

## **Governance of circular economy transitions in the agri-food sector: from conceptual frames to the action**

### **The case of Reunion island**

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### **Rethinking and reconfiguring food production and consumption**

#### **Short abstract**

Our study aims to propose and test an original conceptual frame to analyse the governance of circular economy (CE) transitions in the agri-food sector. It is based on three main dimensions (*ideal, material and institutional*) and was tested in the context of Reunion Island, where resources are scarce and the interdependence between uses very strong. Our field research was carried out in 3 steps: stakeholders' mapping, individual interviews and collective thematic workshops. From May to July 2023, we carried out 44 interviews of stakeholders from agri-food sector (farmers, cooperatives, public agencies, etc). The content was analysed in view of the 3 above mentioned dimensions. To confirm, correct and complete our analysis, we organized a full-day workshop with 25 stakeholders. Analysis revealed that there is no shared frame about the CE. Rethink, Reduce, Reconvert and Reuse were in descending order the most cited R principles. We identified 40 initiatives classified in 3 CE strategies: replacing imported material by local material sourcing or more renewable material, replacing imported food by increasing the consumption of local products, promoting organic matter recycling and recovery. Our study also shows that even if agri-food sector stakeholders' do not directly link institutional measures to a specific support to CE strategies, public agencies, policies and territorial authorities play an important role on the governance of the CE transitions. They provide funds for the projects, work for coordination between actors and promote CE transitions through individual or collective CE strategies. Finally, the stakeholders state that the concept of CE is vague and not adapted to the agri-food sector. Moreover, they criticized the lack of adapted references of directives to the local context and call for the construction of a shared frame to define and develop CE transitions in the agri-food sector.

#### **1. Purpose**

Circular economy (CE) is a concept that is gaining an increasingly important place in public policies at the European (e.g. The Europe Action Plan for the Circular Economy as part of the European Green Deal, 2020) and national levels (eg. In France *Loi Garot*, 2016). Even if the evidence remains vague (Giampetro and Funtowicz, 2020), the promise of reducing environmental impacts and contributing to economic development through circularity seems to appeal agri-food sector stakeholders' attention (Leipold et al., 2021). Consequently, we observe collective and individual initiatives emerging at different scales of agri-food sector (suppliers, farmers, local authorities, etc.).

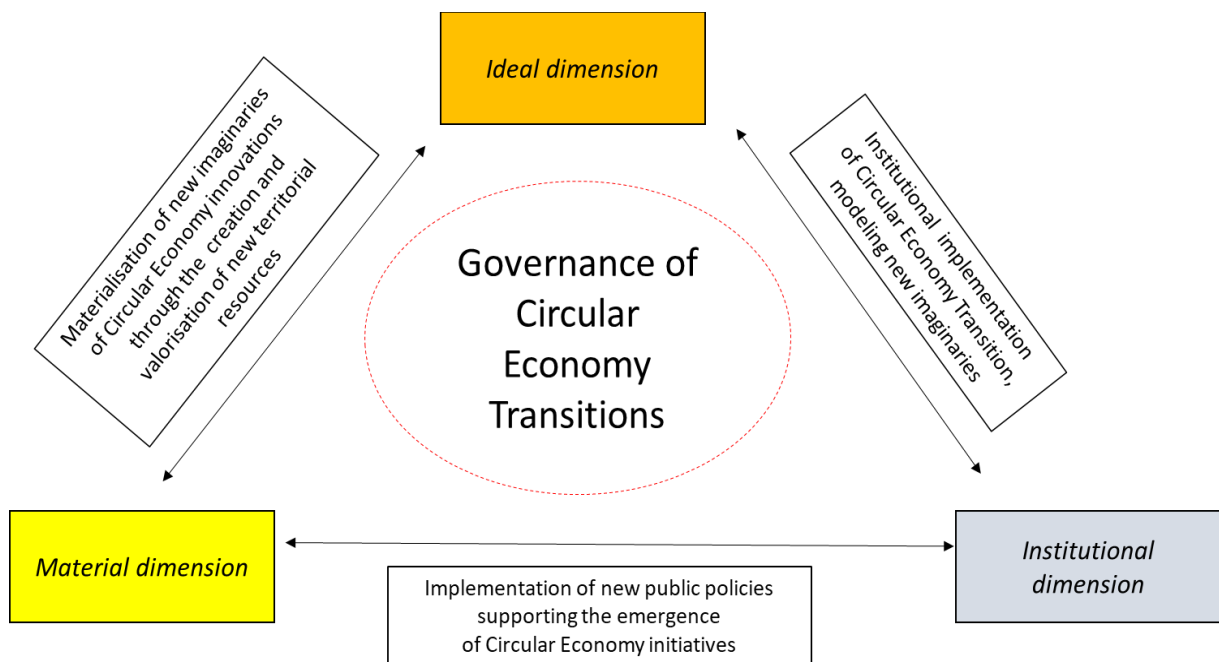
CE initiatives face different governance issues related to internal organizational specificities and to external coordination between actors. Governance issues related to the coordination between actors in the sharing of resources at territorial level can sometimes be conflicting. This is even more true in

island agri-food sector, such as Reunion, where resources are scarce and the interdependence between uses very strong (Kleinpeter et al., 2023).

Furthermore, population and urbanization growth reinforce the pressure in scarce local resources (Russeil et al., 2023). Our study therefore aims to propose and test an original conceptual frame to analyse the governance of CE transitions in the agri-food sector. We also provide practical insights about the governance of the transition to a CE through an analysis of emerging initiatives in the Reunion Island agri-food sector.

## 2. Design

Inspired by transition's studies, mainly Pachoud et al. (2022), and in circular economy literature, we propose and test an original conceptual frame to analyse the governance of CE transitions through three main dimensions (Figure 1):



**Figure 1: Analytical framework of the governance of circular economy transitions**

(Source: Adapted from Pachoud et al., 2022).

(i) the *ideal* dimension reflecting actors' beliefs, representations and comprehensions. Here we focused on the better understanding of stakeholders' CE conceptual frames through the lens of "9R principles" (Potting et al., 2017; Kirchherr et al., 2017): Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle and Recover.

(ii) the *material* dimension concerning local material and intangible innovations which directly or indirectly integrate the circular flows of natural resources to meet stakeholders' needs.

(iii) the third so-called *institutional* dimension includes public policies represented by the directives to follow and the rules to respect in both national and specific territorial contexts. Furthermore, this dimension also includes informal norms.

Three main steps guided our field research: stakeholders' mapping, individual interviews and collective thematic workshops. First, we carried out a pre-mapping of the players in the agri-food sector based on previous research work carried out with numerous stakeholders of the agri-food

sector. Then, we bring together 8 researchers, and use the collective intelligence to identify the main stakeholders in the agri-food sector carrying out innovative circular economy projects. The stakeholders' mapping step allowed us to identify a diversity of agri-food sector actors to be interviewed. The resources considered were biomass from agriculture or recoverable in agriculture: whether sugar cane straw which can be used for animal feed or burned to produce electricity, livestock effluents used for soil fertilization or potentially for methanization, wood chips used as animal bedding or burned to produce electricity, green waste used for composting or as mulch for market gardening.

Second step, from May to July 2023 we carried out 44 semi-structured interviews with a variety of stakeholders from Reunions' agri-food sector: farmers, organized civil society, cooperatives, public agencies, agricultural suppliers, interprofessional structures, farmers' and cooperatives' unions, local authorities, agri-food consultancies and advisory organizations, agri-food industries, research and development agencies, waste treatment organizations, energy producers and supermarkets. The interviews ranging from 1:30 to 2 hours. We fully transcript the interviews and realized a thematic analysis of its content based in the three above mentioned dimensions: *ideal*, *material* and *institutional*.

Third, we organized a full-day workshop with a team of 8 trained facilitators and 25 stakeholders divided in 4 thematic groups. The main objectives of the workshop were to confirm, correct and complete our analysis of governance dimensions related to CE transitions in the agri-food sector. The workshops also aim to identify and debate the main levers to unlock governance issues of CE initiatives in the agri-food sector.

### 3. Findings

First, considering the *ideal* dimension, stakeholders discourses analysis revealed that there is no shared frame about the CE in the agri-food sector. "Rethink" was the most cited R principle and was mainly associated with local consumption of resources but also coordination, reorganization of actors among themselves. Then, "Reduce", "Reconvert" and "Reuse" were respectively the most cited R principles. Moreover, they believe that there is a lack of skilled jobs and structured channels to recycling and recovery materials channels limiting CE implementation (e.g. According to ADEME, 2018, more than 27,000 tons of waste per year were sent to Europe and India).

Second, related to the *material* dimension of the CE, we identified 40 emergent initiatives that directly or indirectly integrate the circular flows of natural resources to meet stakeholders' needs. We identify 3 CE strategies:

- (1) replacing imported material by local material sourcing or more renewable material (eg. Biodegradable mulch; bedding the animals with local products; using local biomass instead of imported coal to energy production, implementation of local hatchery to avoid chick imports, collectivising forage production and storage to better use local biomasses and avoid imports of forage, etc).
- (2) replacing imported food by increasing the consumption of local products (e.g. territorial planning for scholar canteens food supply, increasing consumers' accessibility of local animal products through special subsidies and taxes mechanisms allowing reduction of prices, etc.).
- (3) promoting organic matter recycling and recovery (e.g. implementation of biogas unit, creation of composting units and multi-actors exchange groups to develop organic matter recycling, etc.).

Third, related to the institutional dimension, as mentioned above, CE policies are growing fast at European and National levels. However, the stakeholders state that the concept of CE, as presented in this public policy, is vague and not adapted to the agri-food sector. That is the case for the FREC "The roadmap for the circular economy" (DEAL, 2021) developed in the Reunion Island. That is basically a

declination of the European Green Deal Policy coordinated by the local Department of Environment, Planning and Housing (DEAL). The FREC establishes more than 50 measures and few objectives to be reached to 2030, but only one measure considers local biomasses. Furthermore, according to interviewees, this roadmap did not sufficiently consult agri-food stakeholders.

However, even if agri-food sector stakeholders' do not directly link institutional measures to a specific support to CE strategies, our study shows that public agencies, policies and territorial authorities (the Reunion Island Region and Department authorities) are important in the governance of CE transitions. The institutions are not only providing funds for the projects, but also playing a role in the coordination of CE transitions through individual or collective CE strategies.

The CE strategy 1 seems to be mainly supported by public research players (e.g. through the Inventory of available biomasses and identification of potential new uses) and delocalized local public agencies (e.g. Agency for the Environment and Energy Management, Regional Direction of Agriculture and Forestry) thanks to public policies to promote energy or ecological transitions. They can also be initiated by individuals' private actors or their collective action. The CE strategy 2 seems to be mainly supported by territorial authorities (The Reunion island Region and Department authorities) in line with the local structured cooperatives and retailers to promote local food supply with affordable prices. The CE strategy 3 is mainly led by the waste treatment actors and we observe both public and private initiatives. These initiatives can be coordinated by local authorities like in the case of a consortium of municipalities for green waste treatment. Or still public initiatives, led for instance by the Regional Direction of Agriculture and Forestry, for the creation and coordination of multi-actor arenas to exchange and find out common solutions avoid water and soil contamination through adapted agricultural organic matter recycling. We also observe, individual emerging initiatives like on-farm effluent composting or the implementation of biogas units that can be funded by local authorities.

Finally, the interviewees also criticized the lack of adapted references of directives and laws to the local context. This seems to be the case of livestock effluents spreading regulations<sup>1</sup>. According to certain stakeholders, this law is adapted neither to the pedoclimatic conditions of the island nor to the structures of the farms (small size, intensive indoor breeding). They also mentioned the difficulty of implementing alternative solutions that are often too expensive (composting platform mechanization). The regulatory complexity and rigidity also seem to be slowing down the implementation of solutions.

#### **4. Practical Implications**

In the island context, such as the Reunion, where resources are limited and ecosystems are fragile, the adoption of CE principles in the agri-food is perceived as a mean to replacing imported material by local material sourcing or more renewable material, replacing imported food by increasing the consumption of local products, promoting organic matter recycling and recovery. Moreover, CE strategies are perceived as a mean to stimulating local economy through the creation of new jobs. By individual and collective initiatives, supported or not by public policies and regulations, agri-food sector stakeholders try to implement the transitions to a CE.

Moreover, institutional support to individual or collective strategies does not seem to provide any guarantee on the success of CE initiatives (and even when many actors are on board). CE transitions in the agri-food sector seem to face many governance issues. These governance issues were mainly associated to the low interest in collective actions, public administration obstacles as well as the lack of dialogue between actors, potentially due to historical tensions. Governance issues were largely related to the establishment of socio-technical lock-ins, which sometimes lead to projects being abandoned. Conversely, when the CE is based on regulatory issues and strategies are funded the

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<sup>1</sup> Breed authorization conditioned to a validation by government control agencies of a farm effluents management plan

projects seems to have more chance to succeed. For private actors' strategies, it seems that more than public fund the existence or creation of a market seems an important key to the success.

However, the interviewees also mentioned levers to unlock governance issues of CE initiatives in the agri-food sector. The local construction of a shared frame to define and develop CE in the agri-food sector seems to be a first step. The adoption of a territorial frame of reference with local agri-food actors would be important for the development of a genuine territorial circular economy. It can be done through a territorial planification process where the stakeholders and civil society can participate without an oriented circular use of biomasses like in the case of Regional Biomass Plan resulting from the National Strategy Biomass for energy production (Decree No. 2016-1134 of August 19, 2016).

## 5. Theoretical Implications

The literature on the governance of CE transitions in the agri-food sector is under developed. This lack of adapted references encouraged us to draw a conceptual framework adapted to the agri-food sector, inspired by the work on governance of territorial transitions developed by Pachoud et al., (2022) and the literature on CE. The proposed framework allowed us to carry out a relevant diagnosis on the three dimensions of governance (ideal, material and institutional) impacting transitions. However, this work remains unfinished and deserves to be further developed to better integrate certain specificities of the diversity of transitions in the sector. Furthermore, the construction of an adapted definition of the circular economy in the agri-food sector seems to us to be a good starting point. Indeed, this concept, well developed and integrated in the industrial sector, is still unknown and vague for actors in the agri-food sector.

The three main steps guiding our study (stakeholders' mapping, individual interviews and collective thematic workshops) also seems relevant for the study of governance of CE transitions in the agri-food sector. Starting with a collective stakeholders mapping allow us to enlarge our perspective of actors and to identify the suitable interview contacts. The following steps allow us to identify, to confirm, correct and complete the collected information. Furthermore, we also were able to analyse and debate how the dimensions composing the governance of CE transitions can encourage or lock the development of CE initiatives in the agri-food sector. Otherwise, we also identified and debated the main levers to unlock CE initiatives and enlarge the perspective of the development of a CE transition at the regional level.

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