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The Project of a LTSER Platform Driven by Civil Society in the Argonne

Jon Marco Church, Olivier Aimont, Emmanuel Guillon, Rémi Helder, Grichka Lévy, Pierre Taborelli, Jean Grosbelle

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1. The French LT(S)ER network

Long Term Ecological Research (LTER) is a global network that has been active since the 1980s (Mirtl *et al.*, 2018). It promotes the long-term observation of ecological phenomena in different sites. The network also has a branch in France. One of the specificities of the French network is the emphasis not only on the ecological dimension of LTER sites, but also on social aspects. For this reason, all French LTER sites are now also LTSE sites, which stands for Long Term Social-Ecological Research (Mirtl *et al.*, 2013; Bretagnolle *et al.*). This perhaps reflects the high level of anthropization in Europe. However, this phenomenon is limited to France. Anthropogenic pressure on ecosystems is increasing at the time of the Anthropocene (Crutzen, 2006). The “S” in LTSE is also a reference to the concept of Socio-Ecological System (SES), which is gaining currency to refer to different kinds of systems where human society and environmental systems are closely coupled at various levels (Liu *et al.*, 2007).

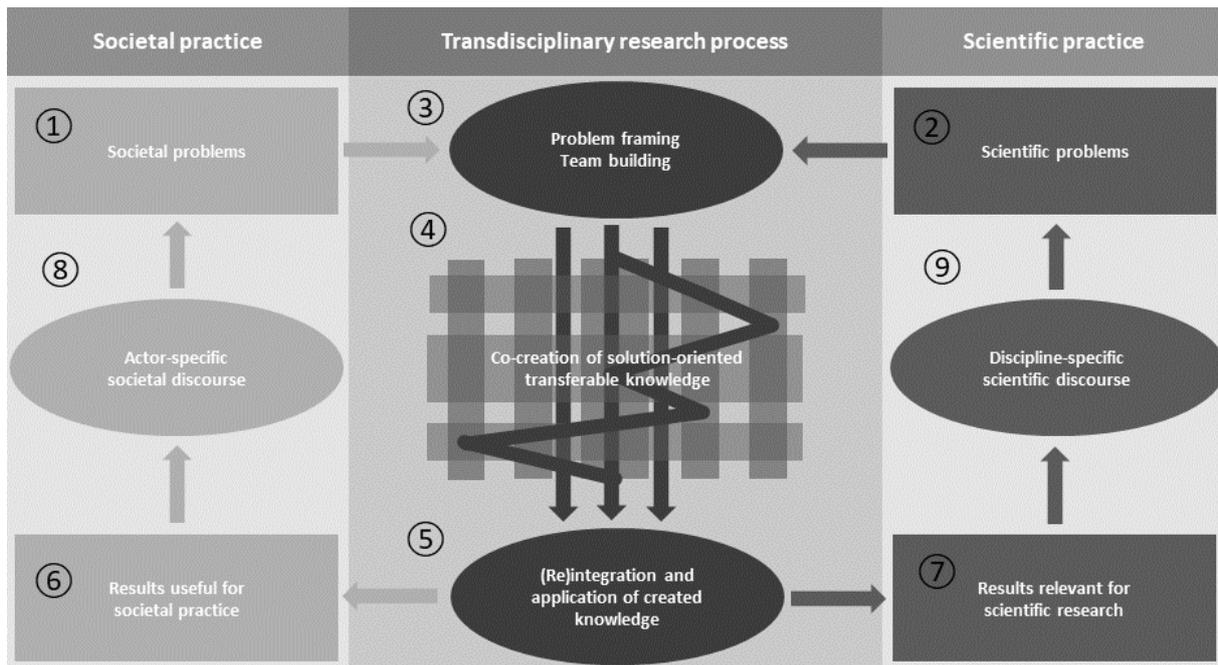
The French LT(S)ER network is an inter-disciplinary and inter-university network of platforms, also known in French as *Zones Ateliers* (ZA), and the sites within them, that is coordinated by the Institute of Ecology and Environment (INEE) of the National Centre for Scientific Research (CNRS). The network promotes long-term observation and research to answer fundamental questions of ecology, but also to respond to societal challenges in relation with environmental dynamics at local, regional and global levels. According to data of the French LT(S)ER network, there are currently 15 LTSE platforms that are labeled by the CNRS, 13 of which are located in the mainland and 2 overseas. More than 1,500 people from more than 118 partner institutions are directly or indirectly involved in the production of the research produced by these platforms. More than 230 of the scholars involved are doctoral candidates.

1.1. The importance of societal actors in a transdisciplinary research process

The research performed in the French LT(S)ER network is place-based and action-oriented. It aims at contributing to solve problems of resilience and sustainability. As such, the network promotes “research, training and invention that can inform action for sustainable development”, i.e. so-called sustainability science (Clark, 2007). For this reason, the network’s objective is to construct its research questions as much as possible together with a wide range of stakeholders to ensure that research results are not only transferred to managers, but also appropriated by all relevant social actors (Van Kerkhoff, Lebel, 2006). Moreover, the inclusion of various types of stakeholders allows to build not only on scientific knowledge, but also on practical knowledge. In this paper, we mobilize the concept of transdisciplinary research process to illustrate how knowledge is co-produced in a LTSE (Church, 2018). Transdisciplinarity should not be confused with interdisciplinarity. While interdisciplinarity consist in the combination of different scientific disciplines to investigate a common object within a research process, transdisciplinarity means including both scientific and social actors in the co-production of solution-oriented transferable knowledge.

¹ Olivier Aimont and Grichka Lévy

Figure 1: Conceptual model of a transdisciplinary research process (source: redesigned based on Lang, 2012: 28)



As illustrated in Figure 1 (Lang *et al.*, 2012), societal problems and scientific problems are the starting point of a transdisciplinary research process. They are not necessarily identical. The framing of a problem and the constitution of the team that will work to identify solutions is therefore very important, because the sharing of the problem and the legitimacy of both the scientific and the societal team are fundamental to the process of co-production of transposable and problem-oriented knowledge. This is a non-linear process that aims at the ownership and implementation of co-produced knowledge. Secondly, these results can be, on the one hand, used in societal practices and, on the other, contribute to scientific practices. They fuel both societal and scientific discourses that will then contribute to the definition of new societal and scientific problems. This iterative process brings us back to the starting point with new challenges. Transdisciplinary research processes contribute to what some authors describe as adaptive governance (Webster, 2009).

1.2. Public participation in environmental governance

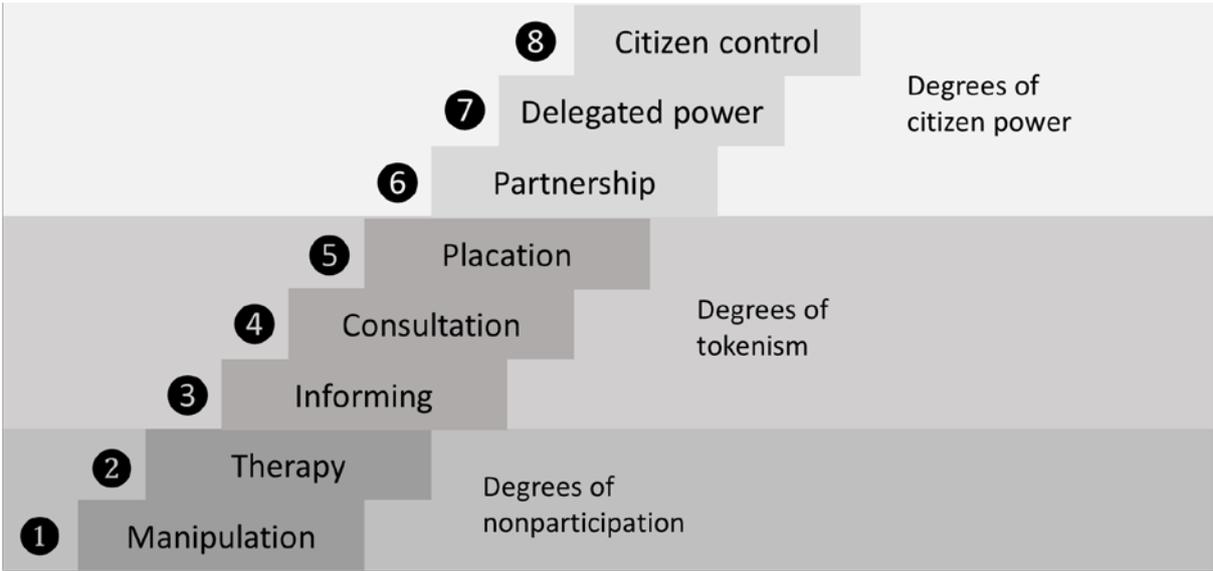
The issue of transdisciplinary research processes within LTSER sites must however be understood in the framework of science-policy relations. The relationship between scientists and decisionmakers is complex, as they are sometimes involved either directly or indirectly in decision-making (Jasanoff, 1990). However, scholars are only one kind of societal actors alongside non-governmental organizations, which include businesses, associations, religions and the media, as well as individuals. These actors can participate in environmental governance processes alongside government organizations. They contribute to so-called public participation in environmental governance. Compared to other sectors of government such as health, finance and defense, the environment distinguishes itself for a greater degree of openness to public participation at different levels, including scholars (Church, Ramcilovic, 2009). As per the 1997 Aarhus Convention, access to information, participation in decision-making and access to justice is particularly important. If the public is not aware of an environmental issue, such as pollution in a certain place or the services provided to the community by a particular ecosystem, it is as if the problem did not exist. Scientists play a key

role as legitimate informants, contributing to the awareness raising that is necessary to empower citizens and civil society.

Public participation in decision-making does not only allow to demand governments to solve environmental problems but can also contribute to improve decision-making by widening the knowledge base to include knowledge that is otherwise not necessarily available to decisionmakers that are sometimes distant from the ground. Public participation in decision-making also increases the legitimacy of decision-making processes and the ownership of the decisions. This increases in turn the likelihood of implementation and compliance. Access to justice is also important to ensure the rule of law, including in case of violation of the right of access to information and of participation in decision-making. For these reasons, public participation of civil society has become a cornerstone of environmental governance processes at all levels, including planning (Raymond, 2009). Countries around the world, encourage participation and adopted legislation, also within the European Union, to ensure its effectiveness. However, there are many ways to participate and levels of citizen participation (Arnstein, 1969). The lower level of participation is manipulation, as illustrated in

Figure 2. Information and consultation is also a form of public participation. In fact, government organization can sometimes act without informing the public or hearing its point of view. According to Arnstein (1969), the highest levels of citizen power are partnership, where non-governmental organizations act together with government organizations such as in the case of public-private partnership for water provision, followed by delegated power, when civil society acts on behalf of government organizations, such as in the case of a convention between a local government and a non-governmental organization for the management of a park. Of course, the highest level is citizen control, where civil society manages to self-organize, find locally appropriate solutions and avoids one-size-fits-all panaceas (Ostrom, Janssen, Anderies, 2007).

Figure 2: Eight levels of citizen participation (source: redesigned based on Arnstein, 1969)



1.3. Citizen science

The LT(S)ER network is increasingly aware of the role of civil society and citizens in the production of scientific knowledge (Abbott *et al.*, 2018; Muelbert *et al.*). We have already seen that the participation of civil society in transdisciplinary research processes contributes to produce solution-oriented transferable knowledge. At the same time, we live in a period of

increasing skepticism towards science and scientists (De Pryck, Gemenne, 2017). Public participation in science-making also contributes to science education, in the sense that it helps disseminate and transfer scientific knowledge. Moreover, public participation in the production of scientific knowledge contributes to increase public awareness about how science is produced, its potential, as well as its limits, with a view to increase the legitimacy of science and improve scientist-citizen relations. Last but not least, so-called citizen science allows scholars to enlarge their knowledge base with the practical knowledge of other actors. This knowledge may not be produced in a science laboratory but is the result of in situ observations and experiences. In some cases, citizens and scholars can work together to collect and analyze data, for example for the creation of species inventories or to track pollution levels (McKinley *et al.*, 2017). This collaboration between professional and non-professional scientists can sometimes be formalized as partnerships between academic institutions and non-governmental organizations. Of course, this can represent a form of cheap labor that is exploited by scientific institutions. If this is the case, this form of citizen science usually does not last over time. For scientist-citizen partnerships to last in the long-term, cooperation must be mutually beneficial, where the process is agreeable to both parties and results are both useful for civil society and relevant for scientific research.

2. The example of the Argonne LTSER project

The Argonne is a low-mountain forest located in the North-Eastern part of France between the midsize cities of Reims and Metz. It used to mark the border between the former regions of Champagne-Ardenne and Lorraine. Since the merger of the two regions in 2015, the Argonne is now part of the Grand Est region. The most frequent type of land cover is forest, which represents about half of the area, followed by farmland, as well as flood meadows and peatlands. The Argonne are a biodiversity hotspot at the crossroads of major ecological corridors. The area is renowned for its forest landscape. If tourism is not really developed, the Argonne's different species and ecosystem features have long been studied by scholars, particularly from nearby academic institutions in Reims, Nancy, Strasbourg, Amiens and Paris. The University of Reims can also count upon its Center for Research and Training in Ecoethology (CERFE), which is located since the 1990s within the Argonne in the municipality of Boulton-aux-Bois.

With no major city less than 30 minutes away, no urban center with more than 5,000 inhabitants and a population of less than 16 inhabitants/km², the Argonne is among the least densely populated areas in France. It represents the beginning of the so-called "empty diagonal" of France, spanning from the Meuse to the Landes departments. Along the urban-rural continuum, the Argonne therefore positions itself at the rural extreme and is therefore representative of the challenges faced by rural areas in France. This is also due to the destruction that took place first during the Franco-Prussian Wars and then, most importantly, during the First World War and, to a lesser degree, Second World War. The Argonne is located not far from the martyr city of Verdun and represented the front of the First World War for most of the conflict. This left permanent traces in the collective memory of the population, as well as significant levels of soil and water pollution. Questions about everyday life can be asked. How to live in a low density area? The Argonne is currently undergoing several parallel labeling processes, particularly the creation of a Regional Natural Park and the establishment of a LTSER site.

Map 1: Location of the Argonne LTSER project within the French LT(S)ER network (source: author generated based on a map by the French LT(S)ER network, 2017)



2.1. The Argonne PNR project

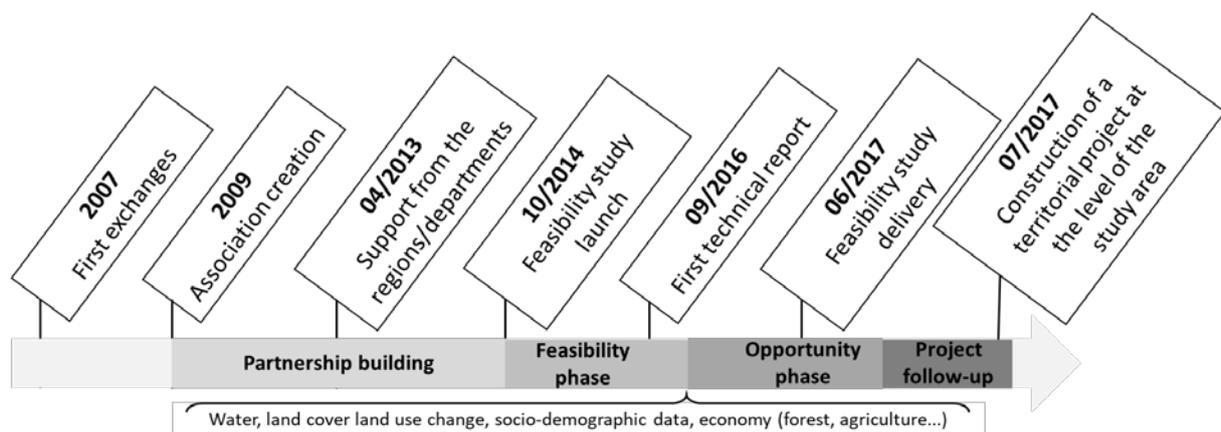
In 2007, a group of local actors, particularly civil society organizations, started reflecting upon how to encourage younger generations not to abandon the area and at the same time protect its unique natural and cultural heritage. The discussions therefore shifted from how to protect its unique natural and cultural heritage *per se* to how to support the sustainable development of the Argonne also for the generations to come. By 2009, the idea to create a Regional Natural Park (PNR) emerged clearly from the discussions, so the group created an association called “Argonne PNR” to promote the creation of the park. The promotion of the idea was not an easy task because the area was split up into two different administrative regions, three departments, a dozen of federations of municipalities (in French: *intercommunalités*) and more than one hundred municipalities. The association succeeded in federating civil society organizations to pursue the common goal of the park and in mobilizing the two regions, the three departments, as well as many municipalities and federations of municipalities, which are

the most difficult to mobilize in such projects because of the little awareness about the specific objectives and practical functioning of Regional Natural Parks, lack of human and financial resources, which usually come from the regional level, as well as general resistance to change. It also succeeded at identifying a first perimeter of the park, which was defined at the municipal level based on the consideration of natural and cultural aspects, as well as the contribution of local experts. In 2013, the two regions and three departments tasked Argonne PNR for the preparation of a feasibility and opportunity study (Lévy, 2016) and provided funding. This is the first formal step towards the creation of the Regional Natural Park of the Argonne, as illustrated in

Figure . Argonne PNR decided not to contract a consulting firm but decided to hire a young professional and produce the study not only in-house but also mobilizing a large number of partner organizations, local experts and inhabitants. They all contributed to the drafting process. This enlarged the knowledge base while at the same time increasing the local ownership of the final product and of the overall process.

Argonne PNR also mobilized scholars with various disciplinary backgrounds, including both social and natural sciences, and of different levels of seniority. They included ecologists, botanists, agronomists, geographers, planners, sociologists and political scientists from nearby universities and other research institutions, as well as some local experts. A Scientific Committee of the association was established and met at regular intervals to provide advice and scientific backstopping to the preparation of the study, including its atlas (Association Argonne PNR, 2016). A first draft of the feasibility and opportunity study was produced in 2016. The study was then finalized and delivered in 2017. The study was also submitted to the National Biodiversity Agency, whose experts were positively impressed by its technical quality.

Figure 3: Timeline for the construction of the Regional Natural Park of the Argonne (source: author generated)



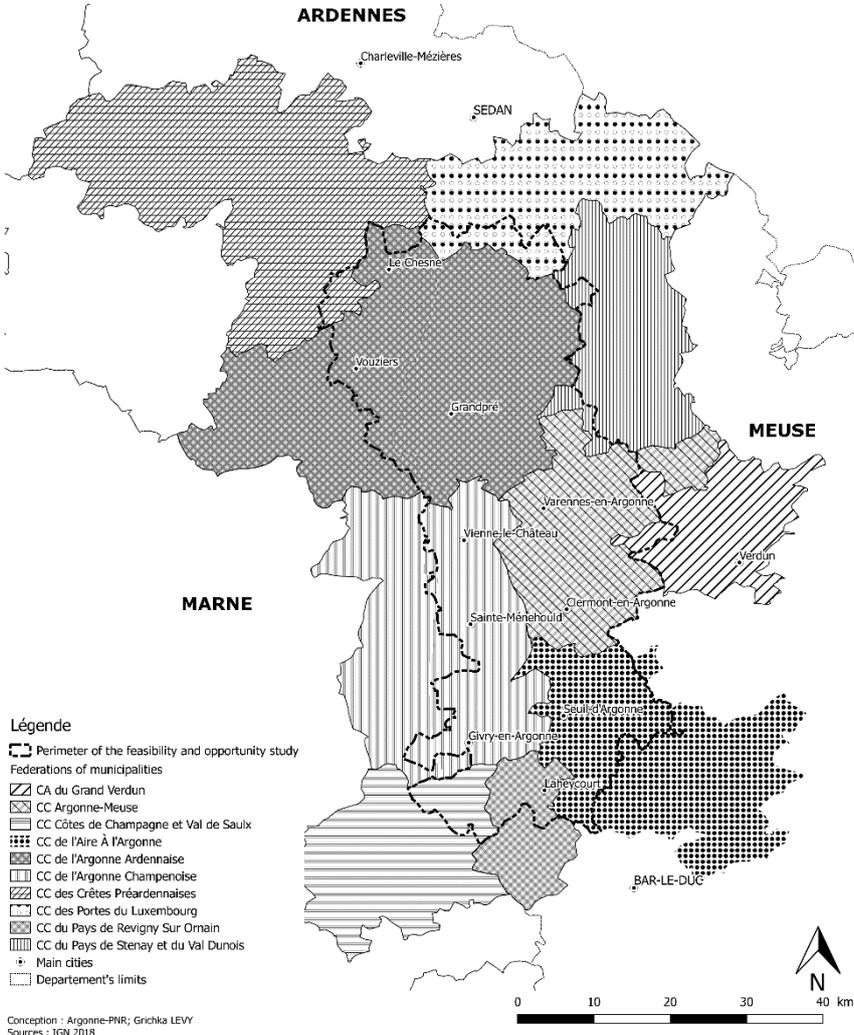
In the meantime, the political and administrative situation changed drastically. In 2015, the Champagne-Ardenne and Lorraine regions had merged with Alsace to form the Grand Est region. The subsequent elections witnessed the departure of the center-left regional councils of both regions and the arrival of a center-right regional council. At the same time, the new laws in the framework of the ongoing territorial reform process resulted in the merger of some federations of municipalities, as shown in

Map 2, and transferred some competences of nature protection from the departments to the federations of municipalities. By 2016, the two regions that requested the feasibility and opportunity study did not exist anymore and the three departments that supported the process were not competent on the matter anymore. Consequently, the Regional Natural Park of the Argonne project is currently on hold. In the meantime, Argonne PNR not only delivered the study but also started implementing some pilot actions in line with what a park would do, such

as producing communication materials, organizing every year a march across the Argonne, developing a brand for local products, as well as promoting local heritage and ecotourism. Supporting the development of research and innovation is also among the priorities of Argonne PNR. This is possible also because the new region, some federations of municipalities, individual donors and many volunteers keep supporting the work of Argonne PNR and the pursuit of the long-term objective of crating the Regional Natural Park of the Argonne. As between 2009 and 2013, it may take seral years for all the federations of municipalities to concur on the establishment of the park. In the meantime, civil society is moving forward with a de facto “citizen natural park” through the implementation of the pilot actions, thanks to the available support.

Map 2: Perimeter of the feasibility and opportunity study and of the federations of municipalities (source: Association Argonne PNR, 2016)

Perimeter of the feasibility and opportunity study and of the federations of municipalities

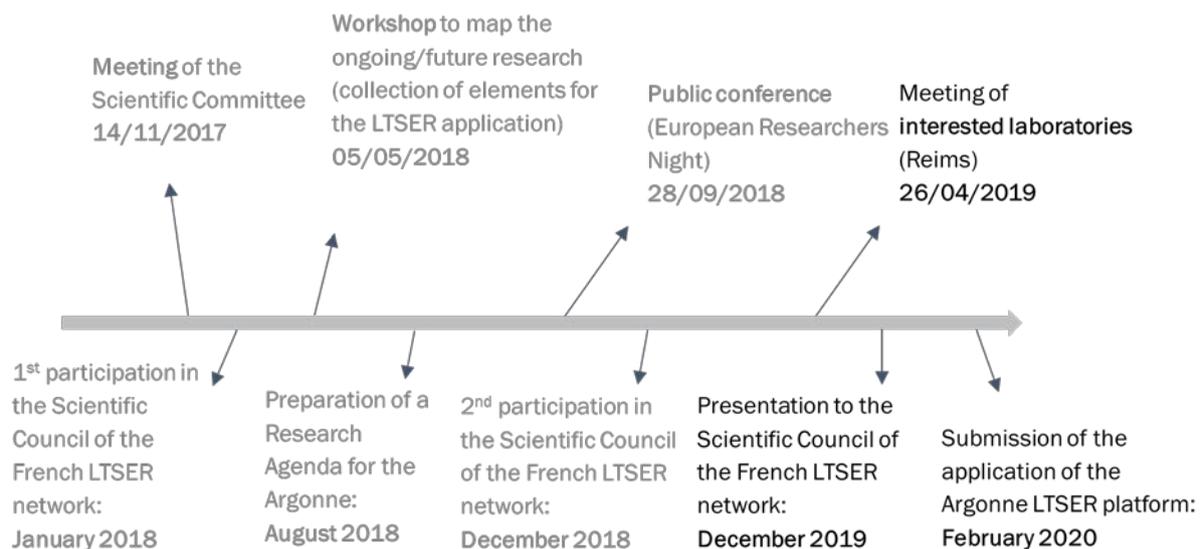


2.2. Participation of civil society in the Argonne LTSER transdisciplinary research process

One of the pilot actions supported by Argonne PNR is the creation of an Argonne LTSER platform, also known in French as *Zone Atelier Argonne* (ZARG) project. As shown in

Figure , the process was initiated in 2017 in the framework of the Scientific Committee of Argonne PNR, whose members expressed the desire to build on the work done with the feasibility and opportunity study and strengthen collaboration among themselves and with Argonne PNR and its partners. Because of the availability of long-term data sets on both ecological and social aspects and because of the involvement in the activities of the French LT(S)ER network and other LTER sites of some members of the Scientific Committee, the development of an LTSER platform in the Argonne rapidly emerged as a suitable instrument to pursue the objectives of both the scholars involved and Argonne PNR. Subsequent exchanges with representatives of the French LT(S)ER network and of some of its platforms confirmed the idea that the main features of the Argonne LTSER project are also in line with the priorities of the network, particularly regarding the inclusion of other societal actors and of social sciences alongside natural sciences.

Figure 4: Timeline for the creation of the Argonne LTSER (source: author generated)



For this reason, the Argonne LTSER project was designed from the very beginning as a transdisciplinary research process with the participation of societal actors in all of its phases, starting from preparation. The small dimension of the Argonne compared to some other LTER platforms and the presence of an umbrella organization such as Argonne PNR, which brings together non-governmental organizations and individuals with the support of government organizations, facilitates the process.

Table 1 shows the level of participation of civil society in the different phases of the project using Arnstein's scale (

Figure 2). The Argonne LTSER project is currently in phase ④. The levels of participation indicated for phase ⑤ and above are projected, not observed levels. They are based on current expectations. This analysis is performed regarding the development of the Argonne LTSER project as a transdisciplinary research program. Of course, the same analysis can be repeated for each transdisciplinary research project conducted in the framework of the Argonne LTSER platform.

The level of participation in the definition of societal problems and in the (re)integration and application of created knowledge is high, because the region and the federations of municipalities partially delegated some of these competences to Argonne PNR, which for

example facilitated the identification of the priorities of the 2017 Territory Project for the Argonne. This is a project “by”, “for” but also “on” this territory, where the inhabitants and their way of life are a research object as much as their living space. The level is also high for the co-creation of solution-oriented transferable knowledge, because the Argonne LTSER project and other societal actors are expected to partner through Argonne PNR to identify solutions to scientific and societal problems. The level of participation in the definition of scientific problems and in the problem framing and team building phases is instead medium. For example, the Argonne LTSER project organized three public events in 2018: one in May and one in September to inform the public but also other scholars about the existence of the Argonne LTSER project and of ongoing and potential research and one in October to consult Argonne PNR and the public on the development of a Research Agenda for the Argonne (Table 2), which aims at combining the main themes of ongoing and potential research with the priorities of the 2017 Territory Project for the Argonne. These events will continue in 2019.

Forest and ecosystem issues, water resources and soil, environmental governance and military history have been identified so far as the main areas with potential for collaboration across disciplines and laboratories. The Research Agenda for the Argonne was developed to identify the demand of research for the area, identify gaps and co-produce innovative, place-based and use-inspired research projects and programs that can fill these gaps. This resulted in the identification of research gaps in terms of issues that are priority for societal actors but that are left behind by scholars, such as tourism development, as well as practice gaps in terms of questions that are raised in scientific research but that are not yet raised on the agenda of societal actors, including decisionmakers. A medium level of participation is expected to be maintained in all phases of implementation, including consulting both scientific and societal actors on the results of scientific research and societal practice, as well as informing both parties about scientific publications and societal processes.

Table 1: Level of participation of civil society in the Argonne LTSER project

Phase of the transdisciplinary research process	Level of participation of civil society
① Societal problems	⑦ Delegated power
② Scientific problems	③ Informing
③ Problem framing Team building	④ Consultation
④ Co-creation of solution-oriented transferable knowledge	⑥ Partnership
⑤ (Re)integration and application of created knowledge	⑦ Delegated power
⑥ Results useful for societal practice	④ Consultation
⑦ Results relevant for scientific research	④ Consultation
⑧ Actor specific societal discourse	③ Informing
⑨ Discipline-specific scientific discourse	③ Informing

3. Conclusion: an initiative driven by civil society

This contribution presented first the importance of societal actors within the French LT(S)ER network and their role in transdisciplinary research processes that promote public participation in environmental governance, as well as citizen science. It then discussed the level of participation of civil society in the case of the Argonne LTSER project. It showed that the project is currently being designed to ensure a high or medium levels of participation in each phase. It is expected that this will contribute to solve both scientific and societal problems,

improve science-policy relations and foster cooperation among disciplines in both the natural sciences and the social sciences, among the academic institutions, particularly within the new region, as well as other societal actors.

The Argonne LTSER platform is transforming this area into a living lab of sustainability. It will provide the opportunity for long-term transdisciplinary research processes to tackle the problems of rural areas and social-ecological systems such as the Argonne and contribute to their transformation towards sustainability. The research infrastructure of the French LT(S)ER network will also facilitate collaboration and allow developing joint actions and socio-ecological experimentations together with other LTSER platforms in France, for instance with regard to data infrastructure, the development of shared protocols to study for example problems of public health in forest areas such as the diffusion of the Lyme disease, as well as the participation in international collaborations in the framework of the global and European LTER network.

Table 2: Comparison between the priorities of the 2017 Territory Project and the ongoing or potential research on the Argonne

PRIORITIES OF THE TERRITORY PROJECT	AREAS OF ONGOING RESEARCH
<p>AGRICULTURE Support agriculture and forestry in connection with the territory Have a chain of farm products under the Argonne brand</p> <ul style="list-style-type: none"> - Building on local specificities - Targeting high-end markets - Promoting short food supply chains - Working with transformers - Experimenting (tests, lab...) - Connecting with the preservation of soils, meadows... - Cluster - Facilitating and supporting - Networking with enterprises - Connecting with health 	<p>AGRICULTURE</p> <ul style="list-style-type: none"> - Agri-environmental indicators - Valorization of orchards
<p>FOREST/WOOD Have a chain of local materials for building</p> <ul style="list-style-type: none"> - Markets and tenders - Poplars - Sawmills - Pilot projects - Meetings of professionals - Study tours in the Northern Vosges - Have a wood energy sector - Forest maintenance - Cooperative companies of collective interest - Agroforestry - Heat networks - Insertion 	<p>FOREST</p> <ul style="list-style-type: none"> - Landscape connectivity for wildlife - Valorization of bark of local species - Geohistory of forests - Forest crisis under the Ancien Régime - Forest soil pedology

<ul style="list-style-type: none"> - Short supply chains - Operators 	
<p>TOURISM Develop an Argonne tourism strategy Argonne as a major tourist destination</p> <ul style="list-style-type: none"> - Creating an event, national attraction - Creating tourism products - Selling innovative products - Improving communication (guides...) - Creating an Argonne get-together 	<p>Develop more research on the topic of tourism</p>
<p>HERITAGE Preserve and enhance natural and cultural heritage A living and shared heritage</p> <ul style="list-style-type: none"> - Relying on associations - Launching an inter-associative challenge to achieve concrete projects and ambitions <p>Develop more activities on military history and ecological challenges.</p>	<p>HISTORY</p> <ul style="list-style-type: none"> - Local history - Front of the Great War - Archeology of the Great War - Military geography before the Great War in the Argonne <p>WATER-SOIL-AIR / ENVIRONMENT</p> <ul style="list-style-type: none"> - Watercourses in the Barrois - Hydrogeology - Pollutants - Aquatic ecotoxicology
<p>BUSINESS Accompany and welcome companies in Argonne An incubator territory for sustainable development</p> <ul style="list-style-type: none"> - Encouraging innovation - Cooperation - Facilitation - Social and environmental responsibility - Transmission 	<p>ECONOMY</p> <ul style="list-style-type: none"> - Ecological economy - Bioresources and circular economy
<p>VILLAGES Valorize village centers and housing, work for the development and connection of services on the territory The “Cooperative Villages”, villages that “give envy”, “En-village”, “Villages of the future”</p> <ul style="list-style-type: none"> - Integrated sustainable development approach integrated - Launching through a call for expressions of interest and support for pilot projects - Mutual aid, cooperation 	<p>RURALITY</p> <ul style="list-style-type: none"> - Geography of the rural world - Rural development - Traditional societies

<p>COMMUNICATION Strengthen the dynamism and image of the Argonne and develop a local communication strategy “We Argonne”, lead people to create narrative</p> <ul style="list-style-type: none"> - Inter-Argonne information network - Storytelling, publishing, promotion - Communication towards inhabitants to make them ambassadors - Label / national level brand / PNR - Crossing of the Argonne - Gathering, coordinating - Inventing, writing, building a narrative 	<p>GOVERNANCE</p> <ul style="list-style-type: none"> - Relationship to nature - Nature parks - Ecological transition - Ecosystem governance - Law of local authorities - Sociology - Management
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