THE FUTURE' PROJECT TO VALOSORGHO

Numerous experiments have shown that technology and social processes must be considered together for an innovation to be sustainable. A partnership for innovation is thus based on the hybridization of knowledge and practices (Hatchuel, 1994), as well as on the co-production of knowledge.

1. BFF, <http://www.biomassforthefuture.org/> (retrieved 14 November 2016).

The proposed approach relies on a theoretical framework derived from pragmatic reflection and pertaining to management and sociology (Dumez, 2007; Callon, 2013). The principle is thus based on creating interactive partnerships at a territorial scale. However, no off-the-shelf method currently exists to form such partnerships. We have thus deployed a pragmatic and participatory method based on territorial engineering. The principles of the approach are: a transdisciplinary theoretical framework supporting a functionalist global vision (each segment having its own non-hierarchical function); deriving value from the action (in interaction with the 'theory'); and leveraging knowledge generated from the practice.

We use a model of interactive innovation that depends, starting from its conception, on the characteristics of the territory and the expertise of its actors. This 'open' innovation model is being promoted by the European Innovation Partnership (EIP) initiative, which advocates networking of actors as an enabling factor for the appropriation and sustainability of agricultural innovation (Centre d'étude et de prospective, 2013). Bottom-up, systemic (non-linear) and not centred on the transfer of any particular technology, the model takes into account the specific context and the contribution of different actors of the value chain through a socio-economic, territorialized and non-segmented vision. According to Leeuwis and Aarts (2011), it is this contribution in the form of a 'collective process' that guarantees successful changes of the scale of the innovation, in particular those that address territorial development issues.

Territorial engineering has consisted of creating an arbitrated and coordinated dynamic of actors that offers ample room for concertation between actors, also called 'territorial engineering chain' (Trognon, 2013). The function of innovation brokerage, as defined by the European Innovation Partnership, is crucial. It consists of implementing territorial engineering, through what has been described as 'acting together' (management, project administration, etc.), and through transparent and accurate documentation, facilitation, mediation, interpretation and building of links between different skills, know-how and scientific disciplines (Callon, 2013; Trognon, 2013).

This approach, whose current status is shown in Table 10.1, corresponds to an intervention framework called 'Valosorgho', recognized as a structuring project by the new Occitania administrative region. The network of actors concerned includes private companies, local authorities, decentralized State services, chambers of commerce and agriculture, cooperatives, research institutions and competitiveness clusters. The participatory process has led not only to the structuring of the value chain but also to the emergence of a shared rationale for promoting sorghum cultivation, based on global warming imperatives, especially water scarcity (Alami *et al.*, 2016).

DISSEMINATION AND APPLICATION OF THE VALOSORGHO MODEL

The proposed participatory model experiments with new research practices in which the quality of the multi-actor partnership is a key factor in terms of operability and evolution capacity, especially in the context of the agricultural sector. This capacity building renews territories (Torre and Wallet, 2013) by triggering collective

Table 10.1. Current status of the Valosorgho approach in Occitania.

Aims and objectives	Developments and achievements	Future perspectives
Analysis of the existing system of actors, specificities of the territory, opportunities, policies	Mapping of the actors' system and the innovation ecosystem Compilation of actor perceptions (40 interviews)	Emergence of a collective territorial intelligence: 'sorghum in Occitania'
Participation of actors	Building of a multi-actor network; co-construction of a common rationale and vision of the value chain	Value chain model 'sorghum in Occitania'
Institutional and political anchoring	Valosorgho is recognized as a structuring project for Occitania and is part of the regional innovation strategy ¹ in line with the orientations of Ademe (The French Environment and Energy Agency).	Support for the mobilization of regional funding (ERDF, etc.). Integration of pilot projects in the region: ClerVerts circular economy project in Lauragais
Academic and technical anchoring	Involvement of 15 laboratories and technical institutes; technical platforms	Joint response to calls for research and development projects (Ademe, etc.)
Anchoring of the innovation in the ecosystem	Association with competitiveness clusters and private companies	Labelling by the 'Agri Sud-Ouest Innovation' cluster
Structuring and activating the R&I process	Mobilizing funding for work on validation of technologies and technical itineraries ('proof of concept')	Submission to regional collaborative research and development calls (CFPs) Emergence of cost-effective value chain models Innovative agricultural production systems
Multi-actor network facilitation	Creation of an operational multi-actor group 'ValeurSorgho' that brings together 16 stakeholders	Recognition or labelling of the group of actors Raising funding for facilitation (e.g., rural development programme CFP ² 'Territorialized sectors'), etc.
Dissemination in Europe	Poster presented at the 1st European Sorghum Congress (Bucharest, November 2016)	Participation in the 1st European Sorghum Congress (Bucharest, November 2016); constitution of a focus group, response to CFP H2020 'Thematic Network'
Dissemination at the international level and in countries of the Global South	Presentation of the Valosorgho approach at the Global Conference on Agricultural Research for Development ³ (Theme: 'Scaling up from research to impact')	Expansion of the model in countries of the Global South, in particular in Africa: a new CIRAD-led collective action for anchoring research in interactive innovation systems Dissemination of the approach <i>via</i> the Biosorg ⁴ project, DP IAVAO ⁵ and inter-African programmes

1. Regional innovation strategy (European policy priorities in the region).

2. Rural development programme financed by the European Agricultural Fund for Rural Development (EAFRD).

3. Global Conference on Agricultural Research for Development, 3rd Global Forum on Agricultural Research (GFAR), Johannesburg, April 2016.

4. 'Gaining mastery over sorghum-based food products', Agropolis foundation, involving the Institute of Rural Economy (IER) in Mali as a partner.

5. Mechanism for research in partnership of CIRAD 'Innovation and Varietal Improvement in West Africa'.

intelligence as well as various achievements. In this process, it is no longer a matter of technology transfer but a matter of collectively built territorial, cognitive and disciplinary integration.

The approach and the methodological reflection go well beyond the framework of Valosorgho in Occitania. Research conducted must benefit partners from the countries of the Global South, i.e., situated in their contexts and adapted to their specific constraints. The implementation of such innovation platforms is on the agenda in Africa, for example in the Comprehensive Africa Agriculture Development Programme (CAADP), which has been implementing multi-actor partnership platforms for several years. CIRAD's system of research in partnership in countries of the Global South also provides excellent platforms to implement and share this approach that combines experimentation and learning in a territory to support the emergence of innovations in the agrifood sector at the same time as encouraging social transformations.

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