

## Summary of the *in itinere* case study « Recycling organic waste in Réunion »

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### I-The innovation story

Various economic activities in Réunion generate increasingly important amounts of organic waste the disposal of which constitutes a source of environmental risks as well as an obstacle to the development of the sectors concerned. Main waste sources are livestock manure, green waste, waste water sludge and sugar industry waste. CIRAD has been working on organic waste recycling in Réunion for nearly 20 years. The progressive enforcement of French environmental policies designed to regulate these problems proves unable to avoid conflict.

Local knowledge and legitimacy built up over the years allowed for setting up the Girovar project in 2010, implemented from 2011 to 2014 by a team of 7 organizations among which the federation of municipalities and the chamber of agriculture. The project was structured around a concertation process at the scale of a region of 5 municipalities – 180.000 inhabitants – covering the western quarter of the island. The aim of the concertation was to explore plausible solutions for regional level organic waste management by means of a value chain transforming waste into fertilizer adapted to local farming constraints and requirements. Outcomes of this process continue to emerge in 2016.

The innovation process was triggered by two interrelated elements: a set of co-designed recycling scenarios and the implementation of a multi-actor and multi-scale concertation process aiming both at codesigning of the scenarios and generating innovation through spillover effects.

### Girovar

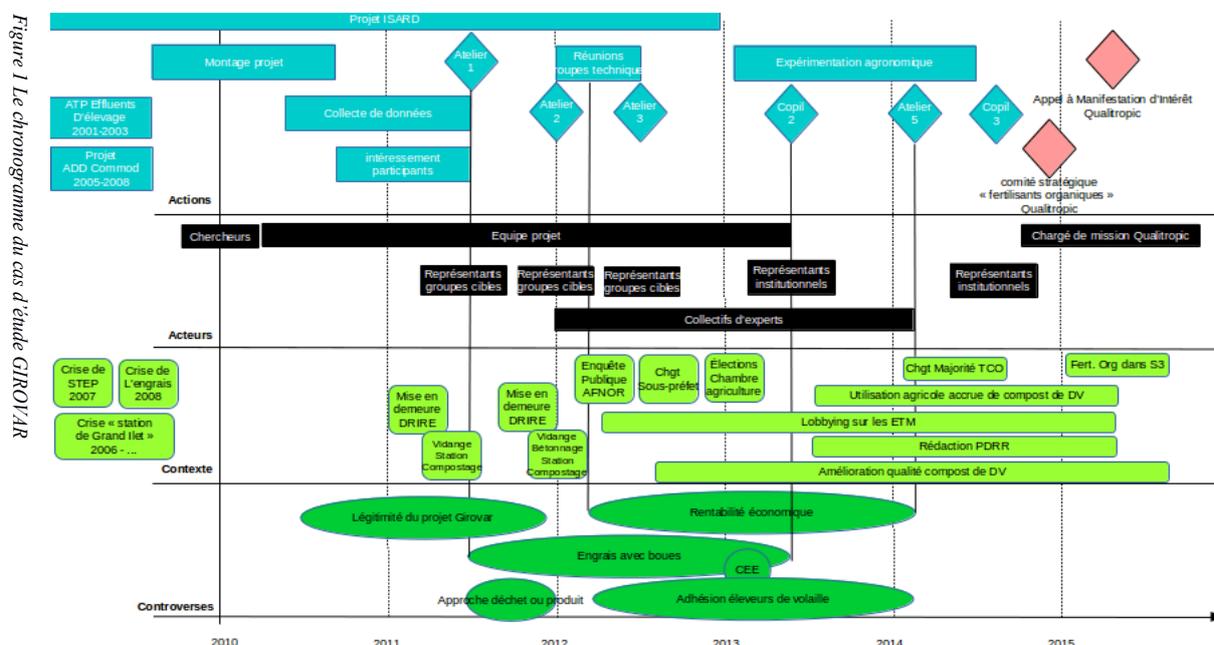


Figure 1- Timeline

From 2010 to 2011 the activities focused on setting up the project, the building of a broad partnership and conducting a multidisciplinary series of analyses of the region at hand. Through a range of means the latter covered agronomic, technological, geographical, environmental and sociological dimensions.

The 2011 to 2013 period constituted the core concertation phase via a 3-level process of participatory workshops, technical focus groups and steering committees. that process successively addressed the initial situation, potential solutions, suitable target products, processing chains to manufacture them, scenarios of the simultaneous implementation of these processing chains and the profitability of the proposed facilities.

From 2011 onwards a series of changes emerge in parallel to the concertation process that are related to the topic addressed: the renovation of the green waste composting plant of the federation of municipalities, a more strictly industry-controlled sugar filter cake recycling chain, the generalization of legal manure spreading plans for all livestock farmers, the reaffirming by the general council of green waste composting as a component of its strategic orientation, lobbying by a coalition of parties with coinciding interests aiming to adjust legal thresholds for nickel and chrome levels in organic fertilizer and soil improvers to local geologic conditions.

At the end of the project in 2014 further changes are observed that aim to address organic waste recycling. They were issued by entities that had been more or less closely

involved in the codesign process. The main tangible changes are the following: Two new agricultural policy subsidy schemes aim to favor (1) the construction of cooperative waste treatment plants and (2) the substitution of mineral with organic fertilizer; the business cluster Qualitropic and the technologie transfer network Fertilizing & Environment take on the issue, respectively by calling for action by the Réunion industrial sector and by providing a platform for communicating results at national level.

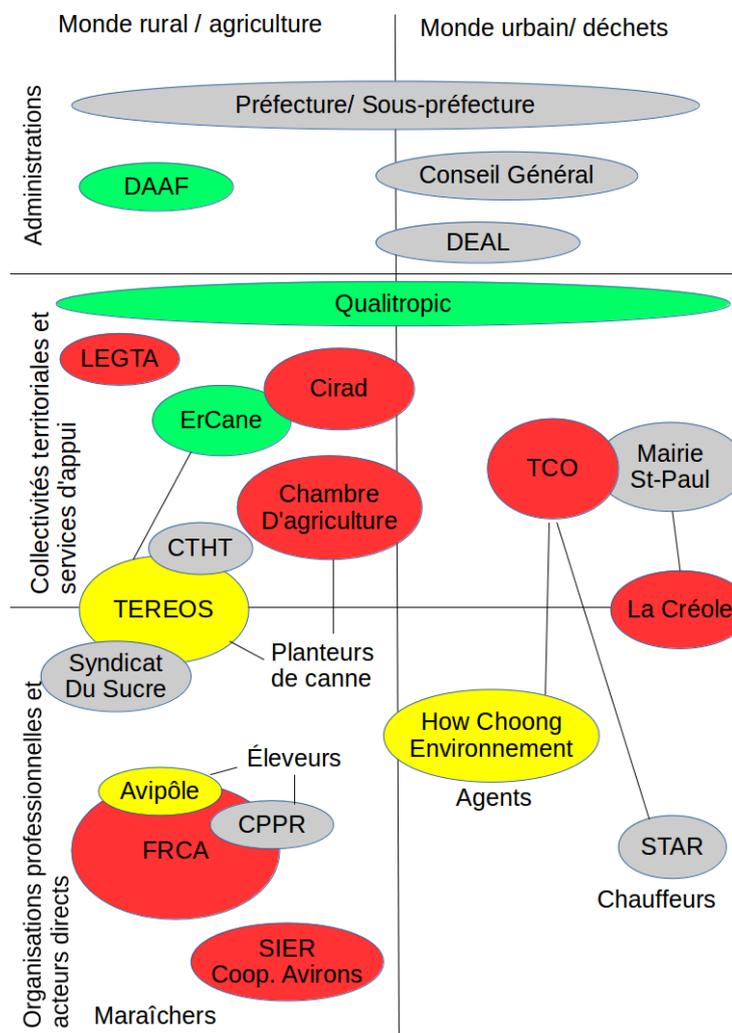


Figure 1 Le sociogramme du cas d'étude GIROVAR

## II- Lessons from the analysis of the impact pathway

The analysis of the project allows establishing a list of outputs directly attributable to the activities of the researchers and their partners during the implementation of the project, and a list of changes (outcomes and/or impacts) that have occurred locally during the project's implementation or shortly after. Concorcing indices allow identifying a number of causal links between on the one hand various combinations of outputs produced by the project and exogenous dynamics, and on the other hand certain recorded outcomes/impacts.

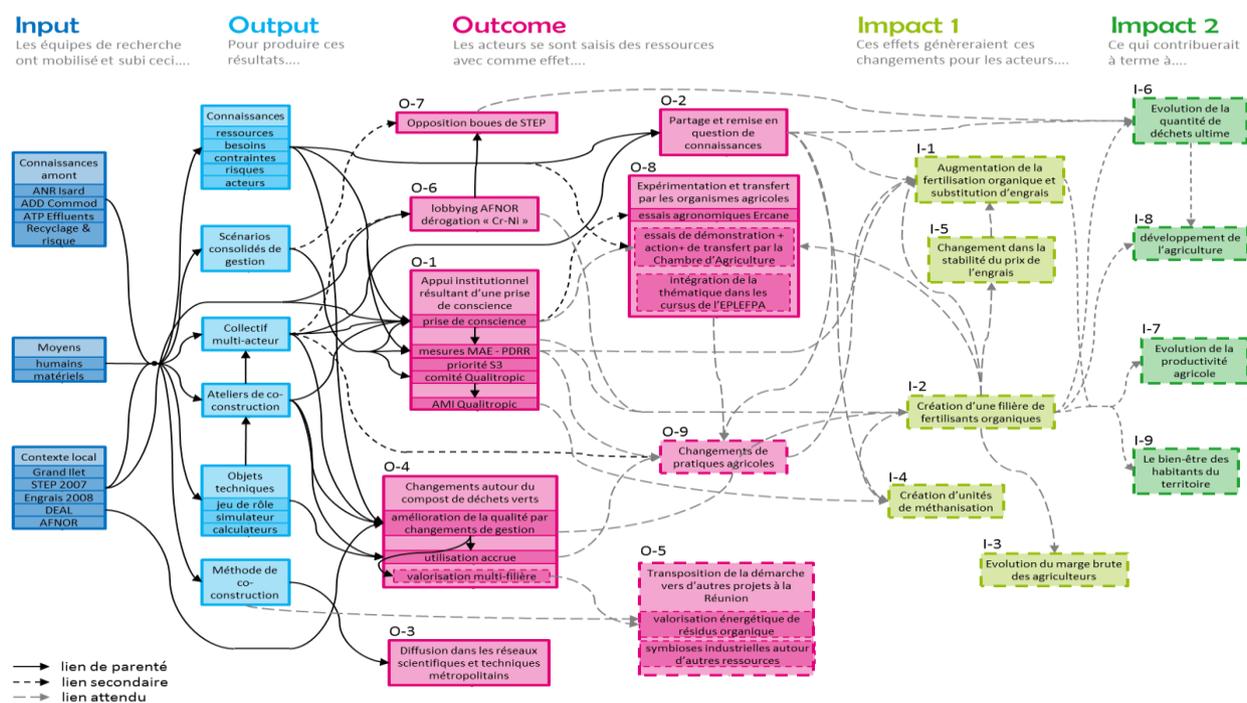


Figure 3-The impact pathway of the Girovar process. in itinere (2015)-original version

Among the outputs that played a decisive role, we note

- the codesign process and network – the concertation arenas – that progressively built-up, reinforced and broadened “awareness”: a paradigm shift that can be traced back to the initial plausible promise. The discourse disseminated is composed of a problem legitimized as important and of general interest – the “wasting” of organic matter as induced by current practice – and a technical solution seen as credible end pertinent: the processing of organic waste into standard abiding fertilizers and soil improvers. The dissemination of this discourse appears to occur both at the level of directly concerned operational actors (farmers, industry operators) and that of those indirectly concerned (public services, technical support services, research);
- the production of formal knowledge, the reduction of uncertainties related to the effects of organic waste recycling, and peer to peer knowledge exchange contribute to capacity building at the level of workshop participants. A series of technical objects accompany this knowledge dissemination (powerpoints, technical reports, scenarios, simulators, role playing games)
- the codesign exercises also appear to facilitate exchange between actors of different levels (national and local authorities, industry management, farmers) united in a multi-stakeholder group the lead of which was transferred to Qualitropic allowing it to continue beyond the project.

At the end of the actively facilitated codesign process the project did – in the absence of a self-identified project developer – not immediately result in the operational implementation of a scenario, apart from an industrial project constituting a first step. The participatory analysis underscores the key role played by the effects resulting from the awareness building in the subsequent innovation process. Among other effects, such a lesson constitutes an incentive for partners to increase the attention dedicated to communication and information dissemination, in the case at hand and even more so similar new initiatives.

### III- How will the expected impacts be reached? What type of monitoring (role of indicators?)

#### III-1 The expected scenario for evolving from outcomes to impacts

The following prospective scenarios result from bilateral interviews with various resource persons in the region. Due to the exiguity of the region these individuals had already been more or less closely involved in the Girovar project. A participatory impact assessment workshop was little successful. The full-time presence of Cirad scientists in the field allowed on the contrary deepening the exploration of expectations, to triangulate the results obtained and to assess the credibility of the resulting scenarios.

A first lever for action is the deployment of significant institutional support and a combination of instruments. This includes the following currently partly or fully effective outcomes: Qualitropic's Strategic Committee on "biofertilizers", its launch of a call for proposals, the inclusion of this "innovative activity" in the strategy S2 of the regional council, training and demonstration activities of the Chamber of Agriculture and the agricultural technical school, and good environmental practice incentives for farmers, all of which converges toward a common goal of creating new organic waste recycling plants to produce standardized fertilizers.

A second lever for action is the questioning of scientific and vernacular knowledge and logic as initiated by the project. CIRAD and eRcane have already initiated new research programs for organic fertilization of sugarcane. At the field level, increasing interest in organic fertilization, actively pursued by the Chamber of Agriculture and EPLEFPA, could result in individual experiments of organic fertilizers by various entrepreneurial farmers.

The development of demand and incentives could in a second phase contribute to convince entrepreneurs to engage in the importation and local production of organic fertilizers. On the island, several initiatives and projects have already been identified: TCO green waste compost of improved quality, a co-composting unit combining green waste and sewage sludge in St Paul, the co-composting of green waste and cattle manure by JPP, a vinasse-based organo-mineral fertilizers production unit on the northern side of the island, several poultry manure granulation units.

#### III-2 What possibilities for monitoring integrating indicators per type of impact?

Impacts level 1	Indicators
Increasing organic fertilisation	Sales figures of local and imported fertilizer (quantity and cost) Practice change indicator, based on the fertilized UAA
Implementing of an organic fertilizer production chain	the number of production facilities for organic standard abiding fertilizers the amount of input material managed by these stations, distributed by origin the employment created by these facilities (and their supply services if applicable)
A change in gross margin obtained by farmers	improving gross margins of farmers
The construction of anaerobic digestion units	
An increasing stability of fertilizer prices	comparison of statistical indicators of temporal variation of sale prices
Impact level 2	
Evolution of the quantity of final waste	data from the quantitative monitoring of waste streams provided by the "waste observatory" the reducing flow of final waste
Evolution of agricultural productivity	Indicators of soil quality Increased productivity New products user satisfaction through farmer surveys
The development of agriculture	the expansion of pig and poultry farms an increasing ratio of livestock production vs. the UAA included in legal manure broadcasting schemes the increase in agricultural production certified as "organic" at the level of Réunion
The well-being of the region's inhabitants	changing/improving water quality at withdrawal points changing/decreasing exposure of rural residents to (olfactory) nuisance