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Place Attachment, Feeling of Belonging and Collective Identity in Socio-Ecological Systems: Study Case of Pegalajar (Andalusia-Spain)

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Abstract: Shared feelings of belonging and attachment held by people in relation to the place they live, and the development of collective identities that such feelings can promote, should be taken into account when seeking to understand the configuration and operation of socio-ecological systems (SES), in general, and the impact these factors have on SES adaptability, transformability and resilience, in particular. However, these topics have not been examined in enough depth in prior research. To address the effects of people's feelings of place attachment and belonging in specific SES and the impacts they have on the aforementioned properties, in addition to theoretical instruments appropriate to the emotional and cognitive nature of this kind of phenomena, in-depth empirical qualitative studies are required to enhance understanding of the cultural and symbolic dimensions of the SES of which they are part. In this regard, the analysis of people-place connections, feelings of belonging and territorial identifications (territoriality) is strategic to understanding how the biophysical and the socio-cultural are interconnected and structured within SES. This article is based on a case study implemented through long-standing ethnographic research conducted in Pegalajar (Andalusia-Spain), which examined the struggle of the local population to recover the water system on which the landscape, as well as the ways of life that sustain their identity as a town, has been built. This case proposed a perspective on feelings and collective identifications as analytical interfaces between social and natural dimensions of SES in order to enhance understanding of their structuring and dynamics, particularly their resilience, and in order to manage them in a more sustainable way.

Keywords: belonging; place attachment; collective identity; territoriality; socio-ecological systems; resilience

1. Introduction

The objective of this work is rooted in the finding that the main stumbling block encountered when developing the operability of socio-ecological systems (SES) as a concept is the difficulty overcoming the dichotomy between social systems and ecological systems in order to achieve a unitary formulation that responds to the epistemological foundation of this concept. This is especially key for environmental management that seeks to apply this unitary perspective to specific SES from a socio-ecological approach. From a theoretical perspective, it can be maintained that the socio-cultural is integrated into the biophysical and the biophysical into the socio-cultural in an inextricable way. Furthermore, it can be maintained that the interconnection between both dimensions is present in each and every component of the SES, as well as in its multiple complex relations, shaping a physical-bio-socio-cultural reality. Developing this approach when analysing specific socio-ecological realities is a different matter, chiefly because the categories “natural” and “social” are deeply entrenched in the networks of meaning that we have built to reflect on the world [1].

Proposals are needed to foster a continuum between nature and culture, integrating the organism into the environment in which it lives [2,3] to develop a perspective of human-in-nature [4,5]. However, although different authors proposed various notions aimed at facilitating such a confluence between nature and culture [6–11], a sufficiently operational approach has yet to be matured and fully developed. Among all this, it is important not to neglect “the tendencies (in the frame of resilience thinking) to assume that ‘socio-ecological’ categories exist naturally, to strip away human agency, to normalise phenomena as if they are inevitable, hide the mechanisms by which ‘systems’ are socially constructed, and depoliticise the value choices underpinning courses of human intervention should strike a highly cautionary note” [1] (p. 333).

Our hypothesis is that, in order to fully understand the complexity of any socio-ecological system, in addition to knowing about the relationships formed by humans with the rest of a system’s biophysical components, the feelings of attachment and sense of belonging formed by a population with regard to a socio-ecological system must also be taken into account. It is important to understand that such feelings constitute one of the foundations of a population’s collective identification, and that this is a key issue in the proper participatory management of territories with a view to achieving sustainability.

To corroborate this hypothesis, it is necessary to examine in greater depth the interactions that take place between the physical-bio-socio-cultural elements that make up an SES. This process of theoretical–methodological construction assumes that an SES should be understood as a complex adaptive system [12–14], with all that this entails in terms of feedback, nonlinearity, emergence, chaotic behavior, uncertainty and the capacity for self-transformation and learning, in addition to the importance of the process and relationships over and above a simple statement of the component elements. Chaotic behavior and learning capacity are perhaps the two core defining elements of an SES as a complex adaptive system. However, greater strides must be taken in order to gain a deeper understanding of the ties between nature and culture.

In addition to refining the theoretical models for understanding the relationships between social and ecological systems, this paper seeks to improve strategies aimed at achieving social objectives, such as authentic local sustainable development [15], integrating the capacities, knowledge and feelings of a local population with regards to the environment of which they are a part as the best way to achieve the main social goals.

To approach the case study with which we sought to test our hypothesis, we interlace several key theoretical concepts below in the following section:

We understand the term *Socio-ecological system* to refer to a complex framework of interrelationships between the component elements of natural and social systems that constitute an integrated whole. It is a holistic concept that helps us to understand and manage the systemic unity of the biosphere.

The Theory of Socio-Ecosystems seeks to explain the coevolution of ecological and social systems, understood as integrated, reciprocal and interdependent systems. This conceptual foundation is based on the perspective of human beings in nature [16].

Socio-Ecosystem Theory is a new field of interdisciplinary knowledge that seeks to address the dynamic relationships between nature and society, and it responds to a central categorical imperative that recognises the interdependence of human beings and nature, focusing on the management of socio-ecological relationships between their components and not on the components themselves.

According to this theoretical framework, socio-ecosystems form a unit of interrelation between ecological systems and social systems. The ecological system is made up of biophysical elements, and the social system is made up of individuals, local groups and institutions, as well as the relationships formed between them [17].

Socio-ecological resilience. Taking C.S. Holling’s seminal definition, we understand socio-ecological resilience as: “the degree of disturbance that a system can absorb before changing to another stable regime, which is controlled by a different set of variables characterized by a different structure” [18].

This is the most developed vision within the framework of socio-ecological systems (SES). However, this concept was adjusted towards its current definition, one in which there is consensus surrounding

the capacity of a socio-ecosystem to take advantage of opportunities that arise as a consequence of a crisis caused, not only by traumatic changes but also by favorable circumstances that appear under “normal” conditions, facing changes and uncertainties [19–24].

Place attachment can be defined as the cognitive and emotional connection of an individual to a particular scenario or environment [25] (p. 165), or in a broader sense, as the experience of a long-term affective bond to a particular geographic area and the meanings ascribed to such a bond, changing overtime, which develop a sense of belonging in people that makes a particular place an anchor of their identity [26]. As B.B. Brown and D.D. Perkins point out: “Place attachment involves positively experienced bonds, sometimes occurring without awareness, that are developed over time from the behavioral, affective, and cognitive ties between individuals and/or groups and their socio-physical environment. These bonds provide a framework for both individual and communal aspects of identity and have both stabilizing and dynamic features.” [27] (p. 284).

Sense of belonging, or *belongingness*, is the human emotional need to be an accepted member of a group to maintain close and safe ties that generate a sense of security, care and affection. People tend to have an “inherent” desire to belong and to be an important part of something greater than themselves. This implies a relationship that is greater than simple knowledge or familiarity. The need to belong is the need to give and receive attention to and from others. Belonging is a strong and inevitable feeling that exists in human nature [28–35]. Human beings need to live collectively or belong to a group that allows for rooting and that generates identity and social reference. Sense of belonging is the greatest reason to form groups, communities and societies. All people feel the need to belong—to be part of something through identification [36].

Collective identity is a process through which the individuals who make up a group are recognised as members of this group and are differentiated from other groups through the development of shared feelings of belonging and attachment. This process is not automatic or mechanical, and it has structural-praxical components along with symbolic-discursive elements. Furthermore, the consequences are very varied, individual and collective, as well as political and psychological: confidence, self-worth, community affirmation, group status [37].

Collective identities are always the result of a process of continual symbolic construction that is grounded in—and at the same time creates—a feeling and sense of belonging. Hence, processes of collective identification are conditioned by a material reality, but their expression is symbolic on the basis of discursive-cognitive models of representation of that reality. When a model of collective identification is assumed and accepted by a certain collective, the model becomes a consubstantial part of the group’s reality by becoming an operational representation of this reality, as well as expressing its affectivities.

We use the term *Territoriality* in the sense of territorial-based collective identification, a concept very close to those of topophilia and geophily developed by Tuan [38,39], which emerged previously in the work of Wright [40]. The first matches territory and feeling, while the second points to the emotional bond between people and nature. Territoriality should be understood as the interface between the social sphere and the natural sphere that make our understanding of the inextricable links between the human and the biophysical operational.

This collective identification defines the “identity” of a territory, based on its “objective” spatial-temporal characteristics but without being exclusively limited to them. Collective identification materializes the human symbolic dimension, built on the space-time dimension of the SES.

2. Theoretical Framework

In addition to the so-called “formal” aspects related to the systemic and complex nature of SES, referred to previously, it is also important to take account of certain aspects pertaining to “content”. An SES comprises a system that integrates matter, life and mind [41], shaping a scaled reality of growing complexity out of which consciousness emerges. The biophysical sphere is marked by dimensions of time and space, and although the human sphere, as a biophysical reality, is also marked by these

dimensions, it adds another defining dimension: the symbolic level [42,43]. This symbolic dimension interconnects biophysical and human spatial temporality, becoming the key element that differentiates an SES from an ecosystem without human presence. This is by virtue of the existence of a semiotic domain that adds not only a cross-scale element but also a cross-ontological one [44] (p. 2).

If the mental socio-cultural dimension of an SES is fully accepted, the role played by this dimension in its functioning can be glimpsed, since humans, through their capacities for abstraction and symbolisation, give meaning and intentionality to the world they inhabit, which in turn become simultaneously cause and effect of the human dimension. The capacity for symbolic production lies with the construction of ontological hierarchies, reflexivity and the ability to remember as well as to imagine and plan the future. Finally, symbolic intangibility is embodied through technological materiality [42,43], which will become one of the primary shapers of an SES.

Therefore, abstract thought and symbolic construction differentiate an SES from any other type of complex adaptive system. They also help us grasp their essential character: “It is this sophisticated interior aspect and the opportunity it creates for novelty, foresight, reflection and learning, as well as the beliefs, norms and values that are formed at this intangible level, that differentiate SES from other ecological systems” [42].

However, the specificity of SES in contrast to other types of complex adaptive systems goes further. Whereas any complex adaptive system exhibits a marked structural character in its functioning, it cannot be neglected in an SES the importance of human agency, both individual and collective [4,45–47], understood as the capacity to act beyond strict structural constriction. This agency is closely linked to symbolic capacity, since it is largely based on the faculty to imagine, foresee and represent the world, and therefore to act creatively therein. Furthermore, the expression of this agency, both in its individual and collective versions, points back to the power relations that structure human groups by virtue of differential access to strategic resources for social production and reproduction, internal factors that affect the development and functioning of SES [48], and whose deficient treatment within socio-ecological studies (e.g., studies on socio-ecological resilience) has been highlighted by different authors [1,49–53]. From this perspective, the political and ethical must be considered fundamental drivers of SES [48] (p. 484).

Considering symbolism and agency, assuming the undeniable human capacity to intervene in relation to the biophysical dimension, we can consistently understand how an SES thinks, learns, adapts and transforms beyond its structural limits. We can therefore understand what its resilience consists of, strongly anchored to collective human action in the majority of cases, in the form of adaptability or transformability.

It is necessary to go even further, however, when considering the human dimension within SES to complete their social dimension. People–place connections, feelings of belonging and human territoriality (territorial-based collective identity) are basic elements used to understand how the biophysical and the socio-cultural are interconnected. Here, it is proposed that analysing processes of attachment and feeling of belonging to places, and their expression in the construction of collective identities, is fundamental in terms of understanding the symbolic dimension generated by human groups in relation to their environments. Thus, territorial-based collective identification should be taken as the interface between the social sphere and the natural sphere that make our understanding of the inextricable links between the human and the biophysical operational.

The prominent role played by humans in the processes that take place within SES is widely accepted [54]. Therefore, if place attachment, feeling of belonging and processes of collective identification play a central role in the functioning of human groups, they must be taken into consideration as part of SES. However, feelings of place attachment and belonging among humans regarding the spaces in which they live and of which they are part are rarely addressed analytically within the context of studies on SES. Indeed, a recent review of the extant literature yielded only a few works that sought to analyse these issues in relation to the processes and resilience of certain SES [5,41,55–59].

In this regard, we agree with Norris et al. that a sense of community and place attachment can both be classed as attributes of resilience [60] (p. 139), considered both multidimensional and multiscalar in nature [61].

We suggest that studying these subjects within specific SES, as part of a “situated socio-ecological analysis” [48], would provide a better understanding of the interconnections between the biophysical and socio-cultural spheres, mediated by the symbolic dimension inherent to human existence. Integrating feelings of place attachment and belonging and the processes of collective identification into SES would enhance understanding of how SES function, thus improving their management.

Concern about this analytical perspective arose from tracking a social movement developed in Pegalajar (Andalusia-Spain) that surrounded the recovery of an aquifer that feeds the structural elements of a very peculiar SES and in which human intervention has been particularly evident for centuries. It is important to begin by describing this case with a view to sizing up the main aspects about place attachment, belonging and collective identification, key factors to understanding the socio-ecological effects of this social movement. Subsequently, the theoretical and methodological implications that arose from these processes, and which should be highlighted in the study of SES, will be pointed out.

2.1. Place Attachment and Belongingness

Patrick Devine-Wright and Susan Clayton point out that “the physical environment has been shown to have strong connections to a sense of self, and identity has proved to be an important mediator of behavior” [62] (p. 267). They also foreground the close relationship among identity, emotions, morals and behavior regarding the environment on which individuals belong [62] (p. 269).

There is abundant literature on place attachment [38,39,63], a specific subject both in the fields of attachment studies and also place studies [64]. Defined as the cognitive and emotional connection of an individual to a particular scenario or environment [25] (p. 165), this construct is very closely linked to concepts [65] (p. 208) such as place identity [66,67], place dependence [68,69], sense of place [69,70], rootedness [26,71,72], place bonding or bondedness [73–75], place familiarity [76] or neighborhood attachment [77]. Considered either as individual items or as integrated in the larger scale aspects constituted by place attachment [75,78], the interest that this profusion of terms underscores the importance of such feelings when developing a sense of belonging or belongingness [28–35], as well as the relevance of rootedness, place dependency and place identity as fundamentals in the construction of individual and collective identities [79,80].

Although the construct of place attachment receives considerable attention in the field of environmental psychology, place studies and environmental-management literature over the past three decades [64,81], these contributions have not yet been incorporated comprehensively into the field of studies on SES.

Place attachment can be defined as the experience of a long-term affective bond to a particular geographic area and the meanings ascribed to such a bond, which change over time. This experience develops a sense of belonging in people that turns a place into an anchor of their identity [26]. As B.B. Brown and D.D. Perkins point out: “Place attachment involves positively experienced bonds, sometimes occurring without awareness, that are developed over time from the behavioral, affective, and cognitive ties between individuals and/or groups and their sociophysical environment. These bonds provide a framework for both individual and communal aspects of identity and have both stabilizing and dynamic features” [27] (p. 284).

In one of the few papers that apply the concept of place attachment to the study of socio-ecological resilience, Zwiers et al. [55] draw the distinction between two types of place attachment: change-oriented and stability-oriented, each with different potential effects on the adaptive or transformative capacity of the socio-ecosystem and, therefore, its resilience. This distinction is particularly useful for the analysis of the case study presented here. A balanced combination of the two types of orientations is necessary for the solid development of any community. Predominance of the first orientation can produce

stagnation and an inability to cope with changes due to a nostalgic conservatism for an idealised memory of the past and an essentialised identity. On the other hand, overemphasis on innovation can undervalue heritage and dismiss valuable knowledge that could help a community to find its own solutions for the future. As Hegney et al. argue, resilience is the ability to learn from the past, to be open and inclusive and to have a sense of purpose [82]. A shared appreciation for local history could provide common ground to increase social interactions, stimulate meaningful involvement with local issues and strengthen cohesion among community members [55] (p. 13). In this regard, Marshall et al. [58] highlight the positive relationship between a local population's feeling of place attachment to an SES and its adaptive capacity.

2.2. Territoriality

Territory is the socialised and symbolised space constructed by human societies through their interaction with the biophysical environment in which they develop their existence. The anthropological concept of territorialisation refers to the idiosyncratic dimension of a certain geographical-ecological-economic-societal space [83]. Walter Firey [84], in his criticism of the economic determinism of human ecology, highlighted the importance of feelings to understand the relationship between humans and the environment. Along these same lines, territory is the environment in which all kinds of social activities have meaning insofar as they are impregnated with affectivity [85] (p. 87). Place, the everyday space for interaction, comes to be seen as an extension of the individual insofar as their individual interests are interconnected with the interests of other individuals in a defined social space, and inasmuch as individual experiences are associated with everyday spheres and moments; in other words, with personalised spaces and times strongly charged with affectivity.

Territory is constructed on the basis of specific actions and interests, more or less rationalised, and conditioned by power relations. It is also constructed through a logic related with other aspects that are often relegated to the background but which are fundamentally important owing to the difficulty in translating them into a rationalistic logic: the emotional and affective aspects that define the human being [86].

When considering the insertion of humans in the environment and the conformation of a territory, it becomes essential to take into account the feelings manifested by individuals in relation to the environment in which they live (with both its living and inert elements) and how said feelings (place attachment) affect their environmental behavior [87]. When such feelings are shared by all or a significant section of the members of a group, this affective dimension becomes a central factor in relation to the processes of collective identification, which are constituted on the basis of feelings of belonging [28,29], which in turn are grounded in the attachment [88,89] felt by the individuals that make up a certain group with regard to the territory in which they live [63].

Feelings of attachment and belonging to a territory are some of the fundamental pillars of collective identity. The formation and development of place attachment are due to the direct experience of people with certain places and their association throughout a life cycle with affective and pleasurable experiences [88,90–92]. Physical attachment and social attachment are not independent from one another. On the contrary, they have to develop jointly. People who are more attached to their social environments are also more attached to their physical environments [63,89,90].

Collective identification is a process through which the individuals who make up a group are recognised as members of the same group and are differentiated from other groups through the development of shared feelings of belonging and attachment. This process is not automatic or mechanical, and it has structural-praxical components (as mentioned previously) along with symbolic-discursive elements. Furthermore, the consequences are very varied, individual and collective, as well as political and psychological: confidence, self-worth, community affirmation, group status [91] (p. 265).

It is always a process of continual symbolic construction that is grounded in—and at the same time creates—a feeling and sense of belonging. This collective identification largely defines the “identity” of a territory from its “objective” spatial-temporal characteristics but without being circumscribed

exclusively to them. Collective identification materialises the human symbolic dimension, constructed on the spatial–temporal dimension of SES. Hence, processes of collective identification are conditioned by a material reality, but their expression is symbolic on the basis of discursive-cognitive models of representation of that reality. When a model of collective identification is assumed and accepted by a certain collective, the model becomes a consubstantial part of the group’s reality by becoming an operational representation of this reality, as well as expressing its affectivities. Feeling and knowledge are amalgamated.

These models and discourses are produced socio-historically, and one of their fundamental pillars can be found in the definition and delimitation of territory. Play a leading, but by no means exclusive, role in this process are the actors who, within the heart of each specific society, struggle for the maintenance or transformation of their techno-economic systems and socio-political organisations. This prominence in the creation of specific models of collective identification implies the need to extend them to all members of the collective and to ensure their acceptance by the majority, in the manner of hegemonic practice. The acceptance of a specific model of identification and certain common symbolic references serves to: (1) reproduce forms of knowledge and relationship with the environment; (2) endow the territory with meaning; and (3) sustain the techno-economic foundations and the forms of social and political organisation on which the collective is constructed. In other words, ultimately, it serves to influence by maintaining or questioning power relations and the configuration of a SES itself. The interconnection between the symbolic dimension and agency is thus synthesised in the collective identities that, as an expression of power/knowledge, play a crucial role in adaptive processes [48].

The fundamental elements upon which processes of identification and their associated discourses develop include the environment in which the human group lives, the SES of which it is a part: an environment defined socially and culturally as territory in which humans are inserted just like all the other component elements. Complex relationships are maintained in such environments, ranging from the appropriation of some of these components such as resources for human subsistence and reproduction to the prominent role played by some of them in symbolic representations, feelings, beliefs, memory and many other human facets.

One key aspect for the establishment and reproduction of a certain territory is the expression of belonging manifested by the individuals and groups that share it. Belonging to a social space is constantly ritualised through everyday symbolic actions as well as extraordinary actions. Affiliation to a group is also affiliation to certain symbols through which different individuals find bonds, spaces for encounters, shared contexts. Symbols are the guarantee of “tradition”, in other words, of the temporal continuity of the group and ties with a mythical community [92], but they are also used to define and reproduce differentiation with other groups on the basis of unequal access to certain places and elements of the SES of which they are a part and of the different levels of knowledge they possess of it.

Hence, processes and models of collective identification are the symbolic expressions of the physical-social-bio-cultural nature of human existence; in other words, of the spatial–temporal dimension of the SES. This is because collective identification develops different converging dimensions: on the one hand, affectivity grounded in feelings of attachment and belonging; on the other hand, knowledge, taking into account that the discourses of representation it conducts are simply forms of collective knowledge about the territory that do not imply value judgments made of it, but that rather encapsulate practical know-how about it and a complete worldview. Furthermore, collective identification implies an evident political dimension, since the discourses of representation that are profoundly involved in the emotional are built on and reproduced in the midst of power relations that structure the human collective in question. Lastly, identifications provide a whole field of ritualisation for the reproduction of affectivities, practices and knowledge. This multidimensionality constitutes the foundation when considering processes of collective identification, especially territoriality, as an interface inside the SES. These processes strategically interconnect the socio-cultural and the biophysical through the symbolic development of the spatial–temporal dimensions of the SES.

Shared feelings of attachment and belonging experienced by a group towards a space, understood as an SES, sustain its collective identity and form the basis on which its actions with regards to this space are generated and oriented. As M.T. Fullilove points out, place attachment is not only an individual psychological process but, in another scale, a common practice of shared love [93,94], a “topophilia” [38].

At a collective level, place attachment has been described as comprising the symbolic meanings of a place that are shared by members of a community and a process in which groups become attached to areas wherein they may practice, and thus preserve, their cultures [95–97]. Furthermore, culture links members to places through shared historical experiences, values and symbols [98–100].

2.3. People–Place Connections and Commitment Regarding SES

Attachments to particular places in one’s community are important motivations for people to share their concerns about local problems and ideas for solutions, and to stay and fight, rather than flee, to preserve, protect or improve the community and its territory [101–103]. Place attachment can be said to preconfigure the development of a sense of community, which in turn is linked to citizen participation and other positive individual and collective outcomes [104]. Psychological and social processes at the root of a sense of community—feelings of mutual trust, social connections, shared concerns and community values—lead to collective-level action and cooperation [103] and contribute to the understanding of proenvironmental behavior and place proactive actions [100,105–107]. Feelings of attachment, belonging and collective identity act as catalysts for the development of local social capital, community mobilisation and citizen participation regarding their place, their territory. This can in turn help increase community resilience [108].

Therefore, the deeper those feelings and that identity, and the more they are shared, the greater the involvement and commitment of its members with respect to their SES [81,109,110]. This perspective sheds light on the political nature of linking a group to a place or territory [101,111].

Adopting this assumption is central to implementing the necessary real and effective participation of the population in the socio-ecological management of territories, or, in other words, SES [34,112,113].

Hence, contributing to, cultivating and fostering these feelings and collective identity become key goal to promote public participation in socio-ecological planning and management [103] (p. 347).

3. Methodology

This work is based on data generated through a long cycle of collaborative anthropological research developed over more than 25 years (1993 until today), during which time various research projects pursuing specific objectives were carried out [114–118]. Throughout these projects, more than 120 semi-structured interviews were conducted, based on previously designed questionnaires, many of them with the same informants at different times throughout this cycle. The interviews were carried out with different political leaders and representatives of the neighborhood association, in addition to a broad qualitatively representative sample of the different sectors of the population, selected on the basis of criteria such as activity, age, gender and political affiliation, among others.

Each of these interviews, with a duration ranging from 45 min to an hour and a half, were recorded and transcribed. In addition to the semi-structured interviews, there were dozens of open-ended interviews, various discussion groups, different workshops, debates in workshops and assemblies. In all cases, beyond the questions and issues directly related to the objectives of each project (agroecological knowledge, water-management systems, traditional construction techniques, culinary culture, socio-political mobilisation), questions were included about elements that support feelings of belonging and attachment among the residents of Pegalajar in relation to the components of the Fuente-Charca-Huerta system. These are the elements that we chiefly used to extract the data required to prepare this text.

In addition, a fundamental and irreplaceable source of information was the direct and participatory observation of life, work, actions and collective actions throughout this process of ethnographic field work. This information, collected in field journals, provided access to the behavioral dimension of

feelings of attachment, belonging and identity, whose real expression goes far beyond discourse and is manifested in practices, gestures and attitudes, all of them impossible to capture by other means.

4. Case Study

Pegalajar, a small town with 2919 inhabitants in 2019, encompasses the majority of the population of a SES located in the Sierra Mágina Natural Park (Andalusia-Spain), where the Mancha Real-Pegalajar aquifer (UH. 05.20) [119] is one of the main structural biophysical components (Figure 1).

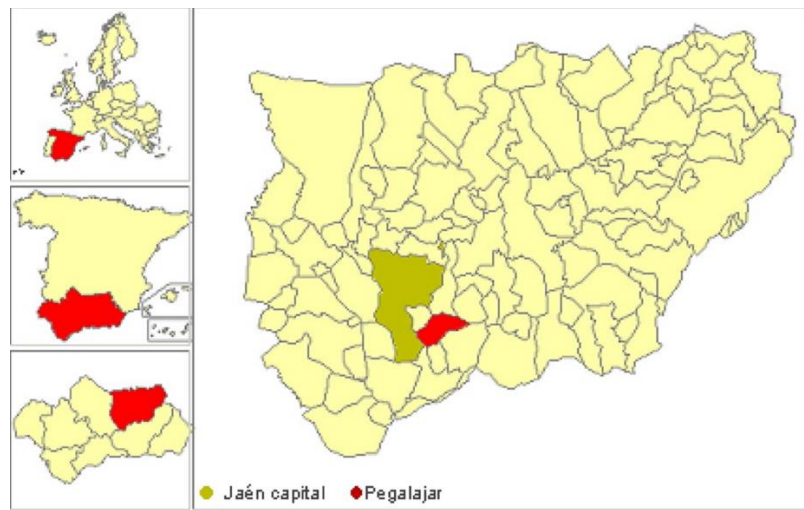


Figure 1. A map of Pegalajar (author: Javier Escalera).

Pegalajar has always lived on agriculture, with a majority of its population comprising landless day laborers or very small land owners in need of employment to supplement their family income. However, as a consequence of its proximity to the city of Jaén (16 kms away), since the 1960s agricultural work has become a complementary activity to employment in construction, services transportation or other economic sectors, although for a significant part of the population the income from olive cultivation for oil production continues to represent a significant percentage of the domestic economy. The olive grove, which for centuries has always been a main crop in the area, has been gaining in weight quantitatively and qualitatively, occupying 4013 hectares (1658 in irrigation and 2355 in rain-fed) of the 4061 hectares cultivated from their territory (98.8%) [120].

Developing agriculture in a Mediterranean area such as the one where Pegalajar is located requires controlling the water flow from a natural spring and creating conditions to cultivate on lands with sharp gradients and low-quality soil, necessitating the construction of terraces and the transportation of fertile soil up from the banks of nearby rivers. Human intervention, for almost a millennium, generated a hydro-socio-agro-ecosystem comprising a series of specific biophysical elements: (1) a natural spring; (2) a reservoir built to store and distribute this water through a vast network of channels; and (3) an extensive area (more than 500 ha) of allotments and agricultural land spread over terraces. This system not only fostered agricultural activity and sustenance for the human population, but it is also a very relevant factor for the dynamic of the aquifer itself and the general water cycle, acting as a regulator and feedback for the cycle, as well as making a significant contribution to the development of biodiversity that would not have been possible otherwise, given the “natural” characteristics of the area.

The ownership of allotments has, since the 19th century, been largely shared among local families, and production has been aimed chiefly at self-sufficiency and internal consumption, with some surplus that could be sold. This circumstance has been a very important factor that has set Pegalajar apart from other localities in the area, acting as a moderating factor in social inequalities. However, so-called “modernisation” from the 1960s onwards fostered a major process of emigration and, consequently,

the progressive abandonment of the allotment land. This marked the beginning of a process of deactivation in the economic significance of the hydro-socio-agro-ecosystem.

However, the most salient elements of this physical-bio-socio-economic system acquired an evident symbolic dimension that surpassed and is currently maintained beyond their purely economic and productive dimensions. The natural spring is the Fuente de la Reja, a local landmark located within the urban area; the reservoir used to store water is known as La Charca (Figure 2), an artificial lake that occupies a central space around which the town has developed as if it were its central square. La Huerta (countryside/allotment land), on the other hand, is a hallmark of the image and idiosyncrasy of the town. Around these three biophysical elements, deep feelings of attachment were generated that are at the heart of the sense of belonging felt by the people of Pegalajar regarding their territory, and of their collective identification as a community. Their material meanings were solidly linked to a profound symbolic sense. La Fuente was sacralised through its association with the miraculous appearance of an image of the Virgin Mary. La Charca, through its integration into the urban space, has become the most important public space and the primary location for daily sociability—walks, recreation, bathing in summer, children’s play area, space for courtship—and is also the central location for many of the town’s symbolic, festive, cultural and recreational actions. La Huerta, on the other hand, has been the traditional space for collective work and the fundamental source of support for the majority of the population, integrating differences and similarities between genders and ages, and is a space for the communication and transmission of environmental and agroecological knowledge. The town identifies itself and has been identified externally by these elements, which not only acquire a material centrality but also an equally symbolic one.



Figure 2. La Charca, main square of Pegalajar (author: Diego Polo).

In October 1988, as a consequence of new water extractions (industry, urban developments, irrigation of olive groves) in different points of the surrounding territory, the natural spring of La Fuente de la Reja stopped producing water because of the overexploitation of the aquifer, and La Charca dried up (Figure 3). By that time, the abandonment of farming and cultivation in La Huerta was already fairly advanced, but this latest episode precipitated the degradation of the SES that, for more than a decade, had already lost its economic importance and was moving towards a deterioration of the landscape owing to the decline in its use. Hence, the configuration and continuity of the SES was called into question, with a particular emphasis on its key material and symbolic elements: the natural spring and the reservoir. The lack of water did not create an economic problem, since the agricultural/allotment land was no longer the main source of the population’s support and

sustenance, and cultivation had already declined considerably; nor did it have an effect on domestic water supply, since this came from other sources in addition to the aquifer. However, it did have an evident impact on elements that have historically constituted the symbols of identification felt by the people of Pegalajar.



Figure 3. La Charca without water (author: Diego Polo).

The SES entered a critical transition phase. Its transformability was evident, in terms of the changes in biophysical conditions (the depletion of the aquifer was understood to be irreversible by politicians and technical experts) as well as the variation in its economic significance (La Huerta was no longer the source of subsistence). Few arguments can be put forward, therefore, which might point to its adaptive capacity.

Soon, for the majority of the population, the image of La Charca without any water was understood as an affront to the very existence of Pegalajar as a town. However, they did not question its material continuity nor did they initially raise the alarm regarding the environmental effects and the loss of agro-biodiversity. A citizen movement was activated demanding the recovery of the water, and in 1992 the “Fuente de la Reja” Civic Residents’ Association was set up in response to the local council’s passive stance regarding what was officially understood as a natural and irreversible process. This movement was based on, and at the same time activated, feelings of place attachment and community belonging that sustained a model of collective identification founded on the Fuente-Charca-Huerta system as the symbolic-discursive axis (Figure 4). However, for another sector of local society, this material and identarian trilogy was cast aside as part of an irrecoverable past; the evident transformability of the SES was taking shape. The biophysical and economic process was proving them right.

However, after more than 30 years, the insistence of a collective committed to a model of local identification based on its members’ shared feelings of place attachment and community belonging managed to reverse the process: first, by obtaining from the relevant hydrological authority (Confederación Hidrográfica del Guadalquivir), an official declaration regarding the overexploitation of the aquifer (1992), followed by the declaration of the Fuente-Charca-Huerta system as cultural heritage (2001), and, finally, by contributing to the creation of a plan regulating the use of water and the regeneration of the aquifer throughout the whole of the region it supplies (2007). As a result of these measures, in 2011, the natural spring began to produce water again (regularly to date), La Charca filled up, and the agricultural/allotment land of La Huerta began to be reactivated (Figure 5), now with an economic logic of cultivation that is markedly different to the one that defined its entire history, since its potential economic dimension is enhanced by the interest not only in producing healthy foods and organic agriculture, but also because of the role this land can play as a social driver.

Thus, the resilience of the SES was expressed and the transformability that seemed to be inevitable was turned into adaptive capacity. The SES fundamentally maintained its biophysical characteristics and functions, incorporating new elements that enabled it to adapt to new realities.



Figure 4. La Charca claims for justice (author: Diego Polo).



Figure 5. The recovered water in the garden (author: Javier Escalera).

The case sketched out here highlights the decisive role played by the population's feelings of place attachment and belonging, without which it would not have been possible to develop a social mobilisation as consistent and sustained over time. These feelings were synthesised in the symbolic dimension of some of its material elements that supported a model of collective identification, in turn activating and guiding the agency that explained the reversion of the structural transformation of the SES, which would have been utterly inexplicable through strictly structural or biophysical elements.

5. Discussion

As stated by Gobattoni et al. [15] (p. 412), strengthening residents' sense of place attachment, enhancing their sense of community and promoting the creation of local networks can be a good strategy for transforming a local community into a more resilient and adaptive socio-ecological system, capable in turn of ensuring and preserving the ecosystem services provided. So, "understanding the relationships that local populations have with the place where they live and how they perceive it, appears of fundamental importance for the definition of effective strategies towards collective outcomes and common goals" (p. 413).

In the case of Pegalajar, it seems evident that the collective action of its population, motivated by feelings of attachment and belonging to the territory, contributed to strengthening the resilience of the SES and its adaptive capacity when it was on the verge of transformation, owing to the depletion of one of its fundamental biophysical elements: water.

However, these feelings of place attachment and belonging among the population were neither uniform nor homogeneous. The nature of these feelings and the ways in which they were expressed vary from a complete lack thereof of any of them (felt by a minority only) and the predominance of attitudes of detachment and utilitarian selfishness, to a deep affective identification with the place and with the material, environmental and cultural elements that marked its idiosyncrasy. Taking the distinction made by Zwiers et al. between change-oriented and stability-oriented place attachment and their different relationships to resilience: "Resilience and change-oriented place attachment can be restored after a disturbance and both are able to adapt to change. Stability-oriented place attachment, in contrast, can result in nostalgia and fear of loss or change of existing place aspects" [55] (p. 2). Hence, although a blind place attachment can block the transformative capacity of people for change, as highlighted by Marshal et al. in their study in Queensland (Australia) regarding actions taken to effect necessary longer-term changes that affect more fundamental system characteristics in response to larger-scale changes to deal with climate change [59], this inclination towards protective behavior can also enhance community resilience [55] (p. 2) and act as a positive influence on its adaptive capacity [59] (p. 7).

This perspective can help us better understand the importance of the affective bond developed by people with their environment and landscape in the resilience of the SES in our case study.

Pegalajar provides an example of a combination of the two types of place attachment. At the start of the movement, a majority of the participants felt predominantly the first type of stability-oriented place attachment, albeit fused with the change-oriented place attachment in the people who led the process. This combination has been changing over time. For example, some of the oldest participants have since died: those who were involved in the early stages of the movement and who still remembered the fully functioning water system of the Natural Spring (La Fuente de La Reja)-Pond (La Charca)-Allotment Gardens (La Huerta). This system, therefore, strongly shaped their feelings of belonging and identity as *pegalajareños*. Others have left village. As a consequence of this change, participation in the movement, without losing its affective elements, became more proactive. The reality is different with respect to new generations building their sense of belonging and identity as a *pegalajareños*.

Since the late 80s, La Charca has been dry most of the time. Without the water, the allotment gardens of La Huerta deteriorated and their cultivation greatly declined. All of this profoundly changed the significance of the main components of the Pegalajar SES for a large part of its current population. This change was compensated by an increased awareness and commitment based not only on feelings of attachment and a sense of belonging but also on ideological positioning. This strengthened a change-oriented type of attachment, in which nostalgic attitudes and melancholy for a bygone "original state" that can never be recovered were replaced by a disposition towards collective action, raising the issue of whether the recovery of the Fuente-Charca-Huerta system can and should play a role as one of the fundamental pillars for the achievement of a truly sustainable future, based on the state of the SES collectively defined as being most desirable.

This process reinforces the stance taken by Gobattoni et al. [15] (p. 412) when they assert that: “(...) when the emotional attachment to places is supported by a felt need of involvement in public processes (...), then a positive link between ‘Sense of place’ and ‘Attitude’ is established through the ‘Participation and integration’ factor acting as a mediator” (p. 422).

This strengthening effect of resilience, however, does not occur as an immediate result of feelings of attachment or belonging, or even those of a change-oriented nature. Instead, it occurs through their materialisation in the form of actions that are part of what F. Berkes and C. Seixas [121] call social factors of SES resilience: learning to live with change and uncertainty; nourishing diversity for reorganisation and renewal; combining different forms of knowledge; and creating opportunities for self-organisation.

5.1. *Learning to Live with Change and Uncertainty*

Crisis and the social movement to recover the water in Pegalajar fostered an awareness among the population about the fragility and vulnerability of the ecosystem of which they are part, and particularly of the functions and services linked to water, not only related with its domestic, productive, and environmental use but above all its emotional meanings and identarian values. All of this was not previously perceived on a daily basis given the abundance of water, which had never been lacking from the natural spring as far as anyone could remember, thanks to the sophistication attained in its use and harnessing.

The easiest reaction to the change brought about by the spring drying out may have been resignation, which in fact did happen and happened in other similar cases within Andalusia, although the result was environmental degradation, the impoverishment of the diversity of the SES, and the deterioration of the basic biophysical functions. However, the concurrence of feelings of attachment to its place, of belonging to its community and a model of collective identification founded on *La Fuente*, *La Charca*, and *La Huerta* as the backbone and symbolic capital [122] was key to dealing with uncertainty. Collective action, guided by feelings of attachment and belonging to the territory, and by the collective identity as a town/people, enabled them to deal with the apparently inevitable transformation of the SES and to strengthen the population’s capacity to deal with uncertainty in a more determined way through a symbolic representation of “what Pegalajar is and how we want it to continue being”.

5.2. *Nourishing Diversity for Reorganisation and Renewal*

Collective memory, one of the fundamental pillars of a people’s shared feelings of belonging and collective identity, is a key element for resilience on the basis of internal models, founded on local conditions and capacities, according to the interests and needs of the population rather than standard recipes promoted by external agents and interests. The recovery and valuation of collective memory guarantees the nourishment of the SES memory as a source of innovation and novelty.

The social movement to recover the water in Pegalajar worked consistently to recover the town’s history and memory linked to *La Fuente*, *La Charca*, and *La Huerta* (events, traditional practices and uses, vocabulary, local agricultural varieties, photographs, tales, legends, songs, beliefs, etc.) and to spread them through schools, exhibitions, publications, the web, meetings and symposia. Through this work, external dissemination was achieved, but local dissemination was achieved most of all, overcoming the profound schism that separated the young people of the town and a hydro-agro-socio-ecological system that they had never seen in action. This strategy also had an effect on adults, who became aware of the values of the SES, substantially revitalising their feelings of attachment and belonging with regard to their town channelled symbolically through *La Fuente* and, above all, *La Charca*. These two physical elements take on a praxical dimension as motives for socio-political involvement, and as instruments for change and sustainability. Today, for a significant section of Pegalajar’s young population, the *Fuente-Charca-Huerta* system is still an affective and identarian point of reference; people under the age of 30 are starting to go back to working on the agricultural and allotment land of *La Huerta*, invigorating the group of traditional allotment gardeners, who are largely advanced in years,

which seems to be a guarantee of continuity and renewal, essential for the continuity of the SES. All of this could not be understood without the concurrence of the emotional, affective and identarian factors.

5.3. Combining Different Forms of Knowledge

Resilience is not an intrinsic quality of SES nor is it an abstract condition of them; instead, it materialises through attitudes and practices. For that reason, it is fundamental to construct capacities to monitor and manage the environment, to generate institutions that frame learning, memory and creativity, to create mechanisms to share knowledge on different scales and to combine scientific and local knowledge, all of which constitutes human capital [123,124]. As indicated previously, local knowledge, the knowledge that is important and relevant in it, is closely linked to the elements that symbolically are considered essential to represent itself as a collective “community” over time and space.

The crisis of the Pegalajar SES fostered collective learning about the environment itself and about the relationships that existed between its different components, local knowledge about the hydro-socio-agro-ecological system was rescued and conserved, and new knowledge was produced as a result of the creative integration of local know-how with scientific and technical knowledge. All of this occurred throughout a long and fertile process of collaboration between the participants of the social movement and a wide and varied number of experts, technicians and scientists from very diverse disciplines. This complex dynamic is unimaginable without a consistent activation of a discourse of common representation that determines what is significant to their identification as a collective. Currently, in Pegalajar, there is a group of people who, through learning and the fusion of experiential knowledge about the functioning of the local water system and hydrogeological diagnostics, are the leading experts in the configuration, characteristics and dynamic of the Mancha Real-Pegalajar aquifer. Their contribution was fundamental for the participatory creation of the regulation and restoration plan for the aquifer [119], leading to the sufficient recovery of the phreatic zone for the natural spring to start producing water again regularly and for the system as a whole to be rehabilitated.

Furthermore, the work carried out to gather and compile local agro-ecological knowledge, the cataloguing of local varieties and the recovery of seeds, together with the acquisition of agro-ecological concepts and approaches, enabled an agro-biological intervention plan to be drawn up and implemented in *La Huerta* as an alternative sustainable development strategy capable of diversifying the local economy. The agricultural and allotment land of *La Huerta* is once again being cultivated on the basis of other economic principles, thanks to the confluence of diverse knowledge, activated through a discourse of collective identification that defends it as an essential element for the town and its people, even though it is no longer central to subsistence. The emotional, affective and identarian factors were the catalysts for this process.

5.4. Creating Opportunities for Self-Organisation

Through the social movement in Pegalajar, institutions were promoted that responded to change, and spaces for experimentation were generated. The citizen movement and the struggle to recover the town’s socio-ecological heritage gave rise to the self-organisation of the collective, developing self-management and increasing its autonomy and capacity to act without neglecting the connection with external bodies, empowering the population and enriching its social capital [125,126]. All of this led to a more active, aware and responsible civil society, not only with regards to the problem of water, with a significant increase in practices of rational consumption, but with regards to many other issues within the community, the treatment of which depended significantly on the experience gained in the struggle for water. In this respect, the difference in the functioning of Pegalajar’s local political system is significant, as it is now much more dynamic and vital than the vast majority of rural populations in the surrounding area and even in Andalusia as a whole.

The capacity for self-organisation is a basic principle of resilience, and the “Fuente de la Reja” Neighborhood Association through which the social movement was articulated from early on in its

development is a clear example of such self-organisation. In this respect, the Association is an institution that teaches how to construct collective action in all its stages: reflection, debate, planning, execution and evaluation. The regular meetings and assemblies provided and continue to provide a context in which all problems, opinions, knowledge and proposals are socialised, setting itself up as an attitudinal and practical framework in the relationship between the members of the group of neighbors themselves, and between these people and the environment. Furthermore, the Association provided a channel linking the social movement at the local level with other spheres and bodies at a broader level (Andalusian Platform for the Defence of the *Fuente-Charca-Huerta* System of Pegalajar, Andalusian Network of the New Water Culture, Friends of Water Channels Association), which strengthened it internally and augmented its capacity for outside influence. Ultimately, the Association contributed to developing a specific way of facing the future. The struggle for water fostered a way of being, of coping with life and of subsisting in a fragile environment. This is the basis of resilience: an attitude rather than a state. This attitude is inextricable from the social dimension through which humans express their feelings and represent their lives and their territory through models of identification.

Without paying close attention to the emotional, affective and identarian factors, our understanding of all these factors that encourage socio-ecological resilience from a social perspective would be seriously compromised. The SES's resilience in Pegalajar could not be understood without taking account of the proposals of Berkes and Seixas [121], but they would be opaque if we did not study the symbolic, emotional and identarian aspects that nourish them. Pegalajar was an SES on the verge of a critical transition and, from a structural perspective, was heading towards transformability. However, its recent development showed signs of resilience. This resilience can only be understood if the emotional, affective and identarian factors are taken into consideration, which explains its adaptive reaction guided by human agency.

6. Recapitulation

We have analysed the struggle of the people of Pegalajar to recover an aquifer that historically supported their SES, starting from a hypothesis regarding the relevance of feelings of attachment, sense of belonging and collective identification as dimensions of the relationships between populations and the socio-ecological systems of which they are part. This demonstrated the importance of their feelings of attachment and belonging when reversing a situation considered irreversible from a biophysical and economic perspective, and also in a generation of new possibilities for the future of the SES. Without these feelings shared by much of Pegalajar's local population, social mobilisation would not have occurred and would not have generated the energy required to reverse the degradation of the SES. Phenomena related to symbolism and agency are the basis of a socio-ecosystem's adaptability. In all probability, this example cannot be considered an isolated case.

Based on these findings, we propose the importance of analysing feelings of place attachment and community belonging, and the collective identities built on them could be considered key in terms of clarifying the role played by the social dimension in SES [5,121]. This sphere of emotions, feelings and knowledge is one of the areas in which social sciences have concentrated their efforts and produced significant theoretical contributions. All of this should be integrated with a practical meaning and applied in the analysis of SES, bearing in mind its strong explanatory power regarding social performance in situations of crisis, the capacity for self-organisation and the strength of local forms of knowledge and beliefs.

With this analytical and methodological reorientation, which emphasises the need for contextualisation in analysis [44] and argues the need for "situated" studies about specific SES [48], certain phenomena that are normally excluded from socio-ecological studies can be tackled with greater certainty. Hence, the symbolic expression that is inherent to the human dimension can be fully integrated along with the agency of individuals and groups, adding greater complexity and nuance to our understanding of social phenomena, including power relations and politics. Both factors, symbolism and agency, are crucial to adequately situate humans in relation to the environment and are

expressed in feelings towards their environment and models of collective identification that become essential in understanding the functioning of SES.

Finally, we insist on the tentative nature of our work and the prospective character of its results. It makes no claim to be conclusive, but it should be considered an invitation to develop further studies in the future that may prompt comparative analyses so as to advance the theoretical improvement of the SES framework and its practical application for socio-environmental management.

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