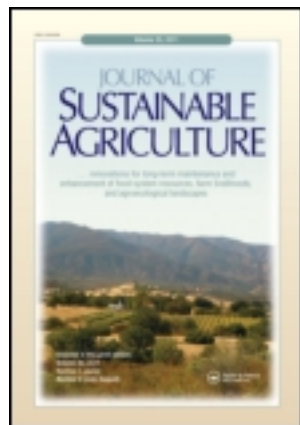


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## Participatory Action Research in Agroecology: Building Local Organic Food Networks in Spain

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## Participatory Action Research in Agroecology: Building Local Organic Food Networks in Spain

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*The serious problems of agrarian unsustainability cannot be solved through technological changes that lessen environmental impacts. Although technological change is important, it is also necessary to change the agri-food system as a whole. Participatory action research (PAR) is a methodological approach to collaborate with local communities. It enables us to advance in the restructuring of physical flows, economies, and information that support local farming, as a means to achieve greater autonomy and self-management. This article presents several case studies in Spain in which PAR has been applied to build local organic food networks. These are characterized by a more sustainable use of local resources and the development of short food supply chains.*

**KEYWORDS** *agroecology, localized food systems, social relationships, organic farming, short marketing chains, Spain*

### INTRODUCTION

The environmental and socioeconomic crisis of industrialized agriculture worldwide has led to the emergence of agroecology as a theoretical and methodological approach that aims to increase agricultural sustainability from an ecological, social, and economic perspective (Francis et al. 2003). In Spain, organic farming is the most consistent implementation of this

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strategy, topping the European area with 1.46 million hectares in 2010 (Willer and Kilcher 2012). Although in recent years organic farming has undergone an increasing process of conventionalization, limiting its positive effect on agricultural sustainability (Buck et al. 1997; De Wit and Verhoog 2007; Darnhofer et al. 2010), it is also true that numerous markedly agroecological experiences have been developed under this umbrella. Common features of these experiences are productive diversification, appreciation of local resources (organic matter, farmers' knowledge, old livestock breeds and crop varieties, landscape, etc.), strengthening of community organizations and developing short food supply chains that enable farmers and consumers to establish direct relationships that benefit both (Best 2008; Lobley et al. 2009; Milestad et al. 2010; Goldberger 2011). In this article, we have given the name "agroecological transition" to the conversion process of industrial agroecosystems to level 3 (redesign the agroecosystem so that it functions on the basis of a new set of ecological processes and relationships) and level 4 (reestablish a more direct connection between those who grow the food and those who consume it, with a goal of reestablishing a culture of sustainability that takes into account the interactions between all components of the food system), as defined by Gliessman (2010).

However, the transition from "industrialized" to "agroecological" models is not easy (Lobley et al. 2009; Milestad et al. 2010). Farmers have identified a number of difficulties with the agroecological transition, which represents a complex process that links different levels (farm, local community, society) and that is affected by social, economic, technological, cultural, and ecological factors (Guzmán and Alonso 2010). The complexity of this process calls for support for the farmers in the form of methodologies that bring about the necessary changes both on-farm and in local communities. Participatory action research (PAR) is a methodological approach that provides a set of action-research techniques useful for agroecological transition (Kindon et al. 2007), which has been applied especially in Latin America. PAR can be used to design and implement, in conjunction with farmers and local people, management and social organization proposals that increase agricultural sustainability.

## RESEARCH APPROACH AND METHODOLOGY

PAR is a methodological approach that emerged from social science halfway through the twentieth century. In the agrarian field, it began with the questioning of extension and training systems used to modernize the farming world (Freire 1969). PAR considers that any development process undertaken will be biased if it does not incorporate the beneficiaries of this process as protagonists of it. In general, PAR approaches seek to generate liberating knowledge that is based on popular knowledge and that explains the global situation (systemic approach), with the aim of starting or consolidating a

strategy of change (transition processes), alongside an increase in political power, aimed at obtaining positive transformations for the community on a local level; and at higher levels in as far as it is able to connect with similar experiences (networks) (Fals Borda 1991).

When applied to an agroecological transition, PAR promotes technological change and, at the same time, improves ecological sustainability of farming systems, from different approaches as participatory rural appraisal or farmer participatory research (Rhoades and Booth 1982; Farrington and Martin 1987; Chambers 1989, 1992, 1994a, 1994b, 1994c). These participatory methodologies try to promote the acquisition of skills and strengthening of organizing capacity by the groups involved, so that they can continue the process by themselves. PAR starts from a participatory and holistic diagnosis of the initial situation of the farm and local community, and defines an objective, realistic situation using sustainability criteria. It encourages the group to reach the proposed goals and to establish relationships with other groups, making up networks and associations that facilitate change at different levels, and establish solid foundations for sustainable rural development. The peasant-to-peasant methodology is a clear example: It is an actual social movement at the moment (Holt-Giménez 2008; Ardón et al. 2009).

PAR has developed different tools that try to incorporate the complexity of social relations, especially related to inequity and marginality in social systems, to generate collective solutions to everyday-life problems. Cuéllar and Calle (2011) speak about the particular trend of community-based participatory approach focused on action-oriented research, presenting research from all over the world, such as those of Tandon (2000) in India, Park et al. (1993) in North America, or Villasante et al. (2000) in Latin America. Participatory approaches focus on relations between social actors, as far as “it is easier to change relations between subjects than subjects themselves” (Villasante 2006, 315). This shift in the focus of participatory methodologies allows one to face situations of social jamming mediated by power relations in the rural scene, since technological change and natural resources management are strongly conditioned by power relations (Scoones and Thompson 1994), and farmers are weak and somehow marginal social actors, especially in the postindustrial era, as far as their power in politics or in food systems (Reed 2008; Bell et al. 2010). The community-based approach allows us to connect the different research scales in the agroecological transition: from farm scale, where research is usually made, to local and larger society, where solutions are usually developed. This gap between the different research scales has been pointed as one of the main weaknesses and lack of agroecological research (Dalgaard et al. 2003).

The community-based approach offers a phase-sequence pattern for action-research projects (Villasante 2006; Cuéllar and Calle 2011) in which it is possible to insert research techniques from different approaches: from social to agronomic sciences; participatory and non-participatory. The mix of techniques, set up over the socio-praxical approach, allows us to develop

the interdisciplinarity inherent to an agroecological approach (Francis et al. 2003), and articulate and integrate the diverse dimensions of agroecology in its different meanings—as a scientific discipline, a set of agricultural practices, and as a social movement (Wezel et al. 2009).

We have divided the PAR process into five consecutive phases (Table 1), according to the socio-praxical, community-based approach (Villasante 2006). Depending on the context, some phases may be removed and others may be parallel or overlapping. Nevertheless, the linear outline of phases is suitable as it explains and structures the process.

The objective of phase I (preliminary) is to estimate ex-ante the “local agroecological potential,” meaning the social, ecological, economic, and cultural resources present in the area that can be used to support an agroecological transition. In this phase, mutual trust and relationships between researchers and social agents is key. Interviews and participant observation (Bernard 2002) are research techniques that are often used (Table 1). Likewise, the Framework for the Evaluation of Natural Resource Management Systems Incorporating Sustainability Indicators (MESMIS in Spanish; López-Ridaura et al. 2002) is a useful research technique that allows us to investigate the problems of agroecosystem sustainability. This technique applied in a participatory manner enables the diagnosis in phase II and the evaluation of sustainability improvement in phase V.

In phase II (participatory diagnosis), we hope to examine the situation from a holistic perspective, in order to obtain objective data about the local situation, as well as subjective views of people with whom we are working. Following Chambers' (1992) principle of “optimal ignorance” (14), we do not want to know everything; rather, we want to know what is necessary in each moment of the process in order to act and transform the part in which we have decided to intervene. In this phase, formal participation and process monitoring spaces are set up, from which we differentiate two theoretical types: the driving force group, as an operational entity that drives the process, composed of the local “base” population; and the follow-up committee, for the formal supervision, legitimization, and consensus regarding the process, which would bring together the economic, social and political associations representing the region.

Discussion groups, sociograms (applied as a qualitative technique that allows us to reflect collectively about the nature and structure of relations between social networks existing in a certain local environment; Villasante and Martín 2007), situational flow charts (used for collective analysis of cause-effect relations of self-defined problems in a certain group or institution and a certain social situation; Matús 1995), strengths, weaknesses, opportunities, and threats (SWOT) analysis, and, in general, techniques from participatory rural appraisal (PRA) are used in this phase (Chambers 1992; Geilfus 1997). In order to start the discussion, it is important to use analyzers (Villasante 2006). The analyzers (Lapassade 1971) are present or

**TABLE 1** Phases and most relevant techniques applied in the agroecological processes

PHASES	Phase I (preliminary)	Phase II (diagnostic)	Phase III (research)	Phase IV (action)	Phase V (evaluation and adjustment)
Matters to solve	Is there potential for the agroecological process?	How do we explain the situation? Who can we rely on?	How can we determine what is possible? How do we create the plan? How do we generate useful information?	How should we act every day?	How can we further the transformation process?
Toolbox	Secondary information analysis Interview Participant observation MESMIS Agroecological-analyzers	Interview Participant observation MESMIS Discussion groups Sociogram SWOT analysis Flow charts PRA techniques	Flow charts PRA techniques FPR	FPR From peasant to peasant Agroecological-mobilizers	Interview MESMIS Sociogram Tetralemmas Deliberative polling

*Note.* FPR: farmer participatory research; PRA techniques: participatory rural appraisal techniques; MESMIS: Framework for the Evaluation of Natural Resource Management Systems Incorporating Sustainability Indicators; SWOT analysis: strengths, weaknesses, opportunities and threats analysis.

past actions that question and analyze by themselves the local situation, particularly in terms of its symbolic aspect—personal or collective values, meaning references, identities, beliefs, desires, etc.—which reveal the links between the different social, local actors. These techniques and others listed in Table 1 are applied in participatory workshops (Chambers 1992), with different objectives, as follows: 1) “feedback workshops” to provide feedback on the information obtained or actions carried out in order to conduct an in-depth analysis of the items dealt with; 2) “social creativity workshops” to analyze the situation, to plan scenarios or future actions and to organize; and 3) “evaluation workshops” to evaluate the participatory process.

Phase III (participatory research) converts the diagnosis into an action plan, the drafting of which involves all the local actors. It must be as legitimate as possible, and must adapt to the most pressing needs and to those actions in which the local population is willing to become involved. This plan includes activities to generate information that reinforces the agroecological transition process. Adopting the farmer participatory research (FPR) framework is an important part of this stage (Farrington and Martin 1987). The farmers’ participation in the investigation was in level 3 (farmer-researcher collaborative on-farm trials) and level 4 (farmer-managed participatory research) (Selener 1997).

In phase IV (participatory action), the researcher’s task is to promote the development of actions included in the action plan, which are organized into sectorial work groups (SWG). Outreach activities are essential in this phase. The transmission of the knowledge generated at farm-scale is done “from peasant to peasant” (Holt-Giménez 2008) and the application of “agroecological analyzer-mobilizers” is particularly effective to achieve social mobilization. The agroecological analyzer-mobilizers are actions that recreate situations which question and analyze the local situation to mobilize it then, particularly in terms of its symbolic aspect. They represent moments constructed by the researcher around intermediary objects, and through the materiality of these objects, they reconfigure the relationships between local actors, displaying a highly performative effect on reality (Villasante 2006; Dirksmeier and Helbrecht 2008; Vinck 2009; Daniel 2011). Traditional knowledge and local varieties are very powerful agroecological analyzer-mobilizers, which concern all of society, due to their link with cultural identity. The activities in which this heritage is revealed displays those types of managements that “exist but are not named,” such as peasant-like management, and other nonindustrial alternatives, which can mobilize compromised social actors to begin reclaiming them.

Last, phase V (evaluation and adjustment) brings the process to a close. It considers the material and subjective aspects of the results obtained, as well as the evolution of the local social map. This phase must encapsulate the construction and accompaniment of new group leaderships along the lines of agroecology, developed interactively throughout the process, in



view of a new PAR cycle. The application of *tetralemma*, as a tool to go beyond the dual discussion between opposite opinions, and the opening of the analysis to more creative meanings (Jayatilleke 1967; Galtung 2010) in evaluation workshops and deliberative polling (Fishkin 1991) are other useful techniques (Table 1).

This article examines the application of the PAR methodology in three case studies in Spain, in order to validate the utility of this approach for facilitating an agroecological transition in the European context and, if necessary, adapt research techniques. With this goal, we chose three case studies with very different characteristics: spatial scale of agroecological transition, social validity of agriculture, farmers' agrarian knowledge, farmers' political and social organization, etc. (see Table 2), which are related to local agroecological potential.

### DESCRIPTION OF THE STUDY SITES

The three following case studies were developed and analyzed. Table 3 summarizes the characteristics of the areas in which the case studies are located.

#### El Romeral Cooperative

The cooperative, created in 1991 by 10 laborers from the Farm Laborers' Union (SOC in Spanish), gained access to a public farm of 103 ha in the town of Sierra de Yeguas, Malaga (Table 3). The SOC lead the fight for agrarian reform in Andalusia during the democratic transition of the 1980s through the

**TABLE 2** Case studies' characteristics related to the local agroecological potential

	Sierra de Yeguas (Málaga)	Morata de Tajuña (Madrid)	Alpujarra (Granada)
Spatial scale of agroecological transition	farm	town	comarca
Social importance of agriculture in the area	high	low	high
Experiences in organic farming in the area	none	low	high
Experiences in SFSC in the area	medium	low	low
Farmers' agrarian experience	low	high	high
Farmers' traditional agrarian knowledge	low	low	high
Farmers' social organization	high	low	medium
Farmers' political organization	high	low	low
Connecting with other social movements	high	low	low



**TABLE 3** Characteristics of the areas in which the case studies are located

Location	Morata de Tajuña (Madrid)	Alpujarra (Granada)	Sierra de Yeguas (Malaga)
Population (no. of inhabitants)	6548	24,750	3206
Population density (inhab/km <sup>2</sup> )	145.5	21.38	37.5
Total farm (no.)	285	4249	269
Farmers into the PAR process	53	330	10 families
Useful agricultural area (ha)	2340	39,242	7561
Rainfall (mm)	386	559.74	492.2
Climate	Temperate with dry or hot summer	Temperate with dry or temperate summer	Temperate with dry or hot summer
Predominant watering regime	Irrigated/Rainfed	Rainfed	Irrigated/Rainfed
Main crops	Garlic, olives, horticultural crops	Olives, almonds, vineyard, figs	Olives, wheat, horticultural crops
Main livestock	Unimportant	Sheep, cattle	Goat
Farmers as first activity (%)	22	68	86
Farmers >54 years old (%)	61	53	24

Source: INE, 1999.

1990s and the creation of agrarian cooperatives in various towns. A group of these cooperatives defended a production model based on traditional rural knowledge and autonomy, which led them to productive diversification and recycling, not using biocides, creating employment and developing short food supply chains (SFSC). The researchers, who subsequently developed the process of PAR, were invited to participate in discussions of cooperatives in the years before the formal start of the agroecological transition (Guzmán 2002). What is summarized here forms part of the PAR process (1993–1999), which began with the decision of the members of the El Romeral Cooperative to adopt an agroecological production and marketing model.

In this case, the study focused on the transition at the farm scale, with a small group of farm laborers in a typical rural context in Spain, where agriculture is a very important economic activity. At the beginning of this process, there was no experience about organic farming in the area. However, the agroecological potential of the group was high, especially for its strong social and political organization. The main shortcomings were due to inexperience of the cooperative members as farmers (Table 2).

Town of Morata de Tajuña

The proximity of this town to Madrid (37 km) means there is a strong peri-urban influence in its social dynamic, which leads to urban prices in the local

land market. The town has suffered from a severe de-agriculturalization process, which can be observed in the degradation of agrarian institutions and infrastructures, the dismantling and poor mobilization ability of the agricultural sector, the lack of agroindustry, and the concentration of sales in the hands of those landowners with more land. At the start of the project only three farms were organic (olive groves), but the product was not sold as such. Nevertheless, tight social networks and the restaurant sector proved to be sensitive towards conserving the landscape, the local agrarian activity, and the potential to boost the local economy; especially to mitigate the threat of further urbanization.

The rapprochement for the case study took place before this research project began. The researchers were participating in another agroecological project in the municipality in 2001. This fact led to first contact with the person who, from 2002 onward, would be the Municipal Councilor for Agriculture. This councilor expressed a strong desire to revitalize agrarian activity in the municipality, and the local administration explicitly accepted the proposals of organic farming and participatory methodologies as the central elements of the project, allowing us to design a comprehensive process of participatory rural development based on agroecological transition processes (López 2012).

In short, this case study focused on an intermediate spatial scale (town), where agriculture is socially invisible, but in which there were some experiences in organic farming to support the process of agroecological transition. The agroecological potential of Morata de Tajuña was initially very low, mainly due to disorganization and weakness of the agricultural sector (Table 2).

### Alpujarra de Granada comarca

This *comarca* (local administrative district with common territorial features and agricultural services; it consists of several towns) is located in the southeast of Spain between two important mountain ranges (Sierra Nevada and Sierra de la Contraviesa) in a very mountainous area. Melt water, channeled by means of irrigation channels, or underground corridors facilitates the irrigation of small plots, generating a clear variety of spatial and temporal arrangements of crops, in which altitude plays an important role. The use of the mountain for livestock complements family farms. The precipitous relief prevented farming from becoming intense and enabled the development of rich, traditional agrarian knowledge, which has survived and is very relevant in the European context. The population has decreased in the last century; it now has an older population, with a higher ratio of males, and is concentrated in fewer groups. At the same time, the number of people coming from other European Union countries, attracted by the landscape and culture, has increased. La

Alpujarra is still an agrarian *comarca*, but the active agrarian population has decreased.

The researchers involvement in the Alpujarra was invited by an association of 54 farmers named “Contraviesa Ecológica” in 2005. They requested that we identify, describe and evaluate the local varieties of fig (*Ficus carica* L.) and the traditional knowledge associated with their management, with a view to introducing them into the organic market. This evaluation involved identifying conjointly those elements of varieties or knowledge, which continued to be valid in the present circumstances and those which farmers needed to adapt in order to achieve their goal: to protect their jobs in farming and conserve their cultural heritage. Subsequently, from 2008 the participatory project was extended to other types of production systems (live-stock, fruit, vegetables, etc.) at the request of other farmer groups and local government. This article focuses on PAR process between 2008 and 2010.

In this case, we covered more area and population (Table 3). Furthermore, agriculture in La Alpujarra has a greater social significance than in the other cases. At the beginning of this process, there were many experiences of organic farming in the area, so the intervention took place in an advanced stage of the agroecological transition. Therefore, the role of researchers focused mainly on those aspects that farmers identified as major deficiencies (Table 2): the organization of farmer groups so that they can identify their needs, prioritize them and find solutions, look for solutions for new technical problems (for those that they had not yet found an agroecological alternative, as some pest control) and finally build SFSC.

## RESULTS AND DISCUSSION

### El Romeral Cooperative

The evident agroecological potential of the group and the previous relationship between the cooperative and the researchers rendered phase I unnecessary. The other phases proceeded at two levels: 1) the discussion of the global producer-supplier model and how to develop alternatives to this, in which nine cooperatives participated in social creativity workshops, coordinated by members of the SOC; and 2) the planning and carrying out of the agroecological transition process on the farm with the El Romeral Cooperative, which included the participatory redesign of the agroecosystems and the development of SFSC (Guzmán and Alonso 2000).

The planning of the transition process on-farm took place in phase II (1993–1994) in three stages: 1) We analyzed secondary information regarding the transition process to organic farming, since there was little experience in Spain in 1993. 2) We diagnosed the initial situation of the farms and cooperative from agronomic, socioeconomic, and technological perspectives, using interviews, participatory observation, and MESMIS. The selection of

sustainability indicators used in the MESMIS was performed in social creativity workshops. We drew up a number of indicators related to the objectives of the members of the cooperative (e.g., employment creation, crop diversification, development of SFSC, etc.), their perception of the risks (e.g. invasion of weeds or pests) and, in general, the sustainability of the process (e.g., land improvement, planting hedges, etc.). 3) The cooperative members proposed the “ideal” situation that they wanted to reach and the transition strategy by means of information feedback workshops and social creativity workshops.

Phases III and IV (1994–1999) took place at the same time. We carried out the plan as anticipated, starting with the evaluation and the production of in situ information, which would enable the management to be modified if necessary. We started trials to optimize the operation (e.g., fertilization and weed management) and to recover the traditional agricultural knowledge and the local horticultural varieties that were incorporated into the farm. MESMIS and FPR were the most important techniques used.

Phase IV consisted of setting the cooperative strategy in motion at the commercial and training levels. The SFSC were developed through consumer associations and organic food producers in various Andalusian cities, linking in with urban social movements. On a secondary level, these were also developed through local business.

Phase V, the evaluation phase (2001), was based, on the one hand, on follow-up factors drawn up and, on the other hand, on the development of new attitudes and possible redefinitions of the values and objectives both of the group and the environment. The results are summarized in Table 4. The agroecosystem was redesigned with high crop diversification, introduction of livestock for home consumption (pigs, chickens), planting of trees along the edges of vegetable plots, and composting of organic waste. We solved problems with pests (*Agriotes lineatus*) and weeds, while maintaining good yields. Success made easier agronomic management adoption by neighboring farmers. Also economic viability and social objectives were achieved (employment creation and development of SFSC), which are still running. However, the process required much effort and some cooperative members did not agree, so cooperative was divided in two in 1996. Currently, the new agroecological cooperative is visited by many groups of farmers and technicians interested in organic farming.

### Town of Morata de Tajuña

The research was conducted in three intermittent periods between 2006 and 2009, determined by the local public financing. Phase I was based on the analysis of secondary information and semistructured interviews with key informants. Furthermore, the researcher negotiated the objectives and limits of the project with the city government, which sponsored the project by binding the proposals and providing funding.

**TABLE 4** Summary of results of the three case studies

	El Romeral Cooperative (1993–1999)	Morata de Tajuña (2006–2009)	Alpujarra de Granada (2008–2010)
SFSC development	By means of consumer associations, local shops, bio trade fairs and school dining halls. It required too much work, causing the cooperative to divide. Half of the members followed the agroecological model.	Marketing local organic food in 70% of local businesses and in 3 local restaurants. Creation of Community Supported Agriculture. Creation of distribution cooperative supplying organic foods through SFSC 300% income increase to organic olive farmers by manufacturing the first organic certified oil in the region, and selling it through SFSC. The organic surface area was multiplied by 3. Creation of an organic winery.	The first olive-oil mill to have organic product was established. Its oil is sold through SFSC. The meat produced by Livestock Breeders Association is sold in a neighbouring <i>comarcaby</i> means of short trade fairs
Organic farming promotion	In 2001 Sierra de Yeguas brought together 28% of the organic horticultural farmers from the province, when it only represents 0.45% of the farms. It is a regional benchmark in organic agroindustry, of which the cooperative is a member.		The number of organic farmers went from 109 to 205.
Solving management problems	Regional impact establishing it as an agroecological leader of horticultural production. We solved problems with pests ( <i>Agriotes lineatus</i> ), and improved weed management	Problems with olive fly ( <i>Bactrocera oleae</i> ) were reduced.	Problems with fig tree disease were solved. We adapted the organic olive farming techniques to the <i>comarca</i> .
Use of local resources	Mainly organic matter. Recovery of local horticultural varieties. The cultivation of local varieties was not consolidated.	Mainly recovery of local horticultural varieties: 7 farmers begin to cultivate local varieties at their farms. Input substitution in 4 farms: agrochemicals are changed by plant extracts for pest control.	Reassessment of traditional agriculture. Especially local varieties of fig trees and migratory herding routes.

Social impact	High; creating employment on the farm and in agro-industry, in a region with high unemployment levels. Employment has tripled in the farm.	The social problem of employing immigrant workers was dealt with. Legal contracts went from 0 to 22.	Formation of two associations: of livestock and organic fruit and vegetables. Strengthening of the three pre-existing associations: organic olive oil, organic vegetables, and organic figs. Training local agents in PAR techniques to continue the process. High in public rural development institutions. The technicians currently accompany the SWG.
Institutional impact		High in educational centres. All the political parties supported the Action Plan Parts of the public local budget were destined to support the proposals from the participative process	

Phase II continued with interviews using a relational approach to create the initial sociogram. The results obtained were used in feedback workshops for the local agrarian sector, applying PRA techniques. During the process, nine farmers from different spheres made up the driving force group, which put into operation the information collected in the preparation of the participatory diagnosis of the local agrarian sector. To achieve this, social creativity techniques were applied (SWOT analysis, sociogram, flow charts, etc.). Moreover, the entity of municipal participation in agriculture and the environment, a local, official advisory council composed of all the interested political parties and associations, assumed the role of follow-up committee for the project.

In phase III, we carried out diagnostic feedback workshops with the population, and the research focused on the recovery of traditional knowledge. The driving force group (nine farmers from different social and productive conditions), together with the researcher and the population involved (more than 50 farmers and other local actors involved in the different workshops), created the action plan of the project, applying a new flow chart to specify and prioritize the actions proposed that were encouraged by the population.

In phase IV, we put into action the 7 SWG that emerged from the Action Plan, comprising farmers and other non-agrarian actors, including the local government, interested in each topic. Each SWG carried out a social creativity workshop to draw up detailed sector diagnoses and to prioritize actions. In parallel, different agroecological mobilizers were implemented (e.g. local food markets and radio programs) to provide the project with visibility, improve the social value of agrarian activity, and make agroecological management alternatives visible.

Last, in phase V, a final round of interviews was conducted as well as deliberative polling, to estimate the subjective transformations obtained locally. Moreover, two evaluation workshops took place, one open to the public by means of the application of *tetralemmas*; and another with the driving force group to create a final sociogram and compare it to the one created at the beginning of the research. The aim of these workshops was to carry out a participatory assessment of the results obtained and, furthermore, reconsider objectives for a possible continuation of the process.

The impact—material and symbolic—generated on the local agrarian sector was high (Table 4). Particularly important was the transformation of the pessimist views of many farmers that changed into motivation to adopt management methods along the lines of an agroecological transition. For this purpose, a cooperative action objective was developed throughout the project, demanded by the farmers in phase II, to improve the social appraisal of agrarian activity in the town. Our strategy was to make this visible in all local public places, and to seek support from all types of entities. With respect to the steps in the conversion process (Gliessman 2010), in this



case study success was higher in level 4 than in level 3. The agroecosystem improved only in those cases in which local varieties were added. Other farmers were able to reach level 2 of input substitution. However, level 4 was widely developed. The organizational effort, made by farmers and their belief in the need to change their marketing model, promoted the creation of infrastructure to transform their products (wine and olive oil) and sell them through local trade and SFSC (Table 4).

### Alpujarra de Granada comarca

The PAR developed between 2008 and 2010, covering all the phases described in Table 1. At the start of the process there was already a reportable area of organic farming in the *comarca* (1,395 hectares), concentrated in some towns in particular. In these cases intervention was aimed at improving, from an agroecological perspective, a process that was already underway.

Phase I consisted of a preliminary definition of the problems and claims of the farmers and the local agro-industry, as well as of the local sociogram. The Driving Force Group was made up of government agents, farmers and the researcher. We defined an SWG, with actors that were related to organic farming, including livestock, fig trees, oliviculture, horticulture, artisan agribusiness, SFSC, and viticulture. We drew up a draft of the work plan for each sector, with a first indicative schedule, thus including steps to be conducted with the people, groups and institutions involved in kick starting the process, the dates expected for the next steps and the resources available for the undertaking.

Participatory workshops were carried out, in which the researcher introduced herself, supported the local actors' demands about organic farming, and started assessing the local agroecological potential. Besides the sociogram, participant observation was important.

In Phase II, we established a typology of farms, through interviews and visits to 51 farms. In addition, we carried out sector diagnoses, and reflection spaces were opened to discuss local agroecological knowledge, highlighting the discourses present in relation to organic farming, the future of the activity and the possible means of strengthening the sector. The SWOT analysis and PRA techniques were applied in social creativity workshops.

During Phase III, we established critical problems prioritized per sector and action plans and annual schedules were drawn up for the 2010–2013 period. SWG in all the sectors identified were also established, except in the wine sector, which was already an established sector. Particularly relevant were the feedback workshops and the social creativity workshops in which we set out the work priorities.

In phase IV, we began to implement the action plans. The effort focused partially on the agroecological transition processes on the farm, developing actions outlined in the FPR. This facilitated the methodological and technical

transfer between the researcher and the farmers, and between the farmers themselves (from peasant to peasant). Good qualitative and quantitative results were obtained (Table 4).

In phase V, we reviewed and assessed the 2010–2013 action plan, and we reinforced the transferal of the group leadership that had been previously started, with the complementary training of farmers involved in PAR techniques. We carried out a participative qualitative assessment of the process (achievements, challenges, and reorganization of networks) using a sociogram, and a quantitative evaluation (increase in organic farming).

Results are summarized in Table 4. Consolidation of traditional farming practices such as transhumance (seasonal migration of livestock), and cultivation of local varieties of fig trees, were the largest contribution to the agroecosystem redesign. This contribution was invaluable from two perspectives: in its symbolic nature as reinforcement of their identity and appreciation of traditional knowledge, and in its material nature through use of local resources, landscape improvement, biodiversity increase, fire risk reduction, etc. The technical problems were solved by redesigning the agroecosystem (e.g., biodiversity introduction) and, sometimes, by input substitution (e.g., pest mass trapping). Finally, the best farmer organization allowed for progress in the establishment of cooperative agroindustry and the food marketing through SFSC.

## CONCLUSIONS

PAR has developed a large amount of tools for achieving social change through social action-reflection processes (Freire 1972) in very different fields of reality. Applied to agroecology, participatory methods have been developed most at the farm scale (e.g., MESMIS, farmer participatory research). Nevertheless, many of the constrictions for agroecological transition can only be solved at higher research scales (Dalgaard 2003), including social and economic complexity, which are at the core of the farming sector crisis. Community-based participatory approaches, which focus on social networks, can help to link different scales of agroecological research and can face the unbalanced relations between actors within the food system.

The methodology applied has combined different research techniques within a participative process, following the sequence proposed by Villasante (2006) for socio-praxis. It has proved to be effective in fostering transition processes at the local community level in the Spanish rural context.

The participatory techniques needed to be simplified in order to adjust the abstraction level of the participants: PRA techniques proved to be the most effective in facilitating participation in the workshops and FPR ones proved to be the most effective in redesigning agroecosystems and their management, as well as in technological diffusion. Meanwhile, participatory

techniques from socio-praxis (sociograms and flow charts) proved to be useful to design and monitor the process by researchers, and showed more limitations for participatory workshops with farmers. Anyway, the combination of different research scales in each project has shown a high potential for synergy between new processes of farmer organizations and marketing, and agroecosystem redesign, in order to move towards sustainability. Although PAR processes focus locally, greater political and social organization of the community allows some influence on a larger scale, for example, public administration, political parties, etc.

Depending on the characteristics of each case study, some techniques of research were more important than others. When there was less agroecological potential (less social importance of agriculture, poor traditional agrarian knowledge, low farmers' social organization), the most useful techniques were those from socio-praxis and PRA (Morata de Tajuña). In contrast, FPR techniques and MESMIS were more relevant when the socio-agroecological potential was greater (La Alpujarra and El Romeral Cooperative). Since the socio-agroecological potential is constructed, we can conclude that the socio-praxis and PRA techniques are more useful in the initial stages of the agroecological transition process and gradually lose prominence when the process moves forward, being replaced in part by FPR techniques and MESMIS.

Although Gliessman (2010) defines agroecological transition in 4 progressive stages, in our case studies phase 1 was not present and phase 4 was developed in parallel to the redesign of the agroecosystem. In fact, SFSC development became the driving force for the change in the management of the agroecosystem in Morata de Tajuña.

Considering the marginal nature of agriculture in the European context, especially in peri-urban areas, the simple act of opening communication spaces between farmers, in which they are the protagonists, fostered initial interest in further participation. However, obtaining specific results regarding farmers' claims and problems was an essential incentive to widen and further increase participation later. The reduced number of people representing the local community of farmers was often insufficient to develop the proposals set out, and, as a result, collaboration from other non-agrarian actors, and widening the territorial intervention scale—to include the whole region—proved to be useful in obtaining a sufficient critical mass. The integration in the project of other actors, and the connection with other networks was essential to develop the SFSC.

The initial identification of the organic production process was interpreted by the conventional farmers as something alien, especially in Morata de Tajuña, where the previous agroecological potential was less. These farmers participated more in activities that were less related to organic farming, such as organizing the local labor market.

The PAR implementation period was assessed as short by participants, except in El Romeral. Stable financing is required for long time periods

(minimum of 4 years) in order for these processes to be correctly carried out; something that is very difficult to obtain.

Despite these limitations, the PAR methodological approach and associated research techniques have been successful in initiating and accompanying agroecological transition processes, in involving farmers in the redesign of their farms to increase sustainability, and in building local organic food networks by the wider society.

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