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Participatory Guarantee System for urban agriculture

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Abstract

Following the rapid growth of urban agriculture (UA), research has stressed the need for a methodology to evaluate and valorise sustainability of UA projects. In parallel, the worldwide development of Participatory Guarantee Systems (PGS) has shown the potential of collective action to promote agroecological practices while ensuring sovereignty of farmers communities. Hence, this action-research aims to assess the potential of PGS to consolidate a network of urban farms, valorise their multifunctionality and promote a collective progress strategy towards sustainability. Interviews were conducted with urban farmers to assess field needs and issues with regards to research objectives. Then, a benchmark analysis of PGS models combined with critics from UA researchers allowed to identify relevant characteristics of PGS applicable in the field of UA in order to meet research objectives. Results and discussion highlighted a strong coherence between universal PGS principles and the need for flexibility, inclusivity, credibility and legitimacy expressed by UA actors. Based on the discussion, a prototype of a PGS for UA was designed, including a methodology to evaluate eco-systemic services and certify progress over compliance to threshold, the creation of territorial observatories of UA with participatory sciences, and a guideline to ensure the co-creation of the PGS as a "Common" with urban and rural actors.

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Finally, I don't know if I would like to thank the Coronavirus because on the one hand you locked me down in my child room while I was supposed to do a Tour de France of urban farms, but on the other hand you speeded up the research process with Skype interviews so that I managed to finalize the thesis before summer. Let's thank Skype instead.

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List of abbreviations

AB: Agriculture Biologique

ADEME: Agence De l'Environnement et de la Maîtrise de l'Energie

ADEAR: Associations pour le développement de l'emploi agricole et rural

AFAUP: Association Française de l'Agriculture urbaine Professionnelle

AIUP: Agriculture Urbaine Intra-Professionnelle

AMAP: Association pour le Maintien d'une Agriculture Paysanne

ANRU: Agence Nationale de Rénovation Urbaine

AUPA: Aire Urbaine de Production Agricole

CESE: Conseil Economique, Social et Environnemental

CIVAM: Centres d'Initiatives pour Valoriser l'Agriculture et le Milieu Rural

ESS: Economie Sociale et Solidaire

EPFL: Etablissement Public Foncier Locaux

EU: European Union

FAO: Food and Alimentation Organization

FNH: Fondation Nicolas Hulot pour la Nature et l'Homme

FNJCF: Fédération Nationale des Jardins Collectifs et Familiaux

HLPE: High Level Panel of Experts

JTSE: le Jardin dans Tous Ses Etats

MAU: Maison de l'Agriculture Urbaine

MOOC: Massive Online Open Course

MRR: Mon Restau Responsable

N&P: Nature & Progrès

PAR: Participatory Action Research

PAT: Projet Alimentaire Territorial

PGS: Participatory Guarantee Systems

PLU: Plan Local d'Urbanisme

SAFER: Sociétés d'Aménagement Foncier et d'Etablissement Rural

SYALINNOV: SYstèmes ALimentaires INNOVants

TPC: Third-Party Certification

UA: Urban Agriculture

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1 INTRODUCTION

Tell me and I'll forget
Show me and I'll remember
Involve me and I'll understand
Step back and I'll act

Confucius or Kung Zi
551 B.C. – 479 B.C.

1.1 What is urban agriculture?

1.1.1 History of urban agriculture

Part of the increasing debates, projects and research surrounding the relocalisation of urban food system, urban agriculture (UA) is sprouting up again in the empty spaces of urban areas, as it encompasses multiple features of sustainable cities (McClintock, 2010). In fact, historically agriculture has been practiced within or at the close border of cities along the process of urbanisation and more intensively as a response to food security issues during crisis periods. For instance, shrinking access to food during the Great Depression of 1893 in the USA led Detroit's mayor to launch a so-called "Potato Patch" program aimed at providing vacant lands to the unemployed, in order them to be able to grow their own food (McClintock, 2010). Another example is the city of Paris that was surrounded by a green belt able to feed urban dwellers throughout the year, thanks to a food provisioning system elaborated by the king Philippe Auguste in the late 12th century (Aubry and Pourias, 2013).

Today, as 68% of the world population is projected to live in urban areas in 2050 (United-Nations, 2018), cities are facing increasingly striking issues alongside external negativities of rapid urbanisation and extensive industrial agriculture since the Green Revolution of the 1960's. This growth brings up challenges such as food security, environment degradation, arable land grabbing, biodiversity loss and management of increasing urban waste and sewage (Fosse, 2018). For these reasons, UA is being more and more studied for its capacity to provide multiple solutions for more sustainable and liveable cities (Daniel, 2017).

Before presenting multifunctionality of UA, it is necessary to understand what is embedded in its definitions and the different declinations of this discipline throughout the world.

1.1.2 Definitions of UA

As the gap between urban and rural environment is not strictly defined, differentiating rural agriculture and UA is not always an easy task to do, especially where the two worlds meet in peri-urban areas. However, this rural-urban dichotomy has been overcome by specialists so that agriculture can be considered as urban when occurring within or at the periphery of the city (Aubry and Pourias, 2013). The distance between the city and agricultural field will imply a gradient of cross-functional relationships, from simply contiguous links to highly functional and two-ways relationships (Aubry and Pourias, 2013, Daniel, 2013). Peri-UA becomes urban when this functional relationship brings competition and complementarities on resources from the territory, such as waste, water, land, culture and knowledge among others, and when externalities – positive and negative – of activities from both worlds (such as noise, smells and any kind of pollution) require co-adaptation (Daniel, 2013). Among several definitions of UA, the one from (Mbaye and Moustier, 1999, Aubry and Pourias, 2013) particularly accounts for this functional relationship between agriculture and the city*: "Is urban the agriculture that is located with or around the city, whom outputs are mostly destinated to city needs and for which resources (soil, workforce, water,…) can be used alternatively either for agricultural or non-agricultural activities. These alternatives usages can lead not only to competition but also to complementarities between agriculture and the city."* In that sense, UA would contribute to the "*urban metabolism*" according to Barles' definition (Barles, 2002), cited in (Daniel, 2013).

Moreover, UA encompasses a plurality of forms involving various technical systems and practices that can be classified according to the business and organisational model (profit oriented, non-profit oriented, hybrid…), the production system (low-tech, high-tech, off-ground, integrated or not) or the spatial embeddedness of production modules (indoor, outdoor, rooftops, balcony, vacant lands, containers…) (Fosse, 2018), but also according to the type of production (vegetables, mushrooms, animal husbandry, bee-keeping…) (Daniel, 2013). Thus, a diversity of functions for the territory may stem from this plurality of forms encompassed by UA.

1.1.3 Multifunctionality of UA and benefits for the territory

UA can provide a multitude of functions for the city and the territory. First of all, it can provide a substantial portion of food needs, especially in southern countries where fresh food is dominantly provided by UA (Aubry and Pourias, 2013). For instance, in Antananarivo, Madagascar, 85% of tomatoes and 100% of cauliflowers consumed by urban dwellers has been produced within the city (Dabat et al., 2004), cited in Daniel, 2013). UA can provide eco-systemic services such as climate regulation, nutrient cycling and flood regulation, to quote a few (Soulard and Aubry, 2011). For example, as urban farmers are in need of locally available organic matter for organic production, "*recycling organic waste through composting can be a win-win situation for municipalities and (urban) farmers"* by proposing cradle-to-cradle management of urban organic waste (Cofie et al., 2006). A green rooftop can absorb up to 56% more water than a synthetic rooftop, which decreases flooding risks in case of heavy rainfall events (Fosse, 2018). Furthermore, UA creates jobs, limits transportation in distribution channels – reducing the "food miles" – which reduces atmospheric pollution, and can strengthen a sense of community, reconnect consumers and producers, raise awareness concerning environmental issues (McClintock, 2010).

Figure 1: Eco-systemic services. Source: Millennium Ecosystem Assessment (Reid et al., 2005)

Although widespread discourses does little to differentiate the roles of UA in the Global North and the Global South (McClintock, 2010), a gradient and opposite hierarchy of functions from UA exists between northern and southern countries (Aubry and Pourias, 2013). In fact, provisioning food is the main purpose of UA in southern countries, whereas beautifying landscape and pedagogic functions are less sought. This is generally the other way around in northern countries, notably because of their embeddedness within globalised food markets. (Aubry and Pourias, 2013). However, this dichotomy tends to evolve, as short food-supply chains are being increasingly developed in the Global North, and environmental benefits of UA are being more and more considered by

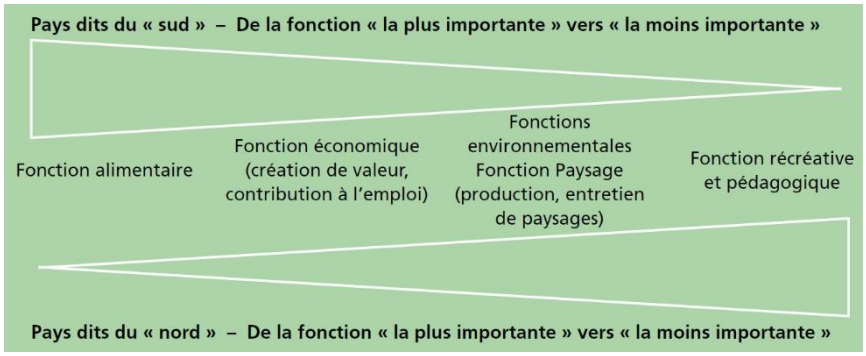

Figure 2: Functional hierarchy of UA in northern countries (upper triangle) and southern countries (lower triangle). (Aubry and Pourias, 2013)

governments in the Global South, by means such as incentive policies to recycle urban organic waste for agriculture (Aubry and Pourias, 2013)

Thus, UA has been growing attention from a diversity of stakeholders in cities, and led to a unique multiplication of actors involved in UA projects. One of them is the organisation Les Cols Verts, whom I conducted my research with, and that I will present in the following section.

1.2 Les Cols Verts

1.2.1 Vision/mission/values

Les Cols Verts is a French organisation founded by Boris Marcel – director and my supervisor for the research – which develops UA projects by accompanying the emergence of citizen collectives. It is designed as a network of local initiatives across national territory and abroad.

Vision

Les Cols Verts' actions are driven by their conviction that UA has the potential to bring multi-dimensional solutions to the agroecological transition. On top of their philosophy, the organisation does not assume that UA can feed the city, rather does it believe agriculture in the city should serve rurality first. According to them, developing UA may engender changes in food consumption habits, then opening the door to innovative means to produce, transform and distribute food in order to create sustainable and embedded food systems (Marcel and Refaïf, 2019).

Mission

Les Cols Verts' mission is to participate to the agroecological transition of the territories by spreading UA projects fostering biodiversity, food autonomy, social cohesion, beneficial linkages between Human and Nature while assuring durable economic development. Therefore, their actions are aimed at sensitizing citizens on food and agricultural issues, facilitating social and professional integration and empowering consumers towards their alimentation and natural resources.

Values

The organisation and its local collectives are fully embedded into the values of Agroecology, social entrepreneurship and the ESS (Social Economy for Solidarity). Thus, they follow principles such as:

- A set of actions with social and environmental purpose
- A not-for-profit orientation aimed at reinvesting profit into these actions, with very limited gap between salaries.

- A participatory governance distributing equal decisional power to its members (one head = one vote) and an empowerment of local communities' governance.
- Respect of the thirteen agroecological principles as elaborated in 2019 by the High Level Panel of Experts on Food Security and Nutrition of the FAO (HLPE). Among them: fairness, connectivity, co-creation of knowledge, social values and diets, recycling, land and natural resources governance… (HLPE, 2019).

1.2.2 Development strategy of Les Cols verts

"Think big, start small and be fast"
Issad Rebrab

Designed as a network of UA projects, Les Cols verts foster above all cooperation between actors of UA in order to spread initiatives, share knowledge among them and thus speeding up the development of UA. With eight collectives already accompanied in France and abroad, the organisation's general objective is to scale up the existing network by integrating new collectives and opening it to the existing actors of UA. Thus, three strategic axes will drive the organisation for the next two years.

First of all, consolidating the existing collectives Cols verts and canvassing new ones, notably thanks to a new Massive Online Open Course (MOOC) on UAs that the organisation has recently launched in January 2020. This MOOC is aimed to promote actively UA and eventually to make projects stand out from the participants, which will benefit from a personalised accompaniment by the organisation.

Figure 3: Cols vert seminar gathering members of the network, February 2020. Photo: Timothée Vernier

Secondly, enhancing communication within the network and creating tools to share experience, knowledge and good practices to foster autonomy of collectives.

Thirdly, developing new services, among them multiplying multifunctional urban farms and valorising them as well as existing ones.

1.2.3 The Label project

Drawing on its experience, the organisation is conscious of the substantial amount of time, energy and money necessary to accompany local collectives. In fact, if the emergence of these latter has been successful so far, further consolidation of the collectives requires more human resources at the expanse of the other projects of the national organisation Cols Verts.

This challenge has eventually led to an innovative idea that actually merge the three strategic lines mentioned above: creating a participatory certification for urban farms based on the cooperation of UA actors. In fact, the main outcomes of this certification would meet the three strategic line mentioned above such as: consolidate existing Cols Verts collectives by integrating them into a larger network of complementary actors, valorising multifunctionality of UA and its positive impact on the territory, and enhancing autonomy of collectives thanks to cooperation and peer-learning.

Thus, to put this project in the context of the master thesis, as I was looking for a research project Boris Marcel presented to me the label project, which rapidly matched with a study subject approached during my semester at ISARA. Among different topics available for a poster presentation, I picked the one about Participatory Guarantee Systems, which appeared to be theoretically a relevant certification scheme for the research project.

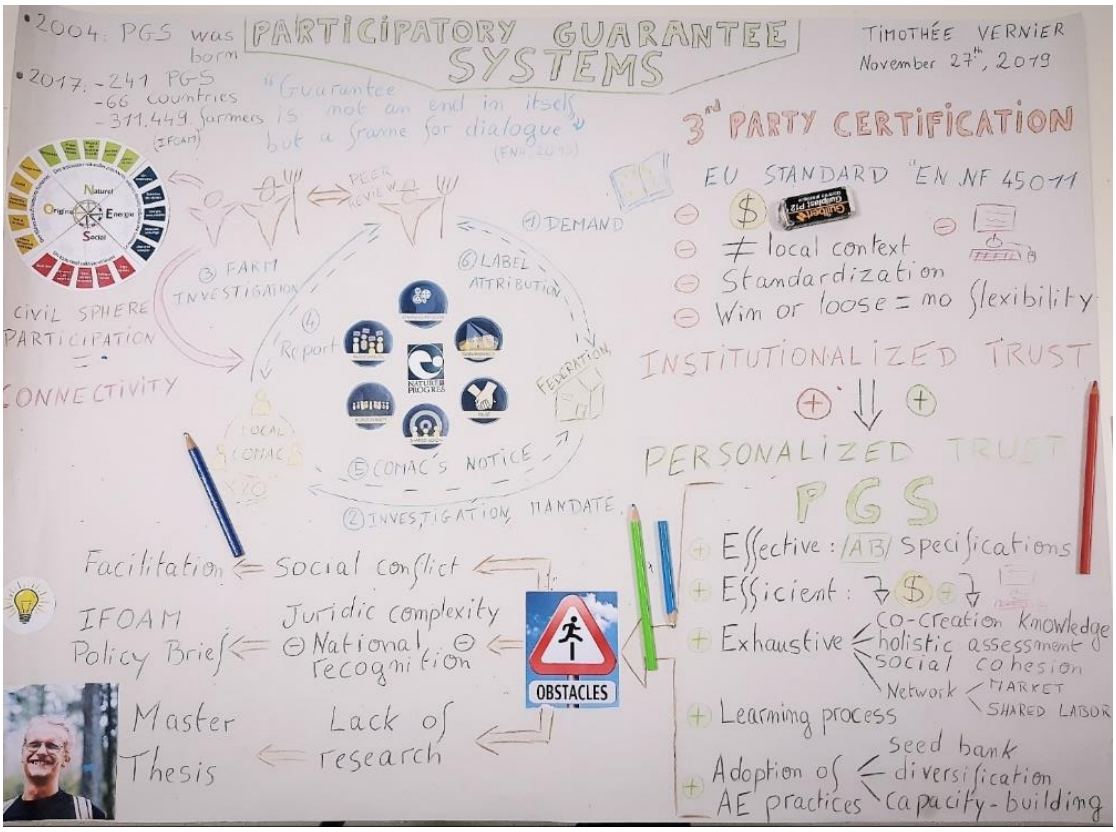

Figure 4: Rich Picture of PGS realised for a class presentation, ISARA semester, MSc Agroecology.

In the following sections I will explain what are Participatory Guarantee Systems (PGS) and why these systems present a certain adequacy for the research project.

1.3 What are Participatory Guarantee Systems?

1.3.1 History

At the beginning of the 20th century, voices are being raised against the scientific approaches of "modern" agriculture including mechanisation, rationalisation of agriculture and the addition of chemical inputs throughout the growing cycle. Among them, "*fathers of organic agriculture*" such as Masanobu Fukuoka, Rudolph Steiner and Albert Howard supported the idea of an agriculture able to merge human and nature in harmony, with the least intervention of humans on the latter (Béraud, 2015a). In Europe, the rapid post-WW2 development of industrial agriculture has prompted leaders of organic agriculture movements to unify against the productivism model of the Common Agricultural Policy (CAP) and its negative externalities on the environment. Thus in France in 1961 was born the French Organisation of Organic Agriculture (AFAB), followed by the first organic production specifications elaborated by Nature & Progrès (a branch of the AFAB) in 1972, within a participatory approach with producers, consumers and nutritionists (Béraud, 2015a). Other specifications guidelines came up at the same time and at first, trust regarding farmers' respect of organic specifications was assured by the networks of organic producers who used to ensure themselves transparency on organic practices to consumers (Lemeilleur and Allaire, 2018b). However, the 1980's success of organic products led to asymmetry of information, frauds and mistrust due to an enlargement of organic markets and heterogeneity of producers (Lemeilleur and Allaire, 2018a, Sylvander, 1997), cited in Beraud, 2015). Then started a process of normalisation of organic specifications, expressed by the creation of a national label AB (Agriculture Biologique) by French Ministry of Agriculture in 1985, which nevertheless authorised local organisations to certify producers (Béraud, 2015a). Therefore until the 1990's, Participatory Guarantee Systems (PGS) were the main certification mechanism, even if it was not officially entitled as such at that time (Akker, 2009). In 1991, the European requirement on certification process (standard EN NF 45011) can be seen as a critical turning point as the Third-Party Certification scheme (TPC, certification by an independent body) became the only legal option to certify "organic", leading to numerous critics towards this standardisation and patenting of organic practices (Akker, 2009).

TPC is a service billed by an independent body, therefore it engenders a logic of market and competition between farmers. Thus, it collides to the philosophy of organic agriculture movement as they were historically founded on a bedrock of core values such as cooperation within a supportive network of farmers (Lemeilleur and Allaire, 2018b). Secondly, it goes against the necessary renewal of organic practices as an intellectual "common" resource – as it was theorised

by Ostrom (1990) – in the sense that an institutionalisation of practices harms the capacity of the community to adapt its intellectual referential framework with regards to its collective learning process (Lemeilleur, 2018 ; Ostrom (1990), cited in Lemeilleur, 2018). Thirdly, as a merchandised service, TPC are often too onerous for small-scale farmers, therefore fostering large-scale producers and consequently an export-import-based agriculture, which is often harmful for local economies and food sovereignty (Lemeilleur and Allaire, 2018b). Moreover, standardisation of certification implies heavy administrative procedures, resulting in costly and time-demanding bureaucracy, which enlarges the distance between producers and the certification body (Lemeilleur and Allaire, 2018b). In a study conducted by Mathieu Béraud (University of Lorraine, 2015), producers emit critics against TPC schemes, reproaching no consideration of social conditions of workers on farms – *"one can hire a migrant and not pay him/her, Ecocert doesn't care !" (*Ecocert being the largest TPC body in France) (Béraud, 2015a). Moreover, TPC schemes would mismatch once again with the philosophy of organic agriculture which considers economic and ecological diversity as the key in integrated farming systems: "*Cost of label is proportional to the number of products to certify, therefore the more diversified is the farm, the higher is the price. In these conditions, TPC scheme fosters intensive monoculture*." (Guy Kastler, quoted by Chastang S (2007), cited in (Béraud, 2015a).
It is criticised a shift from a previously agronomic holistic evaluation of farms based on systemic coherence of the farming system to a strict and *"standardised list procedure that makes difficult dialogue between certifier and farmers."* (Caplat, 2012), cited in Béraud, 2015 #74). On top of that critic, "*all producers participating to the research unanimously deplore the absence of advice and support from certifiers"* […] *"because if ever the producer applies the recommendation and if ever it does not work, this latter could backfire on the certification body."* (Béraud, 2015a). In this context, the initial collective learning process that characterises organic agriculture movements is less vivid.

Along these critics, many alternatives have been created around the world to reconnect consumers and producers together, and re-establish organic agriculture principles in food production. Among them, Participatory Guarantee Systems benefit from an enhanced development and interest since the 2000's, so that the FAO recognised PGS as a credible, relevant and economically affordable alternative to TPC (Lemeilleur et al., 2019b).

1.3.2 Concept

The International Federation of Organic Agriculture Movement (IFOAM) – one of the main networks supporting the development of PGS internationally – defines PGS as "*locally focused quality assurance systems. They certify producers based on active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange*." (IFOAM, 2020)

There are dozens of types PGS around the world, each with their own features specific to the local context. In fact, the life-blood of PGS lies in the active participation of farmers and consumers that they serve, so that they have been created and adopted in total coherence to the needs of the local communities, the geographical and political context as well as the market of their origins (IFOAM, 2007).

PGS are created in alternative to TPC, and they differ in the approach they propose. These programs place high priority on knowledge and capacity building both for producers and consumers, and they seek to be less expensive for farmers because of their direct involvement. An important difference with TPC is the shift from a guarantee based on the provision of evidence of compliance by the farmer, to a foundation of trust based on transparency and openness (IFOAM, 2007).

The IFOAM provides a bedrock of six key values that weld PGS programs together, no matter their respective particularities (IFOAM, 2007):

- **Shared vision** in the core principles guiding the program, with an active awareness of why, how and who is being served.
- **Participation** of a diversity of stakeholders in the co-construction of principles, rules and documents to assure credibility in the certification.
- **Transparency** between stakeholders to assure awareness of how the guarantee mechanism works, its process and how decisions are made. Documents are made available to all interested parties, although a clear line must be drawn between confidentiality (privacy and commercially sensitive information of producers) and transparency.
- **Trust – "integrity-based approach**": capacity of the community to demonstrate this collective trust in the guarantee system through the application of collectively created social and cultural control mechanisms.
- A permanent **Learning Process** to develop capacities and resilience in the communities involved.
- **Horizontality** in the governance which implies an equal share of power with same level of responsibilities and capacity to establish the organic quality of a product or process.

As explained in the previous part, PGS has been the main certification scheme until 1991 even if it was not officially recognised as such. In 2004, the concept was adopted during an international workshop on alternative certification schemes organised by the IFOAM in Brazil (FNH, 2015). Today, PGS are mostly developed in the Global South where small-scale peasants are in needs of credible and affordable certification, notably in Latin America with the network Ecovida, and in India with the Organic India Council (FNH, 2015). In the Global North, most mature PGS are Nature & Progrès in France, Certified Naturally Grown in the USA, although it is in southern

countries and particularly in Latin America that can be found the highest level of PGS recognition by national legislation (Bolivia, Costa Rica, Brazil, Mexico, Uruguay…) (Sacchi, 2019), meaning that products can be certified organic through a PGS mechanism, on the contrary of Europe since 1991.
According to a survey conducted by the IFOAM, up to date December 31st 2019 there are at least 223 PGS initiatives in 76 countries, involving 496 104 certified producers (IFOAM, 2019b).

Concretely, a PGS mechanism works thanks to an organisational structure based on the involvement of all interested parties in the certification. Control visits on farm are realised by farmers in the form of peer review, usually actively involving a consumer in the visit as well. Then, opinions are issued by a local commission and certificate are delivered annually by a federal commission. The general mechanism is explained in the infographic in appendix 1.

1.3.3 Benefits

Depending on the context in which a PGS program is settled, many benefits have been proven. In a comparative study conducted by the IFOAM between 2012 and 2014 involving eight selected PGS mostly in the Global South and in France, social processes resulting from implemented PGS are presented along their benefits for the communities (Bouagnimbeck, 2014). For instance, there have been observed collective marketing and sharing of information, techniques and traditional knowledge, collective seed management through conservation seed banks, common funds, collective works, socialised pricing. The related benefits comprise improved social bonds through sharing of knowledge which empowers social organisation at the local level. Costs are drastically reduced thanks to a better use of locally available natural resource and because farmers do not need to fall back to TPC (costs can be divided up to five times compared to TPC on an annual basis) (Bouagnimbeck, 2014). Moreover, thanks to a diversification of farm activities, (collective) marketing channels and socialised prices, the access to market for producers and affordability of organic products for consumers are improved, which result in general improved livelihood. Finally, farming systems can perform better (according to 78% of the respondents of the IFOAM study) and food security is improved as well for 92% of them (Bouagnimbeck, 2014).
Among these benefits from PGS, some might be replicable in the field of UA and improve urban farms sustainability, and some others might come up as a result of the specific interrelations between UA challenges and features of a PGS.

1.3.4 Limits

If literature has shown the solvability of PGS as an alternative certification scheme to TPC with added benefits (Lemeilleur and Allaire, 2018b), experiences of PGS around the world have also revealed common limits.

First of all, as active participation of interest stakeholders is at the core of a PGS, it implies a concrete continuous participation and an assumption of responsibilities from these latter. In fact, reduced costs require time and physical commitment from farmers as a trade-off. What is at stake is to assure credibility of the PGS, hence the more participants are involved, the less biased are the collective decisions (Lemeilleur and Allaire, 2018b). As farming is usually a very time-demanding activity, volunteering can be both a barrier for entrance and a risk for the durability of the PGS if tasks and responsibilities are not split equally and the return on investment not perceived as worth it.

Another limit of PGS is the potential ambiguity regarding what is considered as "good practices". In fact, a specific situation can be interpreted differently by stakeholders, hence influencing for example to what extent the practice in question does respect the chart or not (Lemeilleur and Allaire, 2018b). Although, this limit can paradoxically become a resource as the purpose of PGS is to adapt the referential (chart, production specifications…) to a rapidly changing world, thanks to the frame for a dialogue made possible through visits on farm. It is then important to underline that "control" in PGS does not fall into a logic of sanction and repression, but rather within an approach of mutual understanding and progress (Béraud, 2015a). Thus, interpretation helps understanding better the context in which the practice is questioned, for which reasons and how it can be improved. *"Transparency in the system consolidate the independence of the decision process"* (Béraud, 2015a)

A third limit to PGS has to do with tension and human conflicts that can result from peer-review and control, but which is actually inherent to all participatory approaches and collective actions (Lemeilleur and Allaire, 2018b).

At last but not least, the major limit to the development of PGS is the absence of legal recognition in many countries such as France and in Europe as a whole. This legal issue blocks the development of PGS by restricting access to distribution channels and governmental aids for "organic" producers for example (Mundler and Bellon, 2011, Lemeilleur and Allaire, 2018b). Furthermore, legal appellation using prefix and suffix "bio", "éco", "biologique" and "écologique" are legally patented by European legislation on Organic Agriculture (Lemeilleur and Allaire, 2018a), therefore these terms cannot be used to certify organic practices through a PGS certification scheme (Nature&Progrès, 2020).

1.4 Relevance of research

My hypothesis is that exists a multitude of expertise that have been acquired by UA actors throughout their respective experience, but there is not enough sharing of these expertises for general progress towards sustainability. I assume a PGS would enable cross-pollination between projects, through peer-visits and the principle of permanent learning process Consequently, this would improve the capacity of UA actors to tackle their challenges autonomously.
Thus, in this section I will use literature to present current challenges that limit UA development, then I will present the potential benefits of a PGS to tackle these challenges.

1.4.1 Challenges of UA

Absence of UA certification

From technical and practical to structural and political challenges, it is crucially necessary to provide tools to valorise UA and its multifunctionality (CESE, 2019). In fact, UA multifunctionality has already been largely proven in literature (Aubry and Pourias, 2013, Daniel, 2013, Daniel, 2017, Fosse, 2018, Duchemin et al., 2010, McClintock, 2010, Soulard and Aubry, 2011).

Valorising the multitude of services provided by UA can be achieved thanks to a certification that provides evidence on the quality of products, services or the project as a whole. Although, no urban farms in France have initiated procedures to be certified yet (Daniel, 2017). This is not only because of the high costs hardly affordable for small-scale production, but also because of the complexity of administrative procedures and the legal restrictions for the access to organic label AB for example. Moreover, the organic label "AB" cannot be obtain for off-ground production, which is a very common practice in most urban farms (Daniel, 2017). If some French urban farms in the study conducted by Daniel (2017) evocated their will to apply for a label, these latter always concern only a specific aspect of the farm activity, not the farm as a whole. For instance, the label "Saveur Île-de-France" aims at valorising the gustative quality and the embeddedness of the products in the territory, whereas the "Ecolabel" only rewards environment-friendly practices such as city-greening.
Nevertheless, there exist no label that certify UA projects as a whole yet. Thus, this multifunctionality very specific to UA would be interesting to better valorise, notably in order to get support from public institutions through subsidies and/or material aids (Chapelle and Jolly, 2013), Daniel, 2017 #91).

Instable business models

Given the multifunctionality of UA, the complexity of its definition and the variety of forms it can take, business models are usually very different from a farm to another, as they rely on a diversity

of aspects such as the objectives and the finality of the structure, its juridical structure (profit, non-profit organisation, hybrids), its geographical location, technics and facilities used, types of production and activities (besides production), clients and market channels… (Chapelle and Jolly, 2013). Consequently, business models are very often hybrids, combining financial inputs from different channels like production sells, public and private subsidies (public institutions and foundations), training courses, education and environmental awareness, team-building, prestation for companies (garden design), coordination of events… (CESE, 2019, (Chapelle, 2013 #108). Overall, financial entries exclusive to production sells dominate budget in a large proportion of business models (Chapelle and Jolly, 2013). However, important interrogations should be considered regarding the continuity of these hybrid business models, notably to assure a salary for those running the project. For instance, many organisations – especially the ESS ones – that do not seek profitability only but whose actions are motivated by general interest are very much dependent to public and private subsidies. Consequently, they are sensitive to inconsistent support (Daniel, 2017, (Pascal Mayol, 2019 #73, CESE, 2019) , that can result from a shift in the political chessboard for example. Also, services provisioning and consultancy on UA has been booming for many years now, but *"what will happen when this market will reach maturity or even will be saturated?"* (CESE, 2019). Considering these projects in the context of current neo-liberal economy with a predominant market logic, it may result an competitive attitude between actors who might not be able to sustain themselves in the long-term (CESE, 2019).

Urban pollution

"*Linking agriculture and pollution generally refer to cultivation practices* […] *but it is less common to consider reverse effects*" although UA is very much affected by various sources of pollutions from the city, particularly when it comes to nutritional function of UA (Aubry and Pourias, 2013). In fact, urban pollution sources are numerous: they can be fine particles from traffic jam, heavy metals and polycyclic aromatic hydrocarbons that contaminate soils due to a previous industrial activity on site (Reid et al.), but also pathogens present in urban organic waste when these one are insufficiently treated for fertilisation use in UA (compost, sewage sludge etc)(Aubry and Pourias, 2013, Soulard and Aubry, 2011, Daniel, 2013). These risks can be limited in many ways like integrated composting and vermicomposting systems (Su Lin Lim, 2016), change in food consumption habit such as cooking food instead of eating it raw (Dabat et al., 2010), cited in (Soulard and Aubry, 2011), but also phytoremediation to depollute soils, forbiddances to consume, soil excavation (mandatory for collective gardens in Paris) (Soulard and Aubry, 2011). However, these measures can be costly, socially exclusive and overall they limit the development of UA in its various forms (Soulard and Aubry, 2011). Cuba's reversion to less petrol-dependent agriculture following USSR collapse is an edifying example of how urban pollution is at stake in the development of UA. A national wide survey revealed trace-elements of contamination above

permissible limits in municipal solid waste compost. As a result, the use of these large quantities of compost was immediately forbidden, although Cuba was highly dependent on this organic amendment for its food security (Alfaro, 2017).

Land tenure, urbanism and architectural rules

With a rate of 236 000m2 of arable lands that are urbanised every day in France, one of the roles of UA is to sensitize urban dwellers to the necessity of protecting arable lands from urbanisation (CESE, 2019). Therefore, a two-tier approach consists not only in preserving land for agriculture in the periphery of the city, but also in conquering (peri-)urban spaces to implement agricultural activities, in vacant lands for e.g. (CESE, 2019). However, unsuitable urbanism and architectural rules and a misconnection with rural Code constitute very limiting factors for these purposes (Daniel, 2013, (Pascal Mayol, 2019 #73, (Soulard, 2011 #110, CESE, 2019, Soulard and Aubry, 2011). For instance, if the current trend in "ecological" construction project is to reduce energy consumption in the architectural design, little is done regarding technical characteristics to make possible UA activities, such as rooftop bearing capacity, sunning optimisation, rainwater collection systems etc (CESE, 2019). Some positive trends exist such as incentives from municipalities and obligations from PLU (Local Urbanism Plans) to integrate greening and UA dimension in building design, but few projects actually reach their initial objectives. For instance, the city of Paris has committed through a chart to green a 100ha in the city in 2020, including 30ha of UA (Paris, 2014), but mid-2019 only 21,5ha had been turned into productive spaces (Garaix, 2019).

Additionally, efforts in adaptation of urbanism rules are also initiated for better access to land (along the 2018 governmental "Biodiversity Plan") establishing objectives such as "*zero net artificialisation*". Thus, land tenure institutions such as the SAFER and the Public Local Land tenure Establishment (EPFL) are asked to work in concertation with collectivities to preserve land for UA projects and maintain agricultural activities in peri-urban areas by limiting urbanisation (CESE, 2019). As a result, city councils such as Bordeaux have created a new PLU in 2016 that notably aims at providing good conditions for (peri-)UA development, including adapted zoning in urban areas or the reversion to agricultural zone for urban zones without effective planning - an obligation stated by the 2014 law ALUR (Klimerack and Charles, 2016). Although, despite these structural changes, conflict of interests remains and can threat UA projects, such as the urban development project in Bastide-Niel neighbourhood. The conflict opposes a planning of 3200 housings conducted by Bordeaux Metropole Aménagement and the bearers of the urban farm "La Ferme Niels" within the Third-Place Darwin Ecosystem, although the second most famous touristic activity in the city (Lozano, 2019).

Finally, the Conseil Economique, Social et Environnemental (CESE) recommends a functional mixing for zones classified *Urban* and *Agri-Urban* to foster coexistence between UA and other attributions, following an unsuccessful law proposal on November the 9th 2016 to create a less

constraining legal framework to Urban Areas for Agricultural Production (AUPA) inferior to 2ha (CESE, 2019).

Thus, solutions and challenges emerge at the same rate, but considering the slowness of administrative procedures and conflict of interests, there is a crucial need to accelerate dialogue with competent institutions (CESE, 2019). This can only be done with the support and the pressure from field actors such as UA organisations that have a lot of experience either to overcome technical obstacles on field and/or to engage political dialogue on these issues.

Social impacts and agroecological transition

Another benefit that can also be a challenge for UA projects is its embeddedness within the territory associated with its social impact for the local population. For instance, many projects aim at fostering socio-professional integration through specific working contract or pedagogical activities to enhance citizen awareness regarding food and environmental issues, and foster gardening practices (Daniel, 2017, (Chapelle, 2013 #108). Reconnecting citizens with their food and their environment is a mean to improve not only public health by changing food consumption habits for e.g., but also citizens' well-being by providing an income and improving city's living conditions thanks to the eco-systemic services of UA (Daniel, 2017, (Chapelle, 2013 #108, (Pascal Mayol, 2019 #73, CESE, 2019, Chapelle and Jolly, 2013).

For examples, organisations such as Veni Verdi and La SAUGE in Paris are actively involving local communities in urban agricultural activities such as community garden in city's priority neighbourhood or pedagogical gardens in schools (CESE, 2019). Other farms such as La Ferme de l'Abbé Rozier in Ecully (Lyon's adjoining suburb) combine a pedagogical dimension for students and families with a professional integration program conducted by the structure AIDEN that trains and accompanies insertion employee, either as a first step towards socio-professional integration or sometimes for a personal farming project (EPLEFPA, 2020). Thus, one the one hand there is a need to integrate all swathes of the local population to initiate a common agroecological transition, and a diversity of actors who have built an expertise in these fields one the other hand.

Figure 5: bio-climatic greenhouse, Ferme de l'Abbé Rozier. Photo: TimothéeVernier

To sum up, common challenges arise in most territories, therefore there is a need to create a constructive dialogue between cities' stakeholders in order to impulse change for more livable and sustainable cities. In the following section, I will express intended benefits of a PGS for UA to tackle these issues.

1.4.2 PGS to tackle UA challenges

Holistic evaluation of farming systems

According to Beraud (2015), certification mechanisms of the organic movements prior to 1991 were based on a holistic understanding of the farm, whereas today's TPC scheme are criticised for limiting the analysis to technical aspects that are usually not appreciated as key elements of the system as a whole. On the contrary, PGS propose a systemic analysis of the farming system, encompassing economic, social, environmental and technical aspects. A relevant example is the NESO compass (figure 5), a tool elaborated by Nature & Progrès to assure a deeper analysis of the farms and its impacts on different facets of society.

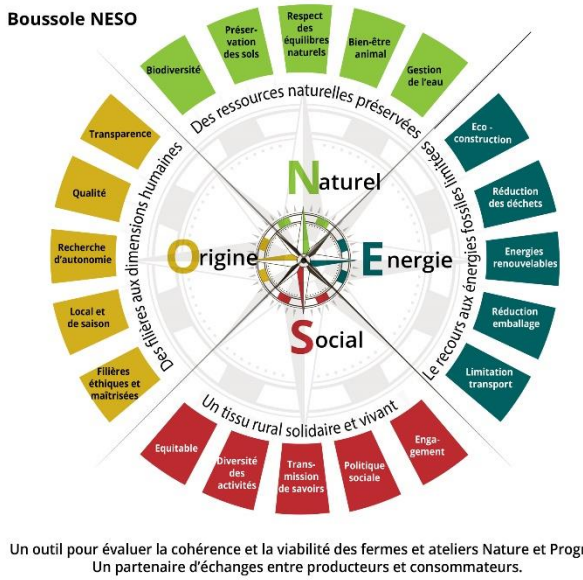

Figure 6: NESO compas, a tool elaborated by Nature & Progrès for holistic assessment of farms.

Thus, I assume a similar holistic approach would be relevant to valorise the multifunctionality of UA projects, for instance regarding the provision of social and pedagogical services, as well as aggradation of biodiversity in urban eco-system. Moreover, Nature & Progrès keeps using its organic specification to assess organically sound production on farm. Thus, even though this cannot legally lead to an official EU organic certification AB, it could be relevant for urban farmers willing to valorise their ecological cultivation technics, especially for off-ground systems. To sum up, PGS appear to be an adequate tool to assess UA project in their diversity of forms, therefore valorising its concrete benefits for the territory.

Direct benefits

First of all, I assume a PGS would allow a collective and officialised commitment from urban farms toward agroecology, by stating a mandatory application of agroecological principles in the chart, such as Horizontal governance, Connectivity, Participation, Co-creation of knowledge, Social values and diets, Recycling, Fairness and Economic diversification, to quote a few (HLPE, 2019). Secondly, involving citizens/consumers in the certification process is expected to enhance their awareness regarding agri-environmental issues and incite them to commit to improve their food system, by changing their food consumption habits for instance.

Thirdly, the co-creation of knowledge resulting from peer farm visits may engender inspiration and reproduction of practices from a farm to another to tackle challenges locally:

- Urban pollution issues could be tackled collectively through direct sharing of knowledge and methods like phytoremediation or integrated vermi-composting technics. Academic researchers could eventually be involved in the PGS, like the research program DESTISOL'AU of INRA (French National Institute for Agronomic Research), whose studies on urban soil pollution could be a great input in the PGS.
- There are plenty of agroecological practices adapted to urban environment that have been developed by actors across the country, and that deserve to be shared. For example, Vergers Urbains (Paris) is an organisation mostly composed of architects and urbanists that have built an expertise regarding urban constraints for cultivation (lack of space, architectural rules etc). Another example is La Ferme du Plateau de Haye (Nancy) that have set up a permaculture farm with only 10.000€, saving costs by making smart use of locally-available resources (wood, straw, locals' knowledge…), hence contributing to an ecological circular economy.
- Many actors such as Les Cols verts (Rennes), Les Saprophytes (Lille), La SAUGE, Veni Verdi (Paris) and La Ferme de l'Abbé Rozier (Lyon) mentioned previously are particularly good at developing participatory and embedded projects with local citizens. Sharing their methods, tools and soft skills with other urban farms would help them to better involve local population, hence improving social impact on the territory.

"*The guarantee is not an end in itself anymore, but a mean to create a frame for dialogue*" (FNH, 2015)

Indirect benefits

In parallel, indirect benefits are expected to occur as the result of a valorisation of agroecological UA projects. First of all, certified urban farms are expected to be better considered and fostered by financer to get financial support. This would improve farm's business models and facilitate emergence of new ones. This point is further developed in the following part 1.4.3.

Secondly, valorising social and environmental impacts of urban farming on the city should positively influence policy-makers to allocate existing urban lands to UA projects. For instance, La Cité de l'Agriculture has realised an exhaustive mapping of fields suitable for UA in Marseille Metropole, and its advocacy for the positive externalities of UA eventually permitted the saving of 35ha in the (peri-)urban area for this purpose, as well as a two-millions euros Action Plan for UA (La-Cité-de-l'Agriculture, 2019). This success should inspire other city councils to support more UA projects with high social and environmental values.

Valorising urban farms as an educational bridge between urban and rural worlds is expected to enhance the sensibilisation of policy-makers on the necessity and the benefits of saving rural arable lands from massive urbanisation. For instance, the organisation Le 100ème Singe (Toulouse) works on preserving peri-urban arable lands by linking public authorities, land owners and neo-farmers with complementary interests. This purpose being common to UA projects, urban farms could incentive public authorities to initiate food policy such as local food provisioning, by creating bonds with actors such as Le 100ème Singe in order to save rural lands.

1.4.3 Research is needed on UA & PGS

Literature on UA and PGS has provided recommendations for further research on these two topics, which I think give credit to the present action-research.

Need for sustainability indicators

Chapelle and Jolly (2013) give some recommendations to public authorities in order to develop UA. For instance, they recommend to support financially or by other means the multifunctionality of UA, with a particular attention to projects that provides social and environmental services. However, the CESE underlines the fact that not all initiatives in UA provide solutions for sustainable cities. In fact, some fall into market logic exclusively and only seek profitability, whereas others provide concrete benefits for the general interest (CESE, 2019). For instance, uncertainties exist regarding "high-tech" UA, according to the ADEME which questions environmental benefits advanced by structures using non-renewable energy through artificial lightnings as a substitute to natural sun energy in order to grow food disconnected to seasonality. Some pretended social benefits are also pointed, such as the lack of citizen participation in projects, or the lack of products affordability (Combet et al., 2017), cited in (CESE, 2019).

Therefore, "*this distinction* [between profit-oriented projects and those seeking general interest] *must be taken into an account by public authorities when they select the projects to support*" (CESE, 2019). For this purpose, the CESE provides clear recommendations such as "*orienting publics aids and award criteria to assure a fair payment of services provided by UA* [as well as] *a fair compensation to urban farmers*" (recommendation 2, p.34) with a specific attention to *"those contributing to the greening of cities* […] *and improving social cohesion*" (p.9) (CESE, 2019).
This is one of the reasons why I assume PGS would be a relevant tool to valorise UA projects with high environmental and social values through a holistic farm assessment, in order to give guarantee to public authorities.

Research on PGS must be diversified

Concerning PGS, literature highlights the need to study the potential of PGS in other fields than organic agriculture (FNH, 2015). In our case, UA is such a complex web of activities that encompasses other aspects beyond organic farming, so that it would be relevant to assess the relevance of PGS for urban farms. Furthermore, an action-research would be a great opportunity to analyze and further understand assets and constraints of PGS (Akker, 2009). Eventually, the outcomes of the research could offer feedback to a network of experiences in PGS at the national scales, a need expressed by the Fondation Nicolas Hulot pour la Nature et l'Homme in its report on PGS initiatives in France (FNH, 2015).
These are the scientific foundations that I think justify the relevance of this action-research.

1.4.4 Research question & objectives

Based on the theoretical framework I have just drawn I will conduct my research around the following question in order to assess my hypothesis: "*To what extent are PGS a relevant certification scheme in order to consolidate a network of urban farms, valorise their multifunctionality and promote a collective progress strategy towards sustainability?"*
Within each research objectives, series of sub-questions will help to guide the research process:

- **Objective 1: a PGS to consolidate UA networks**
  - *Which existing network dynamics*?
  - *What are the current needs and issues in UA networks*?
- **Objective 2: a PGS to valorise UA multifunctionality**
  - *What should be valorised?*
  - *For which purpose?*
- **Objective 3: a PSG to promote a collective progress strategy towards sustainability**
  - *What is at the core of a progress strategy?*
  - *Which potential for knowledge exchanges?*

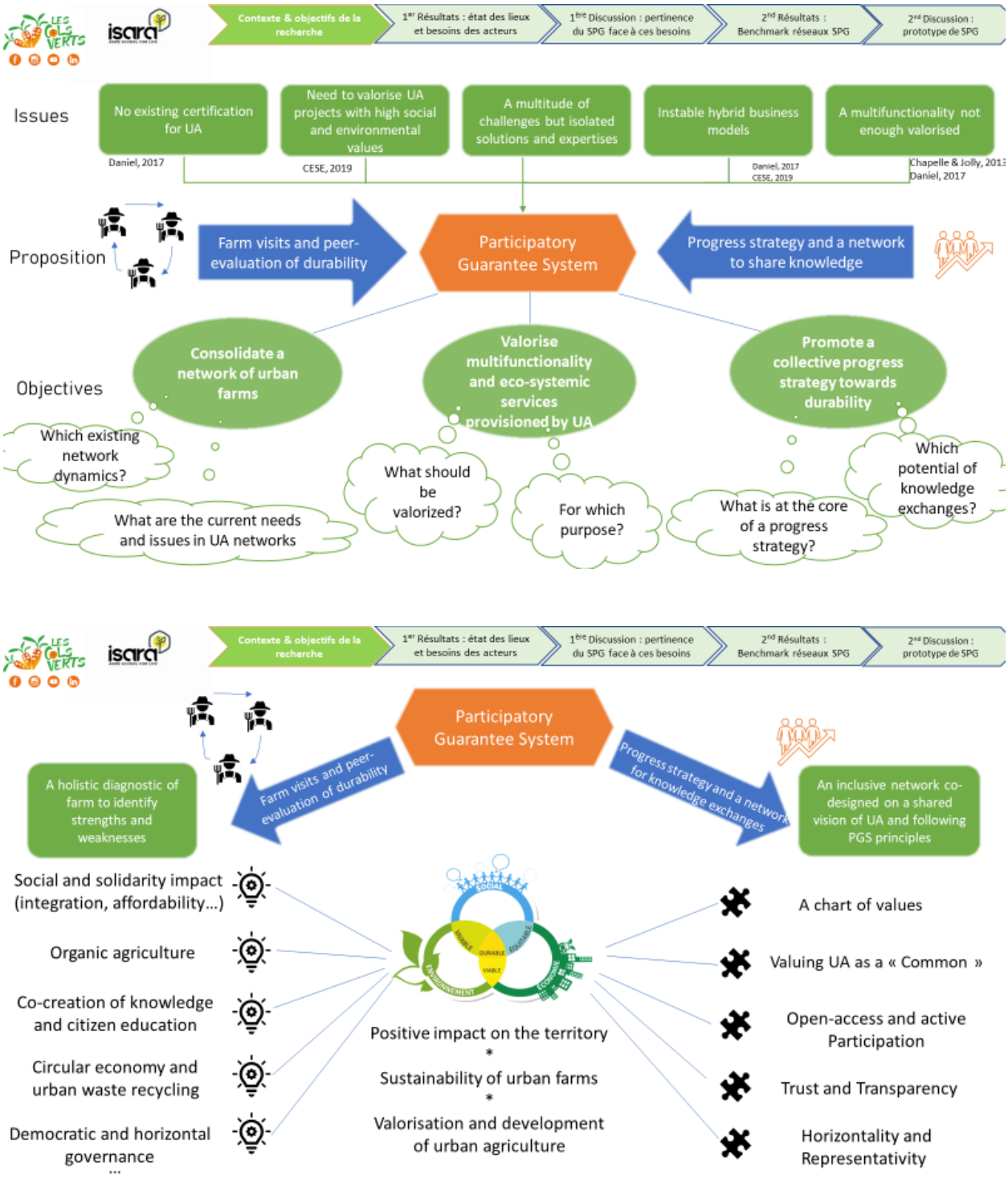

Figure 4: diagrams used to present the research to UA actors (translated from French): relevance of the thesis, objectives and expected outcomes of the PGS.

It is important to remind that this action-research has for main objective to pave the way for the actual co-creation of a PGS for UA. This very first step is essential to get a clear understanding of what are the current context, field needs and issues before carrying out the co-creation of a PSG. On the 28th of January, we interviewed Sylvaine Lemeilleur, a CIRAD researcher who conducted a Participatory Action Research (PAR) of a PGS for agroecological farms in Morocco. Her feedback helped us to rescope our research objectives to follow an adequate methodology on the long-term. Therefore, the present research aims at first to assess the relevance of the project and, at the same time, to canvas actors who could potentially participate to the co-creation of the PGS, if the research outcomes are positive. If so, in a second step Les Cols Verts will conduct a PAR in order to co-create the PGS with stakeholders, a condition *sine qua none* for a PGS to be fully embedded as a "common" in a community of members (Lemeilleur et al., 2019b).

2 METHODOLOGY

At the very beginning of the research process, an exhaustive literature review was done on the topics of UA and PGS in order to get inspired by past and current experiences on PGS on the one hand, and the actual context of UA with a specific focus on France, including initiatives, existing challenges and remaining needs in terms of action-research on the other hand.

2.1 Action-Research process : Kolb's learning cycle

With reference to literature, Lieblein et al. (2012) argue that action-research seeks to combine action and reflection, theory and practice in a participatory approach in order to provide concrete solutions to existing issues. That is why this action-research has been designed and redesigned within an iterative process, by using data from interviews and literature to continuously rethink the research methodology and adapt it at the best to the needs and issues newly revealed throughout the study.

However, embedding research within an action-oriented academic work implies a higher emphasis on methodological rigor (Lieblein et al., 2012). Thus, the iterative research process has been built based on **Kolb's cycle of experiential learning** (Kolb, 1976). This conceptual framework enables to "switch" between concrete world and abstract world in order to conduct a soft-system inquiry. In my case, switching between action and reflection allowed me to reconsider my research approach throughout my learning process and deal with a complex soft-system involving humans plus two already complex and intertwined concepts: UA and PGS.

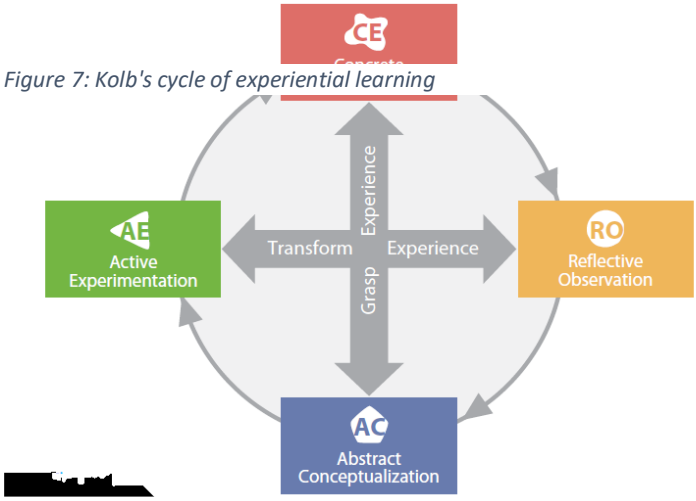

Figure 7: Kolb's cycle of experiential learning

In figure 8, Kolb's cycle is being used to show the methodological process of the research. This diagram highlights the dual and dynamic connections between concrete experiences with interviews of stakeholders ("what is there?") whom data were analysed in the abstract world ("what does it mean?"), then translated into models and concepts to further investigate ("What

could be ?"), and put back into the concrete world through reality-check with new stakeholders ("how do we get there?"). Thus, by going through a cycling and iterative process of observation, reflection, planning and action, action-research enables to analyze complex soft-systems in order to deliver practical and adapted solutions to existing needs and issues.

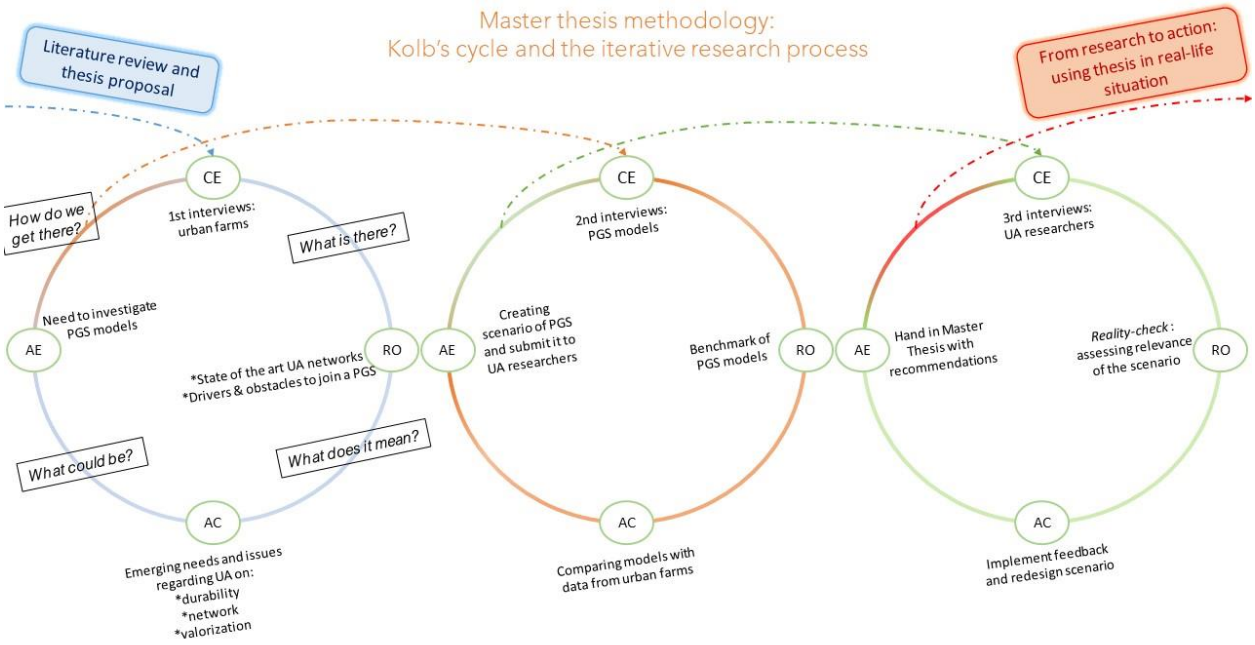

Figure 8: master thesis methodology

2.2 Semi-structured interviews

Categories of participants

Semi-structured in-depth interviews were conducted with different categories of stakeholders from several places across France, in order to collect specific data aimed to answer the research question at different stages of the research. Participants were classified as such :

- **Ten urban farmers** were interviewed to draw a state of the art of values, ideas, perceptions, needs and issues related to UA: durability of urban farms, existing networks and lacks, valorisation of the multifunctionality of UA.
- **Three PGS networks** were studied and their representatives interviewed by doing a benchmark of their modalities, finalities and functioning, in order to glean elements that would fit themes emerging from the first round of interviews with urban farms.
- **Five UA and PGS researchers** were interviewed for a reality-check, by submitting them a first draft of the scenario of PGS, in order to listen and analyze their critical feedback about the relevance of such a scenario, to eventually implement them in a final scenario.

A complete **table of participants** is available in **appendix 2**.

Participants selection criteria

For the integrity of the research and in order to get the most thorough data as possible, participants were selected according to the following criteria:

- A diversity of location in France
- A diversity of forms and complementary expertise to tackle a range of UA challenges
- Different development stages of the projects: starting, maturing, declining.

Overall, the main criterion to select participants was an expected common bedrock of values including Agroecology and the ESS, as these latter are projected to be at the core of the definition of "durability" in the PGS. These selection criteria were evaluated according to information obtained through literature study, web research, notoriety and personal experiences. Obviously, availability, willingness to participate to the research and responsiveness to emailing were *sine qua none* conditions to realize interviews

Process

Stakeholders were solicited by phone call or E-mail, and the five first interviews took place on their working place. This helped to get a better picture of the context and make the interviewee feel confident to speak freely.

Interviews were conducted mostly by myself, and a few times with the director of Les Cols Verts, Boris Marcel. They were recorded with the agreement of the interviewee, either anonymously or with his/her name, according to their will. Complementary notes were taken on a notebook.

Following the methodological framework of Kolb's cycle, questionnaires evolved throughout my learning experience to adapt questions and approach to the interviewee and the types of information that I sought. An example of the **questionnaire** I used for most of interviews is available in **appendix 3**.

2.3 Data analysis

In order to analyze data, an **Excel table** (see **appendix 4)** was first used to transcript records of interviews and distil data into (sub-)categories.

Secondly, main ideas from each interview were extracted and relevant observations noted to link complementary or contradictory ideas between participants.

Finally, data were synthesised in a Word document to bring in light the main themes and structure the results.

Participants' statements were originally in French, and have been translated into English for the thesis writing. Therefore, the original syntax had to be adapted sometimes in order to fit in the body text, but the original meaning of participants' statements has been preserved integrally.

2.4 Lay the foundation for a real-life application

The logical continuation of an action-research being to apply results and recommendations into a real-life project, I have enthusiastically conducted a complementary work aside the research aimed to pave the way for an operational phase at the end of my internship.

Social Business Plan

As the worldwide Covid-19 crisis happened during the master thesis, I turned the national lockdown into an opportunity to dive into the field of social entrepreneurship by completing the MOOC "*Changer le monde : créer son entreprise sociale*" by ESSEC Business School. Thus, I used the PGS project as a study case to design a Social Business Plan in real-life situation. Produced materials are available in the appendices:

- **Stakeholder analysis**: appendix 5
- **Definition of social needs**: appendix 6
- **Social impact value chain**: appendix 7

Fundraising

As representatives of the PGS Nature & Progrès expressed in their interview: "*Co-creating a PGS requires an external support and a strong involvement of a coordinator at the early stage of the dynamic*." (interview Jérôme Enjalbert and Geoffroy Raoult). In fact, participatory approach present an interesting potential to ensure a long-lasting project, however it implies a heavy work of facilitation that should be endorsed by a salary of the initiating structure. Therefore, in parallel of the research I applied for two calls for proposals from French foundation in order to raise funds for the project, potentially allocated to finance my future salary. Although it required a lot of time, it helped me a lot to better define the borders of the PGS, its content, potential partnerships, financial needs etc, which are necessary competencies for any entrepreneurial project. Produced materials are available in the appendices:

- **Forecasted budget**: appendix 8
- **Letters of interest** were sent to research participants in order to formalize and give evidence of a collective dynamic of UA actors around the PGS project: appendix 9.

PGS design

As part of an action-research, recommendations aim to suggest further research and actions based on the research outcomes. Thus, I realised a benchmark of PGS (see part 4.1) in order to produce an intended design of a PGS for UA, based on the results of the research (see part 5.1). Even though a PGS should be designed with direct participation of stakeholders, this design aims to propose a basic framework to use in the collective reflection, but it is not in any case a final imposed version of the PGS.

Participatory process guideline

As explained above, a PGS is a "Common good" (Lemeilleur and Allaire, 2018a), therefore it must be designed with UA actors in order to ensure accession of these latter with the collective decisions. For this purpose, I included in the recommendations an intended design of the participatory process that could be conducted in the form of a PAR to co-create the PGS with stakeholders (see part 5.2).

3 1st RESULTS & DISCUSSION

The iterative methodology of this action-research implied to continuously discuss the results throughout the research process, by assessing their contribution to the research objectives, in order to connect newly revealed needs and issues with the hypothesis and get closer to reality. Thus, with the aim to improve readability and comprehension of the entire research, results and discussion were decided to be merged in two respective sections untitled "**Results & Discussion**". At the end of each section, a conclusion will discuss the results with regards to the research objectives.

This first section is about presenting a **state of the art of needs and issues** related to the research objectives that were expressed by UA actors during interviews. In the conclusion, I will discuss **if in theory** PGS are relevant certification schemes to meet these objectives.

3.1 Research objective 1: how to consolidate UA networks?

The next paragraphs present results from interviews with UA actors who were asked questions related to the first research objective: how to consolidate UA networks? Their answers revealed different network dynamics as well as emerging needs and issues to be tackled.

3.1.1 Network dynamics

3.1.1.a. Inequal territorial dynamics

Peer-collaborations

Along the growth of UA in France, disparate network dynamics emerged across the national territory, sometimes under the initiative of public authorities or brought on by UA actors themselves. Collaborations can be of very different natures, from resources mutualisation to information and knowledge exchange, and research collaboration. For instance, the organisation Vergers Urbains (Paris) mutualize not only tools and space with neighbouring actors such as Zone-AH! and Du Monde au Balcon, but also human labour (shared employees). Sometimes informal deals are being made between two actors : "*We collaborate with La Caverne which produces mushrooms. They provide us space in the basement, in return we cast their mushroom substrate off*." In the city of Nantes, staff from the organisation La SAUGE is being trained by partner Le Paysan Urbain to grow microgreens, while in Nancy, La Ferme du Plateau de Haye collaborates on research programs with agri-school AgroParisTech and Parisian urban farms.

Maisons de l'AU

In several cities such as Nantes, Lyon, Marseille and Angers, some UA actors managed to federate formally the co-creation of local "Maisons de l'Agriculture Urbaine" (MAU, Centre of UA). For example, la Cité de l'Agriculture (Marseille's MAU) presents itself as a driver to "*federate and link UA initiatives, highlight practices, support and advise actors, advocate towards public authorities with a particular work on urban land surveying.*" A few hundred kilometers up north in Lyon, the MAU was created in 2016 by different actors like GROOF and the Ferme de l'Abbé Rozier, whose manager Alain Grenet however deplores an "*insufficient intern dynamic*" at that time.

Support from public authorities

In Paris, UA has received a growing interest from municipality which set up a yearly call for proposals called "Les Parisculteurs" in 2016, aimed at turning vacant urban lands, rooftops etc into food production site. In 2019, 21,5ha were allocated to UA projects with a budget of 7,5 million euros and a team of twelve salaries, which demonstrate a strong investment from Paris municipality to develop UA (Garaix, 2019).

Less dynamic territories

In parallel, some actors feel less integrated in local networks for UA, sometimes simply because there exists no consistent network all year round. Le 100ème Singe (Toulouse) develops incubators for peri-urban farms, therefore they collaborate with UA actors in the inner-city but they admit there is no official network to federate them, except "Les 48h de l'Agriculture urbaine", a yearly national event dedicated to UA. Same for the organisation Les Jeunes pousses (Avignon) which started its farm very recently and regrets "*a lack of other UA actors in the city*", while they try to inject a local dynamic during the yearly event. At the other side of France, the Cols verts collective of Rennes affirms not being engaged in official UA networks but rather participating to UA seminars organised by the municipality.

These examples show heterogeneous network dynamics between territories, some benefiting from a strong implication of public authorities, while other require more "grass-roots" initiatives from UA actors themselves.

3.1.1.b. National networks

AFAUP

Numerous are UA actors who engaged in various networks at the national scale, either specific to UA or covering other fields of action. Among those dedicated to UA, the French Organisation of Professional UA (AFAUP) was created in 2016 in order to develop all forms of professional UA, exclusive of any value-based judgment : organisation and start-up, low-tech and high-tech, indoor and outdoor. The AFAUP seeks to accomplish three main missions on a national scale : federate

initiatives, promote UA and accompany its development (AFAUP, 2018) by advocating its needs and interests towards public and private operators, notably through a chart (AFAUP, 2019a, AFAUP, 2019b). However, many actors do not consider worth it to join the federation for different reasons. For instance, the Cols verts collective of Rennes has not become a member yet for time and money reasons, while their Breton neighbour Optim-ism does not value a subscription because they "*do not necessarily face the same problematics as* [they] *are located in a smaller provincial city, whereas the AFAUP is very much Parisian*." Likewise, the emerging organisation Les Jeunes Pousses voices how complicated it is for an isolated actor to start a project in UA, notably to find partners : "*without actors to source around, we have no choice but to refer to the national level* […] *and I'm not sure to find it out with the AFAUP*."

ANRU+

Another consequent network for professional UA is the ANRU+ network, created in 2018 by the National Agency for Urban Renewal (ANRU) and destinated to winners of its calls for proposal "Innover dans les quartiers" and "Les Quartiers fertiles". This network is the first national public-led dynamic aimed at fostering discussions between actors on issues and practices specific to UA (ANRU, 2018, ANRU, 2019) such as "*juridic questions, land tenancies, production and business model, with the intervention of specialist, field-actors' testimonies and farm visits*" (Optim-ism). Recently, the ANRU+ working group published a practical and thorough report available to anyone willing to start a project in UA (ANRU, 2018). However, the fact that "*workshops are held every two or three months but only during the first year of projects, not after*" (Lab3S, Paris) unable actors to benefit from the network during their phase of development. Besides, UA project initiated apart from ANRU's calls for proposals are not included into the network, which restricts participation to collective reflection.

Community gardens

A large part of UA initiatives are considered "non-professional", such as the community gardens managed by volunteers who do not seek a pecuniary return on investment. These gardens are also organised into networks at the national scale such as the FNJCF (Fédération Nationale des Jardins Collectifs et Familiaux) or the JTSE (le Jardin dans Tous Ses Etats), sometimes also locally like in Lyon with the Passe-Jardins. Nevertheless, bridges are not common with professional UA as it is experienced by the Cité de l'Agriculture who includes all kinds of UA in its network: "*it can be very difficult to work together on very different projects* […], *maybe we will have to tighten the network to professional UA only in the future, because community gardens are on very different issues."*

Non-UA-specific networks

Another case scenario concerns the embeddedness of some actors within agricultural networks that are not specific to UA, but that can still serve UA purpose. For instance, Alexandre Lamarque (Nancy) is administrator of the national Grassroot Permaculture University (UPP) and participates to a regional network of eco-construction professionals.

3.1.1.c. Actors on the edge

Among interviewed UA actors, those located in peri-urban area express a relatively low interest in joining UA-specific networks. For example, "*la Ferme de l'Abbé Rozier (*Lyon outskirts*) is engaged in traditional agri-networks but these latter don't include UA in their field of action*" (Alain Grenet). Likewise, despite the recent set up of an urban farm in Lorient inner-city, the essentially peri-urban farming organisation Optim-ism (Jardins de Cocagne) "*rather likes to work with local networks on rural issues".* In Toulouse, the 100ème Singe once participated to a meeting organised by the AFAUP, even though their work focus much more on peri-urban farming, as they "*gather structures such as the ADEARR, CIVAM, Terres de Liens etc, and* (they) *participated to the co-construction of the collective Nourrir la Ville" (dedicated to recreate greenbelts around cities*." Obviously, features such as spatial proximity to city centre and type of agriculture (especially productive market-gardening) can determinate willingness of actors to get involved in specific intra-UA networks.

In a nutshell, there is a high diversity of degree of network integration, depending on factors such as the concentration of UA actors on a territory and their willingness to federate, as well as the implication of public authorities in the promotion of UA which can vary a lot from a territory to another. In both case scenarios, network initiatives are being developed at the national scale, not without limits.

3.1.2 Needs and issues

Along the multiple network initiatives to link, federate and promote UA actors, participants were also invited to express what are the remaining needs and issues to their eyes. Their observations underline limits of the presented initiatives as they raise potential rooms for improvement.

Limits of official networks

In the same vein of critics emitted by interviewees on the limited inclusivity of the AFAUP and ANRU+, the Cité de l'Agriculture did a territorial diagnostic at its early stage and found out that one of the most prominent needs expressed by UA actors of Marseille was an absence of federating actor to make their voice locally. It is only in 2019 that public authorities officially launched an ambitious program to develop UA in the metropole (La-Cité-de-l'Agriculture, 2019).

Need for trust, transparency and cooperation

Some values have been considered by participants as fundamental in UA networks, such as trust and reliance (Les Jeunes Pousses). In Rennes, Hélène Brethes (Cols verts) regrets "*a lack of pooling, transparency and pragmatic sharing*" and deplores a *"subsisting spirit of competition*" in the field of UA. According to her, there are remaining taboo topics such as business model that must be overcome since "*the role of UA networks is to allow transparency on these topics".*

Issue of typology

One prominent question regarding inclusivity in UA networks is the distinction between professional and non-professional actors. For example, in reaction to the untitled "Professional UA seminars" organised by Rennes municipality, many local actors questioned what is behind the term "professional UA", as they considered working "professionally" for thirty years although they do not have salaries (Hélène Brethes). For the sake of inclusivity, Hélène Brethes thinks "*essential to merge professional and non-professional actors within the same networks of exchange*". Although they might share common values and issues, she admits most issues and dynamics are very different between a peri-urban farm and an "Incredible Edible" initiative (citizen-made vegetable boxes in public spaces). This point of view is shared by Louis Roland, co-director of La Cité de l'Agriculture, who observed a clear distinction between these two profiles in the Marseille UA network : "*community garden are usually less prone to come to network reunions because they know we will talk about topics such as juridical status of urban farmer, the kind of topics discussed at the AFAUP. That is the difference between professional and non-professional UA, it's about problematics*."

3.2 Research objective 2: How to valorise UA multifunctionality?

3.2.1 What should be valorised?

Multifunctionality of urban farms

In coherence with what previous research has shown, multifunctionality of urban farms is perceived by UA actors as a specific feature that should be better valorised. According to Sébastien Groelzer (Vergers Urbains), "*not enough is done to valorise urban farms and their multiple functions beyond production* [such as] *their ecological impacts on biodiversity, their capacity to recycle urban waste, their embeddedness within a community through citizen-led activities and pedagogy in schools. A label should promote this multifunctional and holistic dimension."* As part of their multifunctionality, farms' capacity to provide eco-systemic services is widely assumed as an essential element to be valorised in order to develop UA.

Organic off-ground practices

As highlighted in the introduction, off-ground cultivation practices cannot be certified with the organic Label AB. According to Alain Grenet (Ferme de l'Abbé Rozier), there is a real need for an organic label that encompasses off-ground practices, as many UA professionals have developed virtuous practices to adapt with poor quality of urban soils.

Local embeddedness

Figure 9: L'Agronaute, an urban farm created by La SAUGE (Nantes)

The need to valorise social dimension of UA was largely approved and mentioned by interviewees. Antoine Devins is main manager of La SAUGE's urban farm "l'Agronaute" in Nantes. He believes projects dedicated to general interest need a better recognition, so does Sébastien Groelzer who is convinced that urban farms can be as useful and important as a social centre, therefore "*they must be valorised as public equipment*". Precisely, it is needed to spotlight the involvement of inhabitants in farms' activities and thus farms' capacity to root in a community and serve local needs (Les Jeunes Pousses, Les Cols verts). According to Louis Roland, "*it is necessary to provide evidence of positive impacts by using precise indicators and qualitative feedback in order to gain credibility and therefore remove obstacles, get more financial support."*

Peers-valorisation

Hélène Brethes also pointed a prominent need for peers-valorisation vis-à-vis the teams working on the project "*who tend to question the value of their work*". It becomes quickly necessary for a team to get feedback on their achievement and tools to gain confidence and get a thorough vision of the change they implement.

3.2.2 Institutional support

If every UA actor has his/her own margin of manœuvre to improve the durability of the project, many challenges arise out of the sphere of their decision-power. These structural challenges must be tackled at the institutional level to create effective change, which justify the need to "*promote positive outcomes of UA* (through*) quantitative and qualitative bearable public indicators* […] *in order to guide public authorities towards the integration of UA in urban planning*." (CESE, 2019). Interviewees expressed their perception of the main structural issues that hold the development of UA.

Land tenure insecurity

According to Paul-Arthur Klein (Les Jeunes pousses), land tenure security is the biggest issue for UA, meaning a long-term contract on a field close to the city. To the eyes of Louis Rolland "*it is senseless to start a UA project with a three-year contract of transitory urbanism, there is a real need to secure lands with UA-adapted leases.*" Indeed, in its notice of 2019 the CESE confirmed that "*farm activities must be envisioned on the long-term to organize and run production systems*." That is why in 1945 a new land tenure specific to agriculture – the "fermage" – was created, based on the Rural Code (art. L 311-1). However, this type of lease mismatches with spatial, temporal and financial constraints of UA (CESE, 2019). The case of Alexandre Lamarque – manager of the Ferme du Plateau de Haye (Nancy) – is particularly edifying as he is still waiting for a 5000m2 field that was negotiated at the start of the project. To his eyes, that situation is a nonsense: "*we have to deal with an insecure land tenure although our aim is to fight food insecurity."*

Legislative issues

A lot of issues faced by UA actors have to do with legislative and institutional inappropriateness, and a lack of support from public authorities. For instance, the legal status of "farmer" implies that the main source of income comes from production sells, whereas typical business models of UA structures are hybrid with a high proportion of income from services to companies, schools or training programs (CESE, 2019). Consequences can be very significant: without an agricultural status, urban farmers cannot pretend to the CAP subsidies allocated to young farmers, neither are they protected by the agricultural health insurance (CESE, 2019) which increases insecurity of the project as a whole. Furthermore, agricultural status allows to benefit from specific rules such as irrigation water at a lower cost, which can become a substantial obstacle to develop UA in drylands, as Louis Roland points out: "*here in the South of France variable loads quickly explode without access to water at farm rate*."

Whereas the organisation Optim-ism has been essentially running programs for professional integration on peri-urban farmlands, question is being raised about the status of farmers who will soon take over management of the urban farm in Lorient, and how can Optim-ism ensure them a bearable business model in this situation. In the French capital, Vergers Urbains "*seek a diversified business model that is not depending only on subsidies*". Where Alexandre Lamarque expresses the necessity that farm managers deserve a wage, Hélène Brethes stresses how challenging it can be to build a business model because of conflictual mentalities present in UA ecosystem: "*generating economic value in UA can be scowled on the one hand, because you are directly perceived as the "Start-up nation", but on the other hand it is definitely not secure to fully rely on subsidies, plus you are seen as a money pump*." That is why she regrets a "*competitive mentality*" in UA and observes a "*general embarrassment around topics such as business models*."

Demystification of UA

Some participants imagined a certification as a tool to promote and clarify what is UA to the eyes of inhabitants and farm's stakeholders. Sébastien Groelzer's opinion is that "*a label would provide a better visibility and a higher confidence towards inhabitants and users of the farms* […], *it would guarantee a certain ethic of urban farming*." Indeed, as it was presented in the introduction, UA is such a complex concept that people get often confused regarding the definition(s) of UA, as Paul-Arthur Klein and Inès Revuelta (Les Jeunes Pousses) express: "*UA is still misunderstood, elected representatives feel sometimes lost.* […] *It is important to distinguish the different forms of UA, because people don't understand what it actually is*." (Les Jeunes Pousses) The role of UA and its relationships with rural agriculture is also often misinterpreted, as Hélène Brethes observed during conference where UA and rural agriculture where systematically opposed, whereas she thinks it is a pointless debate.

3.2.3 Limits of valorisation

Competition

In the case scenario of multiple applications from UA actors to a call for proposal, a tangible valorisation like a mention would serve to distinguish actors one from another to the eyes of financers and decision-makers. However, Antoine Devins points that a label can be useful only if there is competition between actors with similar activities, but would be useless to distinguish a productive farm without social dimension from another farm with more social actions, as they are inherently distinct by their activities. Therefore, he expresses concerns about the purpose of the label: "*if it is aimed to distinguish UA actors from each other, it might be divisive whereas we need to be more united at the moment*."

Limited impact of guarantees

La Ferme du Plateau de Haye is an interesting example of a successful project although facing a lack of political support. This is due to a shift in the political chessboard and a change of the farmland ownership from the municipality to the metropole. Despite many rewards and promotions, the farm struggles to obtain financial support to pay a salary that is vital to maintain the project. Furthermore, public authorities have suspended the farm's ability to welcome public, although this hinders

Figure 10: rewards and prizes obtained for the Ferme du Plateau de Haye Photo: Timothée Vernier

the team to give training courses that are one of the biggest incomes for the project. Alexandre Lamarque, manager of the farm, claims: "*We are recommended by more than 150 partners, we won many awards at the national, regional and departmental scales […], we have been nominated "national example of innovative UA" by AgroParisTech. I don't know what more can be done."* This example questions the ultimate goal of valorising and to what extent a certification can actually be helpful to tackle a lack of political support. There exist means to valorise UA projects, however they are obviously not sufficient to get support from decision-makers in some situations.

3.3 Research objective 3: How to promote a collective progress strategy towards sustainability?

With regards to this objective, participants were asked what could be the driving forces of a collective progress strategy towards sustainability. Then they were asked which expertise they would like to benefit from peers in order to progress, and which knowledge they would be willing to share in return.

3.3.1 Need for knowledge and competences

Emerging UA projects such as Les Jeunes Pousses and the collective Cols verts Rennes are well positioned to stress how necessary it is to acquire a wide diversity of knowledge and competencies from the beginning of a project and onwards. Hélène Brethes expresses that "*UA requires tremendous adaptation skills in terms of production, so that thematic groups could be interesting to set up*." As an example, after a bad experience with polluted soils delivered on the farm, she points out the lack of general hindsight regarding soil pollution, and the extremely poor quality of urban fill soil often provided for cultivation, sometimes supplied by public authorities. With the benefit of the hindsight, the emerging organisation Les Jeunes Pousses has experienced that "*starting an urban farm requires to get competencies on many fields such as agriculture, event communication, bar-tending, workshops hosting and animation*." From its perspective of long-standing (peri-)urban farm manager, Alain Grenet expresses how diverse is the UA sector and deplores a "*generally low and uneven level of technical competencies*."

3.3.2 Potential for knowledge exchanges

Interviews revealed a high potential of co-creation of knowledge, and a demand from actors to exchange expertise in order to tackle issues and progress. Where emerging actors such as Les Jeunes Pousses would appreciate the value of an external point of view on their business model for the first three years, Les Cols verts Rennes are willing to contribute to the UA community in an open-source logic with a pedagogical kit they created for kids. Likewise, Vergers Urbains expressed their interest in exchanging and sharing of expertise. Thus, a relationship of supply

and demand of knowledge between peers may be observed, which reports on the fact that "*every actor has developed an expertise in a specific niche"* (Vergers Urbains). Some actors such as the action-research hub Lab3S (Paris) have actually been given the mission to bridge local UA actors with the aim to find collective solutions to their respective issues.

As I was invited to conduct an interview as part of a Skype meeting between Max Schaffer (Optim-ism) and a salary of my organisation Les Cols verts, I had the opportunity to appreciate a live meta-situation of reciprocal interest for knowledge exchange. Indeed, they expressively shared their willingness to "*cooperate on joint projects in Britany*" and the potential to hybridize their models with their respective experience on professional integration for the first actor, and entrepreneurship expertise on UA plus pedagogical competencies for the second one.

The table below puts forth **opportunities for knowledge exchanges** between participants of the research, based on needs and assets they expressed in terms of expertise sharing:

UA Actors	Needs (demand)	Assets (supply)
L'Agronaute (La SAUGE)	-Participatory gardening -Services to enterprises	-Participatory gardening -Event communication and workshops hosting
Vergers Urbains	-Organic UA practices -Pedagogical tools	-System Thinking : landscape design, animation, architecture and urbanism, artistic creation
La Ferme du Plateau de Haye	-	-System Thinking : permaculture design and multifunctional place
Le 100ème Singe	-Pedagogical tools for school - Small-scale organic practices -Short-Supply Chain network	-Participatory governance -Facilitation -Prospection and advocacy -Business models
La Ferme de l'Abbé Rozier	Small-scale organic practices	Small-scale organic practices
Les Jeunes Pousses	-Business model -general warning on UA challenges	-Institutional knowledge / relationship with public authorities
Collectif Cols verts de Rennes	-Organic UA Production	-Participatory governance -Pedagogy and educational activities
Optim-ism	-Pedagogy and educational activities	-Professional integration -Small-scale organic practices
Lab3S	-Participants to action-research	-Networking -Methodology for impact measurement of UA -Valorisation/communication about UA projects -Research methodology on UA issues
La Cité de l'Agriculture	-Methodology for impact measurement of UA -Researchers	-Prospection and advocacy -Networking and communication

Figure 11: needs and supply of expertise in UA

Thus, this demand for co-creation of knowledge stresses the potential of a collective progress strategy in which knowledge and competencies could be shared in a logic of cooperation and general interest.

3.4 Discussion: potential of PGS to meet research objectives

Results from interviews permitted to draw a thorough state of the art of current dynamics in the field of UA, as well as remaining needs and issues through the scope of the three research objectives. Hence, the present conclusion aims to draw a parallel between the research objectives and the hypothesis of PGS as relevant certification schemes to meet these latter.

3.4.1 Essential traits for a label of UA

Participants were asked about their perception of what would be at stake for a certification scheme for UA. Core intertwined notions emerged from their reflection on essential traits to ensure sustainability of such a system.

Flexibility and simplicity

With the benefit of the hindsight, Antoine Devins (La SAUGE, Nantes) shared his experience on a tentative of specifications for microgreens production with his partner network Paysans Urbains. They reflected on criteria and thresholds – such as limited heating of greenhouse and no artificial lights – that would certify production of microgreens with respect to values they endorse. Working on that practical case showed that same results cannot be achieved with the same means, depending on the context and specificities of each farm, here in particular regarding the climate. Concretely, the Paysan Urbain farm of Marseille can easily reduce energy consumption because of the substantially warmer climate of the region, whereas its peer-farm in Romainville (Paris) – where climate is colder – "*is obliged to turn on a frost-protection system in winter to maintain production, but it implies a higher energy consumption."* Antoine pursued the reasoning*: "A producer with a super high-tech greenhouse could demand specification such as low-tech greenhouse to not be heated up in winter, but a new producer cannot necessarily invest in a high-tech greenhouse at an early stage, so of course he must consume more energy.* […] *What should be the threshold for the control then: no heating over 5°C or a limit of energy consumption?"* They rapidly collided "*an overwhelming complexity*" and concluded that quantitative thresholds do not allow to take in consideration specificities and context of each urban farm, therefore it would not be an adequate method to apply shared values. "*Early on we decided to stop, to build our partnership on trust and dialogue, and rescope specifications on basic criteria such as using organic compost and implementing professional integration as part of the model.*" Thus, flexibility of the criteria for control and simplicity of the system seems to be essential traits fitted with the complexity of UA.

Inclusivity

The idea of a label promoting a collective progress strategy raised up the issue of inclusivity. According to Amandine Largeaud and David-Alexandre Lobry (Le 100ème Singe), "*certification is very exclusive* […] *for those that produce with total respect of the specifications but who cannot afford the label.* […] *Price should not become a constraint*." They advocate to enlarge inclusivity to small-scale producers with virtuous practices however not specified, because these latter can actually be more sustainable than certified practices, which are limited and standardised. To their eyes, the example of the organic label AB shows how sclerosing certification can be, because *"most structures defending organic agriculture – like the GAB – rely on nothing but the AB specifications […] but if you do not fit with it you are out. Today it is necessary to open up!"* This echoes with Antoine Devins' concerns regarding a label that risks to divide UA actors "*whereas time is for unification*." Thus, a label for UA should overcome limits of Third-Party Certification (TPC) scheme by ensuring more inclusivity, especially in the context of UA.

Legitimacy and representativity

Obviously, a collective strategy of progress requires a collective dynamic. Given the heterogeneity of UA, it should therefore ensure accession of very diverse stakeholders. According to Sébastien Groelzer, building accession requires *"a horizontal organisation with actors who are representative of the different aspects to be promoted in the label* [in order to] *avoid a lack of legitimacy from the decisional committee*." On the same vein,, the 100ème Singe underlines that this label should not be a mean for a single organisation to valorise its action, but rather be "*a multi-stakeholder group with transparency to ensure representativity, autonomy and independence."*

Emphasis on process and progress

Following the limits of result-oriented certification that Antoine Devins experimented, flexibility seems to require a different logic of evaluation to valorise virtuous practices. According to Hélène Brethes, the spirit of a progress strategy is to evaluate results based on the means and the efforts: "*it is about valorising the path of transition.* […] *There could be "fixed" criteria, but it should not be detached from a strategy of progress*." Therefore, she thinks this implies a mix of quantitative and qualitative evaluation, because quantitative analysis alone cannot appreciate impacts on people, which is the hardest but the priority to be valorised.

3.4.2 Cross-analysis with PGS principles

As presented above, interviews revealed converging views regarding the essential traits of a label for UA, and put forth a set of core notions that synthetize the collective thought : flexibility, inclusivity, legitimacy, credibility.

In parallel, interviews were conducted with representatives of the historical French PGS network Nature & Progrès and PGS researcher Sylvaine Lemeilleur (CIRAD-Montpellier), in order to better grasp what is at the core of a PGS network and how PGS principles ensure sustainability of the system. A thorough cross-analysis of interviews revealed interesting correlations between core notions and universal PGS principles as defined by the IFOAM (IFOAM, 2019a) : Trust, Shared Vision, Horizontality, Participation, Learning Process and Transparency.

The following diagram (figure 11) presents a systemic conceptualisation of a sustainable PGS applicable to UA, with respect to participants' drivers and obstacles to join the PGS. Here, PGS principles are key elements that bridge core notions in order to sustain the system as a whole. The next sections aim to explain these bridges within a chosen logic and a critical approach. However, system thinking inherently requires a holistic view of the system because all elements are intertwined together, therefore many lectures through many lenses can be achieved. The following explanation is intended to be linear enough for a good comprehension, consequently it does not allow to encompass all linkages of the diagram at once. Thus, this latter must be investigated as thoroughly as possible by entering the system from different perspective through different starting points for a complete understanding.

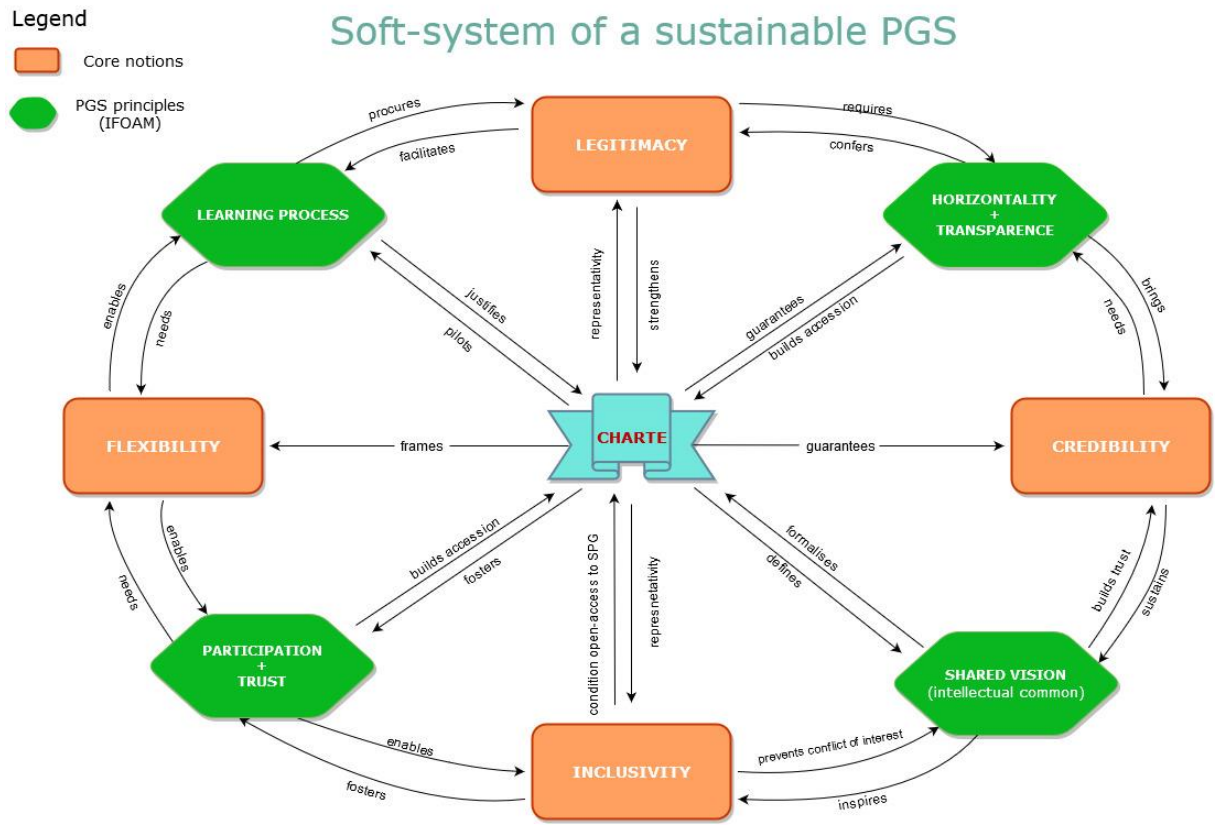

Figure 12: soft-system of a sustainable PGS for UA

Flexibility to ensure inclusivity and learning process

PGS are designed to provide enough flexibility in the evaluation to allow both a learning process – meaning a progress strategy – and participation through a fair inclusivity and trustworthy relationships. According to Jérôme Enjalbert et Geoffroy Raout (Nature & Progrès), "*the chart offers more room for interpretation with more flexible tools than specifications.* […] *It provides a higher leeway that is adapted for very different actors linked by a shared vision*." Thus, the chart is a key element at the core of most PGS, because it defines and formalizes the vision of the "common", and frames flexibility as a written collective commitment. By doing so, the chart becomes "*a fuel for the community (willing) to make a shared vision come to life and defend a social project*." Indeed, Max Schaffer (Optim-ism) expresses that his "*motivation* (to join the PGS) *would be to support a political project*."

Flexibility implies a less strict control and a lot of trust and honesty among PGS members. This provides necessary conditions for a learning process to occur, through cooperation over competition. As Hélène Brethes deplores "*a remaining competition spirit in UA",* likewise Les Jeunes Pousses shared some doubts regarding the PGS and the "*capacity to pull together* […] *as the more urban farms on a territory the more competition there is, and a lot of project leaders want to keep their secret recipe for themselves Trust is needed*." On the contrary, Vergers Urbains's driver to join the PGS is "*to gain trust among inhabitants*." Thus, trust permits cooperation and flexibility to occur, hence supporting a learning process. However, as Sylvaine Lemeilleur underlines, "*it should not be a blind trust though. It is essential to understand the obstacles that prevented an actor to fulfil production specifications. This latter must prove that efforts are still being made. But if ever, after a while, specifications are still not respected, the actor must leave the network*." In other terms, if flexibility permits inclusivity through large participation, it requires complementary control scheme, as trust is not sufficient to prevent the "stowaway phenomenon" that can threaten credibility of the system (Lemeilleur and Allaire, 2018a).

Inclusivity for credibility and learning process

Following the need expressed by the 100ème Singe to open up collectives of organic farmers to other practices than label AB specifications, inclusivity is at the core of PGS. According to Sylvaine Lemeilleur, "*open-access prevents cheating agreements between members. That is why it is a "common" and not a "club"*, […] *otherwise it becomes self-certification."* Concrete application of inclusivity notion and learning process principle can be found in the Nature & Progrès network, where "*the chart is not an exclusive tool, it is rather designed to engender collective discussions* […] *and suggestions for improvements*." (interview Jérôme Enjalbert et Geoffroy Raout). Thus, PGS are designed to frame inclusivity of the system in order to ensure credibility of the certification and to facilitate a learning process through members participation. Nevertheless, Sylvaine

Lemeilleur stresses the need for supervision, a shared vision and respect of common rules to prevent "stowaway phenomenon" and ensure credibility of the system. Indeed, she illustrates this complex soft-system using the particularly relevant example of the famous "common" Wikipedia : "*Everybody can contribute to Wikipedia, but there are strict rules and control. If participation was exclusive to some people, the encyclopaedia would become private and there would be preferential treatment from supervision. On the contrary, herein contributors can disagree and provide nuance on articles, which are continuously being completed because people who oppose different definitions eventually manage to write together*." Thus, collective management of the system can be achieved thanks to rules regarding open-access and use of the resources (the chart), controlling scheme (visits and evaluation) and collective problem-solving capacities (Lemeilleur and Allaire, 2018a).

Representativity and legitimacy for credibility

As Sébastien Groelzer expressed, "*an obstacle to join the PGS could be the technocratic aspects, such as definition of criteria for evaluation and legitimacy of the decisional committee*." Hence, he argues for representativity of UA actors in the network to ensure legitimacy. Furthermore, legitimacy is a key to ensure credibility, as it was experienced by La Cité de l'Agriculture: "*there is the question of legitimacy. Today we are the emissary of UA actors of Marseille and this is what makes our organisation credible towards decision-makers*." According to Nature & Progrès, that is where PGS principles come in to play to ensure legitimacy and consequently provide credibility to the PGS : "*if decisions are being made with transparency, if everybody participate with horizontality, then it counterbalances the arbitrary margin of the chart*." Indeed, they argue that participation is one of the main challenges, so that the model is not being borne by a single and consistent group of people: "*the more people discuss during reunions, the fairest will be the decisions ; the least people participate, the more biased will be the outcomes*."

To sum up, credibility can be ensured through a sufficient and horizontal participation of representative and legitimate stakeholders, who formalize a shared vision in the chart that frames open-access and flexibility. This flexibility allows PGS members to experiment practices within a learning process that gives back legitimacy to the existence of the PGS, as actors join the network with the common aim to collectively improve and seek durability.

In a nutshell, applying PGS principles would allow to create an inclusive, credible, flexible and legitimate certification scheme for UA.

The cross-analysis of core notions and PGS principles above has shown that a sustainable PGS encompassing all aspects conceptualised in figure 12 could theoretically fulfil research objectives and provide solutions to UA actors on these issues.

3.4.3 Consolidating a network of UA

Concrete exchanges

Enlarged inclusivity, trust and cooperation seem to be at the core of what is needed in UA networks. Indeed, Hélène Brethes states clearly that to her eyes "*the role of a network in UA is to create more transparency and to share competencies. […] it would be then interesting to have a network to facilitate inter-acquaintance between peers*". Likewise, Paul-Arthur Klein (Les Jeunes Pousses) regrets the "National Days of UA" where he "*met physically more actors than anywhere else",* therefore he is convinced that confidence in a network arise when peers interact physically one with another. As a personal experience, he relates "*I recently had a woman on the phone who asked me for some help to start a UA project, and I know that if myself I had this call at the start of our project, it would have prevented months of toils."* Yet, farm visits are core elements of PGS which create very concrete opportunities for in-depth meeting on field. These types of concrete exchanges between peers are not structured yet in other UA networks such as the AFAUP or the ANRU+. Moreover, a PGS would provide a wider open-access to isolated actors willing to enter a network of concrete exchanges, whereas the AFAUP does not organize farm visits as part of its functioning, and little is the organisation embedded in provincial cities out of the capital. Likewise, the ANRU+ network being limited to laureate of its call for propositions, the non-laureate actors could join a PGS to participate to another collective reflection about UA durability.

Selective inclusivity

If the gap between professional and non-professional UA has been clearly demonstrated by interviewees, it was nonetheless expressed that mixing both families would have a real social value. Indeed, as Louis Roland says, even though the network approaches more professional-wise topics on UA, "*community gardens stay in the* (Métropole-Aix-Marseille-Provence) *network to get info, to be actively networking, to be advised […], also because their own network is not very active*." As PGS are designed as "common" goods, access is open to anyone as long as values and rules are respected. On this point, Hélène Brethes reminds that the AFAUP has been criticised for its unselective inclusivity whereas she "*could be picky on the chart* […] *with a strong emphasis on environmental values, because* [she] *would not like to be affiliated to a project of productive container using a maximum of electricity*." Indeed, the AFAUP chart is destinated to public and private lessors, decision-makers, but does not necessarily check if values are well applied among projects of the AFAUP members, contrarily to PGS which are designed to prevent "stowaways". Hence, PGS seem to give an answer to the issue of inclusivity, while ensuring credibility.

3.4.4 Valorising multifunctionality of UA

Prevent division

When I asked Louis Roland about his perception of the PGS (still perceived as a label at that time), he showed enthusiasm regarding the capacity of a label to provide "*common impact indicators to promote benefits of UA at the national or even the European scale, because now people invent their own indicators but we need common referential*." On that point, it was interesting to compare recommendations from the CESE with actors' opinion regarding valorisation of projects with high environmental and social impact at the expanse of more profit-oriented projects. In fact, if the CESE states that "*this distinction must be taken into an account by public authorities when they select projects to support*" (CESE, 2019), actors such as Antoine Devins warn about division as a pitfall to avoid in a label whereas cohesion is fundamental. Hence, it seems that distinguishing actors to the eyes of decision-makers might not be the most appropriate way to valorise UA impacts on a territory. The example of La Ferme du Plateau de Haye can illustrate this argument particularly well as even though they received multiple prizes and awards to valorise benefits, these latter did not disincentive public authorities to deprive the farm of its land : "*We have won many awards* […]. *I do not know what more can we do*", Alexandre Lamarque admits.

Peers-valorisation and UA demystification

Therefore, without rejecting the CESE recommendations, it could be interesting to consider valorisation through different perspectives, with complementary aims. For instance, with an informative purpose in order to demystify UA. To the eyes of Les Jeunes Pousses who perceive the PGS as "*a mean to valorise UA projects on a national scale* […] *by heightening awareness of decision-makers on what is UA so that they provide more support*." Features of PGS offer other means for valorisation also needed in UA according to interviewees, such as peer-valorisation through knowledge exchanges occurring during technical farm visits. Here the valorisation is not destinated to decision-makers anymore but towards field actors themselves to value their work, which complements the expressed lack of concrete exchanges between actors.

UA products

Urban consumers could also be targets of a valorisation of UA products. If we consider off-ground practices cannot legally be certified organic (label AB) through TPC (Daniel, 2017), then a PGS could provide an alternative mention that values products from organic UA practices. In fact, according to Alain Grenet, "*arguments and evidence will be most needed for UA where very small-scale production of microgreens is not labelled AB but costs 25€ a kilo. In general, farmers' efforts will be valued by consumers*." Obviously, this opinion is shared by the microgreen producer La SAUGE at its farm L'Agronaute whom manager Antoine Devins considers that "*a certification to*

sell organic UA products is absolutely useful. […] *Microgreens market does not exist yet, and we need arguments to promote it*." Nonetheless and paradoxically to the argument above, this type of valorisation is based on a competitive market distinction but only concerns UA production sells, which represents a very small portion of urban farming business models (CESE, 2019). Hence, a limited number of UA actors could benefit from this valorisation.

Paving the way to the next paragraph, PGS indeed permit a specific valorisation based on farm impact and effective practices but not aimed to distinguish actors. Indeed, PGS principle "Learning process" implies flexibility and an accompaniment of the farmer throughout the certification mechanism, therefore focusing the valorisation on efforts and a progress strategy towards durability. In other terms, PGS valorise means over results.

3.4.5 Promoting a collective progress strategy towards durability

Low-cost strategy

Following the argument above, application of PGS principles present interesting features able to meet the third objective of the research : promoting a collective progress strategy towards durability. At first, the issue of inclusivity is tackled by PGS thanks to a membership at a lower cost. Indeed, as it was presented in the introduction part 1.3.3., the problem of exclusivity resulting from unaffordable costs for small-scale producers has been one of the critics emitted towards Third-Party Certification scheme (TPC) (Lemeilleur and Allaire, 2018b, Béraud, 2015b). With the benefit of the hindsight, Sylvaine Lemeilleur relates experience of a PGS built with and for Moroccan farmers "*willing to be inclusive in order to attract new small-scale producers who are not necessarily experienced in organic production. Added to that they took into an account the fact that initial investment in production equipment cannot be done all at once*." As a reminder, certification costs through PGS can be up to five times lower than TPC on an annual basis (Bouagnimbeck, 2014). Thus, a lower cost would foster inclusivity of most UA farmers in the network as production scale is usually very small in the city, hence enabling a collective dynamic.

Exchange of knowledge

As PGS aim to foster a "learning process" (IFOAM, 2019a), they ensure enough flexibility to facilitate farmers' transition towards agroecology, on the opposite of TPC scheme in which "*officials are not allowed to provide advices to farmers they control, they cannot be judge and defendant simultaneously. Their job is to tick squares to state if you are in or out*." (Sylvaine Lemeilleur). Antoine Devins actually considers the value of flexibility in a label that "*could be awarded to someone with a high social value but maybe less energy-efficient. There could be forbidden factors […] and a final grade based on your scores on different criteria*." In PGS, flexibility goes with an accompaniment of farmers throughout their learning process so that they

improve their farming system. This accompaniment takes place during technical farm visits thanks to tools and methods to evaluate durability and diagnose farming systems in order to highlight rooms for improvement. This type of peer-analysis could offer a relevant bedrock to stimulate the aforementioned potential for knowledge exchanges between UA actors, bringing demand and supply of expertise on the same table. On the contrary, the AFAUP and ANRU+ networks are not designed to provide such peer exchanges of knowledge and know-how, but rather tackle institutional issues notably through advocacy and studies. For instance, the AFAUP has been conducting a national study on juridical forms of UA, likewise the federation collaborated with collectivities and agricultural lessors to provide two practical guides on land tenure for UA (AFAUP, 2020). Therefore, a PGS for UA could provide a learning process fostering individuals' empowerment through a collective progress strategy. This latter would then complete works of AFAUP and ANRU+ which are dedicated to support UA as a movement on a political and institutional matter.

To sum up this discussion, a first cross-analysis combining needs and issues of UA actors with PGS universal principles revealed interesting complementarities, hence supporting the idea that PGS can theoretically fulfil research objectives. With regards to the research question, it seems that *in theory* PGS are a relevant certification scheme to consolidate a network of urban farms, valorise their multifunctionality and promote a collective progress strategy towards sustainability. However, PGS being very different one from another as they target inherently different objectives and finalities, we must question *to what extent* are PGS a relevant certification scheme. To answer this question, it was necessary to investigate examples of existing PGS networks to get inspired and imagine an operational PGS for UA.

4 2nd RESULTS & DISCUSSION

According to Kolb's learning cycle, once we have accomplished this first abstract conceptualisation of a PGS for UA, the *learner* must "*flicker*" from the abstract world to the concrete world and answer the question "*How do we get there?"* Thus, following the logic of my research methodology, the next stage – or "cycle" – of the iterative research process consists in a benchmark analysis of three examples of PGS networks, in order to enrich the reflection with a diversity of perspectives on potentials of PGS.

In this second section, I will present the features and characteristics of these three PGS under the light of their respective objectives. In the conclusion, I will draw a parallel between these objectives and our research objectives and assess their potential application in the field of UA with the use of critical feedback and ideas from interviewed UA researchers. In other terms, I will discuss which "operational" features and characteristics of a PGS for UA are best to meet research objectives.

4.1 Benchmark analysis of PGS networks

As part of the second "cycle" of the iterative research process, a second round of interviews was conducted with the following actors:

- **Nature & Progrès**: Jérôme Enjalbert & Geoffroy Raout, two salaries of the federal office.
- **MIRAMAP**: Charlotte Bouyat, salary of the regional AMAP network Alliance-Isère
- **Mon Restau Responsable**: Patrice Raveneau, salary of the Fondation Nicolas Hulot pour la Nature et pour l'Homme (FNH) and co-coordinator of the PGS.

4.1.1 Nature & Progrès

History and purpose

The federation Nature & Progrès began in 1964 and currently gathers 27 local groups (COMAC) in France. It is important to briefly remind that N&P has had a specific role in the history of organic agriculture certification in France as it spearheaded the first requirements specification of organic agriculture – homologated in 1986 by French administration – therefore it was the official certification operator, whose method was (and still is) based on the active participation of direct actors of food production and consumption. Due to the fast development of organic agriculture throughout Europe since the 1980's, certification schemes were regulated in 1995 through the norm EN NF 45011 that imposes Third-Party Certification (TPC) – meaning certification by an independent body – as the only legal scheme in Europe (thus applied to the label AB in France).

As N&P disagreed with the inherent concept of commodification in TPC, the federation maintained its original certification scheme for organic agriculture – worldwide formalised as "PGS" since 2006 – which become then an unofficial and alternative trademark of a political vision of organic agriculture (Akker, 2015). Indeed, Jérôme Enjalbert and Geoffroy Raout underline that "*N&P is genuinely an advocate of a political project*" for a sustainable society based on values and principles of agroecology (Akker, 2015), which goes along with the definition of agroecology as a social movement (Wezel et al., 2016).

Functioning

On the opposite of the label AB, N&P provides a mention that does not certify each product individually but farms and enterprises as a whole (Nature&Progrès, 2019). Hence, once attributed the mention can be applied on every product. The control scheme combines both "*a chart that gives rooms for interpretation*" and fifteen requirements specifications that "*are adaptative declensions of the chart with different degrees of specifications: "forbidden", "authorised" in a particular context and "recommended" to push members to an ideal vision.*" (interview Enjalbert & Raoult) Evaluation of the candidate farm takes place during annual field visits usually involving a duo of producer and consumer who analyze the farm with the use of two tools: the investigation report for technical and bookkeeping aspects, and the NESO compass for a holistic analysis encompassing dimensions such as social, environmental, energy etc (see figure 5). This analysis is then studied by a local COMAC that will provide a notice to the national federation accredited to deliver the mention. Governance of N&P is aimed to be as horizontal as possible – with respect to universal PGS principle of horizontality (IFOAM, 2019a) – therefore local COMACs are designed to fit with local expectations and context. "*This local basis implies a degree of flexibility that is always framed by common referential documents* (internal rules of procedure, chart…see figure 6) *established by the federation N&P*" (Akker, 2015).

By making use of requirements specifications, N&P as a PGS has the specificity to target a commercial purpose through the guarantee of products to consumers that organic practices have been respected in the production chain. In fact, as Jérôme Enjalbert and Geoffroy Raout specify: *"if you want to certify products to sell them with a mention, a logo, then you must provide indicators to give evidence of a stricter approach than the chart alone."* This specific characteristic of N&P shows the interest of this type of PGS to valorise products and practices on a market. However, "*requirements specific are not obligatory in all PGS* […] (since) *it depends of the finality you want to trigger with your PGS."*

4.1.2 MIRAMAP

For instance, the French national network of AMAPs (Community-Supported Agriculture) MIRAMAP has been implementing another form of PGS as part of the existing network, with a different aim than certifying products for sells. As N&P – which supported MIRAMAP in this work – explains, "*MIRAMAP does not necessarily want to deal with a guarantee. Although, they have all characteristics of a PGS […], they have got a chart, they organize visits…"* (Enjalbert & Raout) Hereby, farm visits are rather designed to start a transparent and trustworthy partnership between a producer and AMAPs, by integrating the farmer within the regional network in a learning approach (Jacques, 2018). Charlotte Bouyat is a salary of the regional AMAP network "Alliance PEC-Isère", she explains that "*farm visits do not result in a tangible certification, it is rather a way for the AMAP to ensure a clear understanding of the chart by the peasant and his/her commitment to respect it, hence providing confidence to other AMAPs potentially willing to start a partnership with this producer."* Visits are conducted by volunteers (sometimes with the help of a salary of the network), they are designed to nourish a reflection about the potential partnership by going through the history and the functioning of the farm, assessing the farmer's needs and expectations regarding the partnership as well as the farm's production capacities with regards to food demand of the AMAP's members/consumers (Alliance-PEC-Isère, 2019). On the opposite of N&P, here there is no requirements specification that guarantees the respect of criteria and practices. Instead, the farmer self-evaluates his/her farm before the visit and collectively after the visit, in order to assess the degree of coherence between the chart and actual practices on farm (AMAP-AURA, 2019). As Charlotte Bouyat expresses, "*we make a diagnostic of good practices and remaining difficulties for the farmer […], the idea being to reveal rooms for improvement, aspirations of the farmer and how can the AMAPs support him/her*." Concretely, the evaluation of AMAP volunteers is completed by one or a few peer-farmer(s) who provide expertise and advices on more technical aspects of the farm system. Hence, in this type of PGS the evaluation frame of reference is "*based on experience and knowledge of other peasants in the network*", which on the one hand makes the process easier for volunteers, at the expanse of credibility of the "guarantee" on the other hand. Nevertheless, as the incoming farmer does not seek a certifying mention to apply on products, credibility and trust are ensured through the farm visit conducted by the AMAP volunteers, who are *in fine* direct consumers of these products.

4.1.3 Mon Restau Responsable

History and purpose

Another innovative PGS is the guarantee for collective catering restaurants untitled "Mon Restau Responsable" (MRR), initiated by the Fondation Nicolas Hulot pour la Nature et l'Homme (FNH)

and Restau Co'. As a salary of the FNH and coordinator of the network, Patrice Raveneau explains the history of the project: "*As part of the Ecological Pact initiated by the FNH in 2007, our scientific expert on agriculture Marc Dufumier suggested that collective catering is a relevant scale to address change in territorial food policies. Hence, we organised three World Cafés involving various actors of the field, and that is where the idea of a PGS came out."* A few years later, the guarantee was designed based on the objectives of the 2018 "Loi Egalim" on sustainable collective catering, therefore it aims to foster a collective progress strategy by providing restaurant managers a diagnostic tool to evaluate its performance with regards to the law objectives. Today, more than 1100 restaurants are engaged in the network, they gather regularly during the "Journées Territoriales d'Engagement" which are designed as an opportunity for peers professionals to meet, exchange knowledge and build new partnerships (Coutand and Emelin, 2019).

Functioning

One of the specificities of MRR is that it does not guarantee neither results nor a level of achievement but an engagement in a collective progress strategy. In that sense, "*Mon Restau Responsable is not a label, because in collective thinking a label is delivered to the bests, whereas our objective is to help every actor to progress, furthermore those who are struggling to do so. Hence, the mention is delivered at the start of the process to encourage them in this approach*." Contrarily to MIRAMAP and N&P, co-founders of MRR did not formalize their shared vision in a chart, but "*approximately twenty participated to the definition of a first questionnaire and four pillars of what should be responsible collective catering."* This self-evaluation questionnaire is readily available on the internet platform "MRR" to any restaurant manager willing to engage in the network. Thus, effective progress is not assessed by looking at the gap between actual practices and the "ideal vision" stated in a chart, but rather by comparing results of the questionnaire filled once every two years. After filling the questionnaire for the first time, the next step consists in a technical visit from a professional peer "*that should be not perceived as an audit, rather an exchange of experience.* […] *They don't have a guideline; the idea is to support the new incoming restaurant with an external point of view and advices on good practices."* Then, staff members gather to decide on which aspects should be improved. Finally, actual practices and further commitments towards sustainability are presented during a public meeting with a maximal diversity of stakeholders (eaters, staff, suppliers, public authorities…) to ensure "*transparency*" and "*trust*". The restaurant is attributed the mention "MRR" after commitment, then every two years it must fill the self-evaluation questionnaire again and present effective progress by comparing results of the two questionnaires. Contrarily to N&P, "*there is no control, no obligation to provide evidences*" Patrice Raveneau precises, however "*a discussion is engaged on each commitment, for a collective understanding of successes and failures* […], *whereupon*

stakeholders vote to decide if efforts have been effectively engaged by the restaurant", which determinate *in fine* if the restaurant receives the mention again or not. If yes, the staff presents further new commitments for the next two years and so on.

This PGS model presents the advantage to be very handy for the applicants, as it provides a readily available and simple framework to quickly assess the restaurant. Because the mention is free and there is no strict "control" of the progress, the network is particularly inclusive with structures that do not have equal means to reach ambitious thresholds. The drawback is a limited credibility of the mention as it only guarantees a commitment. Nevertheless, interactive public meetings allow for a direct valorisation towards restaurant's stakeholders, whose understanding of practices and issues at stake is more improved than with a single logo.

4.2 Discussion: characteristics of a PGS for UA

The benchmark has highlighted that PGS models can seek different objectives, therefore their features can vary one from another. Although, they are all designed to respect PGS principles as a common bedrock of values. Likewise, a PGS for UA should encompass these principles and be designed to meet the objectives targeted in this research. For this purpose, this discussion with expert researchers in UA aims to assess the adaptability of the studied PGS models to fulfil research objectives.

4.2.1 Consolidating a network of UA

Certification of commitments

The issue of **inclusivity** appeared to be at the core of emerging needs regarding networks in UA. Yet, the PGS "Mon Restau Responsable" seem to ensure inclusivity very well, as it is not "*destinated to the best*" and is designed to "*encourage actors having the hardest time to progress*" (Patrice Raveneau). Members of the network are relatively autonomous as they plan and conduct visits by themselves at the departmental scale, so do they with public meetings. Thus, a decentralised and flexible system would fit with the need for inclusivity in UA networks. However, this research has shown the need for a selective inclusivity to ensure respect and spreading of meaningful values, an issue that is not tackled properly by existing UA networks so far according to Hélène Brethes: "*it is a good thing to include everybody, but there must be really strong environmental values* […] *and the AFAUP has been criticised for its unconditional inclusivity*." On this point, MRR does not have a chart of values, contrarily to MIRAMAP whose chart is the central piece of its network. Thus, a chart seems to be an essential item of a PGS for UA.

Low-tech UA

Moreover, by formalizing values a chart allows for a legitimate and non-discriminative selection of actors to enter the network. Baptiste Grard – who works within the AgroParisTech's research-chair on UA – stresses "*the considerable difficulty to put in the same perspective a large diversity of urban production system from hydroponic to aquaponic, off-ground or field cultivation. Actors convey extremely different values* […] *so I doubt they will all match with the chart*." On this point, high-tech and low-tech UA are considered two very different (if not opposite) ways of comprehending food production in the city, in particular with regards to the values conveyed by the actors. Referring to a study conducted by the ADEME (ADEME, 2017), the CESE points the questionable socio-environmental services provisioned by high-tech production systems, especially with regards to the substitution of solar energy with artificial lightening (CESE, 2019). This issue is further highlighted by Pascal Mayol –co-author of the CESE notice – who was interviewed for this research and considers that "*UA must remain connected to rural agricultural realities, to seasonality, to the soil, to the fact that plants must grow with solar energy, not LED."* Likewise, Jérôme Enjalbert and Geoffroy Raoult express that "*N&P is strongly committed to the connection with the soil*", thus they share "*concerns regarding a PGS that would support totally off-ground agriculture with hydroponics etc."* Thus, a PGS for sustainable UA that aims to promote Agroecological values on top of PGS principles should then clearly state strong socio-environmental values in its chart. Concretely, it would probably drive the network towards more low-tech, hence ensuring an open but value-based inclusivity. Such a PGS would have the potential to consolidate a network of UA actors seeking general interest, while preventing stowaways.

Commercial UA

This research has shown edifying example of the actual complexity to integrate both professional and non-professional actors of UA within the same network. For instance, in Marseille the network initiated by La Cité de l'Agriculture will probably evolve towards a more professional dimension of UA, whereas in Rennes the "professional UA seminar" conducted by the municipality engendered confusion and disagreements on the definition of professional UA. Thus, a PGS for UA should be clear on the typology of actors targeted to ensure legitimacy. Indeed, Pascal Mayol justifies the choice of the CESE to "*use the term commercial UA, because there is a lot of professionalism in the so-called non-professional UA*." With a clear and transparent typology, a PGS for UA should be able to justify the targeting of a specific type of UA. As for the distinction between high-tech and low-tech UA, Baptiste Grard expressed his concerns regarding the inclusivity of a very large spectrum of UA forms: "*at the beginning of the PGS, I think you will face real difficulties to integrate both professional and non-professional UA, because a lot of topics approached will concern professional objectives. Moreover, there are already quite a lot of labels for community gardens."*

Paola Clérino is conducting a PhD thesis with the AgroParisTech's research chair on UA on a tool for decision-makers to evaluate durability of intra-urban farms. With the benefit of the hindsight, she warns that "*it is already such a complicated puzzle to adapt a single tool to such a diversity of intra-urban professional agriculture projects, so adding community gardens on top of that would be of a real challenge*." Yet, Patrice Raveneau shared his learnings of his experience with MRR and advised us "*to better start with a simple system, even if you need to complexify it later, otherwise nobody will adhere to the PGS and you will waste this 6-month action-research*." Thus, it seems that focusing the PGS on "commercial UA" would be a relevant and realistic approach at the early stage of the project.

Peri-urban farms

The polymorphic nature of UA implies to also reflect on the inclusivity of peri-urban farms in the PGS. As it was presented in the introduction part, the border between urban and peri-UA is not delineated and depends on evolving cross-functional relationships between the city and the countryside (Mbaye and Moustier, 1999, Aubry and Pourias, 2013, Daniel, 2013). Les Cols verts conveys the vision of an UA at the service of rurality, so that its director Boris Marcel had already envisioned the integration of peri-urban farms in the PGS. Likewise, N&P representatives stressed that "*the issue of peri-urban land-grabbing is tackled by numerous actors and institutions who ought to engage in the PGS to give credit to the elaboration of the chart for instance*." Likewise, Baptiste Grard observes a form of self-centrism in the community of UA, and suggests to "*include actors of rural agriculture such as the CIVAM, Terres de Liens etc*." Amandine Largeaud and David-Alexandre Lobry run the peri-urban farming incubator Le 100ème Singe ; they perceive the potential of a PGS as "*a network to bond concentric circles from the inner-city to the countryside : UA to link peri-UA and the city, and peri-UA to bridge the city and the countryside*." In parallel, the evaluation tool designed by Paola Clérino is destinated to intra-urban farms only, as according to her a lot of evaluation tools for rural farms can also be applied to peri-urban farming systems. Thus, a PGS for urban and peri-UA would be complementary of Paola Clérino's tool on the one hand, while adding values, principles and benefits of PGS to an existing set of evaluation tools for peri-UA on the other hand. By doing so, this PGS appears to be a genuine niche to be further explored.

Free accession and sustainable business model

At last but not least, several interviewed UA actors pointed that an inclusive PGS should be affordable to small-scale producers: "*cost of accession should not be a constraint*" (Le 100ème Singe). If PGS are designed to permit certification of organic practices at a lower cost – such as N&P – the PGS Mon Restau Responsable proposes "*a free mention to ensure inclusivity of a maximum of restaurants.* […] *However, transportation costs are respectively at the charge of*

visitor and visited member." Patrice Raveneau justifies this choice with the argument that "*communication is much simpler with free admissions"*, and "*collecting very low contribution can actually be even more expansive than the amount of the contribution itself*. Thus, considering instability of UA business models, it would be relevant to design the PGS for UA on the basis of MRR with free accession. Nevertheless, business model of the PGS itself must be considered very carefully. With the benefit of 50 years of experience in PGS, N&P stresses that "*external financial support and a salary can be useful at the early stage of a PGS, but if this latter does not ensure neither a financial autonomy nor a strong implication of volunteers, it will not last very long*." To sum up, a large inclusivity can be fostered through free accession to the PGS, as long as this latter can rely on volunteers and/or sufficient financial inputs.

4.2.2 Valorising multifunctionality of UA

Means and results

In Mon Restau Responsable, if the self-evaluation questionnaire not only fosters inclusivity in the PGS through a relative flexibility, it could also potentially valorise the multifunctionality of UA by the publication of results of the evaluation. Moreover, the mention being attributed to actors to guarantee their commitment towards more durability, this would allow a valorisation of means and efforts. Although, valorising a commitment instead of results can be limiting in terms of credibility according to co-founders of Les Jeunes Pousses who expressed concerns regarding a lack of legitimacy towards decision-makers who might say: *"what proves us that your project will effectively contribute to the ecological transition of the territory?"* Considering this obvious limit, it seems that certifying a commitment on the image of MRR might not be sufficient to influence decision-makers positively, whereas providing results may be more credible evidence of effective sustainability.

Results: eco-systemic services

As it was shown in the introduction part, the multifunctionality of UA can be expressed in terms of eco-systemic services (Soulard and Aubry, 2011). In fact, this need to valorise eco-systemic services was clearly expressed by UA actors such as Louis Roland from La Cité de l'Agriculture "*with indicators to gain credibility and raise funds*." Likewise, Pascal Mayol confirmed this critical need to measure multifunctionality of UA: "*When environmental functions of UA will be correctly assessed, then a correct payment of these functions will be made possible*." That is why Baptiste Grard and his research-team conducted a three-year experiment entitled "SEMOIRS" on a methodology to assess eco-systemic services of UA. He defines this methodology as "*participatory, since UA actors themselves measure the impacts of their project on aspects such as food and water consumption, public visits on farm or recycling of urban waste*. *In a way it is a*

self-evaluation." According to him, the self-evaluation questionnaire of MRR could be "*a relevant tool to provide a constructive and qualitative picture of the farm*".

Means: internal evaluation

On the same vein, Paola Clérino envisioned her evaluation tool for decision-maker as a referential basis on durability of urban farms, "*not only on benefits but also on potential risks to provide an internal and an external evaluation of farms*." As the tool is aimed to be used by decision-makers themselves, criteria will be co-designed with them during participatory workshops. Thus, considering these criteria in the PGS could help UA actors to design their projects while taking in consideration the expectations of financers and decision-makers, hence fostering support from these latter which could substantially improve farms' durability as a result.

One of the main differences between the two research projects is that Paola's one is aimed to evaluate projects *ex-ante* – so at a conceptual stage –, whereas the SEMOIRS seeks a retrospective evaluation of farms' impact, so *posteriori*. Hence, these two projects seem to be complementary, the first one providing tool for an "internal" evaluation of farms through their envisioned means to seek durability, the second one allowing an "external" assessment of farms' effective durability through measurement of its impacts. Thus, evaluation criteria of the PGS for UA could be inspired by these two evaluation methodologies in order to design a holistic self-assessment tool. Indeed, Baptiste Grard and Paola Clérino are both favourable to collaborate with Les Cols verts on this purpose.

Sovereignty

The other main difference between the two tools is that one is designed by the decision-makers for their own use, while the other one is designed by UA actors and researchers for the use of these latter. Although, both researchers agree on the absolute necessity to ensure participation of UA actors in the design of the two tools. According to Paola Clérino, "*it is necessary to build this tool with urban farmers so that criteria match with field realities and to make sure indicators can be effectively measured*." Added to this practical and accurate issue, Baptiste Grard stresses furthermore the need to ensure sovereignty of urban farmers in the elaboration of the tool and its functioning "*for the success and the appropriation of results and their interpretations by UA actors themselves,* […] *otherwise the risk is that they let decision-makers evaluate their system based on criteria that may not be adequate*." That need for sovereignty justifies to create a "common" able to prevent any patent on durability criteria of UA projects, which may engender conflict of interest at the expanse of general interest. Indeed, during her preliminary research Paola Clérino observed that "*most evaluation tools for UA are not shared publicly because UA experts create them to sell their expertise to decision-makers, so they have absolutely no interest in making these tools available to others*." This is an edifying application of existing dynamics of privatisation

of intellectual resources, which have been largely criticised in literature on PGS and certifications schemes (Akker, 2009, Béraud, 2015b, Lemeilleur and Allaire, 2018a). For this reason, a PGS for UA must designed as a "common", which implies to be co-elaborated in a participatory process involving a diversity of stakeholders (Lemeilleur et al., 2019b). This process will be further developed as a PAR in the recommendation part.

Sense of belonging

Evaluating a system can be time-demanding, therefore return on investment must be worth it to motivate the assessment. In fact, a survey conducted during Paola Clérino's preliminary research revealed that only 55% of UA actors consider "very useful" a tool to evaluate their farm "*mostly because of a lack of time or because no incentive motivate them enough to do so*", on the opposite of decision-makers which 94% to appreciate such a tool as "very useful" (Clérino, 2018). Thus, a PGS should be a powerful driver to incite actors to evaluate their farm. In fact, according to Jérôme Enjalbert and Geoffroy Raoult: "*in N&P, the main fuel is what people gain in organizing themselves together, if they find a fulfilment and a conviviality, if they bring to life a shared vision together."* Creating a sense of belonging could be indeed a driver for UA actors who expressed the need for peers-valorisation in a network able to ensure trust, transparency and cooperation (see parts 3.1.2 and 3.2.1). Likewise, this sense of community-belonging has been targeted as an objective of the PGS Mon Restau Responsible, which is "*a reciprocal sign of recognition between restaurant managers who feel a higher confidence by contacting a peer in the network*." (interview Patrice Raveneau).

Participatory sciences

Building on Paola Clérino's results, Baptiste Grard considers that urban farmers will not evaluate their farm because of a lack of time and motivation, "*unless they learn from the systemic analysis of their farm, or if the impact measurement positively influences the farm's outreach*." For this purpose, notably, the project "SEMOIRS" set up a protocol of participatory sciences to measure biodiversity within urban farms. Indeed, involving citizens in the evaluation of the farm enables to valorise this latter directly towards participants who become active stakeholders of the project. Thus, it may be relevant to integrate a dimension of participatory sciences in the PGS for UA in order to meet the objective of valorisation of its multifunctionality.

Public meetings

Likewise, the model of MRR managed to increase credibility of the mention through public meetings aimed at presenting the restaurant's commitments to a range of direct stakeholders, who are eventually the final actors to decide whether the restaurant deserves to be attributed the mention once again. By doing so, this PGS ensure a personalised trust between benefiters and its stakeholders, which participates to a direct valorisation towards these latter. This dimension

would be seemingly relevant to be implemented in the PGS for UA, as it was suggested by Sébastien Groelzer: "*This certification should also include a people-focused dimension in its governance, for example with citizen panels who would have decisional power to attribute the label."*

4.2.3 Promoting a collective progress strategy towards sustainability

Guaranteeing commitment and progress

As presented in the results in the first section, a collective progress strategy could be initiated through a network able to stimulates exchanges and co-creation of knowledge, in order to meet supply and demand of expertise between UA actors. According to Baptiste Grard, the PGS would be a relevant tool for this purpose, as visits and evaluation constitute frameworks to compare farming systems and their performance on dimensions of durability. To his eyes, it is "*a relevant basis for collective reflection*" that allows urban farmers to situate their project within a web of peer projects. For this purpose, he believes that "*actors should be able to question their strategy and their performance within a specific context, but without being bind to reach ultimate threshold."* Hence, MRR seems to provide an adequate approach to achieve this goal of a PGS for UA since the mention guarantees progress related to a commitment towards durability, but obtaining the mention does not impose the application of strict and standardised thresholds. On this point, Pascal Mayol is "*favourable to a valorisation of different levels of individual commitment, as long as progress can be assessed and act* […], *maybe with progressive thresholds. Otherwise it should not result in Greenwashing*." Thus, a system of certification of commitments combined with an evaluation of progress based on a chart as referential – like MRR or MIRAMAP – seems to be more adequate for a PGS destinated to UA than a relatively stricter system based on requirement specifications – like N&P.

Territorial observatories

As a continuation of the project SEMOIRS, Baptiste Grard stressed the "*necessity to build territorial data repositories for UA*." Interestingly, this idea supports the CESE's recommendations to evaluate eco-systemic services provisioned by UA (n°15), whose data collection should be organised within **territorial observatories of UA** (n°16) (CESE, 2019). Furthermore, Pascal Mayol approved the potential of a PGS to put in practices these recommendations: "*The PGS is in adequation with the CESE recommendations.* […] *to my eyes it is a relevant and feasible bedrock that can be articulated with our idea of territorial observatories*." In the wake of his words he even expressed ironically "*a touch of jealousy that we could not have talked about it in the*

CESE notice", giving then credit to the relevance of a PGS to fulfil the CESE's recommendations for the development of UA.

Collaborative web platform

Concretely, such territorial data repositories could take the form of a collaborative web platform, on the image of **AMAP'artage**, a web library created in 2018 as part of the PGS initiated by MIRAMAP, in order to foster exchanges of knowledge and know-how between AMAPs. "*Steps to create an AMAP, strengths and weaknesses, obstacles faced by local groups etc are made available to the entire network of AMAPs.*" (Charlotte Bouyat) Designed as a "*a tool for collective self-learning*", the web platform is aimed to stimulate contribution to the sharing of experiences and the "*strategy of continuous improvement of practices listed in the Chart*." (MIRAMAP, 2018). Thus, the example of AMAP'artage shows the potential of PGS to produce collaborative tools aimed to foster a collective progress strategy towards durability, which in the context of UA could be designed as territorial observatories.

To sum up this discussion, feedback and ideas provided by UA researchers allowed to critically assess the different features of PGS studied in the benchmark, in order to extract relevant characteristics that could be applied in a PGS specific to UA. Overall, researchers supported the potential of a PGS as a relevant certification scheme to fulfil research objectives, as long as this latter is designed in such a way that its features are adapted to the context of UA.
Hence, in the following and last chapter of this action-research, I will combine outcomes of this discussion with inspiring extra-materials to design an intended prototype of a PGS for UA.
Before all and as a closing part of this final discussion, a disclaimer must be done to critically assess limits of the methodology and the integrity of the results.

4.3 Disclaimer

As my research was entirely based on qualitative data, one could perhaps relate this field of study to sociology of agriculture. Yet, analysing qualitative data implies a substantial part of interpretation of the results with regards to the research question. Moreover, translating interviews from French to English and from direct to indirect speech may have affected the exact form of participants' statements. However, general meaning and content of interviews was fully respected.
An obvious and unprecedented disclaimer affecting a lot of research project is the global sanitary crisis of the Covid-19. Because of the crisis, most interviews had to be conducted by Skype during the lockdown, instead of farm visits. Hence, this situation might have affected data collection and

their interpretation, as it was not possible to meet the participants in their local environment, which can make it more difficult to build a trustful relationship. Moreover, the initial methodology also planned interviews of external stakeholders of urban farms, such as clients or visitors, but these interviews had to be cancelled because no farm visit could occur. Nevertheless, one integration employee and a high school teacher during a class visit were interviewed at the Ferme de l'Abbé Rozier (Lyon), as well as two groups of young visitors during an event at l'Agronaute (La SAUGE, Nantes). Content from these interviews was transcribed, classified and analysed in the Excel table (appendix 4), but eventually results could not be used in the research because of a lack of consistency in the methodology which had to be adjusted to the crisis context.

Finally, it is important for honesty and transparency to relate that the recording file of the interview with Pauline Sy (Lab3S, Paris) was accidentally erased. Thus, exact words of Pauline Sy could not be transcribed, although I "saved" my fresh memory by writing and classifying main ideas in the Excel table right after the interview.

5 RECOMMENDATIONS

As a fundamental dimension of an action-research, in this last chapter I will provide recommendations for a sustainable PGS model for UA. At first, I will design a prototype of the intended PGS, then I will provide a suggestive guideline for the PAR aimed at co-creating the PGS with stakeholders.

5.1 PGS design

Project with participatory approaches require a strong involvement of stakeholders to design the project. Yet, as Amandine Largeaud (le 100ème Singe) pointed out in her interview: "*Peer-to-peer is cool, but it is very often a mean to not mobilize any mean. The most mature and successful network are those that have been designed upstream in terms of tools*." That is why hereby are provided some suggestions aimed at designing a sustainable PGS for UA, based on results of the research with adequate extra-materials.

5.1.1 General mechanism

Based on the results and discussions of the research, hereby is an intended PGS design inspired by mechanism of the PGS Mon Restau Responsable. Indeed, such a functioning allows for enough inclusivity through free accession, relative flexibility through valorisation of improvements and commitments over results. Furthermore, this design is particularly citizen-oriented thanks to participatory sciences, citizen dialogue and citizen vote that contribute to the embeddedness of the urban farm in the community of citizens, who gain back their power of action and decision within their food system. Finally, this design facilitates a progress strategy that can be easily evaluated, conceptualised, visualised and valorised thanks to the methodology SYALINNOV, which will be further explored in the next paragraphs.

Figure 13: general mechanism of the PGS for UA

5.1.2 Targets

For the reasons presented in the part 4.2.1, it would be relevant – at least for the first years – to focus the PGS on commercial UA (also said "professional"), in order to ensure coherence and simplicity of the system, so that stakeholders stay involved as it was strongly recommended by Patrice Raveneau from Mon Restau Responsable. However, as UA aims to bond urban and rural worlds together and because of the blurriness of their borders, peri-urban farms should be largely invited to get involved in the PGS.

5.1.3 Dimensions of sustainable UA

What defines the durability of urban farms must be collectively decided in participatory process to design the PGS as a "Common" (see next part 5.2). However, building a referential of sustainability implies to base the reflection on research and experience in the field of UA. Thus, I suggest to guide the design of criteria and indicators according to the HLPE definition of agroecological principles (HLPE, 2019), as well as the first recommendation of the CESE regarding functionalities of UA that should be supported by public policies (CESE, 2019):

- **Environmental functions**: city air cooling, reduction and recycling of urban waste, sustainable water management, flows management, soil detoxification, aggradation of biodiversity, reduction of air pollution…
- **Social functions**: citizen participation, social and professional insertion, development of low-tech systems…
- **Integration of UA in territorial agriculture and food systems**: complementary production to existing ones on the territory, pedagogical functions regarding rural and farming realities… added to what I suggest to include the coherence of practices with seasonality and pedo-climatic conditions.

5.1.4 Progress methodology

Grégoire Bleu, president of the AFAUP, underlined the necessity to evaluate services provisioned by UA and related saved costs (CESE, 2019). In parallel, Baptiste Grard and the project SEMOIRS support the idea that eco-systemic services would be a relevant lens to evaluate sustainability of urban farms. Indeed, the measurement of eco-systemic services provision would permit to evaluate direct impact of urban farms on the territory, its inhabitants and the environment.

Yet, the foundation Daniel & Nina Carasso has developed the **methodology SYALINNOV**, aimed at measuring impact of sustainable and innovative food systems. This methodology has been designed to be simple and applicable by internal staff ; its framework is adaptable to projects of very diverse nature, and it is co-designed with stakeholders to ensure its appropriation by these latter (Carasso and Montpellier-SupAgro, 2017). Without necessarily applying the entire methodology from A to Z, some tools seem particularly fitted with a PGS for UA:

- After defining and measuring indicators, the **impact vector** is a tool enabling the visualisation of results with a quick glance. Embedded in a progress strategy, this tool presents the potential to valorise improvements between two evaluations on the one hand, as well as to consider rooms for remaining improvements and challenges to be tackled.

Thus, the impact vector could be used not only to valorise the provision of eco-systemic services by UA projects to the eyes of stakeholders, but also to guide progress strategy of urban farmers themselves. In a way, this tool seems relatively similar to the NESO compass developed by Nature & Progrès (see figure 5)

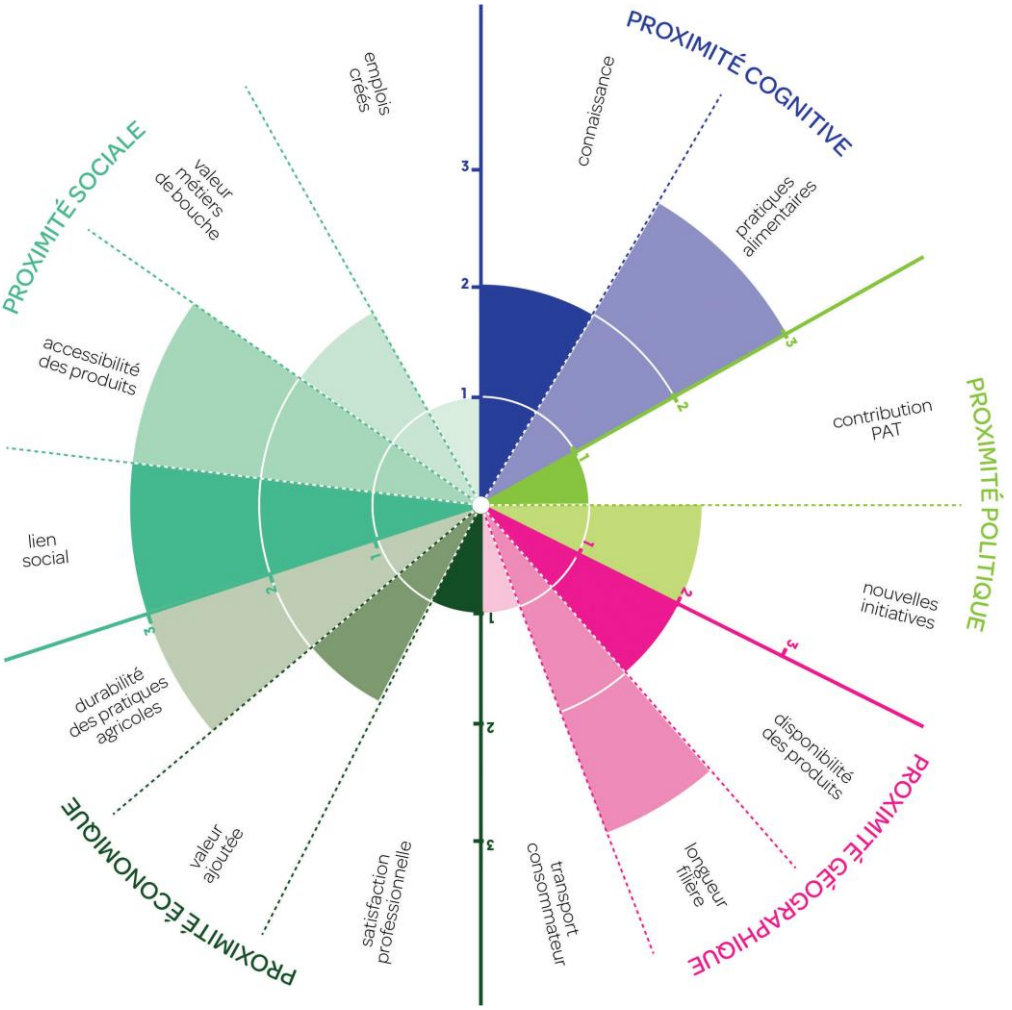

Figure 14: vector impact, methodology SYALINNOV.

- Likewise, the **Theory of Change** is a tool particularly visually speaking that supports a progress strategy. By seeking an ultimate change and the successive intermediary steps and actions necessary to make that change happen, the Theory of Change allows to plan and structure a progress strategy on the long-term, while showing a pro-active and results-oriented vision of the project, which can foster confidence of stakeholders, and in particular decision-makers. For instance, Les Jeunes Pousses used this tool to present their new project of urban farm to the mayor of Avignon, which really help this latter to get a thorough understanding of the interest to set up the first urban farm in the city. The two co-founders Paul-Arthur Klein and Inès Revuelta shared their original creation with me after our interview, which I consider of very high quality. The material is available in appendix 10.

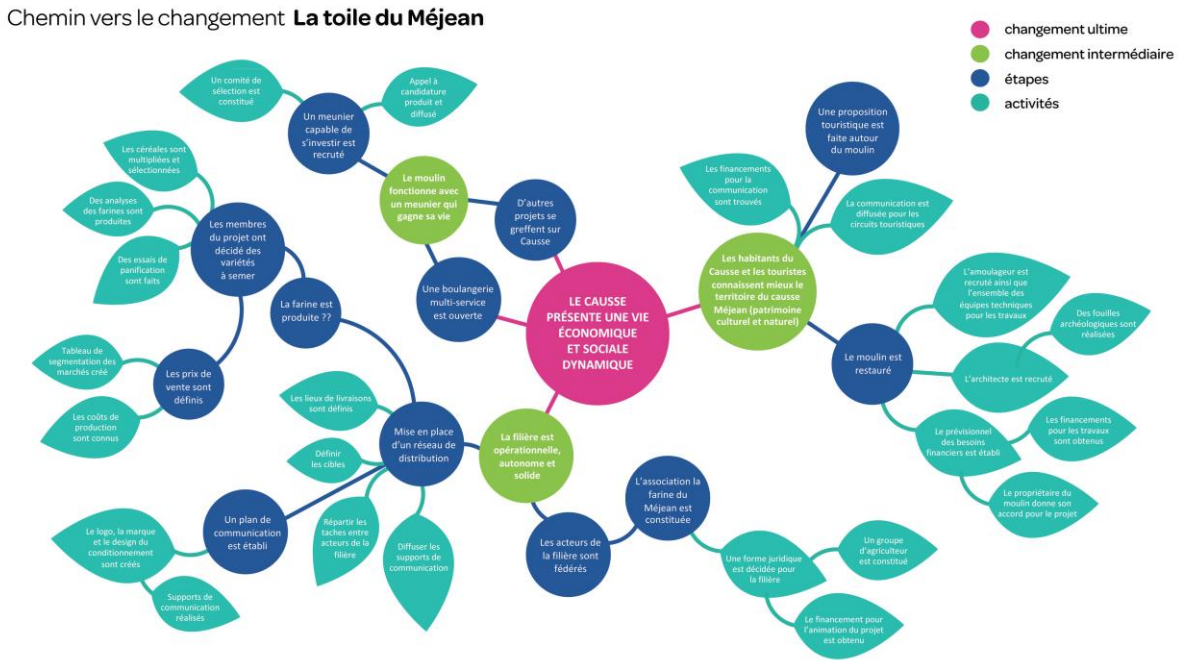

Figure 15: Theory of Change, methodology SYALINNOV

5.1.5 Project MESCLUN

At the very end of my research, I just discovered the project MESCLUN, whose workshops were conducted in February 2020 – at the very beginning of my research – by the AFAUP and a set of actors from agri-education, agronomic research, and digital technologies. In a few words, this project "*aims to develop a set of numeric tools in an "open-source" logic and a perspective of horizontal governance. These tools are designed for market-gardeners, project managers, teachers and agricultural technicians and advisors*." (MESCLUN, 2020, p.6) These tools and their perspectives expressed by the authors show a clear and particularly relevant potential for collaboration with the PGS project, as these two projects seem to be obviously very much complementary:

- **La Serre des Savoirs** is a web-platform to foster sharing and co-creation of knowledge and know-how between actors. Designed as a "Wiki", it aims to host and provide a large diversity of resources and services (videos, scientific articles, documents etc). As in my research, developers of this tool observed a disconnection between "*dispersed knowledge hubs, not contextualised and sequenced by field of expertise.*" (MESCLUN, 2020, p.11). Thus, since these tools are designed with major UA actors (AFAUP), it seems that such a web-platform could correspond with the idea of **territorial observatories for UA** suggested by the CESE and the potential of a PGS to stimulate contribution of UA actors to this knowledge hub – like AMAP'artage (MIRAMAP, 2018). Indeed, authors stress the "*necessity for MESCLUN tools to integrate different usage scenario in their conception and development, in a consistent dialogue with field actors*." (MESCLUN, 2020, p.53)

Hence, the PGS for UA could be one of these usages as it can provide conviviality (a "Common"), a reward (the mention) and a structured frame for dialogue, data collection and exchange of knowledge (visits and impact measurements). In return, actors involved in the PGS could benefit from a qualitative web-platform issued from a collective reflection with professional actors.

- **La Pépinière** is a tool to design market-gardening systems while proposing the creation of forecasting scenario and hypotheses. La Pépinière aims to help farmers to plan strategies on fundamental dimensions of a farming system (notably economic, agronomic and workload-wise viability). Combined with the progress strategy of actors in the PGS and the evaluation of strength and weakness of their project, La Pépinière could provide tools to imagine improvements of urban farming systems, while the PGS could provide the frame to diagnose rooms for improvements that could be then tested in scenarios projected within La Pépinière.

- **Le Compagnon** is a tool designed to facilitate consistent data collection on field in order to ease the follow-back of activities and increase precision of scenarios created within La Pépinière. Combined with the objective of impact measurement of the PGS, le Compagnon could be particularly relevant to help UA actors in the evaluation of their farms. In return, the PGS would be a driver to motivate UA actors to contribute to research through data collection, in order to *in fine* support a shared vision of agroecology in the city.

At last but not least, participants to MESCLUN workshops tackled many issues and questions related to "Commons", such as horizontal governance, property of data, open-source logic, fight against standardisation of practices, as well as flexibility, inclusivity, the building of trust among stakeholders and the seeking of general interest. Hence, this already initiated collective refection on "what makes a Common" is a very positive and hopeful dynamic that the PGS for UA should join for simultaneous development of both projects.

5.1.6 "Humus diagnostic" - Terre de Liens

As presented in part 4.2.2, participatory sciences have a great potential for direct valorisation of urban farms to the eyes of citizens, as well as it increases their knowledge and awareness regarding agroecological issues. Thus, data collection could be realised with citizens for specific dimension of the farm evaluation - such as biodiversity measurement – and be based on the "*protocol of participatory sciences for biodiversity measurement*" developed through the project SEMOIRS (Baptiste Grard).

Besides, as the PGS will be co-designed also with peri-urban and rural actors, the participation of **Terre de Liens** should be considered. In fact, as part of its process of agricultural land saving through the establishment of agroecological farms, Terre de Liens has developed the **participatory diagnostic tool "Humus"** which educate citizens to analyze farms through landscape reading, soil analysis and the counting of bio-indicative plants for example (Terre-de-liens, 2017)

5.1.7 Business Model

As explored in the part 4.2.1., business model of a PGS should be considered very carefully, as the advantage of a low-cost system for its beneficiaries implies either a large involvement of volunteers and/or external financing. For the reasons presented in part 4.2.1., it would be appropriate to design a PGS with **free accession**, but wherein transportation costs for visits remain at the charge of the visitors and the visited farmer, in the form of a respective exchange of services.

This model is similar to Mon Restau Responsable, therefore, following the advises of Patrice Raveneau, funds should be sought "*with collectivities, as part of PAT* (Projets Alimentaire Territoriaux), *or through sponsorship of foundation (Carasso and Montpellier-SupAgro), the ADEME etc*." At term, there should be either sufficient volunteers to run the PGS and/or internal financial resources from the supporting structure to finance a coordinator. Thus, and as part of the exercises of the MOOC on social entrepreneurship, I realised an intended (but not quantified) **business model**, based on existing and future activities of the Cols verts. The table is available in appendix 11. In parallel, as explained in the methodology part, I also made a **forecasted budget** for the three first years of the PGS (see appendix 8), as part of the application to a call for proposal of the foundation Daniel & Nina Carasso.

5.2 Participatory process guideline

5.2.1 Objectives

A PGS is a "Common", whose success mostly relies on sufficient and active participation of the community that support this collective intellectual resource and apply PGS principles. For this reason, an authentic PGS is usually designed within a bottom-up logic through a participatory process. At the beginning of the research, Boris Marcel and I interviewed Sylvaine Lemeilleur, researcher at the CIRAD-Montpellier, who recently conducted a participatory process with Moroccan farmers and stakeholders willing to co-create a PGS to certify agroecological practices. Methodology was capitalised through a PAR and valorised in a scientific article aimed to facilitate creation of PGS elsewhere (Lemeilleur et al., 2019a). According to her, "*the participatory process*

(has) *several objectives: to improve participant's understanding and acceptance of the PGS principles (ii) to produce supporting documents and tools for their PGS (charter, specifications, control visit form, PGS rules and regulations, etc) (iii) to create the conditions for participants and stakeholders to be able to manage the PGS themselves. Some indirect outputs were also expected (iv) strengthening a community of practice (v) exchanging knowledge."* (Lemeilleur et al., 2019a, p.6) Obviously, most objectives will be common to the participatory process to design the PGS for UA.

5.2.2 Participants

Throughout my thesis work, I have had the opportunity to gather many different stakeholders around the PGS project, notably through collaborations on two calls for proposals. These actors are willing to participate to the participatory process which demonstrates the relevance of such a project to tackle collective challenges expressed by these same actors. Not all partnerships have been formalised yet, but a first **consortium of researchers** has been imagined involving the following actors with their own contribution:

- **Les Cols verts**: project coordination.
- **CIRAD** : Sylvaine Lemeilleur will conduct a monitoring-evaluation of the democratic process in order to assess the degree of appreciation of collective decisions by participants. Capitalisation of the experience will contribute to a wider dynamic around PGS in France. Besides, she will share her experience to design relevant participatory workshops.
- **ISARA** : Perrine Vandenbroucke and Hélène Brieves will conduct a monitoring-evaluation of learning outcomes of farmers throughout the PAR. These outcomes will be potentially capitalised and valorised for example through video-testimonies on a web-platform.
- **AgroParisTech**'s research chair on UA: Baptiste Grard and Paola Clérino expressed their interest to get involved in the participatory process, as he would like to "*pursue and apply his work with the project SEMOIRS in a more operational project like the PGS*" ; and she agrees on the relevance to collaborate on such complementary projects that are the PGS for UA and her tool for evaluation of urban farm.
- **Fondation Nicolas Hulot pour la Nature et l'Homme:** Pascal Mayol is scientist at the FNH and co-writer of the CESE notice on UA. He expressed a strong interest for the PGS as a relevant tool to meet the CESE's recommendations, and is willing to contribute.

In parallel, the following **UA actors** signed a letter of interest (appendix 9) to express their willingness to actively participate to the workshops:

- La Cité de l'Agriculture
- Le 100ème Singe

- Les Jeunes Pousses
- La Ferme du plateau de Haye
- Le Lab3S
- Vergers Urbains
- Collectif Cols verts Rennes
- Collectif Cols verts Strasbourg
- Collectif Cols verts Montpellier (Entrelacs)

As expressed in the part 4.2.1., the respective philosophies of PGS and an UA bridging urban and rural worlds support the relevance to include **peri-urban and rural actors** and institutions in the participatory process. According to interviewees suggestions and personal refection, the following actors should be considered:

- **Terres de Liens**, notably for their tool for participatory diagnostic of farms (see part 5.1.6)
- **Terres en ville,** as a major research hub on (peri-)urban food and agricultural policies
- **Réseau Agriville**, as a major network of participatory researches on UA.
- **Collectif Nourrir la Ville**, co-created by Le 100ème Singe and other actors to develop green belt around cities.
- **Projet MESCLUN**, for the relevant cross-complementarity with the PGS for UA (see part 5.1)

In a general matter, **open-access to workshops** must be ensured and the number of participants not limited (Lemeilleur et al., 2019a), in order to guarantee inclusivity, legitimacy and credibility of the PGS, and prevent this latter to become a "club".

5.2.3 Content and process

Based on exchanges with UA actors and researchers, as well as scientific resource on PGS (Lemeilleur et al., 2019a), the participatory process may last approximately two years. The timeline of main steps and dates of workshops will be decided with stakeholders. At first, it was imagined that workshops would be centralised and successively thrown in different locations to ensure non-discriminative proximity to actors spread across national territory. Actually, interviews with UA actors revealed a shared interest for common topics, which led to the willingness of some actors to conduct PGS workshops locally with their own community of UA actors. In fact, it seems that a decentralised process may allow a larger participation, a stronger involvement of actors due to already existing network dynamics, a faster implementation in several territories, and more relevant inputs since the PGS design will be based on a larger diversity of contexts. Thus, the following figure 10 describes an iterative, democratic and decentralised participatory process:

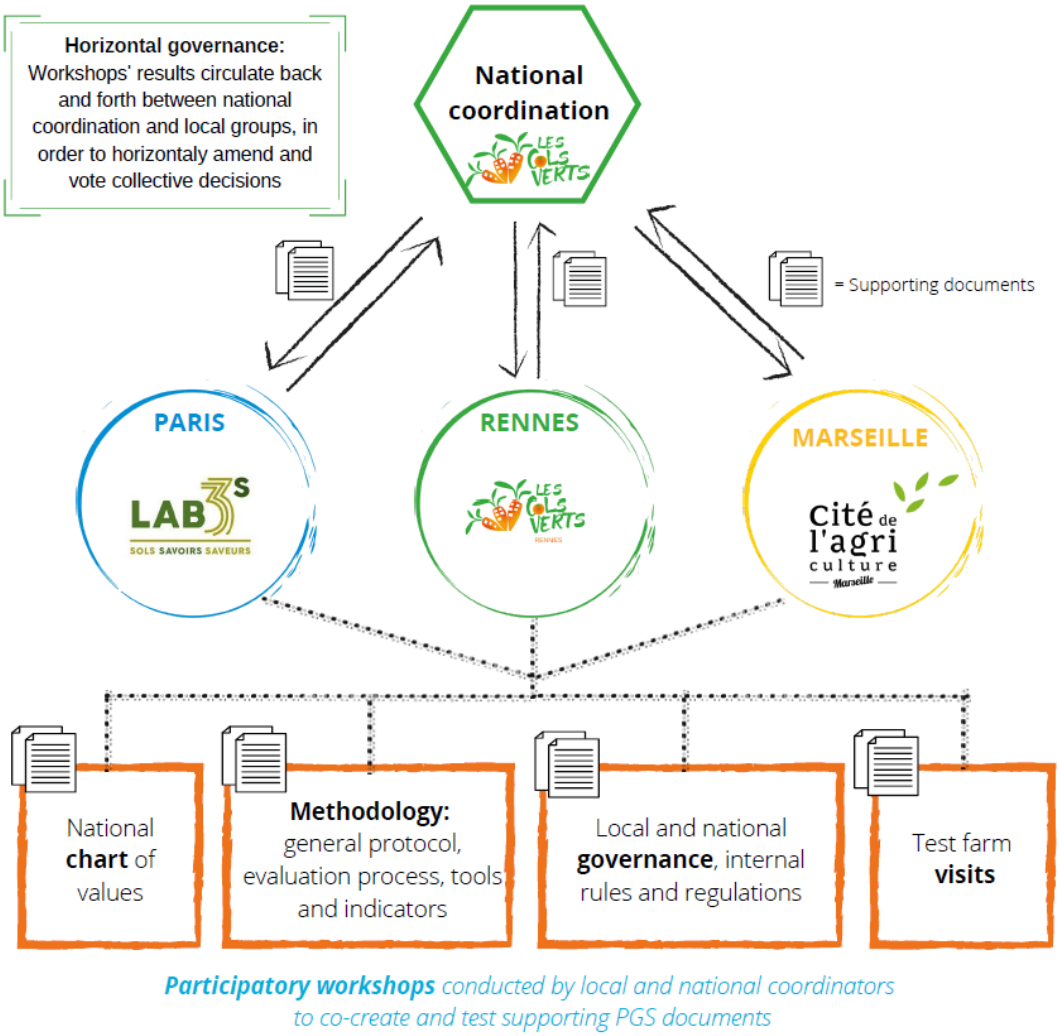

Figure 16: decentralised participatory process to co-create the PGS with stakeholders

At last but not least, essential issues regarding the collective management of a "Common" will have to be discussed during workshops, such as horizontal governance, property of data and sharing of info. This justifies furthermore the relevance to collaborate with the **project MESCLUN** wherein these issues have already been discussed during workshops. Likewise, expected situations (for instance a request to join the PGS, contestation of a decision, conflicts, evaluation committee) should be simulated in order to prevent inappropriate reaction that could harm collective cohesion and consequently the durability of the PGS. For this purpose, the **Forum Theater** workshop has proven to be a relevant tool (Lemeilleur et al., 2019a).

Beyond this suggested guideline, the success of this PGS will depend of the quality of facilitation work to stimulate participation and guide human interactions throughout the participatory process. Indeed, in participatory approaches a basic framework is needed to structure the reflection and make sure the collective workload does not overcome individual's project. However, quality of final results and their applicability is mostly depending on the good management of collective intelligence.

6 CONCLUSION

This master thesis was designed as an action-research in order to pave the way for a field-based innovation still at a conceptual stage. As such, the field-based approach appeared to be relevant to conduct a cross-analysis of two very complex topics – UA and PGS. In fact, this approach allowed for a thorough understanding of issues in both area of study, thanks to a reality-check from research to field actors, from abstract world to concrete world. A **state of the art** of research in UA revealed major issues on the one hand, such as the need to valorise UA projects with high social and environmental value, the absence of certification specific to UA able to meet this need, and a multiplicity of common challenges but isolated and disconnected expertise. On the other hand, interesting matchings between UA and PGS have been observed, which justified the relevance of an action-research to assess their complementarity, in theory and in terms of concrete applicability. Based on this hypothesis, the following **research question** was investigated and declined in **three research objectives**: "*To what extent are PGS a relevant certification scheme in order to consolidate a network of urban farms, valorise their multifunctionality and promote a collective progress strategy towards sustainability?"*

Interviews with UA actors allowed for a reality-check and further exploration of their needs with regards to the research objectives. Concerning the consolidation of UA networks, interviews revealed a diversity of network dynamics, from informal peer-collaboration to formal networks in UA, and the embeddedness of some UA actors in more traditional agri-networks. Main needs and issues expressed by interviewees concerned limits of UA networks especially in terms of inclusivity and capacity to connect isolated actors, as well as a lack of trust, transparency and concrete cooperation and exchanges. Regarding the second objective, interviewees put forth specific needs to valorise UA multifunctionality in order to gain support from public authorities, demystify UA to the eyes of citizens, and increase sense of belonging in UA community through peer-valorisation. Limits of institutional valorisation and competitive distinction were also underlined by participants. Finally, needs and potential for knowledge exchanges between UA actors appeared to be one of the main drivers to promote a collective progress strategy towards sustainability. Then, a cross-analysis revealed a strong coherence between PGS universal principles and core notions expressed by UA actors regarding sustainability of a certification scheme to meet research objectives. This first discussion allowed to conceptualize a **theoretical capacity of PGS** as "Commons" to ensure flexibility, inclusivity, credibility and legitimacy in a certification scheme for UA.

Then, a second round of interviews took place in the form of a benchmark of three PGS in France, in order to assess potentials of different models with regards to their finalities. Following an iterative research process, characteristics of PGS were combined to create an intended scenario of a PGS for UA, which was submitted to UA researchers for a reality-check. In a second discussion, inputs of researchers were combined with results of the benchmark and interviews with UA actors, in order to ponder **concrete applicability of a PGS** able to meet research objectives and deal with UA complexity. Concerning the first objective, a relevant PGS for UA should ensure free accession and inclusivity of urban and peri-urban farms, but be limited to "commercial" UA and not destinated to individual initiatives or community garden. Furthermore, the mention should guarantee commitments and efforts over compliance to thresholds, in order to prevent a network designed only for the best performers. However, open-access should not harm credibility of the PGS, therefore a chart with strong agroecological values must be formalised, potentially fostering low-tech over high-tech UA systems, as this distinction is very pregnant in UA typology. With regards to the objective of valorisation of UA multifunctionality, urban farms should be evaluated on their internal sustainability as well as externally through the assessment of their provision of eco-systemic services for the territory. However, it has been stressed that evaluation criteria must be designed with UA actors in order to ensure sovereignty of these latter, which matches with the philosophy of PGS. Participatory sciences and public meetings are suggested to foster direct valorisation of UA projects to the eyes of citizens. Finally, for the third objective of a collective progress strategy it has been proposed to compile data from farms' evaluation and exchanges of knowledge on a web-platform designed as territorial observatories of UA.

As integral part of an action-research, **recommendations** were provided to lay the foundation for a real-life application, in the form of an intended design of the PGS for UA as well as suggestions for the participatory process to co-create the PGS with its stakeholders. Bridges with inspiring projects, tools, methodologies and actors were suggested for their potential applicability in the final PGS, due to their characteristics suitable with research objectives.

To conclude, this action-research has shown the relevance of PGS to consolidate a network of urban farms, valorise their multifunctionality and promote a collective progress strategy towards durability. Feedback from PGS professionals and UA experts give credit to this project and confirm its potential to foster durability of urban farms and guide UA as a whole towards a collective and shared vision of agroecology in the city. Nevertheless, to draw on Jérôme Enjalbert and Geoffroy Raoult's warning (Nature & Progrès): "*sometimes a PGS works because of four or five charismatic leaders, but there comes the limit of a PGS since leadership signifies a lack of horizontality, and this fundamentally questions the PGS as a Common*." In the case of the PGS for UA, the project has been first initiated by the only organisation Les Cols verts through the

present master thesis. For this reason, it is absolutely necessary that Les Cols verts endorses the stance of a facilitator for the upcoming participatory process, and not a leader, in order to ensure active and legitimate participation on the long-term in the collective management of the "Common".

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8 APPENDICES

Appendix 1 : IFOAM infographic PGS

Appendix 2: Table of interviewed participants

Name / structure	City	Category of participant
Sylvaine Lemeilleur - **CIRAD**	Montpellier	PGS Researcher
Alain Grenet - **La Ferme de l'Abbé Rozier**	Lyon	Urban farm
Amandine Largeaud & David-Alexandre Lobry – **Le 100ème Singe**	Toulouse	(peri-)urban farm
Sébastien Groelzer – **Vergers Urbains**	Paris	Urban farm
Antoine Devins – **La SAUGE**	Nantes	Urban farm
Alexandre Lamarque – **La ferme du Plateau de Haye**	Nancy	Urban farm
Paul-Arthur Klein & Inès Révuelta – **Les Jeunes pousses**	Avignon	Urban farm
Hélène Brethes – **Les Cols verts**	Rennes	Urban farm
Max Schaffer – **Optim-ism** (Les Jardins de Cocagne)	Lorient	Urban farm
Louis Roland – **La Cité de l'Agriculture**	Marseille	Urban farm
Pauline Sy – **Lab3S**	Paris	Urban farm
Jérôme Enjalbert & Geoffroy Raout – **Nature & Progrès**	Alès	PGS network
Charlotte Bouyat – **network AMAP-Isère**	Grenoble	PGS network
Patrice Raveneau – **Mon Restau Responsable** (foundation Nicolas Hulot)		PGS Network
Baptiste Grard – **research chair on UA (AgroParisTech)**	Lyon	Researcher
Paola Clérino – **research chair on UA (AgroParisTech)**	Paris	Researcher
Hélène Brieves – **ISARA researcher**	Lyon	Researcher
Pascal Mayol – **co-author of the CESE notice on UA**		Researcher

Appendix 3: Interview questionnaire for urban farmers

Timothée VERNIER
Chercheur en Agroécologie
Msc Agroecology - ISARA-Lyon / NMBU Norway / Wageningen University
Réseau national - Les Cols verts
M: 06.19.21.58.09
E: t.vernier@lescolsverts.fr

Guide d'entretien - interview des fermes urbaines

Comprendre le projet de la ferme

1) Quel est le projet de l'association ?
2) Quelles valeurs portez-vous ?

Quels facteurs de durabilité des fermes urbaines / de l'AU ?

3) Quels sont les besoins fondamentaux pour développer et durabiliser l'AU ? et votre projet ?
4) Comment pourriez-vous progresser sur ces aspects ?

Quels besoins de valorisation de l'AU :

5) Y'a-t-il selon vous un besoin de valoriser les fermes urbaines ? Si oui, dans quel but ?
6) Qu'est ce qui devraient être valorisé et comment (*pratiques, valeurs, démarche, impact sur le territoire)* ?

Etat des lieux des réseaux d'AU et des besoins/sources d'apprentissage

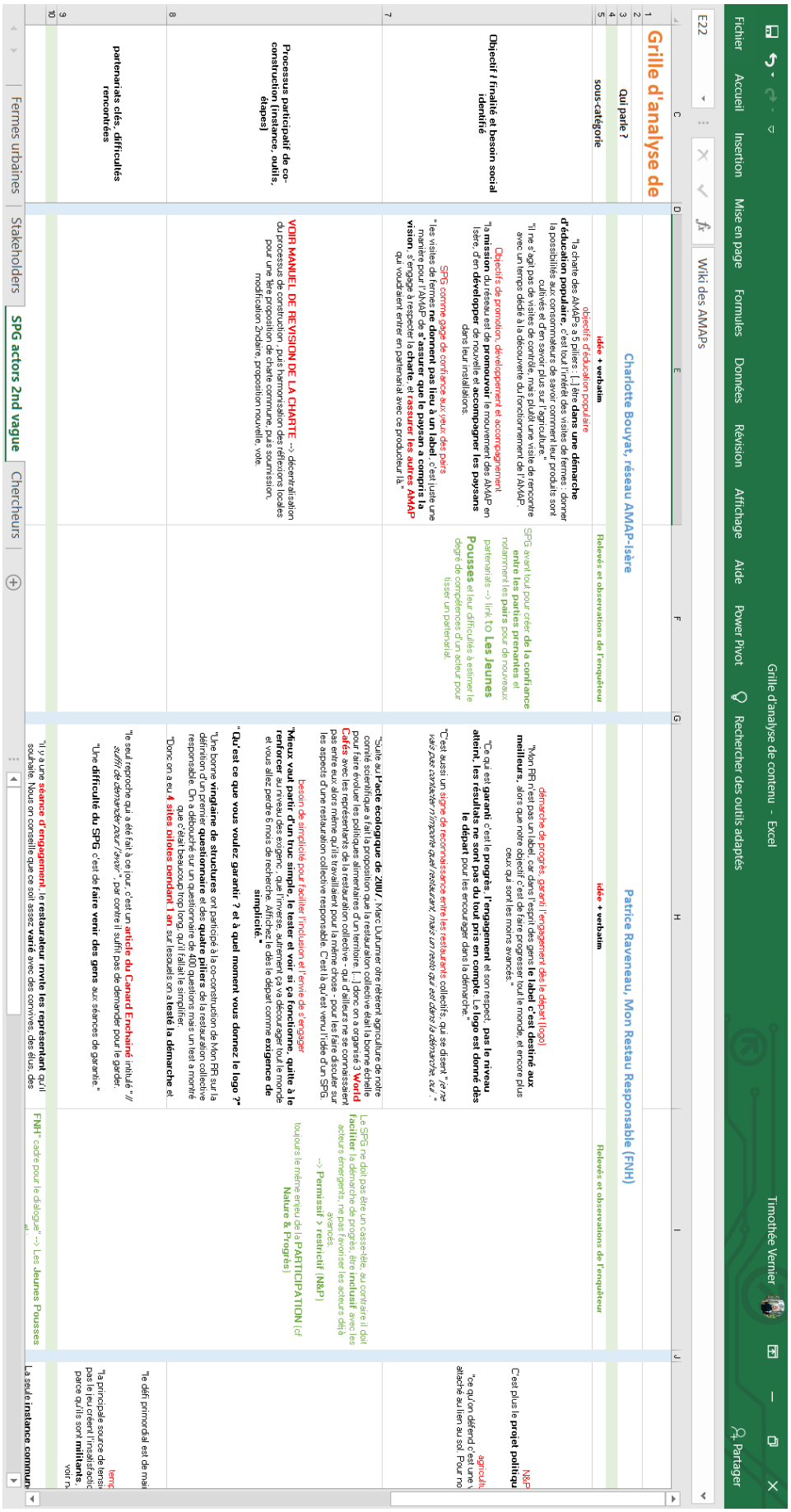
7) La ferme est-elle engagée dans des réseaux d'AU ? En quoi ces échanges permettent à votre ferme/projet de progresser ? A l'inverse, avez-vous identifié des aspects manquants dans ces réseaux ?

8) Quelles expertises d'autres acteurs de l'AU pourraient vous être utiles pour progresser ?
9) En retour, quelle expertise pourriez-vous transmettre à d'autres fermes urbaines pour les aider à progresser ?

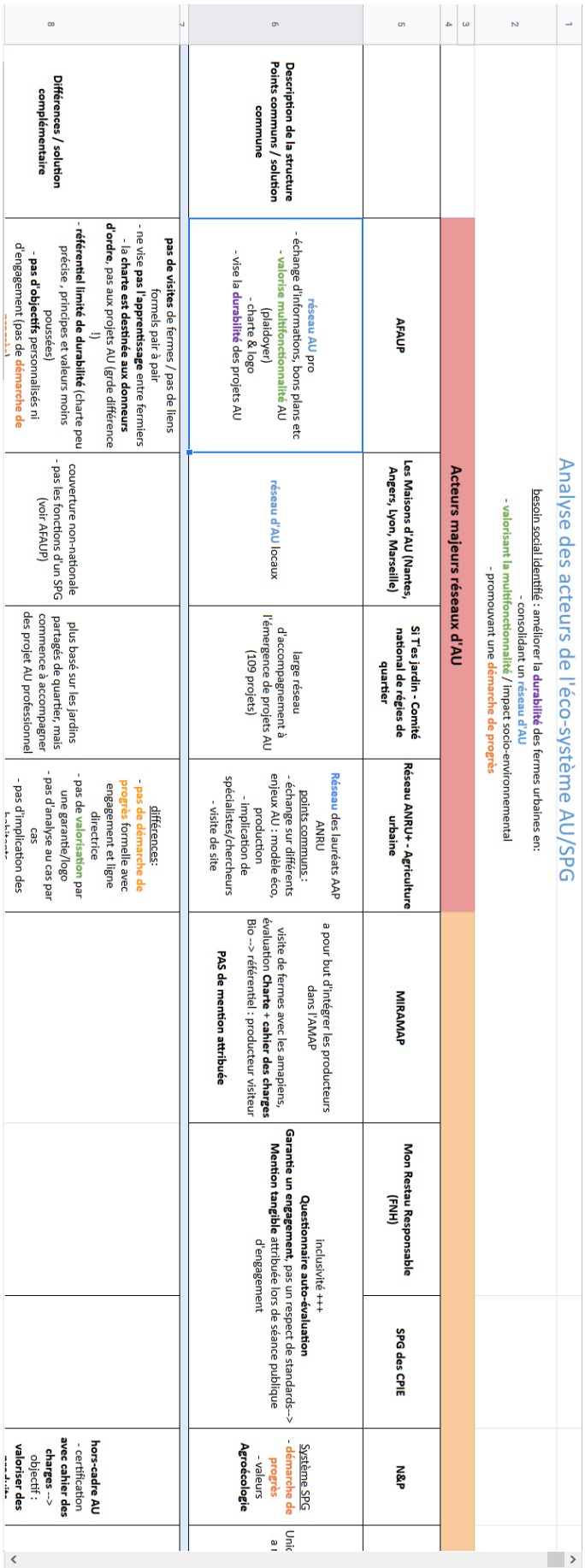
SPG:

10) Quelles seraient vos motivations et vos freins pour s'inscrire dans une démarche de progrès au sein d'un réseau de fermes urbaines ?

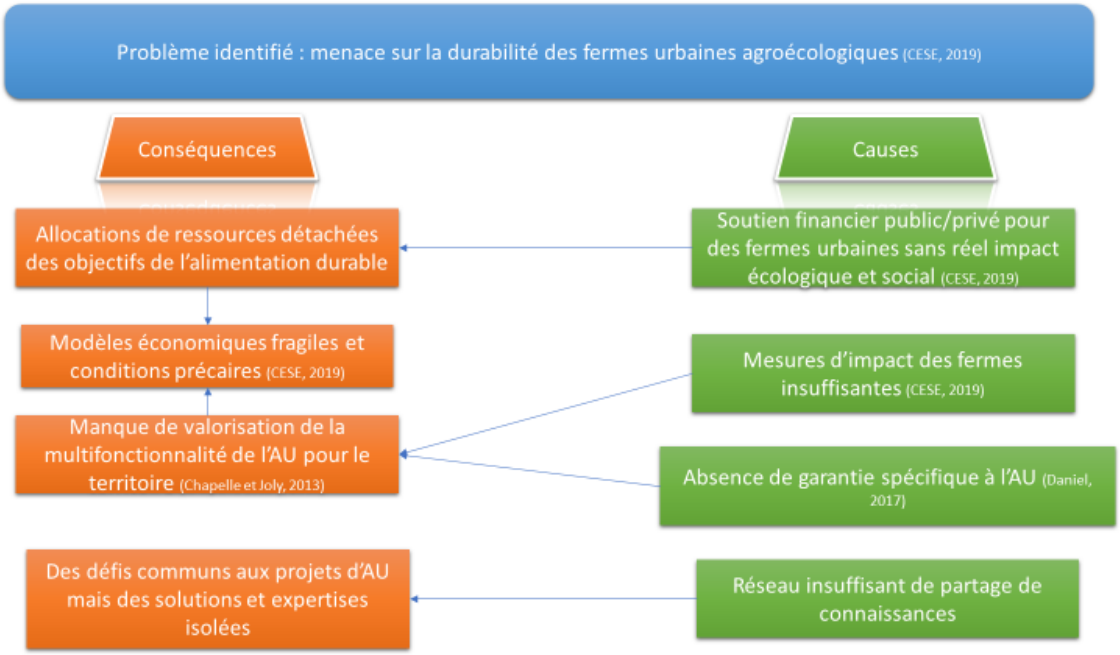
Appendix 4: extract of the Excel table to classify and analyse qualitative data from interviews



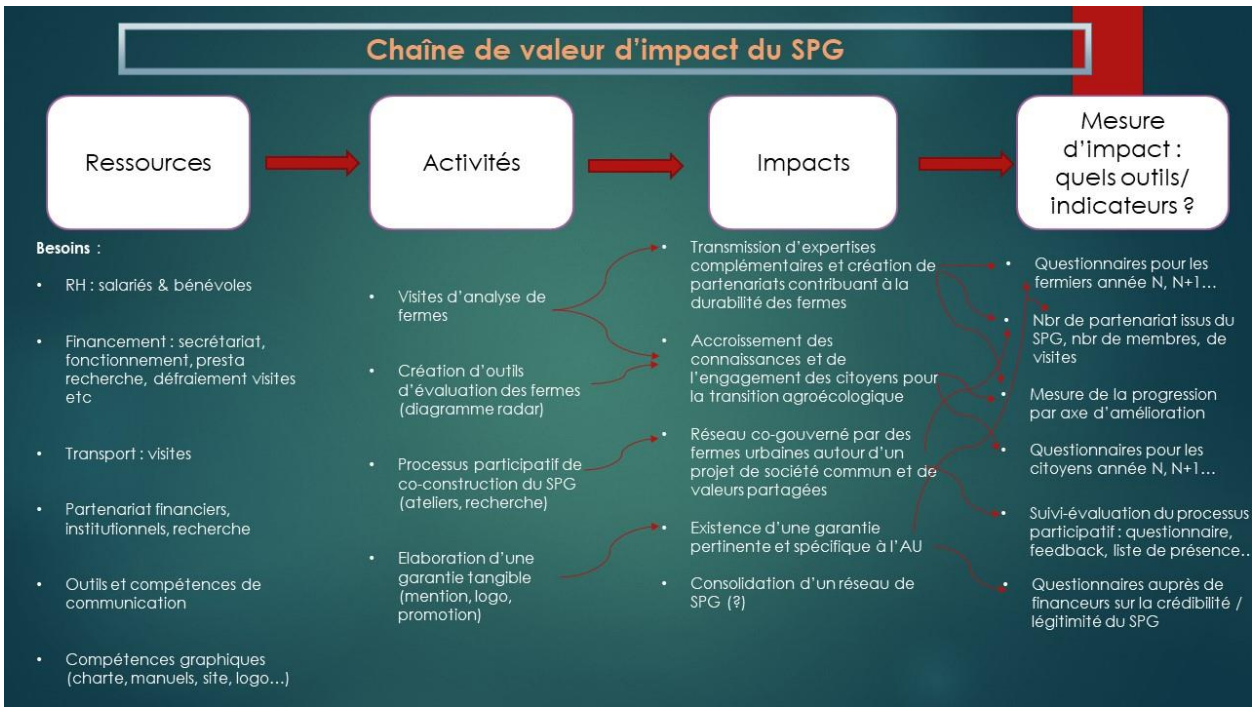
Appendix 5: extract of the stakeholder analysis



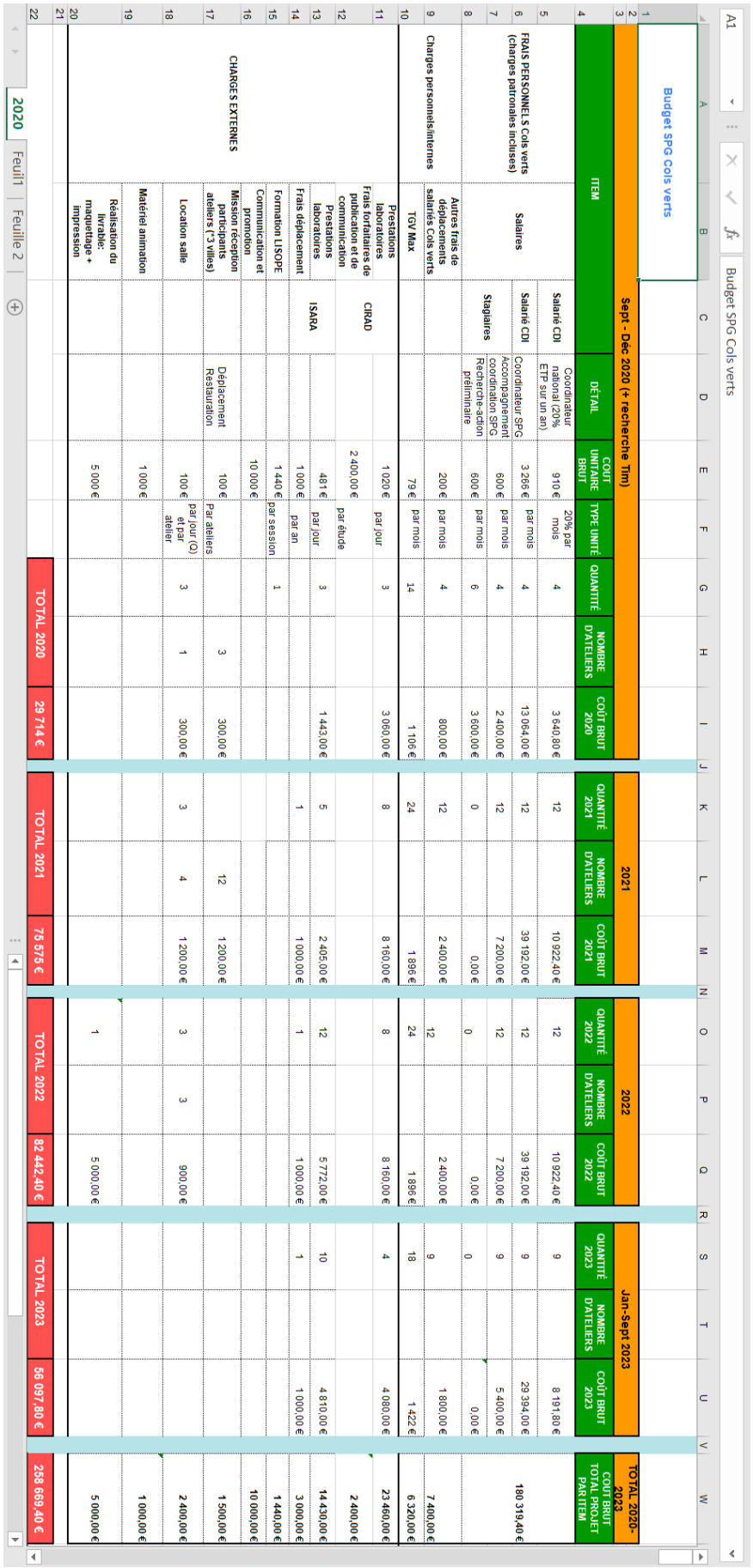
Appendix 6: definition of social need tackled by the PGS



Appendix 7: Social impact value chain of the PGS



Appendix 8: forecasted budget of the Participatory Process of co-construction of the PGS



Budget SPG Cols verts

ITEM			DÉTAIL	COÛT UNITAIRE BRUT	TYPE UNITÉ	QUANTITÉ	NOMBRE D'ATELIERS	COÛT BRUT 2020	QUANTITÉ 2021	NOMBRE D'ATELIERS	COÛT BRUT 2021	QUANTITÉ 2022	NOMBRE D'ATELIERS	COÛT BRUT 2022	QUANTITÉ 2023	NOMBRE D'ATELIERS	COÛT BRUT 2023	TOTAL 2020-2023 COÛT BRUT TOTAL PROJET PAR ITEM
				Sept - Déc 2020 (+ recherche Tim)					2021			2022			Jan-Sept 2023				
FRAIS PERSONNELS Cols verts (charges patronales incluses)	Salaires	Salarié CDI	Coordinateur national (20% ETP sur un an)	910 €	20% par mois	4		3 640,80 €	12		10 922,40 €	12		10 922,40 €	9		8 191,80 €	258 669,40 €
		Salarié CDI	Coordinateur SPG Accompagnement	3 266 €	par mois	4		13 064,00 €	12		39 192,00 €	12		39 192,00 €	9		29 394,00 €	
		Stagiaires	coordination SPG	600 €	par mois	4		2 400,00 €	12		7 200,00 €	12		7 200,00 €	9		5 400,00 €	
			Recherche-action préliminaire	600 €	par mois	6		3 600,00 €	0		0,00 €	0		0,00 €	0		0,00 €	
Charges personnels/internes	Autres frais de déplacements salariés Cols verts			200 €	par mois	4		800,00 €	12		2 400,00 €	12		2 400,00 €	9		1 800,00 €	
	TGV Max			79 €	par mois	14		1 106 €	24		1 896 €	24		1 896 €	18		1 422 €	7 400,00 €
CHARGES EXTERNES	Prestations laboratoires Frais forfaitaires de publication et de communication	CIRAD		1 020 €	par jour	3		3 060,00 €	8		8 160,00 €	8		8 160,00 €	4		4 080,00 €	6 320,00 €
				2 400,00 €	par étude													23 460,00 €
	Prestations laboratoires	ISARA		481 €	par jour	3		1 443,00 €	5		2 405,00 €	12		5 772,00 €	10		4 810,00 €	2 400,00 €
	Frais déplacement			1 000 €	par an				1		1 000,00 €	1		1 000,00 €	1		1 000,00 €	14 430,00 €
	Formation LISOPE			1 440 €	par session	1												3 000,00 €
	Communication et promotion			10 000 €														1 440,00 €
	Mission réception participants ateliers (*3 villes)		Déplacement Restauration	100 €	Par ateliers		3	300,00 €		12	1 200,00 €							10 000,00 €
	Location salle			100 €	par jour (Q) et par atelier	3	1	300,00 €	3	4	1 200,00 €	3	3	900,00 €				1 500,00 €
	Matériel animation			1 000 €														2 400,00 €
	Réalisation du livrable: maquettage + impression			5 000 €								1		5 000,00 €				1 000,00 €
						TOTAL 2020		29 714 €	TOTAL 2021		75 575 €	TOTAL 2022		82 442,40 €	TOTAL 2023		56 097,80 €	5 000,00 €

Appendix 9: prototype of a letter of interest sent to research participants for future collaboration on the PGS project

Lettre de manifestation d'intérêt pour le projet de recherche « Système Participatif de Garantie des fermes urbaines »

Fait à……

Le……/……/……..

A : Monsieur Boris Marcel, association Les Cols verts, Directeur général du réseau national,
et Monsieur Timothée Vernier, association Les Cols verts, chercheur agroécologue à l'ISARA-Lyon.

Objet : manifestation d'intérêt pour participation au projet "Système participatif de Garantie des fermes urbaines."

Je soussigné……,

représentant-e de la structure ……,

manifeste mon intérêt pour le projet de recherche-action initié par l'association Les Cols verts visant à développer un Système Participatif de Garantie de la multifonctionnalité des fermes urbaines. Je suis en effet convaincu-e de l'intérêt de démarches plus collectives d'échange de pratiques, de partage d'expériences entre fermes urbaines dans une perspective de progrès et de valorisation de la multifonctionnalité de ces dernières.

Mon implication dans ce projet se traduira de la manière suivante :

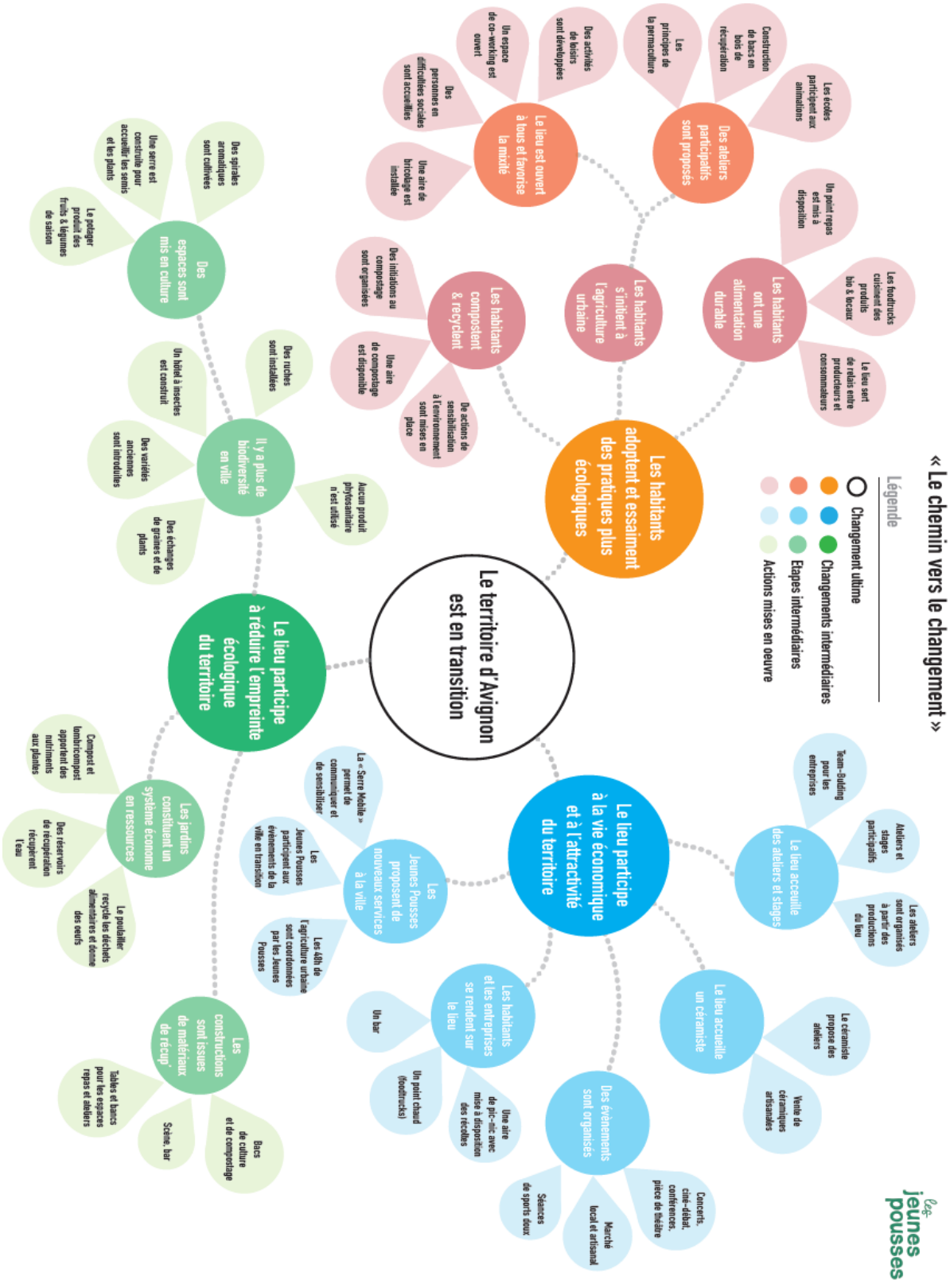
- Participation aux ateliers de co-conception du Système Participatif de Garantie : élaboration de la charte, des outils de gouvernance, du guide de visite etc.
- Participation à la phase de test du dispositif par une visite-évaluation dans une ferme urbaine partenaire du projet.

J'accepte la mention du nom et logo de ma structure par l'association Les Cols verts comme partenaire de soutien au montage du projet de Système Participatif de Garantie, sans que cette mention n'oblige un engagement de ma personne ni de ma structure (entourer la réponse) :

OUI / NON

Signature :

Appendix 10: diagram realised by Paul-Arthur Klein and Inès Revuelta (Les Jeunes Pousses) to visually express the Theory of Change applied to their urban farm Le Tipi.



Appendix 11: intended business model of the PGS for UA

Stratégie de financement du SPG

	Bénéficiaires								
				Publics cibles					
	Fermiers urbains		Citoyens/consommateur	Collectifs CV incubés	étudiants formation CV	étudiants formation Veni Verdi	Entreprise	Fondations	Fondation
source de financement	Contribution	Offre	Contribution (formation	Incubation post-MOOC	Prix formation 1 à 3 mois	Part du prix de la formation pour	"Entreprise au Naturel"	AAP	AAP
Proportion dans le	Faible (100€ ?) :	Elevée	faible	Moyenne	Moyenne	Moyenne	Elevée	Elevée (90 000€?):	Elevée :
Phase du projet	Développement / vitesse de croisière							Lancement	

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