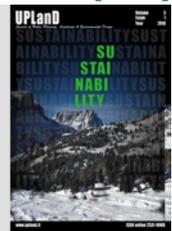


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BUILDING COMMON KNOWLEDGE FOR CO-DESIGNING AND IMPLEMENTING RIVER CONTRACTS: THE LANDSCAPE UNITS OF THE SIMETO RIVER AGREEMENT

Giusy Pappalardo, Filippo Gravagno, Medea Ferrigno

Department of Civil Engineering and Architecture, University of Catania, IT

HIGHLIGHTS

- Integrated approaches to watershed planning refer to the broader international debate about landscape, inspired by the ecological concept that interprets natural and anthropic elements as nested systems.
- Although today the importance of looking at the nested nature/human relationship is widely accepted, the necessity of enabling local communities to actively govern their landscapes is not clear.
- River contracts are voluntary programs aimed at implementing integrated approaches to watershed planning through the direct involvement of various local actors.
- Landscape units, generated through community-based approaches, constitute a device for building common frameworks of enabling knowledge for the implementation of river contracts.

ABSTRACT

The paper discusses the process of building common frameworks of knowledge through a community mapping process that has led to the definition of landscape units for the implementation of a river contract. Authors propose landscape units as sub-bioregions with specific characteristics that serve to improve the awareness of living in a common home. This awareness is a precondition for taking care of landscapes. In this respect, landscape units are tools aimed at increasing stewardship, the sense of belonging, and the act of care within various actors of local communities. Authors present the process of the Simeto River Agreement, a river contract developed in the Simeto River Valley, Sicily, IT. The process started from a community mapping initiative, which led to the identification of landscape units, and finally to the implementation of the Agreement with the aim of identifying enabling knowledge for the care of landscapes. Authors reflect upon the process of engagement in a long-term university-community partnership developed through approaches inspired by the paradigms of action research, and enriched through experiences of service learning.

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1. INTRODUCTION

Since the International Aarhus Convention on "Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters" (1998), the EU and the Council of Europe have released specific conventions and directives concerned with informed interactions between communities and environmental experts. The "European Landscape Convention" (ratified in Florence, 2000), the "EC Water Framework Directive" (2000/60/EC), the "EC Strategic Environmental Assessment Directive" (2001/42/EC), and the "EC Assessment and Management of Flood Risks Directive" (2007/60/EC) are at the core of river contracts, i.e. voluntary programs, aimed at implementing integrated approaches to watershed planning (Bastiani, 2011). The aforementioned acts stress one point: the importance of integrating laypersons' perception of landscape with expert knowledge in environmental and ecological matters, through the direct involvement of various local actors, each of them carrying diverse forms of expertise and experience (Fischer 2000; Fischer 2009).

Moreover, the definition of landscape itself emphasizes the nested relationship between natural and anthropic facets. As a matter of fact, the EU Landscape Convention states: "Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (EU Landscape Convention, Florence 2000, Art. 1). In other words, landscapes are the co-evolutionary manifestation of bi-directional and ecological relationships between individuals, society, and the environment (Pizziolo et al., 2003; Pizziolo & Micarelli, 2003). The search for holistic approaches aimed at investigating these intertwined relations is rooted in various schools of thought. Among others, Bateson's Ecology of Mind (1972) and the principles of the deep ecology movement (e.g. Naess (1973)) make clear how "[...] organisms [are] knots in the biospherical net or field of intrinsic relations. An intrinsic relation between two things, A and B, is such that the relationship belongs to the definitions or basic constitutions of A and B, so that without the relationship, A and B are no longer the same thing. [...]" (Naess, 1973, p. 95). In the same vein, the philosophical movement of Bioregionalism (Parsons, 1985), states that human beings connect with other living species and natural

elements through material and immaterial relationships. According to Bioregionalism, humans and non-humans share the same common home, the Earth, whose bioregions are not portions determined by administrative boundaries, but intertwined systems delimited by geomorphological elements - such as a watershed - shaped through humans/non-humans connections.

Although with different approaches, other bodies of literature evolve from the same underlying assumption, i.e. considering natural and anthropic elements as a whole. Palazzo (1997) discusses the legacy of landscape architects (e.g. Ian McHarg), and ecological planners (e.g. George Angus Hills) that have highlighted the importance of investigating and valuing such relationships rather than looking at the environment through separate fields of expertise. In addition, scholars within the framework of social-ecological systems (Gunderson et al., 2002; Ostrom, 2009) have long investigated the nested relationship between human communities and non-human biotic/abiotic communities via multidisciplinary research. From yet another perspective, critical geographers such as David Harvey (1996) have highlighted the concept of socio-natures, i.e. the inextricable hybrid of ecological and social facts defined not only as socio-ecological processes, but also as political-economic.

This variety of traditions and approaches converges with the idea that it is not possible to strictly separate the understanding of natural, human and societal dynamics. In the last decades, this has been even more compelling because the global effects of anthropic activities have become highly transformative. Consequently, scholars, such as the Nobel Laureate Paul J. Crutzen, are spreading the concept of Anthropocene, which emphasizes the central role of human activities that are irreversibly affecting the current geological epoch (Crutzen & Stoermer, 2000).

In the light of this broad debate, the issue at hand is how to translate the aforementioned concept of nested human/nature relationships into planning processes and practices that enable local communities to actively govern their landscapes. Decades ago, Italian scholars such as Magnaghi (1994) and Gambino (1997) introduced this broad question into the national debate, leading discussions concerned with the dynamics of territorial systems (as in Magnaghi) and pluralistic landscapes (as in Gambino).

Although today the importance of looking at the nested human/nature relationship is widely accepted, the necessity of enabling local communities to actively govern their landscapes is not clear. This open question translates into finding ways for raising communities' awareness of their key role in taking direct care of a common home, drawing from deep ecology and Bioregionalism approaches. In other words, what are the practices, steps and tools for building stewardship, the sense of belonging, and the act of taking care of these places (Decandia, 2000; 2016)? This leads to another question: what are the devices for sharing common frameworks of knowledge in order to design and implement common frameworks of action (Barbanente & Monno, 2003; Berruti & Moccia, 2017)?

2. FROM COMMUNITY MAPPING TO A RIVER CONTRACT IN THE SIMETO VALLEY: THE LANDSCAPE UNITS AS A TRAIT D'UNION

In this paper, authors present and discuss the process of building common frameworks of knowledge through a community mapping process that has led to the definition of landscape units as a first step for the implementation of a river contract. Landscape units are sub-bioregions with specific characteristics that serve to improve the awareness of living in a common home. This awareness is a precondition for taking care of landscapes. In this respect, landscape units are tools aimed at increasing stewardship, the sense of belonging and the act of care within various members of local communities, generating common action. Through landscape units, commonalities, differences, and interconnections emerge within the nested human/nature systems. Specifically, the authors present a

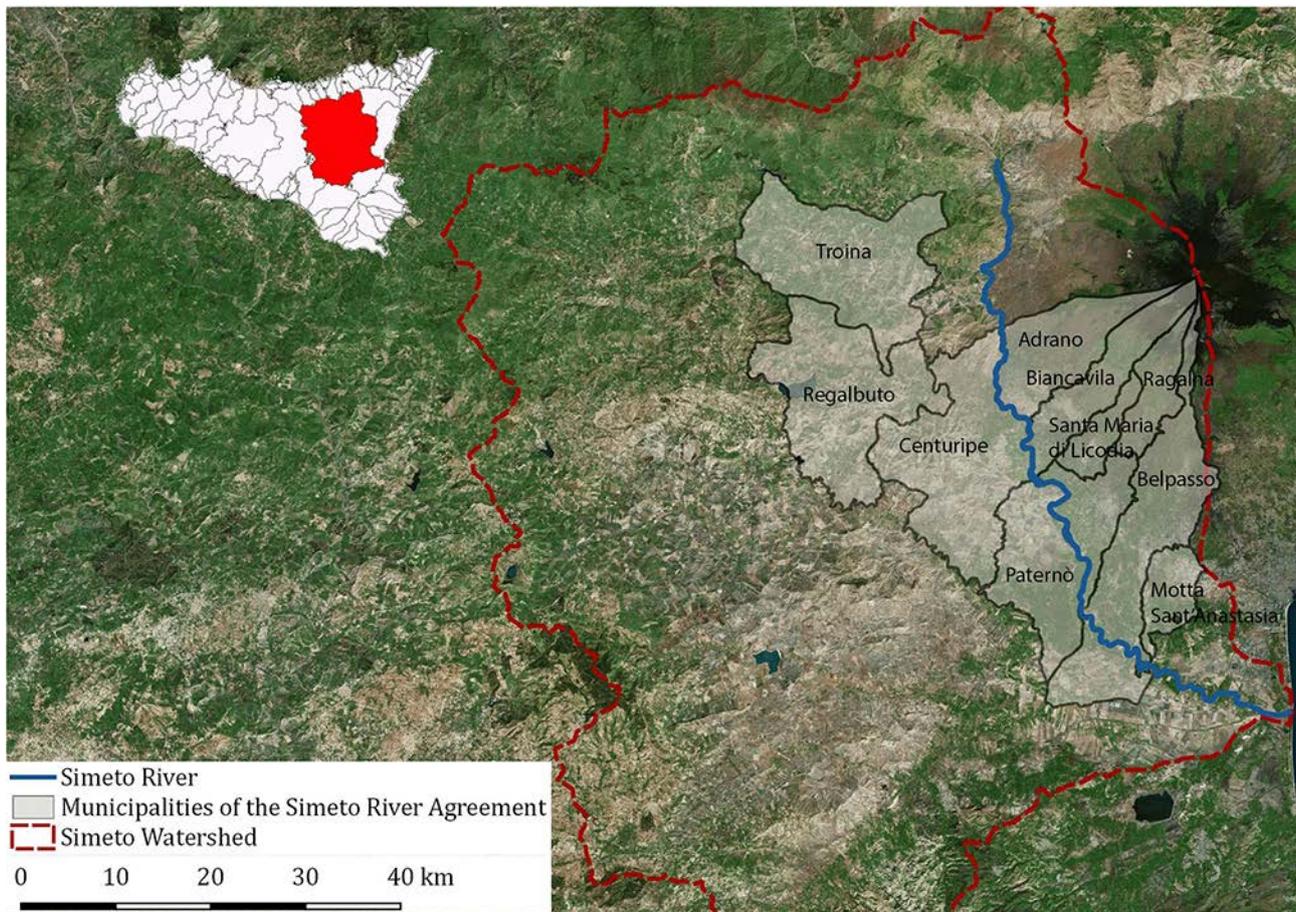


Figure 1: Localization of the Simeto Valley. The Simeto River (shown in blue) and the Simeto Watershed boundary (shown in red). The represented municipalities are the participants in the Simeto River Agreement. *Source: authors' elaboration based on Sicilian regional census GIS.*

process that started from a community mapping initiative, which led to the identification of landscape units, and finally to the implementation of the Simeto River Agreement. This Agreement is a river contract developed in the Simeto River Valley, i.e. the middle stretch of the Simeto river, whose watershed is the widest one of Sicily, IT.

Authors reflect upon the process of engagement in a long-term university-community partnership developed through approaches inspired by the paradigms of action research (Whyte, 1997; Reason & Bradbury, 2001), and nurtured through service-learning experiences (Reardon, 1998). After a brief review of the previous literature on “mapping together” (Fortmann, 2009) as a first step for building stewardship and the sense of belonging (par.2.1), authors discuss: the context and the setting (par. 2.2); the process of community mapping in the Simeto Valley (par. 2.3); the landscape units resulting from mapping together (par. 2.4); and significant current outcomes of the Simeto River Agreement (par. 2.5). Finally, authors reflect on how the process of building landscape units through the act of mapping together has generated not only stewardship and sense of belonging, but also capacity for enabling the local community to actively shape the co-evolution of the landscape, in this case through the implementation of a river contract.

2.1 *Integrating various forms of knowledge through the act of mapping. An overview*

Community-based mapping (Lydon, 2003; Parker, 2006; Perkins, 2007) is the practice of mapping the physical space through participatory approaches. Specifically from a Bioregional perspective, community maps have the power of improving the awareness of living in a common home, the Earth (Aberley, 1993). Specific approaches to community mapping also aim at gain power for indigenous, minorities and unprivileged citizens. These are approaches of counter-mapping, i.e. the political act of shaping the physical world accordingly with the necessities of the powerless (Peluso, 1995; Hodgson & Schroeder, 2002). A wide stream of literature about community mapping addresses eco-museums, i.e. community agreements established through dynamic processes focused on the valorisation of genius loci (sense of place as defined by Norberg-Schulz, 1980). In this case, community-based maps are tools for the identification

of local peculiarities that have to be preserved and valued; maps are also devices for promoting a broader participation in establishing community agreements; the act of mapping itself, aimed at identifying the core elements of local characters, helps promote a widespread sense of ownership (Borrelli & Davis, 2012). When community-based maps are concerned with a precise identification of resources for promoting local development, maps identify the spatial positioning of physical elements as a base for policy making in various environmental and socio-economic fields. For example, community maps for Participatory Rural Appraisal are a “family of approaches and methods to enable rural people to share, enhance, and analyse their knowledge of life and conditions, to plan and to act” (Chambers, 1998, p.953). In summary, community-based mapping can be utilized for a wide range of approaches as a tool that targets a variety of goals and outcomes.

Applied to the definition of landscape units, all of these diverse approaches may converge for identifying the peculiarities of each human/nature system, distinguishing:

- similarities and internal relations within each human/nature system (for the identification of different landscape units);
- external relations among the different landscape units of the same Bioregion (such as a watershed or a river valley).

The following paragraphs present the premises and the development of a community mapping initiative in the Simeto River Valley, inspired by a combination of the aforementioned streams of literature and aimed at identifying the landscape units as a synthesis of diverse forms of knowledge and interactions.

2.2 *Context and premises*

The Simeto River (Fig. 1) is located on the eastern side of Sicily. It is the watercourse with the island’s largest water basin area (4186 km²). As with many other rivers in the world, starting from the 1950s, the river has gone through a series of interventions aimed at flood risk mitigation. Specifically, hydraulic infrastructures appeared during the 1950s and 1960s, targeting the torrential flows incoming from the mountain and hilly sections, and rectifying the meanders of the riverbed in the floodplain, which were responsible for fre-

quent overflows. These interventions led to the diversion of the river mouth, construction of drainage channels for the protection of the surrounding areas, reclamation of the pre-existing fluvial areas for agricultural activities and urbanization, and construction of longitudinal embankments, in addition to other outcomes. Over a period of sixty years, the river's landscape and the ecological dynamics that nurture the river itself have undergone significant alterations that have resulted in the loss of biodiversity and of the primary characteristic features of the river and its valley. These transformations reflect the distorted balances of power that have burdened Eastern Sicily since the 1950s (Armiero et al., 2017).

Despite the interventions on the river, the rural and agricultural economies slated to take advantage of such interventions, did not see important increases; indeed, today the agricultural sector in the Simeto Valley is marginal and not very profitable.

Moreover, in 2000 other threats to the river came from the possibility of introducing highly polluting industrial hazards along its course. Specifically, the construction of a mega waste-to-energy created in the framework of the 2002 Regional Waste Management Plan inside a Special Area of Conservation (SAC) within the Municipality of Paternò. Additional authorization was granted to release and process toxic waste as part of the production cycle for an industrial plant that manufactures clay-bricks in another SAC within the Municipal-

ity of Adrano. Both projects would have created high levels of pollution along the river. These two threats have generated a social movement that has led not only to stoppage of the projects, but also to the formation of associations within local committees with the goal of proposing alternatives to the dynamics that were affecting and devastating the local landscape.

From the tenacity of the population of the Simeto valley, a collaboration with the University of Catania has arisen, and in particular with the Lab-PEAT (Environmental and Ecological Planning and Design Lab). Starting from 2008, these entities have been engaged in a long-term partnership aimed at developing a co-planning process for pro-active conservation and enhancement of the landscape (see Table 1). This has been possible because of the direct involvement of the local community in the process of territorial governance developed in the framework of the Third Mission of the University (Pappalardo and Gravagno, 2018). One of the results of the partnership is the implementation of the Simeto River Agreement, signed in 2015 by:

- 10 municipalities whose territories are crossed by the middle stretch of the river, its springs and tributaries (Adrano, Biancavilla, Belpasso, Centuripe, Motta Sant'Anastasia, Paternò, Ragalna, Regalbuto, Santa Maria Di Licodia, Troina);
- more than 50 local associations gathered in

Table 1: Steps of implementation of the Simeto River Agreement (SRA).

Year	Phase of the Process	Involved Actors	Tools for generating common knowledge	Documents	Advancement of the SRA
2002-2008	Social mobilization	Local Associations	-	-	-
2008-2010	The start-up of the long-term University-community partnership	Local Association + University	Community Mapping (PAR and Service Learning)	Attachment A	Kick-off of the SRA
2011-2014	The search for collaboration with Institutions	Local Associations - University + Municipalities	Landscape Units (PAR and Service Learning)	Attachment B	First Memorandum of Understandings for the SRA
2015-2018	Integrated watershed planning	The Participatory Presidium + University + Multi-level Institutions	Continuation of PAR and Service Learning	SRA documents + Action Plan	The SRA [river contract]

Source: authors' elaboration.

the Participatory Presidium, an umbrella organization aimed at promoting and developing participatory practices within the Agreement;

- the University of Catania.

The Agreement is a voluntary act within the framework of river contracts. Its main goal is to build a new vision for the development of the Valley, promoting actions aimed at protecting and enhancing the environmental well as cultural heritage. According to the Agreement, social and economic regeneration commences from reframing values and errors of the past, and reconfiguring policies and practices reconnecting the broken relationships between individuals, society, and the environment. As such, the Agreement promotes a new alliance between the settled communities and the local ecosystem, reconfiguring the nested human/nature relations in the whole river valley.

2.3 Generating common knowledge as a precondition for common action

The experience of Simeto River Agreement started with a process aimed at building a common framework of knowledge for co-designing common strategies in which institutions and communities envision possible scenarios and evaluate collaborative practices. Actually, an important step in the process that led to the signing of the Agreement was the construction of collective and shared op-

portunities of mutual learning through the act of mapping (Fig. 2). This step moved from the idea that mutual learning among various community actors and institutions is a necessary precondition for common action. In order to achieve this goal, between December 2009 and May 2010 in the Simeto Valley a community mapping initiative was conducted in order to foster relations between the residents, researchers, and (ultimately) institutions involved in the definition of the community-based plan for the Valley, as ratified through the Simeto River Agreement. Although the community mapping initiative has been heavily discussed elsewhere (e.g. in Saija et al. 2017; Pappalardo, 2017), it is important to highlight how the process of generating common knowledge has led to improvements in the sense of stewardship and belonging that have been reinforced through the subsequent identification of landscape units.

Each mapping event included different phases, and each phase served to stimulate participants on different aspects. First, a “map of the mappers” was set up, in order to identify participants’ homes on a large-scale (1: 25000) map. This phase focused on highlighting the participants’ places of daily life in relation with the whole bioregion (i.e. the Simeto Valley). Next, participants were asked to draw “mental maps” (based on Lynch, 1960), highlighting what they recognized as meaningful on a white sheet of paper in which showed only an evocative course of the river with an evocative graphic sign. These “open ended” maps aimed at exploring participants’ perception of the land-

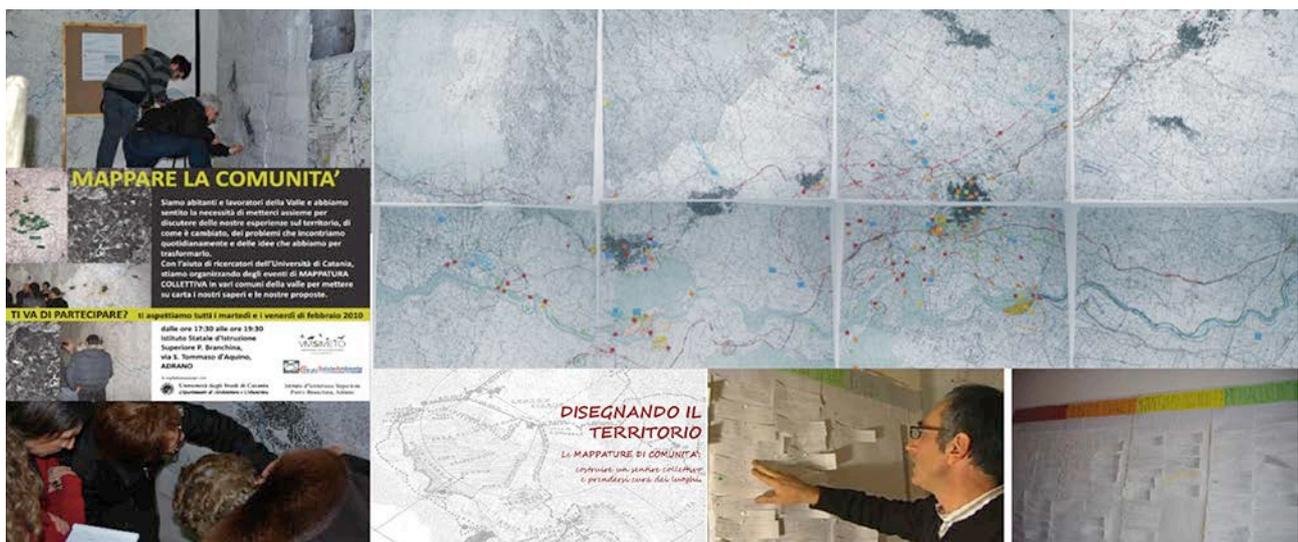


Figure 2: Community Map (Title). People interacting during the community mapping initiative.
Source: authors' archive.

scape. Semi-structured interviews also served to integrate the mental maps with the narration of places and experiences. The core of the initiative was the huge collective map, obtained by assembling 16 Regional Technical maps (scale 1:10.000) still representing the Valley. The participants were invited to interact with the map using different coloured stickers and answering five simple questions: What do you like? What do you dislike? What did you like, but now it has disappeared? What would you like it to do here in the future? Do you have any doubts about the map? Questions lightly guided the variety of contributions that emerged. Above all, the aim of the collective map was to generate dialog among participants, who could agree/disagree with others' indications. In addition, the aim of the collective map was to visualize the relationship between anthropic activities and the physical environment. A focus on water resources was also set up through a set of more detailed maps (1:2000) aimed at identifying im-

paired streams and tributaries, as well as sources of pollution.

Community mapping was therefore essential to gather a large amount of information that would have been very difficult to obtain without interaction with the local community that shared knowledge and experiences. The report of nine months of community mapping events later became the Annex A to the Simeto River Agreement. The report collects experiences and desires of a community that tells its own story, imagines a new possible future, and proposes actions aimed at improving the landscape in which it lives. The process of generating common knowledge, undertaken by the community and researchers together, has continued over time, making gradual progress at each step in order to enrich individuals and the whole community. The subsequent phases of building common knowledge required cyclical processes during which new questions emerged. Facilitators attempted to answer these questions

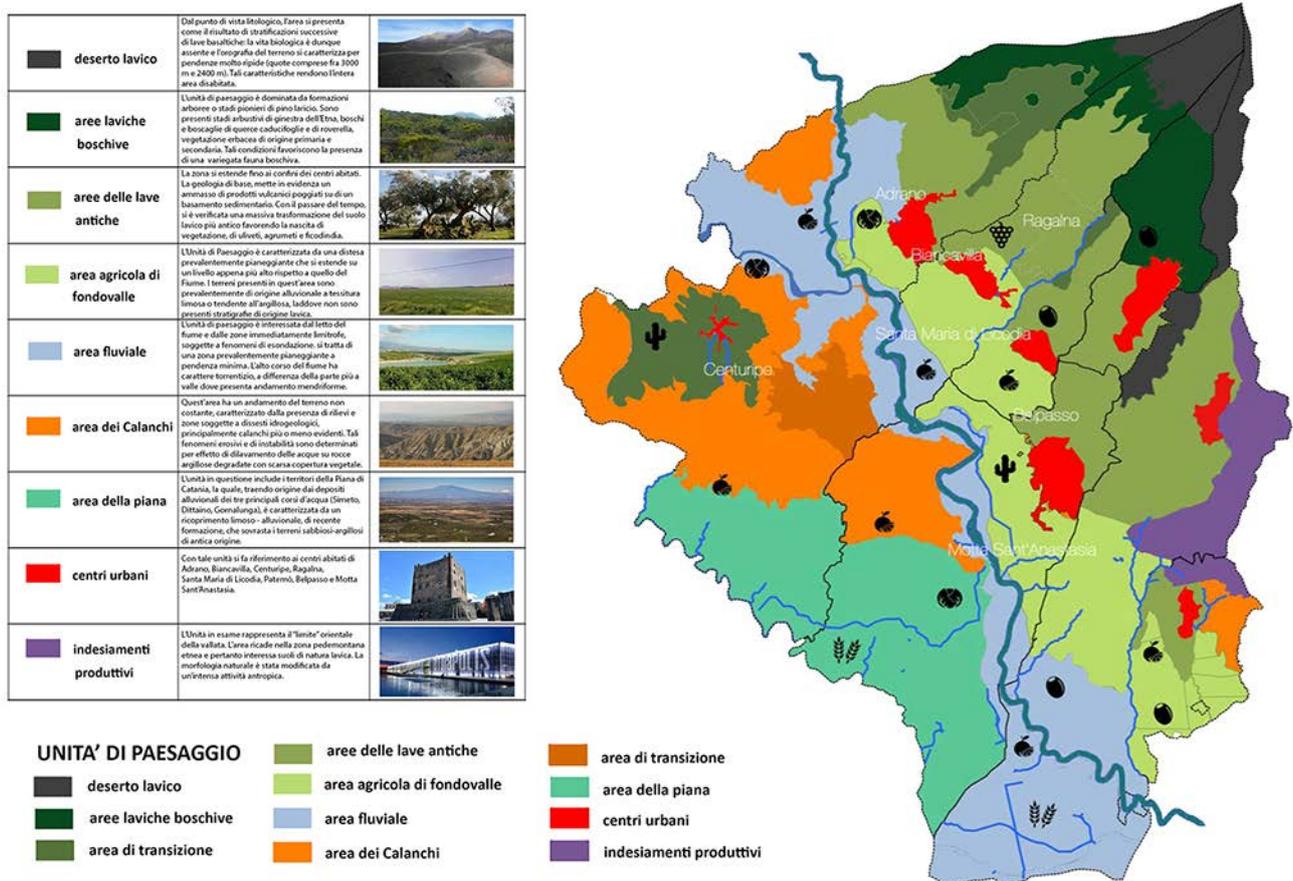


Figure 3: Localization of the Simeto Valley. The Simeto River (shown in blue) and the Simeto Watershed boundary (shown in red). The represented municipalities are the participants in the Simeto River Agreement. Source: authors' elaboration based on Annex B of the Simeto River Agreement.

with the awareness that the complexity of the observed reality could not disregard the subjectivity of the various observers' point of view. Through these phases, authors have experienced how the representation of the landscape cannot escape the different specificities and characteristic singularities that serve to represent the plurality of the nested elements through intertwined relations. With this in mind, the process of building common knowledge continued through Service Learning classes, mainly attended by the students of the Territorial Planning course, offered by the Department of Civil Engineering at the University of Catania in 2014. Students have integrated the data gathered through the community mapping initiative with specialized data for spatial analysis, strengthening the relationship between the geomorphological understanding of the space and the stories told by the community. This integration has finally led to the definition of the landscape units of the Simeto River Agreement.

2.4 *The landscape units of the Simeto River Agreement*

The overall data collected during the community-mapping phase were merged with those related to the physical elements of the territory. In this way, it was possible to establish an accurate identification of certain geographical areas with certain morphological and lithological characteristics. This integration allowed the identification of different categories of land use and, above all, of the nested physical and social organization of the community which gives each landscape its own precise peculiarities. In this way, it is possible to distinguish one unit of landscape from the other, identifying nine-macro areas characterized by well-defined social-ecological characteristics, as well as different social groups. Although the large amount of information was derived from the community-mapping work, the technical work has been decisive in identifying and differentiating one landscape unit from the other. In each landscape unit, the elements useful for their definition were natural, as well as historical and cultural, relating to the community that has experienced multiple transformations over the years. The social elements of the communities that live in the Simeto Valley also have become an important element of distinction between one unit and another; for

example, the demographic data for each specific area give precise information in order to obtain a well-structured framework that shows the complexity of the territory. In addition, the organizational structures of the community have given important insights for characterizing the landscape. The understanding of the social and morphological dynamics, and their effects on the existing ecosystem, has highlighted the current evolutionary direction, their relationships and dependencies, the ecological cycles and the socio-economic dynamics of the communities that live in the Simeto Valley. The landscape units became part of the set of documents that constitute the Simeto River Agreement and are represented and explained in its Annex B (Fig.3).

This experience allowed the students to comprehend and appreciate the complexity of the subjectivity inherent in such processes, and how to identify the necessary questions which one can ask to combine technical knowledge with widespread local knowledge (the last one comes from the memories and stories of everyday life told by the people who live in the affected area). This has shown how everyday experiences connect inextricably with the transformations of the landscape and that inevitably choices have brought about a change in the ecological balance. Likewise, the local community has reflected on the state of conservation of some areas that today are in a derelict condition, and the fact that their protection cannot be separated from the context that created them. Today the absence of even minimum maintenance is leading to the loss of environmental quality of these areas. These reflections have allowed the inhabitants to understand how the transformations of the landscape are strongly rooted and linked to the model of economic development of the Valley and, at the same time, the transformative processes of society have altered the social organization of the community itself.

The definition of the landscape units required a gradual deepening and integration with various inquiries, developed by students of the Master Degree Course in Building Engineering and Architecture during the final thesis, still conducted as Service Learning projects. Even on these occasions, learning has never been one-sided, but has generated a bi-directional process thanks to the exchange of knowledge and skills between researchers (i.e. students), communities, and in certain cases, institutions. The final theses were opportunities for studying specific themes select-

ed according to the needs expressed by the community, such as the need to deepen the hydraulic characteristics of the Simeto River, or to support innovative processes of urban/rural regeneration. All the materials produced were useful for fostering the debate by providing the community with additional knowledge and tools, and at the same time, the students acquired various applied skills through hands-on activity in the field. This process of producing and structuring community-university exchange was a key aspect in triggering and nurturing a widespread debate on the landscape, deepening the knowledge of places, sharing different knowledge and ideas on the future of the territory, and building common documents in order to influence the decision-making processes.

Reflecting on what had happened to the Valley over the last 50 years has allowed all parties to envision alternative hypotheses of development and possible new scenarios for anthropic activities and land use. Community members, researchers, and institutions involved in the Simeto River Agreement have finally shared the need to change the current trajectory of development toward more responsible relationships between individuals, society, and the environment within river landscape. In the final documents that are at the base of the Simeto River Agreement it is clear the need to plan the future of the territory with full respect of its characters, starting from the way in which the past policies have unconsciously ignored the specific characteristics of Simeto Valley and subsequently failed. Rather, it is necessary to fulfil the expectations of heritage preservation, regeneration, and sustainable use of resources, starting with sustainable water management. This system of awareness has emerged through the process of defining the landscape units as devices for supporting the public debate on intertwined complex matters.

2.5 Main current outcomes of the Simeto River Agreement

Such a system of awareness has achieved several results within the framework of the Simeto River Agreement after three years from its official institution in 2015. Among others these include:

- bottom-up input for the drafting of the Regional Flood Risk Management Plan (Directive 2007/60/EC) and the Regional Watershed
- Management Plan (Directive 2000/60/EC), both of which acknowledge the informed contribution of the local community to the expertise and to institutional decision-making processes;
- authoring of a EU Life proposal focused on adaptation to climate change through the use of blue-green infrastructures in urban environments; the proposal also fosters the continuation of the construction of the common framework of knowledge, through oral history and community maps, concerned with the relationships between cities, water, watershed, and the river, in order to build resilient communities, not only from a physical, but also cultural standpoint; the proposal has been financed in 2018 and is in the first stage of implementation;
- self-candidature for the National Strategy for Internal Areas, the selection of the Area of the Simeto Valley and experimental Area of National relevance for the quality of the participatory process that has been set up; the multi-level co-design of integrated actions tandemly addressing social and environmental matters.

In each case, an increase in renewed interest and a new awareness related to the nested human/nature relations emerged, as well as the integration of the historical heritage valorisation and the socio-ecological revitalization. These outcomes regard both laypersons and the institutional actors at various governmental levels. The aforementioned programmes have also enabled the Simeto Valley community, especially those involved in the Participatory Presidium, to establish stronger relationships with institutions at various governmental levels, and experimenting with new organizational structures that may produce significant benefits for the whole landscape regeneration in the long run.

3. CONCLUSIONS

Moving from the assumption that human/nature relationships need to be framed as a whole (Naess, 1973; Parson, 1984; Harvey, 1996; Crutzen & Storermer, 2000 among many others), authors have discussed how the process of building common knowledge has been a precondition for build-

ing common action (Barbanente & Monno, 2003; Berruti & Moccia, 2017). Common frameworks of knowledge lead to a widespread sense of stewardship and belonging (Decandia, 2000; 2016) that ultimately encourages the act of conservation and regeneration.

The voluntary enactment of the Simeto River Agreement as a river contract (Bastiani, 2011) and its first outcomes give evidence of the increasing capacity of the local community in collaborating with institutions and embracing action toward the regeneration of the landscape with a long-term perspective. A key device for enabling this process has been the use of the tool of landscape units. Two main phases generated data for the identification of the nine landscape units of the Simeto River Valley. The first phase was the community mapping initiative (Lydon, 2003; Parker, 2006; Perkins, 2007 among many others) inspired by the paradigms of action research (Whyte, 1997; Reason and Bradbury, 2001; Fortmann, 2009). The second phase was the integration of the community

mapping outcomes with technical maps produced by engaged-scholars and students in various opportunities of service learning (Reardon, 1998) within the framework of the Third Mission of the University (Pappalardo & Gravagno, 2018).

In the light of this experience, authors have presented landscape units as enabling devices for understanding and visualizing the complex human/nature nexus, in order to raise awareness on the necessity of promoting and implementing integrated strategies and actions. This experience opens the discussion for the opportunity of connecting laypersons' experience with expert knowledge as a political act that is able to affect the decision-making processes. Nine years have passed since the starting point of the community mapping initiative, and three years have passed since the institution of the Simeto River Agreement, although several important results have been accomplished, further research might investigate how to incorporate such practices into the ordinary planning procedures.

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