

Local Ruralism: Systemic Design for Economic Development



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Abstract Rural regions have high potential for local economic development offered by social innovation (Neumeier, *Sociologia Ruralis* 52:48–69, 2012) and social transformation and transition (Markard et al., *Research Policy* 41:955–967, 2012).

The aim of this article is to unlock the potential of systemic innovation in rural development through research insights and practical methods. Theories and practices can define a framework to be used and exported in different contexts.

Design approaches inform first principles for human social systems and encourage social innovation processes for the improvement of the quality of life and the economic well-being of people (Bistagnino, *Systemic Design: designing productive and environmental sustainability*. Slow Food Editore, Bra, Italy, 2011). The explained case studies are practices undertaken by the author to directly bring findings from a design phase through to implementation. The three cases are set in three different geographical contexts (Mexico, Italy, and Spain) with declining rural situations. The empirical evidence for what might be the necessary enabling condition for rural development remains limited, so this direct experience can give new insights on systemic innovation as enabler for rural development.

The ambition underlying these projects is to develop pertinent knowledge, clear frameworks, and concrete guidelines, which constitute a new method to facilitate the actions of systemic networks in rural regions.

Introduction

Today, citizens of many rural regions find themselves locked into patterns of economic decline. Although urbanization is creating enormous pockets of poverty in large urban centres, there are more poor people in rural areas contending with social and economic aggravating factors: lack of visibility, equipment, and basic infrastructures (Ramos & Malagòn, 2010).

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While fully understanding the process of rural development fully requires a multiplicity of different theories (Lee, Árnason, Nightingale, & Shucksmith 2005), we argue that speculative and empirical approaches can help us understand the dynamics of realities. In other words, a focus on theories related to systemic innovation design (desk research), and on analysis of real case studies designed by the same researcher (field research), provides a means of understanding framework and concrete guidelines to facilitate future actions of systemic innovation networks in rural regions. In terms of rural development, as Ray (2006) said, the neo-endogenous approach, with its tension between bottom-up and top-down choices, has two primary characteristics:

1. The economy is reoriented to maximize the retention of benefit, within the local territory by valorizing and exploring local resources—physical and human.
2. Development is contextualized by focusing on the needs, capacities, and perspectives of local people.

The development model emphasizes the principle and process of “local participation” in the design and implementation phase, through the adoption of cultural, environmental, and community values (Ray, 2006). Regional development processes are strongly dependent on people’s ability to develop sustainable structures that, on the one hand, facilitate all forms of innovation, creativity, new ideas, and visions in acting and, on the other hand, maintain the essential stability (Neumeier, 2012). Similarly, Cooke (1998) stresses that with the convergence of evolutionary theory and industrial district theory, variations in the development of regions can no longer be explained only as a result of physical and financial resources only. Instead, different organizational and technical abilities of regional actors can make the difference in local development, because of the application of practical and technical know-how with the available regional resources.

As for its structure, the next section introduces the methodology used to define an exportable framework, informing the role and the use of desk and field research (Celaschi & Deserti, 2007). This section is followed by a discussion on design approaches and how they can build a systemic innovation specifically for the development of rural areas. The next part is given over to an exposition of personal experiences by the author in three case studies, from the preliminary stages to the implementation. Finally, we can merge some results and conclusions with speculative and empirical duality.

Methodology

Despite an increasing interest between both policy analysts and academics in the notion that innovation might be an enabler for rural development, there is so far a limited empirical evidence base on which enabling conditions are necessary. Utilizing a combination of desk (literature) and field research leads to a more in-depth understanding of reality from different viewpoints, which is crucial when exploring topics or issues involving a large range of actors and stakeholders. This research is heavily focused on action case method (Vidgen & Braa, 1997) in order

to move from understanding to prediction and to change. The basis of this research is therefore the use of diverse kinds of data sources and a mix of qualitative and quantitative methods. The literature review detects the existing information already written by others, with an important identification of the sources and their reliability (literature, case studies, site visits, interviews, industry interactions). The desk research moves from the most quantitative data, like database, statistics, reports, case studies, and scientific reviews, to other qualitative sources such as social media. In the same way, the field research moves from more quantitative data, such as data recording, field mapping, and surveys, to more qualitative, approaches such as observation and ethnographic empathy. The combination of desk and field research aims at understanding the facts in order to define an original framework (Celaschi & Deserti, 2007). These two steps are not temporally subsequent, but they reiterate many times with intermediate situation of visual framing and gap analysis in order to redirect research in the right way (see Fig. 1).

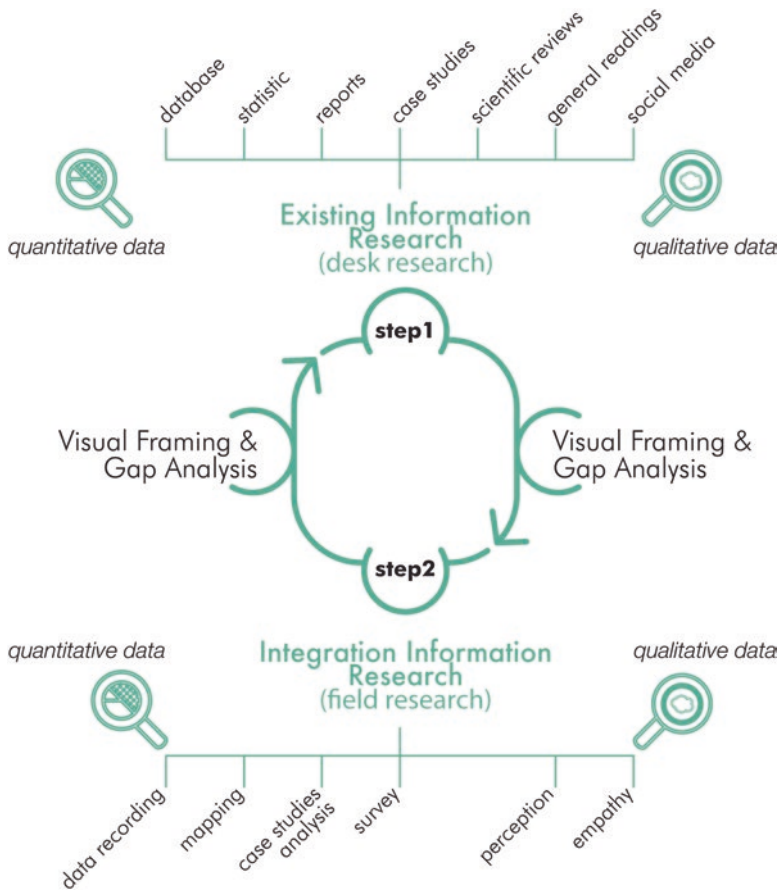


Fig. 1 Relation between desk and field research (courtesy of Andrea Gaiardo)

In the first step, the design approaches are analysed in order to understand how they can contribute to systemic innovation for the development of rural areas. The living systems theories are taken into consideration and can give us many insights for future improvements, from generative science to systemic design.

In the second step, the analysis *ex post* of real selected projects allows to map and evaluate links to innovation, governance, and rural development. Three case studies directly improved by the author are analysed, taking the advantage of direct and from inside knowledge of them. The empirical research is focused on identifying the enabling conditions and limiting factors for rural development, in order to define a new framework for the enhancement of smart, inclusive, and sustainable growth in declining rural areas.

Theoretical Background

The challenge of the desk research is to put together the latest theories connected to sustainable development that integrate the “triple Ps” (people, planet, profit), incorporating many contributors from social sciences and humanities, natural sciences, and economic studies, to define the complexity of this topic.

On the basis of the complexity in living systems theories, many next developing theories on social dynamics, natural behaviours, and industrial processes applied that concept on artificial systems. The generative science shows how finite parameters in the natural phenomena interact with each other to generate infinite behaviours.

This science explores the natural phenomena at several levels including physical, biological, and social ones. The generative science was further enhanced by Wiener’s (1948) cybernetics. Cybernetics unified the physical, biological, and social sciences into a holistic discipline of artificial and social systems control and communication. Similarly, a generative philosophy evolved through von Bertalanffy’s general systems theory (GST). He stated that “a system is a set of unities with relationship among them,” underlining the relational aspects among the several parts and the global essence of the whole system. Contemporary ideas from systems theory have grown within diversified areas. As a transdisciplinary, interdisciplinary, and multi-perspective domain, GST brings together principles and concepts from ontology, philosophy of science, physics, computer science, biology, and engineering as well as geography, sociology, political science, psychotherapy, and economics among others.

Complexity models of living systems address also productive models with their organizations and management, where the relationships between parts are more important than the parts themselves. Treating organizations as complex adaptive systems, the productive, management model emerges in economical, social, and environmental benefits (Plsek & Wilson, 2001). In that field, Porter’s industry cluster (1990) evolved in more environmental sensible theories: Frosch and Gallopoulos’ industrial ecology (1989), in which the resources of industrial processes move through the system to become waste and then output, can become inputs for new processes. Furthermore, in Chertow’s industrial symbiosis (2000), the geographic

proximity is neither necessary nor sufficient; turning waste into business opportunities reduces demands on the earth's resources and provides a stepping stone towards creating a circular economy (CE) (Pearce & Turner, 1989).

A further contribution to CE comes from the systemic design (SD) discipline, driven by different academic groups around the world. SD enhances the dialogue among the different actors involved in complex anthropic systems, in order to optimize the throughput of materials, energy, and information from one system to another in continuous dynamic balance. SD is being developed within design practice and through the Systemic Design Association as of Oct 2018 focusing on different aspects of the issue:

The systemic design research team at Politecnico di Torino (Italy) is active in research and didactics. There is a 2-year master of science in systemic design named after Aurelio Peccei. This approach, put forward by Luigi Bistagnino, focuses on the relationship between the outputs and the inputs of a system, by viewing waste as a valuable resource.

The Strategic Foresight and Innovation MDes programme at OCAD University (Toronto, Canada) sustains a systemic design initiative led by Peter Jones. Emphasis is placed on teaching complex problem finding, framing, and solving, to envision and develop sustainable futures with design action research, system mapping and process design, and dialogic design.

Systems-oriented design is the SD approach developed by Birger Sevaldson at the Oslo School of Architecture and Design (Norway). It seeks to train designers' ability to cope with a larger degree of complexity and to take more responsibility for the consequences of their actions.

Systems thinking and design is part of the academic programme at the National Institute of Design (India) in the design department established by the late M. P. Ranjan and led by Praveen Nahar. They apply a systems approach towards complex issues and wicked problems with high level of ambiguity, uncertainty, and complexity from socio-cultural-economic-environmental perspectives.

The systems theories can play an important role in rural development, such as Ison's participatory rural appraisals (PRAs) with their conceptual and process issues relating to design (Ison, 2000). The systemic design approach, in the most recent evolution, is particularly attentive to the territorial implications and valorizations. In that sense, we can call it systemic design for sustainable rural development, where the management of local resources and wastes can generate new territorial businesses to guarantee distribution of wealth to local communities.

Action Case Accounts

Comparing case studies, we draw attention to the human activities needed in rural development and examine local contexts.

Case studies can provide support for a framework for the development of rural areas—possibly to identify the distance points from theories and practices and to

verify the differences in design (project) and implementation (action) phases among the case studies. We choose the following three cases for their different geographical contexts (Italy, Spain, Mexico) and also for their social, economic, and technological background. The common characteristics are the need for stimulating economic and social development in rural communities and the active participation of the author in their design and implementation.

We might state in advance that a universally recognized definition of “rural development” does not exist, because development is the result of different factors (physical, technological, economic, socio-cultural, institutional). The term “rural” defines all the territories that are not urban (or allocated for urban expansion), where the main activities are agro-silvo pastoral and the habitation density is very low. We can consider sustainable rural development as a process that allows a rural population to generate value at their local potential while respecting the environment (Capello & Hoffmann, 1998). The three cases described below fit those characteristics: The EN.FA.SI. project is based in Cuneo province in north-western Italy, the Ahuehuetla project is based in Ahuacuotzingo village in Guerrero state in Mexico, and the Systemic Buying Group project is from the Lea-Artibai district in Spain’s Basque Country. Cuneo is the main city of the province with less than 600,000 inhabitants and a density around 450 inhabitants per km², but the rest of the province has a low density with primary activities of agriculture (cereal and fruit production), forestry (elm, oak, chestnut tree, willow), and grazing (cattle and sheep). Ahuacuotzingo is a village in southwest Mexico, with about 25,000 inhabitants and a very low density (65 inhabitants per km²). Farming is important for land use and for the management of natural resources, but just for subsistence, as well as farm animals. Lea-Artibai is a province located in the northern part of the Basque Country and derives its name from the two rivers it hosts: Lea and Artibai. It overlooks the Gulf of Biscay; its culture and economy are closely connected to the sea, especially for the Lekeitio and Ondarroa. These are the main towns in the area, together with Markina-Xemein, where most of the people are concentrated (26,000 inhabitants), but the population is mainly diffused across many small villages in the countryside.

The author was a team coordinator in these three projects from the early stages, so the data collection, the critical analysis on the work direction, and the project evolution are enriched with personal details and knowledge. With projects personally led, from the design stage to the implementation and the real activation, they last an average of 3 years: EN.FA.SI. project lasts from 2011 to 2014, Ahuehuetla and the Systemic Buying Group projects started in 2013, and they are still ongoing.

EN.FA.SI. Project

The EN.FA.SI. project (l’ENERgia e il FAGiolo in Sistema), supported by the Piedmont region with POR-FESR 2007–2013 funds on productive transition and innovation, aims to develop a specific area in north-western Italy (province of Cuneo) through a process of designing for food supplies.

Analysis

The project takes place in the province of Cuneo (Piedmont), a varied territory characterized by the mountains, the hills, and the Po river valley. The Cuneo area is rich in natural resources, history, and ancient traditions deeply rooted in the territory. The manufacturing industry and service sectors are the most incisive for the local economy; however, the province of Cuneo is traditionally tied to agriculture and breeding, characterized by high-quality crops and excellence in agricultural and food products. The cool temperatures of the lowland area, the high solar radiation, and the drastic temperature range make it a suitable area for growing the Cuneo bean (Fagiolo Cuneo). The project analyses the scenario, the environment, the territory, and the habits of its inhabitants, applying the systemic approach to the supply chain of the Cuneo bean.

Project

The project studies not only the linear process but also the inputs and outputs involved in each phase, to generate added value from what is usually considered waste. Environmental problems generate both difficulties and the main opportunities for innovation related to Cuneo's bean supply chain, from cultivation to distribution, from packaging design to rediscovering and promoting traditional recipes. This research evaluates the input and output of all stages of production, studies the energy needs and the flows of matter and energy, and proposes a system to ensure zero impact on the environment. Cuneo's bean supply chain is of great importance for the cultural history of the province, highlighted by the presence of a "consortium" set up by the Chamber of Commerce of Cuneo in 1989, to promote this product registered as TFP (traditional food products) and PGI (protection of geographical indication).

The planned improvements introduced during many years of research and related tests cover many aspects such as water consumption, the use of pesticides and chemicals, the waste management in the field, and different production stages—including biomass, broken or non-standard beans, the cooking, and dehydration wastewater. The biomass was tested for the production of 100% recycled paper. The feasibility of producing goods made from bean pods was also investigated, bean pods which currently are left unexploited in the field, such as food supplements, natural cosmetics, biopolymers, and biofilms (see Fig. 2).

Actions

Among the other results, the project led to the introduction of two types of dried beans characterized by low cooking times:

- Precooked bean without preserving liquid
- Bean flakes obtained from broken beans with a lamination process

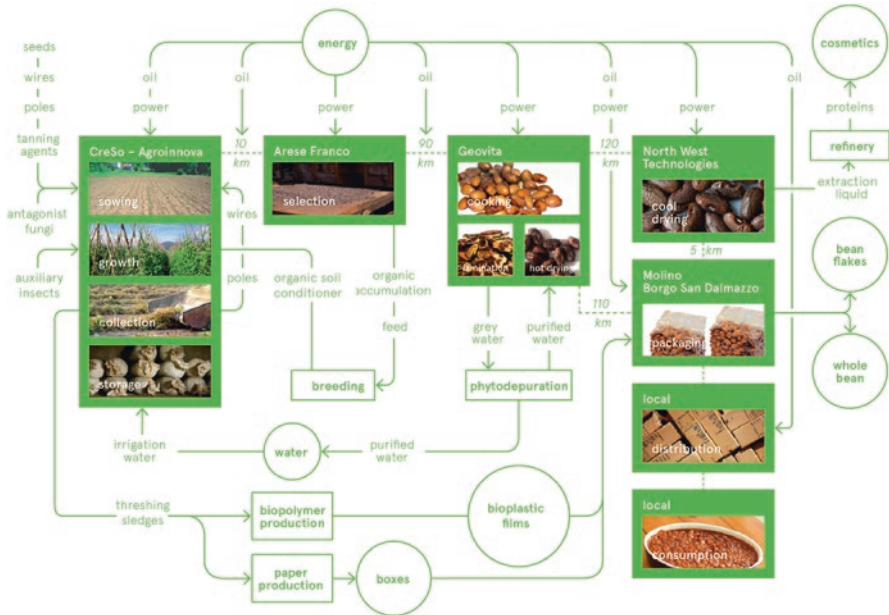


Fig. 2 Cuneo bean complex system

Both processes extend the shelf life of the bean and introduce new products on the market, with new textures and low cooking times. These features expand the potential market, extending the products to new targeted consumers.

Packaging represents the means of communication and dissemination of the project and aims to increase the consumer’s awareness about the origin, traceability, and tradition related to the bean, highlighting the systemic approach and the management of the whole supply chain.

The project impacts have been revealed in:

- Environment: land conservation, protection of soil and native species, the consolidation of local culture, clean industrial processes, and efficient logistics
- Economy: increasing productive activities in the area, niche business development, and integration of different production activities
- Technology: process innovation and efficiency
- Society: increasing local workplaces, enhancement of the know-how mainly held by the elderly, and the application of scientific innovation in the field

The project was logistically complex, involving many local small and medium enterprises (SMEs), and it delivered many new products for the new local market. The programmed changes in the system provide an evolution in industrial processes

that were modified from linear (resource extraction, processing, and production of manufactured goods and scrap) to systemic and integrated, by creating a network of companies with zero emissions.

Conclusion

EN.FA.SI. project supports the rural development, bringing both scientific research and technology transfer in sectors closely linked to traditional production techniques. By addressing the general public, the project was able to convey its values, and some improvements were easily implemented in the production activities, raising critical awareness about inefficiencies and consolidated malpractices, by increasing productivity and protecting plants against unauthorized human treatments.

Ahuehuetla Project

The project started with the cooperative of farmers in a small village in Guerrero state (Mexico): Ahuehuetla. The project is promoted by the cooperative and the Red Mexicana de Mujeres, with bottom-up processes. It aims to develop this rural area through a participative process of designing and improving local activities.

Analysis

The area is characterized by low population and enterprise density, high unemployment, and a history of emigration to the United States. Since 1980, Mexicans have been the largest immigrant group in the United States: In 2013, approximately 11.6 million Mexican immigrants resided in the United States (up from 2.2 million in 1980), and they accounted for the 28% (41.3 million) of the country's foreign born (U.S. Census Bureau, 2013). This situation generates a radical change in lifestyles and food consumption and a loss in material culture, as immigrants often adapt by imitating the host culture, risking the loss of their own local and traditional know-how. In recent years, many seek to improve their quality of life and well-being by returning to farm the land in their hometown. The population of this rather isolated rural area reveals to be intimately and intensely linked to the territory and to have a strong sense of belonging and collective strength. In addition, the farmers of the Ahuehuetla Cooperative are very motivated for a substantial change towards sustainable rural development.

Project

A systemic design approach requires a complex process consisting of several stages, managing many variables and developing the active participation of all actors and stakeholders. This means that the project needs many years to be implemented, but even if it is not finished yet and complete, the first results can be experienced in the context.

The Local Agricultural Cooperative (LAC) was born with the five farmers that are involved from the beginning of the project and by two other interesting realities on the territory: a group of five women producing *panela* (a typical local product, a sweetener resulted from the transformation of sugar cane juice) and another one of women who own and manage an organic greenhouse. The aim of the LAC, called *Ahuehuetla*, is to cooperate and collaborate on the basis of some shared values to address common challenges and provide mutual benefits. The goal is to work with local resources and show that this rural area is not poor, redefining and designing new flows of matter and energy. In this way, the farmers could become stronger under different perspectives: the support in investments that alone could never be realized; and the sharing of equipment, tools, and spaces.

Action

Within the project of *Ahuehuetla Cooperative*, we also dealt with the design of their organizational logo, which is the central visual element that helps to identify and remember the brand. As happen in every company, this icon is a real symbol: The main purpose of it is to summarize and underline shared concepts and values from farmers. It is not only a graphic action, a graphic sign, but it is a way to define and promote a strong and precise identity for the farmers and the entire community. Other fundamental preliminary results are the improvements made in 2015:

- Two biodigesters were installed for disposing organic waste and to generate biogas used in the kitchen restaurant.
- Kitchens were equipped with chimneys, a small improvement but very important considering the diffusion of respiratory diseases caused by the production of smoke in the kitchens.
- Plantation of 40 fruit trees for the production of oranges, lemons, mangoes, and bananas to be used directly in the restaurant or processed in the laboratory.
- Construction of a playground for children using discarded materials.
- Refurbishment of the roofs, with the metal sheets replaced by waterproof structures (fabric covered with a natural substance derived from the viscous liquid extracted from *nopal*, a typical and widely present plant in the territory).
- Construction of a greenhouse for the production of vermicomposting.

Furthermore, there are important intangible aspects inherent in the culture: The community is supporting each other, sharing problems and solutions. The creation of the *Ahuehuetla Cooperative* also allows the farmers to broaden their perspectives:

Expected results of the study further implicate social, economic, environmental, and health aspects. The farmers of the Ahuehuetla Cooperative can become self-sufficient not only in terms of energy and food production, improving the quality of life, but also increasing the supply of food products, both unprocessed and processed (Fig. 3).

Azaro Project

A project was designed to promote the development of local agriculture and to better link production activities and citizens to the territory.

Analysis

The area of Lea-Artibai is located in the north of the Basque Country, and it is characterized by strong cultural identity and belonging to the territory. The agrofood sector is traditionally linked to fishing sector, which is currently experiencing a deep crisis. Agriculture is a marginal activity characterized by micro-small enterprises and focused mainly on self-sustainment and on selling products in small local markets. The main resources of this territory are the forests of pine and eucalyptus: Even though these are not indigenous trees, they cover the vast majority of the hills.

The production sector is made of numerous micro-small activities and some medium and large enterprises, mainly related to the processing of fish, plastic, and metals and to the manufacturing of industrial components. A peculiar feature of the territory is the predominance of the cooperative organization of companies.

The first phase of analysis carried on remotely and on-site highlighted strength points and problems of the current situation: on one side, the richness of the natural, cultural food and wine heritage and, on the other, the predominance of non-local forests, the lack of connection between the industries and the local territory, and the shortage of land to further develop agriculture and the crisis of the fishing sector.

Project

Based on these elements, the aim of the project is to promote the sustainable local development of Lea-Artibai through the implementation of the systemic approach in different activities within the area, in order to create a complex system of inter-connections able to generate the renewed territorial development.

The next steps of the project include the interpretation and re-elaboration of the gathered information and the definition of the measures to implement. The main local problems are considered as levers for the change and enable the individuation of potentialities that represent the elements for further studies. Starting from them and from the information gathered, a new system that answers to identify

problems is designed. The theoretical outcomes and benefits generated are studied; the system is then progressively implemented and results are monitored (Battistoni, Pallaro, & Arrizabalaga-Arambarr, 2016).

The starting point of the project was then identified in the combination of potentials offered by cooperatives (human potential of their employees) and by local food producers (production potential of their high-quality goods) to overcome the problems experienced by both actors.

Action

The 11 cooperatives located in Lea-Artibai currently employ about 1400 workers. Eika Koop, a cooperative producing electric components for kitchen, is the second largest one in the area, with almost 500 employees. If we consider their families, approximately 1500 people are directly and indirectly involved. Eika is located in an industrial area, but has no relations with neighbouring enterprises nor with the surrounding territory. Its employees are considered only as workforce and not as a potential for other activities. Their working hours often coincide with opening hours of local shops and marketplaces; thus, to satisfy their necessity to buy food, employees usually go to supermarkets, lowering the quality of their diet, consuming products coming from all over the world, and giving money mainly to platforms of logistics that manage their fluxes. On the other hand, micro and small local food producers are able to offer high quality of products, but experience many difficulties in finding customers and sustain high production costs. The shop Produkt On, born to sustain the promotion of local products, is a first step to overcome these problems. It currently sells fresh and preserved food coming from local producers of Lea-Artibai and Durangaldea (the neighbouring district) and members of a cooperative named Oiz Egin. However, its opening hours coincide with working hours, a condition that limits the effectiveness of its service. The project focuses on the creation of a Systemic Buying Group (SBG), identified as the appropriate model to satisfy the needs of the involved actors. The analysis of several case studies of buying groups was performed to understand the feature of each of them in relation to their context; as a result, an underlying functioning schema emerged (see Fig. 4). The members of the SBG will be chosen among the employees of Eika according to their interest in the project. A pilot group of 50 employees will be formed and an internal coordinator elected. Produkt On will be the coordinator and will manage the order, organizing requests among its producers—the partners of the cooperative Oiz Egin, already linked to the shop—and assembling the baskets of products. These will be then delivered to the cooperative where employees could easily collect them. After use, the packaging of baskets will then be returned to Produkt On and producers.

The SBG generates positive impacts that interest all actors. Besides saving time and money, employees will improve their diet thanks to the high quality of local products; this will be reflected in better health and reduced number of absences from work that will be a benefit for Eika. Through the project, Produkt On will gain visibility and will increase the number of producers cooperating with it. Local producers will more easily find customers and will increase their income.

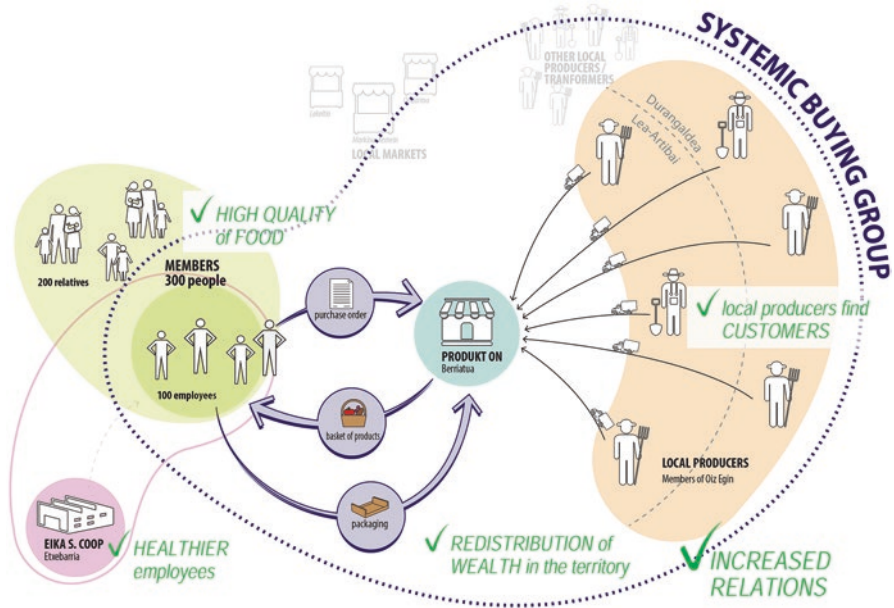


Fig. 4 Systemic Buying Group structure and actors involved

Conclusion

Globally, the project leads to a redistribution of the wealth among the local actors of the territory, giving support to the local economy. The project creates a local development based on:

- Environmental sustainability, leading towards zero emissions
- Economic sustainability, for the creation of a new economic model
- Social sustainability, for the new equal relations established between actors and for the benefits interesting employees

The developed project aims at becoming a driver for The change of a territory where the crisis of the wood and fishing sectors has highlighted the necessity to rethink the basis of rural development in the long term, starting from the enhancement of the territorial potentialities.

Summary of Findings

The three case studies show three different rural situations: The first one is very focused on agriculture (even if located in a wealthy area of Italy). The second case project is from a very poor rural region with many social problems. The third one is

focused on other activities not so well connected with the territory. However, we can analyse and summarize common results of the case studies and peculiarities of different contexts (Zahedi & Otterpohl, 2015).

One of the main aspects of the rural area is the strong relation with the agricultural sector, so all the projects started from the field for the systemic goals of increasing the wellness of local communities. The EN.FA.SI. project is working on a single production (Cuneo bean) and can spread the benefit of a better production on the entire territory, without incentivizing a monoculture. The Ahuehuetla LAC wants to increase the local agricultural production to share the benefit with the community. The SBG helps the workers to have a higher-quality diet, connecting the local producers with the consumers. So even if design solutions differ among the three contexts, they share similar starting points to increase the quality of life of people living in rural areas—because the primary goal is to increase the quality of local production in terms of choice of the right cultivations, improvement of the processes at environmental and technical levels, and sharing the benefits.

Another important aspect is the role of the local actors in the complex process of rural development. We choose these three cases because the author is actively engaged in the design and implementation processes, providing a perspective of the systemic researcher/designer and the relationships with the other actors involved. The team of actors involved in every phase of the project is multidisciplinary and includes the participation, on several levels, of the professionals and of the local inhabitants of the rural community. In that context, the designer assumes the role of “designer mediator” as described by Celaschi:

...his/her aim is to build or consolidate the team and the mediated integration between different types of knowledge and different specialism. (Celaschi et al., 2013)

The systemic designer designs the throughputs that transform the output into input in a continuous metabolization within the complex system; he/she must manage the awkward, often complicated, dialogue from the different actors in all the phases of the project; he/she will also collaborate with all the involved actors. The basic ecosystem is the local community with its active participation mainly in the implementation phase. It is crucial for the success of the project, so it should be engaged from the early stages if we want to obtain long-term results. We have experienced directly in the field the difficulty of dialogue with local community and farmers, not for language differences, but for cultural barriers. Therefore, the systemic design has the responsibility to build a trustful environment to evolve the relations among actors.

Another important actor is crucial to build up trust, a role we called “connective actor” (Bicocca, 2016a, 2016b). This role can be of a single person, as in the case of Ahuehuetla LAC, or an organization, as in the other two cases. In Mexico, we are working closely with Nuria Costa Leonardo, a Nobel Peace Prize nominee from 2005. She has been involved in numerous projects with the Red Mexicana de Mujeres (REMEMUR) on socially responsible business in rural development. Costa

Leonardo has already earned the faith of the local community, and she strongly believes in the quality of our design work; she helped connect our experiences and build a conducive social environment affording dialogue and the open exchange of experience. In Italy and Spain, we are working respectively with Coldiretti, a farmer's association, and Azaro Foundazioa, a local foundation for business development, both of which are already well known and engaged as dialogue partners.

The presence of the connective actor is also crucial for the systemic designer because it helps to maintain the relation also when he/she is not physically present in the region. The systemic designer cannot stay in place for the duration of a given project, not just because of the duration required (usually more than 3 years), but because the local stakeholders must become committed to adopting the project as their own and they should take care to achieve a shared sense of sustainable rural development.

These projects are convened as real dialogue processes among actors, allowing for extensive periods of feedback and affording project change many times during the different phases of evolution (Lee et al., 2005).

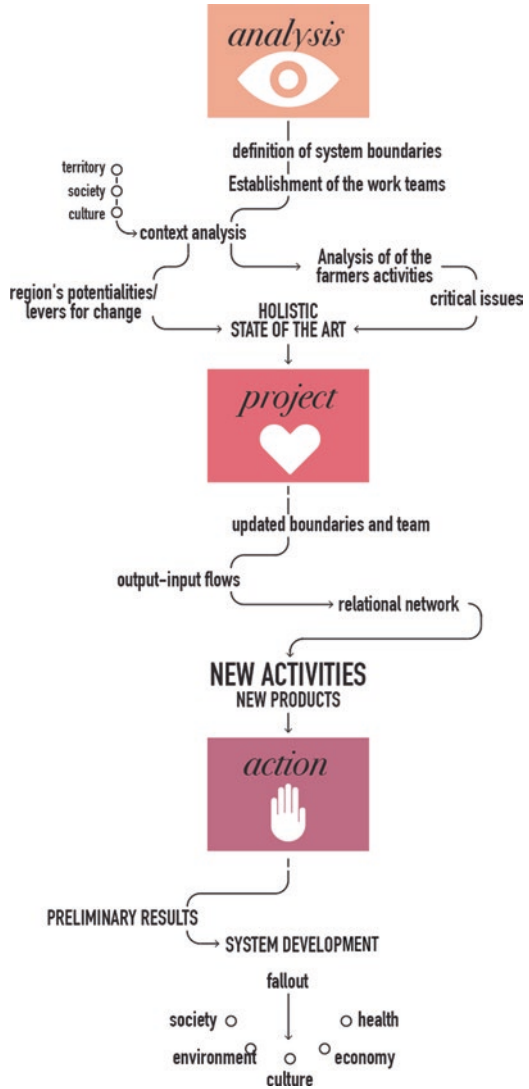
Lastly, we might reflect on the role of politics in these development projects or rather the lack of political engagement. From the case studies, we can see an evident absence of politicians; it appears the rural areas are usually not a primary interest for them (the low density of population means a lot of effort for few votes). In the same way, the inhabitants of rural area feel very distant from politics, and they are quite negative about any help that they can obtain from it. With those feelings, the dialogue with the parties is very hard, and the first step for the development of those rural communities is really a bottom-up approach.

Framework

Both these theories and practices contribute to the definition of a framework for the sustainable development of rural area. The framework is made up of three steps (see Fig. 5):

1. **Analysis:** This defines the systems' boundaries and establishes the work teams in order to elaborate a double analysis (context analysis and productive activities analysis). The context analysis includes a holistic diagnosis of the local territory, society, and culture, with the goal of identifying the region's potentialities and levers for change. The productive activities analysis provides a series of criticalities that should be faced by the project.
2. **Project:** During this phase, it is essential to have a preliminary update on boundaries and work teams, because the first step can change the perspective and the priority of the development strategy to be implemented with the project. The project phase works on the output defined in step 1 (those outputs come from both local events and productive activities) in order to transform them into input

Fig. 5 Rural sustainable development framework



for other businesses already existing in the territory or that can be locally improved. The result of the project phase is the definition of new activities and products that can be developed within the area.

3. **Action:** The last step in implementing the project phase is forecasting. During this phase the first preliminary results come up and enable the flourishing of the entire complex system. The implementation of the project touches on local society, environment, culture, economy, and health.

Conclusion

Rural areas are fragile and rich, both weak and strong at the same time. They are stable, with people planted firmly in an area over generations, connected to the environment, and aware of the dependence upon it. Rural areas are often experienced as isolated and distant places from the rest of the world.

The application of SD in rural areas can guarantee the economic development of these territories thanks to the exercise of its five principles (Bistagnino, 2011):

1. **Output becomes input:** The wastes of a system become the resources of another one, in order to generate a continuous flow of material, energy, and information, leading towards zero emissions. This is the basic principle that helps anthropic processes to imitate the nature and to define new ways to pursue a sustainable development.
2. **Relations generate the system:** The different elements of a system are connected to each other from the exchange of material, energy, and information, generating the strengths of the system itself. The relationships developed within the system generate it as open and inclusive. In these rural areas, the lack of connections is a serious weakness that makes the territory very fragile, so with the increase of relations, it starts to be resilient and stronger.
3. **The system is self-generating:** The autopoietic open systems are self-supported and reproduced, so they can evolve in relation to the changes that occur in the context. Like biological systems, the system is self-regulating and dynamically stable in order to change with the co-evolution of the entire system as a whole. Rural contexts are usually very reluctant to change, however to go towards a new sustainable development they need to be flexible and adapt to new situations.
4. **Actions are local:** The operational context is prioritized, by wisely using local resources. The cultural material heritage is preserved, and any system can be identically replicated in another place. The scalability and replicability of systems are evaluated as a *unicum* (Barbero & Bicocca, 2015). As we have seen in the action cases, they are all different, one from the other, and they need distinct solutions that work just for the specific situation, which has a strong tradition and cultural heritage to preserve.
5. **Human being is at the centre of the project:** The relationship between man and context is the heart of the project, not in an anthropocentric way. The human component should be considered in the design process in order to guarantee the respect of local culture and know-how, especially in rural areas where the folklore and local culture is very vivid.

Thanks to the findings of this research, we can identify two key aspects of SD that are crucial for the economic development, especially of the rural areas: One aspect is related to the designer as mediator (Celaschi & Deserti, 2007), and the other is the common starting point from the agricultural aspects, strictly related with the consumption of food.

The important role of the designer consists in generating a trustful environment where local actors feel comfortable to actively participate in a bottom-up process of co-designing.

Agriculture is the basic activity in rural area and establishes the origin of SD projects; it is crucial to generate fruitful relations for the territory in order to identify new related business, with the use of technologies appropriate for the local know-how and possibilities. This starting point has important implications, not only economic but also health related. With a safe and devoted agriculture, the yielded food has higher quality, so primarily local people can increase their wellness.

These rural areas are characterized by high level of complexity; for that reason the SD can be able to manage a high quantity of elements that are not related to a simple and linear cause-effect relation. Some of the elements of this complexity can be found, for sure, in environment aspects: as mentioned, the prevalence of agriculture that is fragmented and for the subsistence. Other complex elements are related to the social situations: Small communities are isolated with long and strong tradition that should be valorized instead of flatten and conformed. Others are related to political aspects, where the central government is not trusted by local people that feel abandoned. This is a common feeling among people in rural areas and we need to have a methodology that enhances bottom-up processes. Inclusive design is therefore helpful to reorganize the system and define new ways for the development. Finally, as for the technology-related aspects in rural areas, there is low, if not totally absent, access to new expensive tech, so we should provide appropriate tech for each specific context (Morrison, 1983).

Merging theories and practices enables the definition of a framework that fosters sustainable development in rural areas. This entails increasing the local capacity to generate activities that create profit (growth), to act together to promote the rural area and its interactions with urban centres (inclusive), and to respect the environment (sustainable). Positive change is locally embedded, socially inclusive, and, often, producing or encompassing networks that link social scales (e.g. between local, national, and international). Good networks are inclusive, facilitating collective learning, allowing sharing of success, and generating wider social acceptance. The main outcome of this research is the definition of a framework, within a systemic design process (Bistagnino, 2011) that enables the sustainable development of rural areas and the wellness of local communities.

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