

A quest to a self-sufficient and
sustainable local food system: a case
study of Reunion Island



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Abstract

The COVID-19 pandemic revealed the underlying weaknesses of conventional food systems and the associated risks in terms of food security in Overseas Countries and Territories. This study establishes a comparative case study of local citizen-initiatives aiming to contribute to a more sustainable and self-sufficient local food system in Reunion Island. Local Sustainable Initiatives (LSIs) and their current food system are analyzed, as well as their interaction with institutions, using a model developed on the basis of theoretical insights. Institutional policies and subsidies promoting these types of initiatives were gathered through a content review, while in-depth semi-structured interviews were conducted with members of three initiatives. Results show that LSIs are embedded in a wider mentality shift and aim to accumulate production across initiatives to create food security at an island scale. Lastly, although some subsidies are available, the LSIs remain wary of the meddling of institutions with their work.

Keywords: case study, citizen-led initiative, self-sufficient, sustainable, food system, Reunion Island

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1. Introduction

1.1 Background

The conventional industrialized food system, boosted by the agricultural revolution that followed the Second World War- the Green Revolution- relies on “highly productive crops [to] meet global demand, and [...] rely on food distribution network” (Mendez et al., 2021). However, in 2019, the COVID-19 pandemic revealed the underlying weaknesses of our conventional food system and the associated risks in terms of food security. The mechanism on which this system relies is stark disparities between places where food is abundant and accessible and places where food is lacking and hard to get (Leitheiser et al., 2020). Motivated by the negative externalities, communities over the world gather to imagine alternative food systems, aiming to tackle the blind spots of our conventional system: inclusivity, sustainability and resilience (Mendez et al., 2021).

1.2 Research problem

While the vulnerability of small islands in the face of climate change has been widely recognize (Nurse et al., 2014), Outermost Regions and Overseas Countries and Territories, because of their link to, and economic dependence on, central governments, have been somewhat neglected. However, these islands are vulnerable to climate change to a similar degree as small island states. Furthermore, the particular context of islands requires a tailored approach to climate change adaptation (CCA) (Kelman et al., 2013; Hernandez et al., 2018), from which learnings can be transferred to non-islands settings (Kelman et al., 2013). The dissatisfaction with the dominant model and their inability to respond to social needs, especially in terms of CCA, can trigger the emergence of citizen-initiatives (da Silvia et al., 2018). Moreover, citizen-initiatives, because of their “informality”, are flexible and are able to combine different interests and visions (Pesch et al., 2017).

This study investigates the role of citizen initiatives and their potential as a catalyst for larger societal changes, based on the example from Reunion Island, hereafter referred to as Reunion. This tropical 2 500 km² island lies in the western Indian Ocean and is a French Overseas Department. In 2018, its population was 855 961 inhabitants (Populations Légales 2018 – Site de Secours Insee.fr), but is expected to reach 1 061 000 inhabitants by 2040 (INSEE). Regional planning tools in Reunion are experimenting with CCA strategies to reduce the vulnerability

of the population and infrastructures, related to the risks of sea-level rise, storm-surges, floods and heat-island effects. However, these tools mostly focus on urban areas (Ribalaygua et al., 2019) and the threat to food security has been neglected until now.

Embedded in the conventional industrialized food system, its economy relies heavily on the production of sugarcane. In 2019, 1,72 million tons were produced, which amounts to 31.4% of the total production of local agricultural goods and 20% of the island's total export (raw and transformed). As a consequence, Reunion imports 31% of its non-durable goods, including food. The geographic distance nature of Reunion to food-exporting nations reinforces the risk of scarcity of available food for everyone. Indeed, only 4% of imports come from proximate territories like Africa or other Indian Ocean islands, and 91% from the EU and Asia (INSEE, 2020). Furthermore, this department has the highest incidence of people living below the poverty threshold of France (38.9% in 2018; INSEE, 2018), while the costs of living is higher than in mainland France. Actions are thus needed to improve food security for the island in the face of global uncertainties.

This study aims to answer the following research question:

“How are citizen-led initiatives contributing to the development of a self-sufficient and sustainable local food system in Reunion?”

The following questions that ensue from the main research question are:

1. How are the citizen-led initiatives organized?
2. What are the ambitions of the citizen-led initiatives?
3. What is the status of their food system?
4. What are the current policies that support the establishment of such initiatives?
5. How do the citizen-led initiatives relate to current institutions?

1.3 Structure

The report is divided into 6 chapters. Chapter 1 presents the context and the questions that will be addressed. Chapter 2 elaborates on relevant theories and develops a framework for the research. Chapter 3 explains the methodology. Chapter 4 presents the findings that are discussed in chapter 5. Chapter 6 recapitulates the main research points and conclusions.

2. Theoretical framework

2.1 Citizen initiatives

This research builds upon the theoretical models of Pesch et al. (2019) and Soares da Silva et al. (2018) in order to establish a framework to analyze citizen initiatives.

Pesch et al. (2019) define Local Sustainability Initiatives (LSIs) as actions led by a local community that aims to explore social and economic practices that are different from the dominant, institutional system. The given framework offers a two-perspective approach of LSIs. Firstly, LSIs are a place of sociotechnical innovations. Due to their bureaucratic freedom, LSIs can develop new technologies, integrate existing technology, and engage in social innovation. Social innovation engages solely with social bodies such as economic models, culture. These innovations are then diffused in various ways: replication through a network of activists, scaling up that brings the concept to a broader audience or the niche-to-regime translation through structural changes made by institutions (Boyer, 2015). Secondly, civic engagement is defined as a way for civil society to self-organize and pursue a common set of goals. Pesch et al. (2019) distinguish three types: civic engagement that brings additional capital and supports the existing social and institutional system, an activist engagement that aims to criticize existing patterns and practices, and an engagement that brings capital usually provided by the public or private sector.

Furthermore, the institutional context in which these LSIs are embedded is precursory to their success. The interaction between government institutions and citizens initiatives, when successful, has the potential to shape places that are more sustainable in terms of ecological, social and economic factors, but is also more likely to shape future interactions and relations between institutions and citizens at large (Soares da Silva et al., 2018). The model (Figure 1) is adapted; elements of local institutions (policies and subsidies), citizens which are replaced by citizen-initiatives, as well as their interactions as a tool to shape a food system are integrated in the present study's conceptual model.

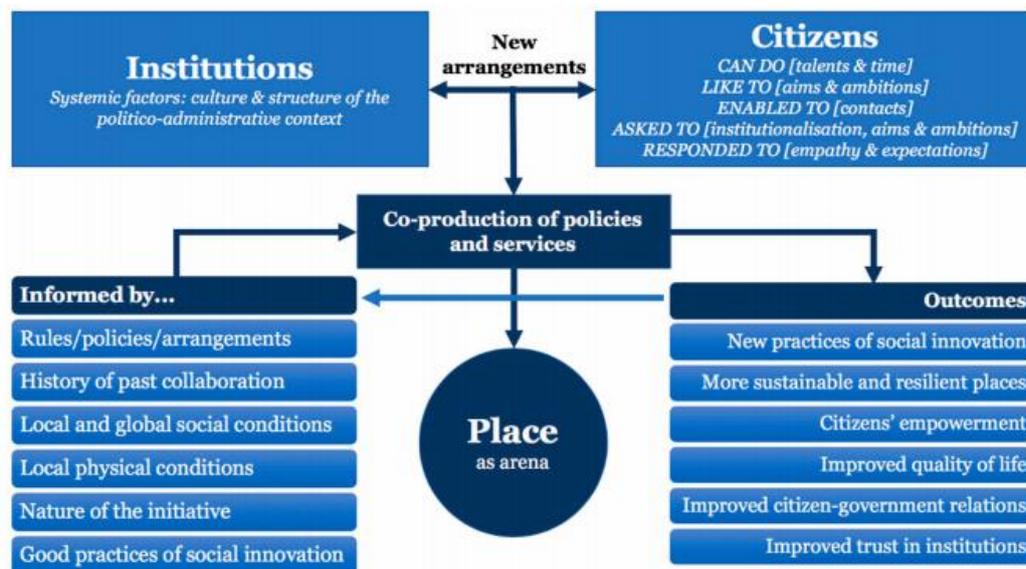


Figure 1: PLaCi: Conceptual model of citizen initiatives and their role in shaping sustainable places (Soares da Silva et al., 2018, 252).

2.2 The food system

Food Systems are traditionally referring to the activities of food production, processing and packaging, distribution and retailing, and consumption (Ericksen, 2008). The definition was later extended to associated waste management (Pothukuchi et al., 2000; Ericksen, 2008) and the “associated regulatory institutions and activities” (Pothukuchi et al., 2000).

Furthermore, food systems are embedded in a wider network of interactions with “biogeophysical and human environments” (Ericksen, 2008). In that way, climate change and sustainability are intrinsic elements of food systems.

Although the local food movement often reduces the success of alternative food systems to the minimum food mile achievable (Cleveland et al., 2014), the concept of local food in this study is essential for a sustainable food system. Indeed, situated in the middle of the Indian Ocean, Reunion is highly dependent on food import and thus long-haul transportation. The associated negative externalities of these hauls include financial costs, embedded CO2 emissions, and vulnerability to external shocks (e.g. increase in food prices). The food system in Reunion is thus highly dependent on spatial scale and food miles are necessary for food safety and food self-reliance (Cleveland et al., 2014). However, the general goal to consume “local” is not sufficient to promote effective actions and policies (Cleveland et al., 2014); citizen-initiatives should decide on adequate indicators to monitor their progress towards

their goals. This study uses self-sufficiency as an additional indicator of an alternative food system.

Food self-sufficiency is used to refer to the “extent to which a country can satisfy its food needs from its own domestic production” and has the ability to protect countries in the case of a disruption in the international supply by increasing their own food supply (FAO, 1996). Clapp (2017) develops that self-sufficiency can be understood as the “ratio of food produced to food consumed” (Figure 2). In this way, the production of food is equal to food consumed but import and export still happens (Clapp, 2017). However, this concept can also be applied in a country with a mono-culture (FAO, 2012). This highlights the importance of a diverse food production in order to be self-sufficient.

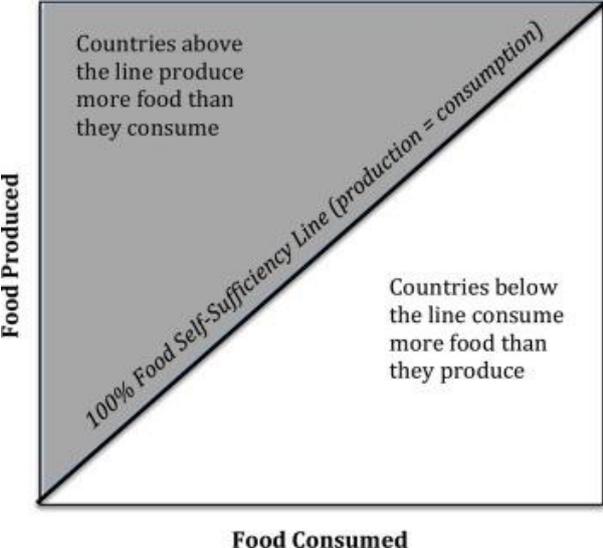


Figure 2: Basic representation of food self-sufficiency (Clapp, 2015, 89).

The concept of self-sufficiency does not directly indicate that the food system of a country guarantees easy access to food for everyone (Clapp, 2015). For this reason, sustainability is used as another evaluator. A sustainable practice is defined as a practice that “cause[s] little or no damage to the environment” and that can therefore be sustained for a long period of time (Cambridge Dictionary, 2021). The United Nations uses the term sustainable development to define “development that meets the need of the present without compromising the ability of future generations to meet their own needs” (United Nations Sustainable Development, 2021) of which food security and sustainable agriculture are

integral part of the UN sustainable goals (Food security and nutrition and sustainable agriculture, 2021).

The interaction with sustainable practices and food systems is developed by Ericksen (2008). The framework establishes the interaction between food system activities (food production, processing, distribution and consumption) and food systems’ outcomes that contribute to social welfare, food security and environmental security through the analysis of food systems and their drivers as well as the components of the food system. The scope of the study focuses on the components of the food system, visible in Figure 3 (Ericksen, 2008).

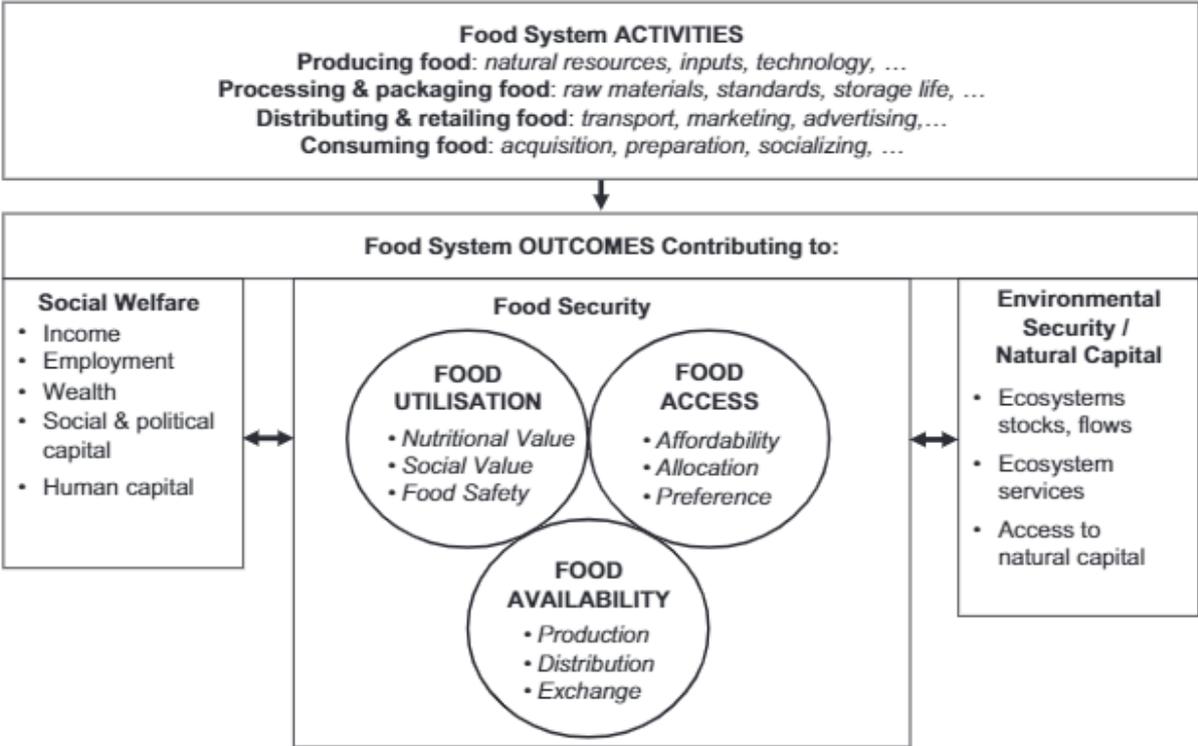


Figure 3: Components of food systems (Ericksen, 2008, 239).

2.3 The model

This research builds upon the literature presented in the section above. From the various models, a new model is hereby created, combining food systems, LSIs and their interaction with institutions. This simplified model (Figure 4) will serve as guide for the presentation of the results in chapter 4.

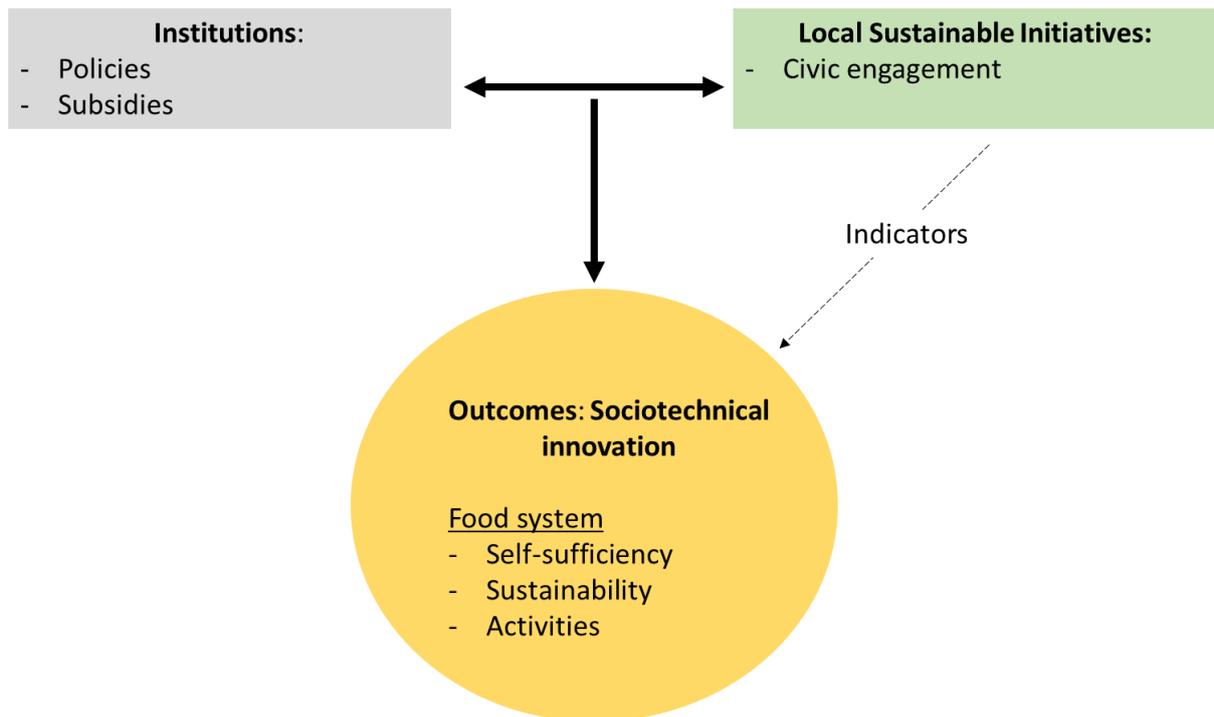


Figure 4: Conceptual model (present study).

In the first box, the institutions are analyzed by the policies and subsidies that target citizen initiatives and the creation of an alternative food system in Reunion.

The second box presents the LSIs as presented by Pesch et al. (2019), and is informed by their civic engagement in a first part. The institutions and LSIs interact with each other. The outcome of their interactions defines the outcomes of the food system. It is evaluated in terms of its activities (production, processing, distribution and consumption), its self-sufficiency (import/export), its sustainability (social welfare, environmental security, food security) and informs us on the sociotechnical innovation, second component of the LSI. Finally, the importance of indicators for LSIs to choose appropriate actions for a successful outcome is highlighted.

3. Methods and data collection

3.1 Methods

Comparative case studies allow to gain insight into a phenomenon through a focus within and across cases (Punch, 2014). The aim of this comparative case study is to establish a landscape of LSIs that contribute to the creation of a self-sufficient and sustainable food in Reunion Island.

To select cases, the most similar approach was first chosen. It provides “the strongest basis for generalization” (Searwright et al., 2008) when cases are selected for their representation of the population. A first case was selected according to its’ size, accessibility, available information and its’ potentiality for communication; it was subsequently used to match against other cases according to the following parameters: i) the date of creation of the initiative, and ii) its influence, estimated through the number of followers on their Facebook pages. As identical variables were not achievable, approximate matching was used (Searwright et al., 2008). However, after the first meeting with an LSI, as online information was outdated or missing, the method developed into a snowball sampling, which can be useful for hard-to-reach populations (Baltar et al., 2012). Two additional cases were then selected. For each case, the data collection was performed in two steps: a content analysis and an in-depth interview.

3.2 Presentation of case studies

Le Collectif Ecovillages (LCE) was launched in 2019 during the first quarantine of the Covid-19 pandemic, is a network of 11 ecosites scattered across the island. The aim is to “favorize, encourage, guide the emergence and the birth of more and more of ecosites”, to “make them known” and to be a platform of networking. Results include information of sites in the network (referred to as LCE), as well as the site where the founder lives, L’Entre-Tous.

Tiers-Lieu du Sud-Sauvage (TLdSS) was started in 2016. This LSI is a private property land site, located in the South of Reunion; it is owned by the founder. The aim is to create a site that is autonomous in food, energy, water, education and entertainment. It joined LCE when it was launched.

Germin’Acteurs (GA), located in the South-West, was formed by six individuals in April 2018. It rented a plot of land in December 2020, for a period of six years. The aim is to create a site of experimentation in food sustainable production.



Figure 5: Local Sustainable Initiatives and their location (present study)

3.2 Data collection

Content analysis. Content analysis was first conducted to gather data in the form of public documents to analyze their content for policies and subsidies that target alternative food systems and suitable for citizen initiatives. A short content analysis was then conducted to give a rapid view and understanding of the goals, actions and working of the collective. The website of LCE and its associated documents (news articles) and Facebook pages of all initiatives, which allow to reach people with barriers and to expand the geographical scope of the sample (Baltar et al., 2012), are analyzed.

In-depth semi-structured interviews. In-depth semi-structured interviews have been conducted according to the interview sheet (appendix A), that was adjusted according to the case study. The collectives were first contacted by email or social media. Selection of the interviewees was left to the collective on the basis of volunteering.

Interviews have been conducted in person between April 10th and May 24th 2021 with the founder of each initiative, within the COVID-19 restrictions. To allow for more depth, time constraint was not applied. Interviews were conducted in French and recorded on mobile phone.

Table 1: Overview of interviews (Author, 2021)

Initiative name	Location	Date	Duration (minutes)
Collectif Ecovillage	Entre-deux	10/4/2021	90
Tiers-Lieu du Sud-Sauvage	Saint-Joseph	7/5/2021	120
Germin'Acteurs	Ravine des Cabris, Saint-Pierre	24/05/2021	120

3.4 Data analysis

Transcripts were made by hand and using “Amberscript”. The collected data (content analysis and interviews) was then analyzed through a combination of deductive and inductive codes, using the Atlas.Ti software. Deductive coding trees (Appendix B) were developed based on the theory presented in chapter 2. Inductive codes were developed through an analytical read of the data.

3.4 Ethical considerations

In order to ensure integrity and safety during the research process, principles of ethics have been reflected on as follows.

Consent. The interviewees were free to choose participate in the study. At the start of each interview, participants were informed of the process. They were reminded of their right to stop the interview, take back statements or pull back their interview all together, after which their consent was assured vocally.

Harm. The risks of harm were identified as follows: sharing of personal information, triggering topics (news/injustices), speaking out against the dominant system. These factors were taken into account and participants were free to not respond to questions.

Anonymity and Privacy. Data is anonymized by lettering names mentioned during the interviews, addresses are not transcribed as well as other data or combination of data that is susceptible to be recognizable. Interview recordings were kept until transcribed, and erased immediately after. Interview transcripts are stored in a save file in a password protected computer. They will be kept until the 1st of July 2021, after which they will be deleted.

Scope of the research question. The research design and interview guide have been planned in order to reduce harm and invasive questions. Only data that is relevant to the research question is collected.

4. Results

In this chapter, results are presented in accordance to the conceptual model developed in chapter 2.

4.1 Institutions: policies and subsidies

Regional. In 2021, facing the economic and social impact of the Covid-19 sanitary crisis and the associated measures, the Région Réunion (local authority), in cooperation with the state and the Department set out a “Plan to Revive the Region”. This plan, with the motto “Local Lé vital” (local is vital), has 4 pillars, one of which is to incite local food production and consumption.

Departmental. Reflections on the critical situation of the current food system in Reunion at the departmental level started around 2018. In 2019, a first plan, “AGRIPei” was created to govern the transition from a mono-culture of sugar cane to the diversification of food sources. The aim is to promote a self-sufficient food system by 2030, that would be a source of employment, food, as well as preservation of the environment and favor short circuits. A first incentive had already been given with the “Program for Rural Development of La Réunion” for the period 2014-2020 as part of The European Agricultural Funds for Rural Development (FEADER). In Reunion, FEADER aims to optimize food systems, preserve ecosystems and valorized natural and agricultural spaces, reinforce the attractiveness of the secluded spaces and boost employment in those areas, and finally -but most importantly- invest in research and the development of new expertise with regards to new modes of food-production.

Several calls for projects were launched by the department. In 2020, a support for “the creation of transformation units for the local food-processing production” was offered for a network of farmers that aims to transform their local agricultural production. This project aims to support local exploitation impacted by the sanitary crisis, but also to reinforce the food security (production, commercialization and consumption) in Reunion, and in the local, national and international market. With the new FEADER program for the period 2021-2027 launched, a first call for the development of “new products, practices and methods in the agricultural and experimentation of agronomics sector” was published. This call, directed at institutes and organizations of applied research and experimentation, public or private, which

also includes public collective dynamic, aims to experiment with new agricultural techniques, especially agro-ecologic and agronomic, in order to respond to local food needs.

4.2 Local Sustainability initiatives

Development and internal organization. The internal organization of the LSIs is informal and non-hierarchical. Their growth happens through social media platforms, in particular Facebook, which have allowed them to expose their goals and reach people that share the same vision. LCE first launched a call for mobilization during the Covid-19 pandemic, triggered by the idea of an economical, societal, environmental and sanitary world crisis. Informal and spontaneous exchanges followed through Facebook, and led to an in-person meeting. The initiative was then officialized and a horizontal system, the “animation circle”, constituted of 10 members responsible for keeping the initiative alive, was created. TLdSS was founded by one individual who reconverted his private property into a site for an initiative. The development of the terrain is organized partly by himself, partly by external help (friends, members of other initiatives) and partly by “roofers” (people that are hosted and fed in exchange for their contribution to the maintenance of the place). GA was at first a small collective that officialized their initiative in order to gain trust of institutions and be eligible for subsidies. The core of the initiative is constituted of six members of equal status.

Indicators. To monitor the progress of their initiative and its food production system, indicators such as the “gross happiness product”, interventional research, or the monitoring of soil quality (TLdSS) and the growth of the audience on social media platforms (GA) were considered. However, the limited time, energy and bravery, as well as Covid-19 lock-down temporarily pushed these indicators aside (Tiers-Leu du Sud-Sauvage).

Barriers. These systems have proven to be challenging. First, the human factor has slowed the momentum of these initiatives for two reasons: people need to get to know each other and consider the opportunities for collective actions (LCE) and people have different backgrounds and are at different stages in their [life] journey; “an equilibrium has to be found” (GA). Second, in the case of TLdSS, time and energy were lacking as the initiator is the main person to carry the project. Third, the “legislative and administrative setting” constitutes a barrier for future projects (GA).

Civic engagement. The common aim to create ecosites, and later ecovillages, ensue from a discontent with the existing societal model. The various activities offered by the LSIs indicate

an ambition to create a new system, “parallel to the existing one” (LCE, TLdSS), and to achieve full autonomy: first, in education through training courses, workshops, and mutual learning (LCE, TLdSS, GA), in entertainment and arts (music, films, theater) and in housing through airbnbs and rented properties (LCE, TLdSS); second, in terms of energy, water and access to food (LCE, TLdSS, GAss); third, through the support and the implementation of “short circuits” and of a local alternative monetary system, the “June”.

Reception and critiques. The LSIs report that feedback is mostly positive, as indicated by their growing Facebook pages and positive comments on the platform. However, they are also the target of multiple critiques. First, the founders are criticized for their perceived lack of participation in events they organize, although they strongly deny this. Second, they are often the target of stereotypes: dirty, hippies, etc... (LCE, TLdSS). Third, the role of French “immigrant” in these initiatives is a recurrent debate. Indeed, local natives blame them for taking charge, appropriating the land and being secluded (LCE, TLdSS). Fourth, questioning on the legality of certain actions has emerged due to the planting of crops on the public domain (GA).

4.3 Institutions and LSI

Interactions and barriers. Interactions are at an individual level through connections with individuals working in a municipality, or in the department (LCE and TLdSS). However, the attention of institutions is not always welcome. Their activities are sometimes illegal. Seed acquired through importation (GA). Constructions are not registered and follows the philosophy of “to live happy, live hidden” (LCE), which is common in such initiatives. They fear “subordination” (TLdSS), “manipulation” (GA) and the loss of decision power. Future support could thus be accepted, sometimes welcomed (GA) if it is kept minimal. Yet, in order to be eligible for public subsidies from the department (eg. Call for projects in 4.1), initiatives are required to have an official status and a minimum of two years existence. Furthermore, calls for projects are often within a specific thematic and framework, which don’t include the secondary activities of the LSIs. In addition, the bureaucracy is an obstacle to apply candidature for subsidies (GA).

Perceptions. The LSIs are built upon a critique of the current institutions and their (non-)actions. The conventional capitalistic system supported by the institutions are part of the “old world”, and is as such outdated (LCE, TLdSS). The Covid-19 pandemic reinforced the negative

image of institutions and LCIs accuse them of “taking of control” of the live of individuals, qualifying their actions as a “coup d’état” (LCE).

According to the LSIs, institutions are not threatened by them as they are relatively small, and do not generate money (LCE, GA, TLdSS). However, they believe that institutions are keeping a close watch on their activities. Indeed, they could be viewed as a “threat” if they achieve their full autonomy as they aim to do (TLdSS).

4.4 Outcome: the food system

4.4.a Activities

Production. The production consists largely of fruits, especially from trees, and vegetables with an emphasis on local root vegetables. Also, medicinal and aromatic plants, as well as plants for aesthetic purposes, are cultivated. A few animals – ducks and chickens- are an important part of the system: they are a source of protein and their dropping is a potent fertilizer (L’Entre-Tous, TLdSS). Furthermore, land ownerships constitute an important input in the production process, as LSIs need it to cultivate their crops. However, LSIs faces challenges in obtaining resources: first, a lack of seeds, which could be explained by a failure to provide from institutions (GA); second, the price of real estate is very high in Reunion (LCE, TLdSS).

LSIs use various methods of production although they all practice market gardening (i.e., professional production of consumer foods). The multiple ecosites of LCE have their own type of production, from collective gardens to professional farmers, using permaculture, agroecology, or agroforestry. TLdSS specializes in permaculture and syntropic farming. GA uses “natural” methods. In addition to food production on their site, they conduct additional actions such as collective gardens and public nurseries. Except for specific works (e.g., cutting trees), the initiatives avoid the use of heavy mechanics and prefer manual technology and alternative tools (e.g., rocket stove) (L’Entre-Tous, TLdSS, GA) to reduce the use of fossil energies (GA).

Processing. TLdSS and GA expressed the ambition to transform their production for longer preservation through vacuum packaging (TLdSS), dehydration (solar and electric), and to produce essential oils as well as sirup through distillation (TLdSS, GA). Nonetheless, packaging needs to be minimized, which is made possible by consuming local and through “short circuits” (GA).

Distribution and consumption. The primary use is personal (“planting to eat”). Nevertheless, a very important dimension is the sharing and exchange of food across initiatives, or between friends and neighbors, according to the amount produced. TLdSS explains that a main concept in permaculture is to “always produce enough to have a surplus in order to share the abundance”. In the future, a small share of the production might be sold in order to finance future projects (GA).

4.4.b Sustainability

Social welfare. The initiatives are self-funded, produce no income, and are entirely volunteering based. However, members (membership fee of 40 euros in Le Collective Ecovillages), are distinct from “sympathizers”, which are people that support the initiative, and punctually participate in activities (LCE, GA). In the future, LSIs will consider remunerating their members if they receive public funding, or if the initiatives become professionalized. Peculiarly, TLdSS aims to create a double status. First, an official status would permit to generate money through workshops and trainings, and people to work full time on site. Second, an association based on volunteering. Furthermore, capital is accumulated through the sharing and exchange of knowledge and practices, tools, natural resources (seeds) within a large network of initiatives sharing the same vision. This network develops through friends, Facebook and by participating in activities organized by other initiatives. Finally, harmony between members within initiatives is maintained by adhering to a value chart that guides behaviors and choices (LCE, GA). The values are as follows: sharing, nonviolence, respect of the individual and the environment, equal governance, autonomy and experimentation.

Environmental security. Their natural capital consists of their plot of land. Water is stored in cisterns (L’Entre-Tous, TLdSS) and containers from recycled objects (GA). The valuation of waste as organic matter is also ensured through composting (GA, TLdSS). Furthermore, the initiatives minimize their impact on the environment through their production practices. A high biodiversity is fostered by planting uncommon and rare endemic species and limiting invasive species (L’Entre-Tous), which omits the need for using pesticides and fertilizers. Instead, natural treatments are used (eg. black soap, olive oil, garlic, etc.) (GA). Permaculture reproduces the natural working of a forest, in which the system is self-maintaining. Interventions are thus not needed and the productivity of every corner of land is maximized by making all elements edible (TLdSS). Using of manual tools (4.4a production)

preserves the micro-biodiversity as well as the fertile topsoil. Moreover, raising awareness on the negative impacts of chemical products in the food production could make a more secure environment (GA). However, although they are trying their best, LCE expresses that sustainability does not depend on them but on society at large.

Food security. First, food usage and habits need to be questioned. Indeed, food has an important cultural dimension: what you are used to eat is not necessary what you need to eat (TLdSS). Furthermore, dietary habits need to be adapted to the zone (i.e., eating local). Local varieties are adapted to the local climate and soil type, rainfall, sunlight exposure, etc... and are thus easier to grow (GA). Having very diverse food sources also allows the system to be resilient in cases of diseases and extreme weather conditions (LCE, TLdSS, GA). Likewise, the knowledge of local and endemic plants needs to be safeguarded and carried through next generations, as they have an important social value. This is done by mutual learning (LCE). Second, food accessibility is limited by the member fee of 40 euros. Third, food availability is limited. First, the availability of seeds on the territory is insufficient, also for professional farmers (GA). Second, the distribution is unusual. TLdSS aims to be an open space, where people are free to enter, cultivate and pluck fruits and vegetables. However, it is not open day and night under condition as it is also their living spaces. Finally, although the initiatives are open for all, food production is for participants/members, and the associated network and not for the Reunion population at large (LCE, TLdSS, GA).

4.4.c Self-sufficiency

At the scale of the initiatives, the food system is not self-sufficient. In the case of LCE, ratios depend on each location. The founder's consumption originates from his own production for roughly 10%, and the remaining 90% from markets and supermarkets. Most of the food consumption in TLdSS is also from markets. GA, only 3 months into their plantation, hasn't had their first harvest yet.

However, food self-sufficiency at the scale of their initiative is not the goal for everyone. Firstly, because it would ask too much time, energy and resources that are not available (TLdSS). Secondly, because it would not be effective as, even if they were, people outside the initiatives would steal their production (LCE). Instead, the aim is to create an island that is resilient and has "food autonomy". To create a resilient and autonomous food system, their strategy converges: they need more initiatives catered towards food autonomy and diverse food

sources at the scale of in Reunion. Indeed, the different altitudes on the island create micro-climates that vastly vary in space, and with it the type of production feasible. The goal is thus to “collaborate between sectors” (GA) in order to have enough capital as a collective, not as individuals. Remarkably, LCE stresses the importance of food sovereignty and to regain their decision power in the food system.

5. Discussion

In their role as sociotechnical innovators, the LSIs express mixed ambitions. On the one hand, the development of the initiatives around shared values, goals and associated actions shows a form of “bonding” (Pesch et al., 2019, 305), a feature of LSIs that contributes to social capital in support of the dominant societal and institutional system. Furthermore, the narrative and alternative practices around which these initiatives are formed reinforces their common identity, separated from the mainstream identities, and challenges the conventions, placing themselves as a social movement (Pesch et al., 2019). On the other hand, their discourse implies the desire to demonstrate an example for other, placing them simultaneously as a “simple niche” and a “strategic niche” (Pesch et al., 2019, 304). In implementing alternative practices (permaculture, agroecology, workshops, short circuits, compost, ...), the LSIs are replicating existing strategies and diffusing them through their network (Boyer, 2015). This ranks them as the third type of LSIs: an intent to provide goods and services that are usually provided by the public or private parties. Indeed, the slow response of local authorities in Reunion to a potential future food crisis has prompted citizens to self-organize in order to “fulfil societal needs” (Pesch et al., 2019, 307). Yet, it is unlikely that the initiatives will diffuse their practices by a niche-to-regime translation, as it would mean compromising their values of self-reliance and co-governance (Boyer, 2015), which they firmly reject. Another characteristic of these LSIs is, the use of technology, and in particular social media, that provide leverage for their development (Pesch et al., 2019), enables them to reach a wider audience and thus “scale up” (Boyer, 2015). However, the overuse of the term “local” to define their food system activities may indicate that they have fallen into the “local trap” explained by Cleveland (2014). Indeed, the blurred separation between their goal, values and indicators (TLdSS, GA), or lack of indicators (LCE), might ultimately lead to inappropriate or ineffective actions and policies to reach those goals (Cleveland et al., 2014).

The lack of interaction between LSIs and institutions can reveal multiple things. First, the LSIs are relatively recent (2018), not yet fully established, or too young to apply for subsidies (LCE). Second, the support provided by institutions is not specific enough to attract these kinds of initiatives. Third, the lack of trust expressed by the initiatives shows either a non-successful history of collaboration (da Silva et al., 2018) or reveals the activist nature of these initiatives (Pesch et al., 2019). However, the “global economic and social conditions” (da Silva et al.,

2018, 10) are behind the scope of this study, it is thus not possible to discuss the effects of those conditions on the establishment of these initiatives.

The components of the food system activities are in accordance with the model defined by Ericksen (2018), with the exception of food distribution that entirely relied on personal connections. The concept of self-sufficiency employed by the initiatives follow the definition of Clapp (2015) which is to produce enough to meet their own needs. They don't express an interest for "isolationism", but strive towards self-sufficiency in order to be resilient. However, the need to alter the social value of certain food habits, by instead relying on local climate and production, highlights the link between self-sufficiency and sustainability in the case of Reunion. Furthermore, although the FAO (2012) highlighted the risk of mono-culture associated with defining self-sufficiency as the equal ratio of food produce to food consumed to monitor self-sufficiency, the initiatives have foreseen this risk and seek to prevent it by diversifying their food source. Although computing the nutritional values of the food production is beyond the scope of the present research, the emphasis on the diversification of food sources, especially in fruits and vegetables, also indicates a potential favorable health outcome of the food system, which leads to higher food security (Ericksen, 2008). However, their heavy reliance on fruits and vegetables might conflict with local food preferences (diet rich in meat). In regards to food safety, LSIs did not indicate standards or regulations to monitor the production of safe foods. Nonetheless, their use of natural methods and the reduction of packaging might reduce the risk of producing unsafe food (Ericksen, 2008). The accessibility of the outcomes of the food system are debatable, as only members and their network can consume the production, sometimes with a fee barrier (LCE). As the LSIs are located mainly in the South of the island, the market is limited in other regions of Reunion. In summary, LSIs do create important human capital through the collective activities linked to their food system (production, processing, distribution and consumption) and the relations, knowledge and skills that stem from them. However, the current inability to generate income and wealth is a threat for the potential of food security (Ericksen, 2008).

6. Conclusion

This article discussed the role of citizen initiatives in the development of a sustainable and self-sufficient local food system through a comparative case study from Reunion Island. Building upon theoretical concepts, this study established a simplified model of the interactions between institutions (policies and subsidies) and LSIs and the outcome of those interactions: the food system. Three citizen-led initiatives were selected to conduct in-depth semi-structure interviews.

LSIs and their food system are embedded in a wider mindset shift. “Alternative” methods are indeed established on multiple levels: education (mutual learning), entertainment and arts, and housing. Moreover, the farming methods of choice (permaculture, agroforestry, syntropic farming) are “trends” of alternative sustainable movements in farming. Furthermore, the initiatives develop through the use of social media platforms, especially Facebook; their food system is propelled and facilitated by land ownership. The initiatives are also embedded in a wider initiative network which shares similar values. This network facilitates the access to resources (seeds), and diffuses practices and skills. However, the network also shows a tendency to withdraw somewhat from the Reunion society and to completely disconnect from institutions. Production is concentrated on fresh produce (fruits and vegetables). Two out of three initiatives aim to transform and package their produce. Consumption is primarily personal, then shared within the network.

On regional and department levels, institutions are showing a slow, but progressive wish to change the agricultural system. Remarkably, similarly to initiatives (LCE), the Covid-19 pandemic has been a catalyst for regional policies to promote a localized and diversified food production, setting up subsidies for experimenting with alternative food system practices. However, subsidies mainly focus on professional farmers and do not directly target the LSIs. Finally, the creation of a resilient food system at the island scale will not be accomplished by reaching self-sufficiency on the level of each initiative. Instead, it may be accomplished by spreading out sustainable food production across multiples sites on Reunion and interconnect them. However, the tendency of LSIs to detach from the mainstream societal tissue will be an obstacle to fulfilling their ambitions.

The scope of this study is limited by the few (3) interviews and the possibility of biased views of these initiatives, as only one member was interviewed. Recommendations for future

research includes looking at the drivers of the food system established by the LSIs. Furthermore, spatial disparities at a local scale could be investigated as the importance of biophysical factors and micro-climates have been established. Lastly, a follow up of this study after a 5-year period to monitor the progress and the development of the relation with institutions of these initiatives would be important to further understand their impact on the island.

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Appendix A: interview guide

Introduction

Thank you for your time. The research focuses on the role of citizen-led initiatives in the creation of a self-sufficient and sustainable food system in La Reunion. Would you allow me to record this interview for a better transcription?

I remind you that all information given will remain anonymous and are all targeted for the research. I will personally contact you to ask for permission if I wish to use any direct citation. You also have the right to stop the interview at any moment, and to retract your information afterwards.

Background information

Age:

When did you join the initiative? Why?

What is your role in the initiative?

The following questions relate to the Local Sustainability Initiatives.

- a) How does the initiative function? How is it organized? Why?
- b) Are you connected to a public party that is not part of the initiative? (Region, municipality...) If yes, how? Why?
- c) Do you benefit from public funding?
- d) Do you sometimes feel that public parties sometimes hinder your actions? If yes, how?
- e) Are you connected to other citizen-led initiatives? If yes, how? Why?

We will only focus on civic engagement in this part as sociotechnical innovation will be dealt with at the same time as the food system.

Civic engagement

- a) What are the goals of the initiative? What are its' values?
- b) In your opinion, do you disrupt the existing system? If yes, in what way?
- c) How does the population react to your initiative?
- d) How does the public domain react to your initiative?

The following questions relate to the food system.

- a) What are the objectives of the alternative food system?
- b) What are indicators to monitor your progress towards those objectives?

Activities

- a) How do you organize your production? (individual, in groups)
- b) What tools and resources do you use?
- c) Do you process/package the food? If yes, how?
- d) Do you distribute the food? If yes, how? And to whom?
- e) How do you consume the food? (social, individual, mixt)

Sustainability

Food security

- a) What are your indicators of food security?
- b) What do you produce?
- c) How do you utilize your production? (personal use, public use)
- d) What is the primary use? (basic need, secondary necessities)
- e) How accessible is the food? (fees, expenditures)

Environmental security

- a) What are your indicators of environmental security?
 - What natural capital do you use? (land, water)
- b) What actions do you take to maintain ecosystems?
- c) What other services do you provide in regards to ecosystems and natural capital? (type of agriculture, ways to deploy agriculture)

Social welfare

- a) What is the status of members of the initiative? (employees, equals)
- b) Are you and members of the initiative remunerated? Are you able to live from the initiative?

- c) Can you describe the profile of members of the initiative?
- d) What do the interaction between members look like? (formal, friends, colleagues)

Self-sufficiency

- a) What are your indicators of self-sufficiency?
- b) Are you able to feed yourself only from what the collective produces? If not, what do you import?
- c) Do you sell what you produce in the initiative?

Future

- a) What are your future projects?
- b) What impact did those commitments have on your personal life?

Closing

Again, thank you for everything. Do you wish to make any last statements? Do you have any remaining questions?

Appendix B: Coding trees

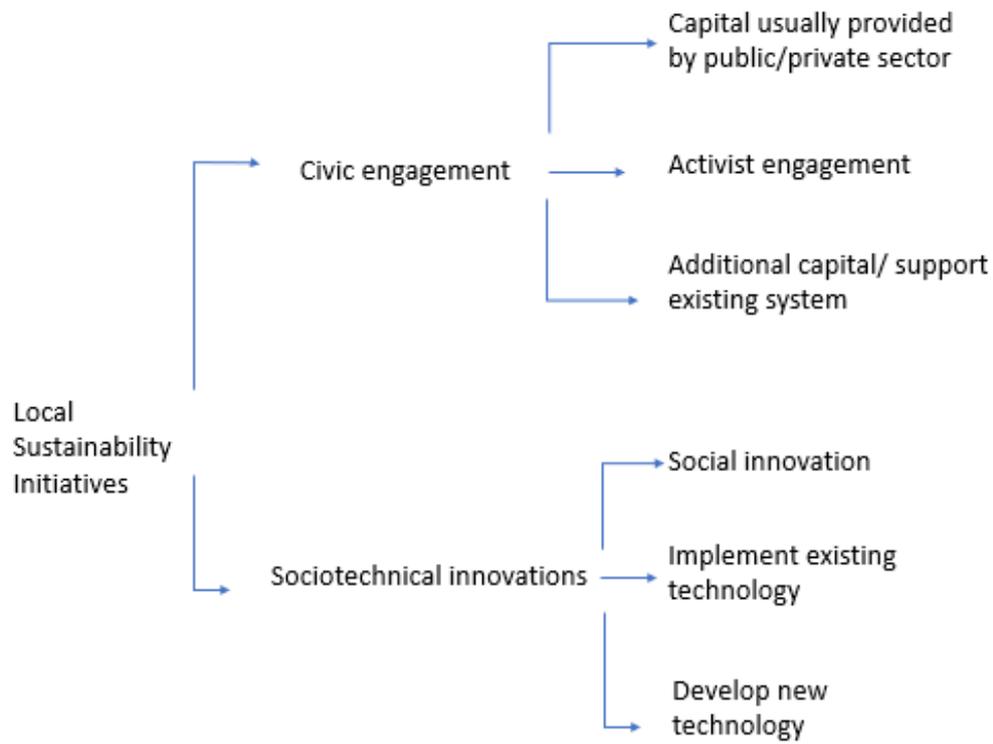


Figure 1: coding scheme part I

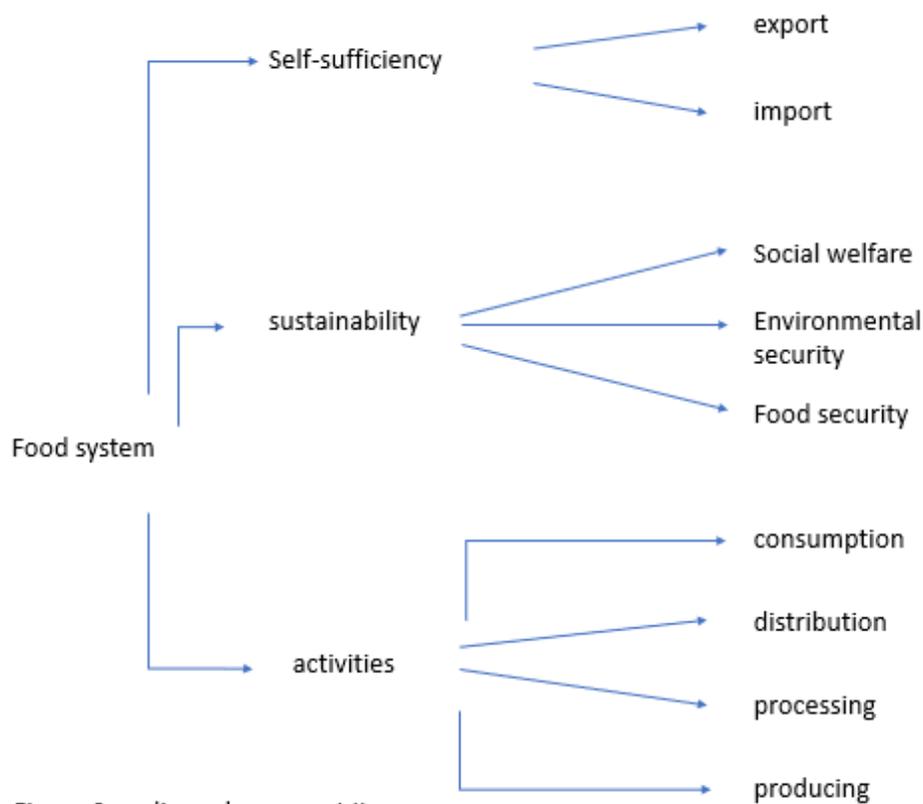


Figure 2: coding scheme part II