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A Multi-Methodological Decision-Making Process for Cultural Landscapes Evaluation: The Green Lucania Project

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Abstract

The paper introduces the multi-methodological decision-making process implemented in the ‘Green Lucania project’ by a multidisciplinary research group of University of Naples Federico II, Department of Architecture (DiARC), for the cultural landscape valorization of Pisticci municipality (Basilicata Region, Italy). To identify situated synergistic actions able to produce a network of ‘green’ shared values, an adaptive evaluation approach has been implemented, where Collaborative Spatial Decision-Making processes and Geo-Design approaches interplay. The multi-methodological decision-making process for cultural landscapes evaluation activates a fundamental link between knowledge and values, to transform this dialogue into goals and actions, identify key-values, explore decision opportunities and possible alternatives, explicate impacts and effects, and manage complex systems with multiple priorities related to multiple landscape values.

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1. Introduction

Today there is a growing interest in landscape as an important perspective in sustainable development, promoted at the global level by all the most relevant institutions and through significant regional directives and policies. The opportunities presented by a landscape-based approach for the European continent mark out the landscape as a possible new paradigm for a local development model, with the aim of harmonious integration of social, economic, and environmental factors in space and time (Agnoletti, 2014). The European Landscape Convention (Council of

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Europe, 2000) also states that landscape can be connected to: its objective and subjective characters, the ecological-environmental, historical-cultural and settlement aspects, land and economic use; the regulatory and political processes as a whole that contribute to its continuous reconstruction; the social perception of positive and negative values and policies (Voghera, 2011). The landscape is regarded as a holistic and dynamic system of systems (Zonneveld, 1995), an expression of the continuous and vibrant interaction between ecological, social, and economic processes. Indeed, the landscape is considered a process rather than a result: natural and social practices constantly change the landscape, making transformation dynamics a key issue in research and design. Giving shape to relationships between human beings and the natural landscape is a core task and involves civil-, cultural-, agricultural-, nature-, and environmental-based techniques as operative instruments (Nijhuis, 2013). Landscapes are dynamic and change is one of their properties. Humans have always adapted their environment to better fit changing societal needs and, thus, reshaped the landscape. In view of accelerating biological and cultural landscape degradation, a better understanding of interactions between landscapes and the cultural forces driving them is essential for their sustainable management (Naveh, 1995). Landscapes of the past cannot be brought back, but how valuable elements and areas can be preserved and become embedded functionally in the modern urbanized and globalized society must be studied (Antrop, 2005). This challenge requires a better understanding of the interactions between landscapes and cultural and social forces that have shaped them in the past and are driving them in the present. Their recognition may help mobilize some of these forces for public education and for the decision-making process in land use, which will determine their future fate (Naveh, 1995). There exist a great variety of landscapes that are representative of the different regions of the world. Combined works of nature and humankind, they express a long and intimate relationship between peoples and their natural environment, and define a particular type of landscape: the cultural landscape (Rossler, 2014). Certain sites reflect specific techniques of land use that guarantee and sustain biological diversity. Others, associated in the minds of communities with powerful beliefs and artistic and traditional customs, embody an exceptional spiritual relationship of people with nature. To reveal and sustain the great diversity of interactions between humans and their environment, to protect living traditional cultures and preserve the traces of those that have disappeared, these sites, called cultural landscapes, have been inscribed on the UNESCO World Heritage List. According to Sauer's definition (1925), a cultural landscape is fashioned from a natural landscape by a culture group: culture is the agent, natural area the medium, and cultural landscapes the result. Cultural landscapes testify to the creative genius, social development, and the imaginative and spiritual vitality of humanity. They are part of our collective identity. Cultural identity is strongly associated with the ways in which people interact with their landscapes. Much has been written about the significance of landscape (or the related idea of place) to communities and their cultural identity. The literature ranges from sociological and anthropological work, to studies of 'place identity' (Hay, 1998; Gray, 2003). A common theme is that both self-identity and group identity are intimately connected with the events and history that are associated with the tangible environment. Culture and identity are, therefore, not just about social relationships, but are also profoundly spatial (Stephenson, 2008). Cultural landscapes are the result of consecutive reorganization of the land to adapt its use and spatial structure better to changing societal demands. The safeguarding of landscapes and sites is necessary to the lives of human beings, for whom they represent a powerful physical, moral, and spiritual regenerating influence, while at the same time contributing to the artistic and cultural life of peoples, as innumerable and universally known examples bear witness (Rossler, 2014). Diversity and identity of cultural landscapes are central in the discussion. It is shown that coherence between small composing elements in a broader spatial context is important for the legibility of the landscape and that the ability to tell the story of a place strongly enhances its identity and overall value. This offers criteria for inventorying and assessing landscapes, which are needed to define future management and development (Antrop, 2005). According to this perspective, cultural landscape can be a driver for innovation, because it contains values that can guide landscape transformation and development. How can these values become integrated with the future demands and needs of society? Cultural landscape is the combination of tangible and intangible values, expression of a complex relationship of organisms, between human beings and ecosystem. The explicit recognition of the existence of multiple and interdependent values establishes both the conceptual and empirical foundations for understanding just how these value categories can be applied to a specific decision-making context.

Innovative processes of cultural landscape evaluation and planning are based on the integration of knowledge to solve current complex problems (Fusco Girard, 2014). They require that economics and sociology disciplines

involved with governance be included, together with ecology at the landscape level. The integration of traditional landscape ecology and other disciplines involved in design, planning, and management, can be relevant to improve the use of insights and data in spatial planning and implementation and, vice versa, a more articulated role of landscape ecology in assessing the effects of alternatives in planning and management strategies (Vos & Meekes, 1999). Indeed, cultural landscape is a suitable, but complex context in which to test multi-methodological evaluation for decision-making. Cities and territories must engage strategic challenges of sustainable human development, based on composite interaction between decision-makers, stakeholders, and local communities' perspectives, interests, and preferences, considering existing resources and different asset forms (human, social, economic, environmental, productive, cultural), their link and mutual relationships. In this perspective, supporting integrated approaches to decisions, oriented to existing resources development and to construction of new opportunities, can produce more efficient results than sectorial approaches and, at the same time, operate in a multi-dimensional and inter-sectorial space. Integration is a complex concept, characterized by different dimensions that must be identified and investigated; it involves vertical and horizontal processes, diffused, flowing, multi-directional, not rigid, hierarchical, and uni-directional, and related to different forms of local development activities (Allmendinger & Haughton, 2009).

In evaluative approaches, integration means considering dynamic interaction between different context dimensions, able to combine existing relationships and explore potentialities to build new relationships, tangible and intangible. Context peculiarities suggest that the most appropriate integrated approach depends on examining the decision process and how to structure and conduct it. Therefore, every decision 'situated' problem must be identified according to an appropriated multi-dimensional perspective and a complex situated strategy can be considered an opportunity (Keeney, 1992), in which strategic thinking can creatively suggest extra alternatives, starting with existing values consciousness. Indeed, values not only conduct adequate alternatives creation, but support decision situation identification too. At the same time, identifying values is strictly linked to decision opportunities' recognition and supports a strategic elaboration process. Thinking through complex values can engage the limits of structured and sectorial approaches and treat opportunities and problems about decisions in a flexible, dynamic, and incremental way, recognizing a multi-dimensional value vision as an essential requirement (Cerreta, 2010). Thinking through complex values implies a multi-dimensional perspective that reflects material and immaterial values, hard and soft values, objective and subjective values, use values, non-use values, and intrinsic values (Fusco Girard, 2010), their synergic and complementary relationships, considering fluid spaces and blurry profiles, and including multiple points of view to formulate a 'situated strategy' (Liew & Sundaram, 2009).

Multi-disciplinary and multi-methodological approaches enable work on a different scale and can identify multiple landscape values. Identification of multiple co-existing values coincides with the recognition of multiple knowledge forms (expert, common, implicit, explicit, formal, informal, etc.) and mutual relationships in a process that nourishes itself (Zeleny, 1982). Common choices are characterized by uncertain facts, disputable values, high-stake and urgent decisions that require scientific rigour, a transparent decision process, and collaboration in social sphere evaluation tools (Funtowicz & Ravetz, 1991), orienting attention from the result of the decision process to the process itself (Munda, 2004) according to an adaptive and incremental framework. Indeed, the adaptive evaluation concept is linked to synergies between concepts of adaptive collaboration and management and adaptive governance of decision processes, based on local resources and communities' values identification, in a plural and integrated perspective that considers context peculiarity and different perspectives and perceptions (Funtowicz & Ravetz, 1991). Adaptive evaluation adopts an experimental approach and supports experiments oriented to test feasibility and results of alternative strategies, according to the 'learning by doing' principle (McDaniels & Gregory, 2004), supporting active participation and the politic legitimacy of public choice.

An adaptive evaluative approach can challenge change and build progressive, mutual, and collaborative learning that must be individual, community, institutional, and politic, trying to overcome the theory-practice gap (Arvai, Bridge, Dolsak, Franzese, Koontz, Luginbuhl, & Thompson, 2006). Adaptive evaluation is based on a multi-methodological approach, where Multi-Criteria Analysis and Multi-Stakeholders Analysis are combined in considering the specificity of the decision context. Participatory Geographical Information System (GIS) methods are also considered essential collaborative tools to support local community groups to identify problems and express their needs (Aditya, 2010), and be able to define and activate Collaborative Spatial Decision Support Systems.

Another interesting perspective is identified in a combination of the previous approaches and techniques with Geo-Design approaches. Geo-Design is defined as design in geographic space (geo-scape) (Miller, 2012): an emerging term for a technique that combines the information capacity of GIS with the decision-making process of design, yielding tools that are informative, interactive, and ideal for plans and planning processes. Geo-Design incorporates elements of sketching and design, but also elements of modelling and analysis. The purpose of Geo-Design is to facilitate life in geographic space, enhancing collaboration, scenario generation, monitoring of implications, ongoing feedback, and evaluation and selection of optimal designs that reflect a community's needs and visions for the future. Planners tend to think of design on a site scale, but Geo-Design covers a variety of scales, bridging the gap between regional and local contexts. This is important, because to be practically effective and politically prudent, plans need to make sense across a spectrum of scales and disciplines. This ranges from design, urban design, community planning, town and city planning, and regional planning, up to planning for mega-regions (Abukhater & Walker, 2010). Geo-Design is an iterative design method that uses stakeholders' input, geospatial modelling, impacts simulations, and real-time feedback, to facilitate holistic designs and smart decisions (ESRI, 2013).

According to the above perspective and taking into account the aim to identify an adaptive multi-methodological decision-making process for the evaluation of cultural landscape in the Green Lucania research project, a methodological framework for the Pisticci cultural landscape is introduced in Section 2, considering the opportunity to integrate Collaborative Spatial Decision-Making processes and Geo-Design approaches; in Section 3, the stages of the methodological approach are explored in relation to its application to the Pisticci cultural landscape evaluation; finally, in Section 4 some conclusions and possible future developments are presented.

2. Towards a Collaborative Spatial Decision-Making process

2.1 *Green Lucania strategy: A cultural landscapes network*

'Green Lucania' is a research project elaborated by a multidisciplinary group of University of Naples Federico II, Department of Architecture (DiARC), for the cultural landscape valorization of Pisticci municipality (Basilicata Region, Italy) and for the definition of an integrated strategy for all the Basilicata Region, also named Lucania. This segment of Basilicata Region, in the South of Italy, is a complex matrix that offers multiple themes and ideas to work on new incremental processes. These processes, despite growing in deeply different territorial boundaries, often opposed and disconnected, contain the idea of the hidden synergism network. Starting from Pisticci, it is intended to activate a network of incremental and dynamic local innovations among the different municipalities of Lucania, able to improve awareness of local resources and their potentialities according to a green perspective for a situated process of good governance.

The territory of Pisticci (Fig. 1), an expression of a complex cultural landscape, represents the context in which to identify strategies and situated actions, starting with different categories of co-existing values identification. Pisticci, according to the Green Lucania project perspective, looks for itself in inner social bonds, in its urban and rural environment, in sharing a renovated urban identity, reasons and energies for success in global competition, and opportunities to strengthen its attractiveness. Pisticci territory, rather than a landscape made by multiple landscapes, can be identified as a landscapes network. Each landscape has been analyzed by a disciplinary team engaging specific themes in a multi-relationship and multi-level perspective, swinging constantly between reality and possibility, and tracking itineraries not preset and mummified in rational planning logic or rigid links, but open and elastic.

The network is structured by historic landscape, new-town landscape, geographic landscape, natural landscape, agricultural landscape, abandonment landscape, built landscape, slow mobility landscape, sociality landscape, and identity landscape that describe a cultural landscape perspective. Therefore, multiple complexities characterizing the Pisticci landscape require an adaptive evaluative approach to identify local specific values and context-aware valorization strategies, with a dynamic and incremental process, made by continuous feedback and references, to identify interactions among different expertise involved in the decision process, and to decline specific actions more suitable to 'green' transformations.

2.2 The methodological framework: phases and contents

The methodological approach elaborated for the evaluation of Pisticci cultural landscape starts from the redefinition of a Geo-Design process in order to activate a Collaborative Spatial Decision-Making process.

Traditionally, digital design involves the direct allocation of land uses to build a plan or the application of spatial optimization models (Steinitz, 2012). What makes Geo-Design fundamentally different from a traditional design process is the workflow, the process of creating a design. Geo-Design is normally a collaborative enterprise, in which computers respond to changes in design as the various stakeholders build it. The ability to create a design collaboratively and rapidly measure its impacts as the team proceeds, fast iteration in rapid design cycles through several improved versions of a design, and the use of a digital platform for collaboration and communication, forms the basis of the Geo-Design workflow. These are significant ways in which Geo-Design workflow differs from a traditional one. Structured Geo-Design follows some prototypical workflows. Many process models/workflows have been proposed and used for different application domains.

Simon (1978) recognizes that the four steps of intelligence, design, choice, and review are essential tasks in individual decision-making in an organizational context. Another workflow is a three-step process -- criteria development, options generation, and options evaluation -- in public participatory decision-making (Renn, Webler, Rakel, Dienel, & Johnson, 1993). Steinitz (2012) sees six steps in modelling for landscape planning that include presentation models, process models, evaluation models, change models, impact models, and decision models. The workflows consist of prototypical sequencing of process phases and it is assumed that if needed at any phase during the process, the workflow can go back to a previous phase.

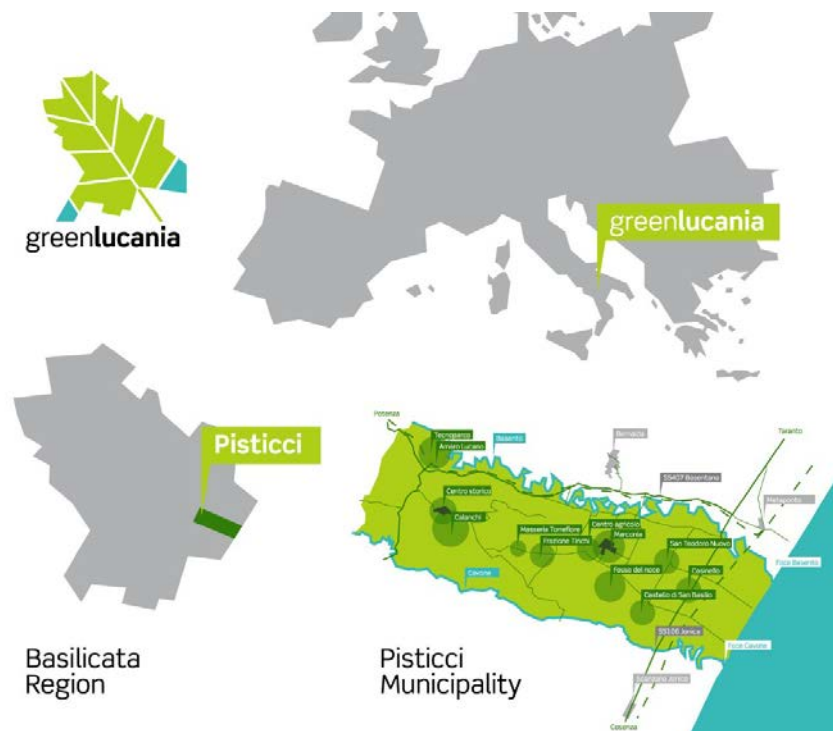


Fig. 1. Pisticci landscapes network.

The methodological framework elaborated for Pisticci cultural landscape evaluation started from a combination of two fully tested workflows: the Conservation Measures Partnership (CMP) Open Standards for the Practice of Conservation and Steinitz's framework (Fig. 2).

The CMP Open Standards for the Practice of Conservation is a set of project cycle or adaptive management Open Standards, a framework and guidance for conservation actions, developed by the Conservation Measures Partnership, for the purpose of bringing together common concepts, approaches, and terminology in conservation project design, management, and monitoring to help practitioners improve the practice of conservation (CMP, 2013).

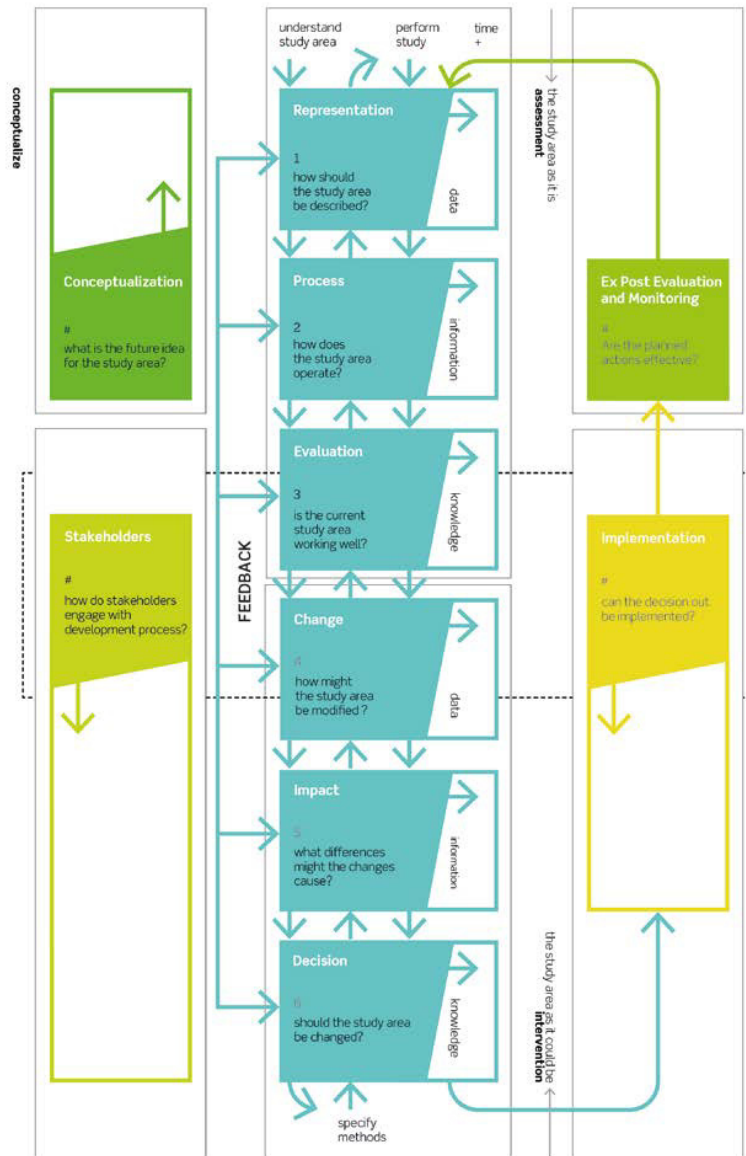


Fig. 2. The methodological framework.

In particular, these standards are meant to provide the steps and general guidance necessary for the successful implementation of conservation projects. From this workflow, we extracted the introductory phase of *conceptualizing*. At the same time, we analyzed and elaborated Steinitz’s framework, proposed by Carl Steinitz

(2012) to describe six levels of inquiry during a spatial decision process, where each level is associated with a type of modelling with GIS to form a comprehensive expression of a decision support strategy for landscape planning and design. The so-assembled workflow for Pisticci (Fig. 2) is structured in a preliminary phase, *Conceptualization*, six *Modelling* steps, and two final phases of *Implementation* and *Ex post Evaluation and Monitoring*.

Conceptualization is the first phase that answers the main question *What is the future idea for the study area?* and involves specifying the basic parameters of the project in preparation for the design work that will follow. In this phase, it is necessary to identify who will initially be involved on the project team, articulating the project's thematic scope, vision of what to achieve, and the targets that will be the focus of the work. It also includes making sense of the context in which the project is intending to work, including threats and opportunities, and key-stakeholders.

Modelling is the second phase that identifies six levels of inquiry during a spatial decision process; each level is associated with a main issue and a type of modelling with GIS to form a comprehensive expression of a decision support strategy for landscape planning and design. The six levels are related to the following described steps and define a continuous cycle of data, information, and knowledge (Zeleny, 2006). Step I - *Representation models*, that answer the question *How should the study area be described?* In this step, the data upon which the study relies are selected, with data collection, domains creation, mapping and visualization. Step II - *Process models*, considers the question *How does the study area operate?* and provides information for the different assessments that are the content of the study, by models classification, relationships mapping, and stakeholder mapping. Step III - *Evaluation models*, are dependent on the decision-making context and consider the question *Is the current study area working well?* In this step, it is relevant to consider trend analysis, uncertainty factors identification and correlations, and drivers for change selection. Step IV - *Change models*, answers the question *How might the study area be modified?* by considering scenarios co-design, conflicts assessment, and shared values assessment. The change models will be tested in the study area, and are also data, as assumed for the future. Step V - *Impact models*, identifies the main question *What differences might the change cause?* and where the selection of impacts takes into account Multi-Criteria Analysis, Multi-Stakeholders Analysis, and Economic/Financial Analysis, selecting information produced by the process models under changed conditions. Step VI - *Decision models*, identifies the question *Should the study area be changed?* and, like the evaluation models, is dependent on the cultural knowledge of the stakeholders and responsible decision-makers and related to stakeholders' engagement, prioritizing alternative options, consensus building, and choice selection.

Implementation and Ex post Evaluation and Monitoring is the phase of realizing the decision output, generally in the form of an action plan. *Can the decision be implemented?* and *Are the planned actions effective?* are the main issues to consider in the selection of planning/design implementation tools, stakeholders action planning, funding strategies, work plan, and timeline. These phases establish a tracking system to verify the implementation and effectiveness of planned actions, then monitor the status of the implementation, report to stakeholders, regulators, and the decision group.

Every phase, as shown in the diagram, is characterized by continuous stakeholder feedback, to make the process more aware, collaborative, and interactive as possible. As indicated in Figure 2, the decision process flow may go back to a previous phase if the conclusion for the current phase indicates the need.

3. The Pisticci cultural landscape evaluation: A network of perceived values

3.1. The workflow implementation

The workflow elaborated for the Pisticci case study has been implemented so far for the phases of *Conceptualization* and *Modelling* with four of the six steps. The Pisticci landscape has been analyzed using a cognitive framework that gives back the principal characteristics, but also helps to identify complementary components describing peculiarity and resources. Indeed, knowledge is deeply linked to decision process construction (Zeleny, 2006) and permits the selection of appropriate methods and tools useful for defining transformation and development opportunities.

A decision process, able to identify intervention scenarios to prefigure possible transformation, request feedback and collaboration between different expertise and knowledge, enables interaction among geographic scale and cultural dimensions. Organizing change and defining characteristics delineate an incremental way to combine

stakeholders' and multi-knowledge input. It is fundamental to understand the study area and to identify the possible effects determined by transformations.

In this perspective, decision-making uses dynamic and cyclic models that enhance knowledge and, at the same time, contribute to identifying terms and dimensions of change. The elaboration of input interactions and feedback among stakeholders, decision-makers, and the local community, and between representation, process, evaluation, change, impact, and decision models, with appropriate methods respond to some relevant questions: 1. How can Pisticci landscape be described? 2. How does it work? 3. What are its criticalities and potentials? 4. How could it be changed? 5. What could bring about change?

In the first phase of *Conceptualization*, the future idea for the Pisticci landscape was identified through the interaction of the multidisciplinary research team, the local administration, and a group of social, environmental, and cultural associations, specifying the basic philosophy of the project, and elaborating the contents of the 'green' strategy, and articulating the project's thematic scope: an incremental network strategy oriented to start from the identification of the complex values of the Pisticci landscape to activate the vision for Green Lucania, including targets, threats, opportunities, and key stakeholders.

In the second phase of *Modelling*, a shared framework of knowledge was elaborated, where the different experts of the research team contributed to identify the landscape characteristics according to a multidimensional approach, combining several dimensions: historic, geographic, urban, environmental, agricultural, infrastructural, economic, and social. For the elaboration of a spatial decision process, each main issue explored has been expressed by a selection of suitable indicators and modelled with GIS to form a comprehensive system of decision support for the landscape valorization strategy.

In Step I - *Representation models*, the study area was described with soft and hard data collection, considering the soft data related to traditions, lifestyles, habits, behaviours of the local community settled in the different areas of the Pisticci municipality, and hard data deriving from statistical sources, studies of experts, official databases, and open source databases. The different data have been mapped and modelled with GIS, to visualize all the information. In Step II - *Process models*, all the information collected was elaborated and interpreted considering a thematic classification, where the role of each expert in the research team was determined the identification of the main characteristics and relationships. At the same time, it was essential to activate local community involvement to identify the perceived values attributed to each resource and to map which main local actors to involve. Indeed, the structured approach for Pisticci starts from the identification of recognized and perceived values by people, institutions, the local community and scientific community, to construct a values network concerning relationships between natural, built, and cultural environment. Interaction between landscape expertise and stakeholders' interests defines a 'potentiality-criticality map': it expresses the relevance of local resources as a synthesis of expert knowledge and common knowledge, identifying a system of perceived values that could guide the change.

For the elaboration of the potentiality-criticality map, the Green Lucania project activated a process of involvement of the local community online and onsite. It launched an online survey to understand the primary needs of the local community and to identify goals and strategic choices for the future Pisticci landscape. The survey's main goal was to discover Pisticci's resources, expressions of recognized values, significant for inhabitants and those who live in this territory as visitors or specialists. The questionnaire 'Partecipa[@]Green Lucania' has been diffused by social networks and media, and has been oriented to understand "Pisticci Today: the place where I live", throughout the identification of the main environmental, cultural, and architectural resources and their weakness, and to knowing perceptions about 'Future Pisticci: the place where I would like to live'. In this section, participants express their point of view through open questions, indicating the positive and negative actions for the future Pisticci landscape. The last part of the questionnaire asks about a collaborative approach, to integrate the local community in a multi-contributory process.

Onsite interaction with Pisticci's local community started with a series of participatory meetings located in the periphery neighborhoods to give back a role to marginal areas relative to the old city centre. Through the engagement of key stakeholders and links between the local community and university research team, a stakeholder map was sketched, and stakeholders are involved in the process debate. The participatory meetings activities were organized applying the Open Space Technology (OST) Methodology (Owen, 1999, 2008) that permits any organization to create work groups and reunions to elaborate a product together in a short time. It has been tested all over the world in the past twenty years, in groups from five to 2000 people, in conferences lasting one to three days, structured in four main phases: informal discussion; in-depth discussion about selected theme; decisions; report

redaction. Every team produces a final report, including data emerging during thematic discussion. Every report is put on a wall to be constantly consulted and, at the end of the day, gathered together in a single document distributed among participants. The instant report is one of the main results, a concrete and useful tool that contributes to building awareness and is a guarantee of obligations toward the local community.

For Step III - *Evaluation models*, after the definition of the decision context and taking into account the results of previous steps, a trend analysis of the hard and soft data was elaborated to identify the most relevant drivers for change, useful also for guiding the implementation of Step IV - *Change models*. In this step, a scenarios co-design process was activated through the assessment of local conflicts and shared values, elaborating a 'decision map', able to synthesize the preferences of the local community with respect to landscape resources and sensitive to activating change.

3.2. Place-based scenarios for landscape valorization

According to the results of the *Modelling* phase, three main thematic categories were identified related to 'Architecture and culture', 'Economy, production and tourism', 'Nature and environment' that identify the main components of the Pisticci cultural landscape. For each thematic category, it has been possible through the online survey to identify the resources considered significant, both positive and negative, and to obtain the weight attributed to every resource by the local community. At the same time, through the onsite participatory meetings, three scenarios for landscape valorization were elaborated, one for each thematic category. In particular, for 'Architecture and culture', the scenario 'Your Pisticci' identifies the opportunity to take care of the territory, considering the tangible and intangible components that characterize its landscape as *common*, with specific attention to the identification of actions able to integrate tradition and innovation, to improve infrastructure, increase the diffusion of information and communication, and to activate a network of synergic interactions among architectural and archeological heritages, and the local community.

For the thematic category 'Economy, production and tourism', the scenario 'Pisticci 3.0' identifies the approach of a green, sharing economy, as a guideline for the activation of an innovative territorial marketing process oriented to a slow touristic use of local resources, to a valorization of local identity, and the promotion of a collaborative relationship between urban and natural areas.

For the thematic category 'Nature and environment', the scenario 'A miniature Switzerland' describes the need for active protection of the territory to reduce environmental pollution of natural areas, of rivers, the sea and beach, and to mitigate the negative effects of the recent extraction of oil.

The recognition of the natural value of environmental resources as badlands, sea and beach, pine forest, trenches, springs and rivers, requires the promotion of a responsible and aware use of landscape resources, improving the system of communication and information for the local community and different users.

For every scenario elaborated, a decision map was defined to rank local resources perceived as relevant by the local community. The decision map is the result of a Spatial Multi-Criteria Analysis implemented with a Multi-Criteria Decision Analysis method (ELECTRE-TRI) (Roy, 1981, 1985) and GIS (Fig. 3). GIS was used to assess the criteria requested to define the suitability of landscape resources to their valorization, classifying the study area into homogeneous zones. Combining GIS and Multi-Criteria Decision Analysis involves many tasks including data gathering and structuring, and computation of criteria using spatial analysis and simulation (Malczewski, 2006).

Considering the scenario 'A miniature Switzerland', for the selected relevant resources (rivers, pine forest, springs, trenches, badlands, beach, and sea) a criterion map has been generated related to each criterion elaborated by the online survey results: characterizing resource, identity resource, critical resource, potential resource. Criteria modelling produced a set of maps, one for each criterion, on which the score for each elementary surface of each resource is indicated. The next step was to aggregate the partial suitability indexes into a holistic suitability index, and this aggregation was realized with the support of ELECTRE-TRI, an outranking method used for land management purposes and land suitability assessment (Yu, 1992; Joerin, Thériault, & Musy, 2001; Destan, Yilmaz, & Sahin, 2013). The construction of an intermediate map for each criterion enables classification of the different resources, taking into account the weight given by the sample of online survey respondents. ELECTRE-TRI classifies the environmental resources, considered as alternatives, according to predefined categories (Roy, 1985). In this study, three categories of resources suitability are defined as favourable, uncertain, and unfavourable. To define this classification, it is necessary to assign values to a set of subjective parameters that express their preferences. The most important subjective parameters are composed of two sets of reference environmental resources. The good

references give the limits separating favourable and uncertain suitability, whereas bad references define the limits among uncertain and unfavourable suitability. Each resource is compared with the two sets of reference resources. If a resource is clearly better than the good references, it is qualified as favourable. In an analogous way, it is unfavourable if it is clearly weaker than the bad references. An uncertain resource is not better than the good references, nor weaker than the bad ones. ELECTRE-TRI considers other subjective parameters: weight, indifference, preference, and veto, which are associated with each criterion. Weight expresses the relative importance of the criteria; indifference is the largest value that may be considered insignificant; and preference is the smallest value constituting a clear advantage (Vincke, 1992).

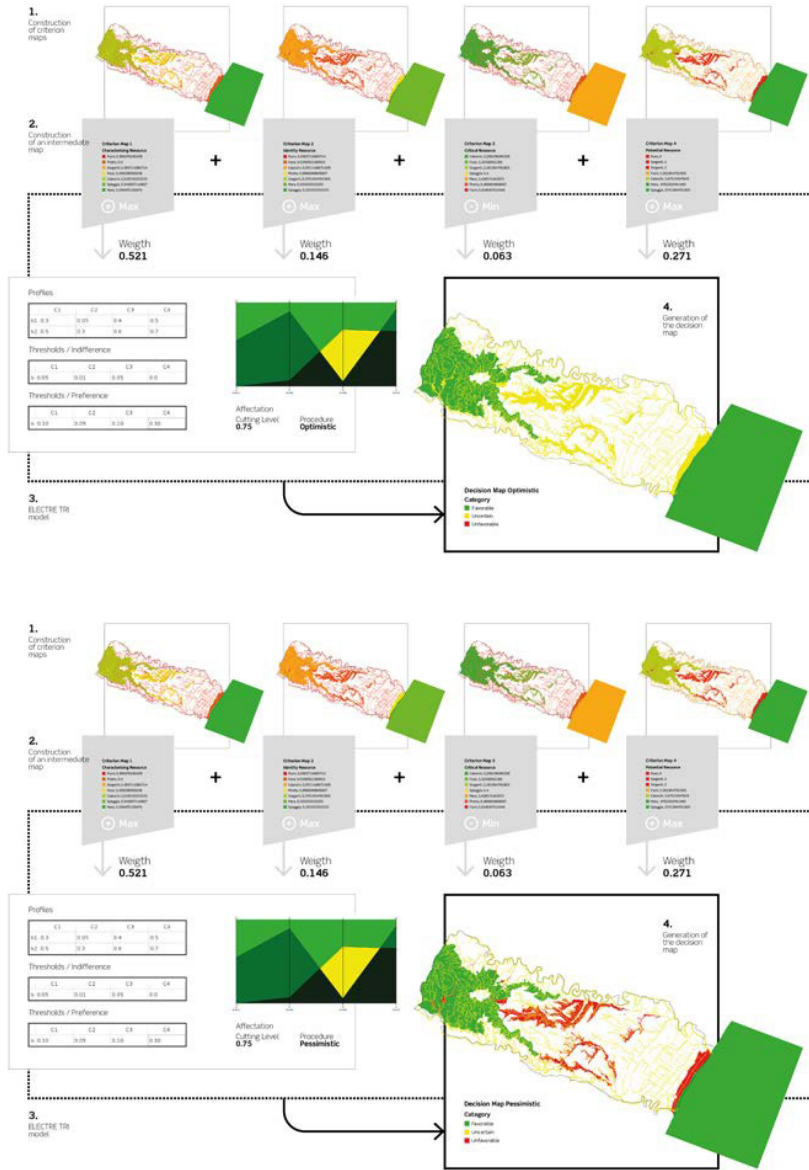


Fig. 3. The decision maps for 'A miniature Switzerland' scenario.

The ELECTRE-TRI module of QGIS (Quantum GIS Development Team, 2015) was used to create a final decision map that shows the environmental resources distinguished as favourable, uncertain, and unfavourable, expressing the suitability index to the valorization of the Pisticci landscape environmental resources for the scenario 'A miniature Switzerland'. The same process of Spatial Multi-Criteria Analysis was elaborated for the other two scenarios and the output of this Multi-Criteria Decision Analysis (MCDA) is a dynamic map that can be reviewed by decision-makers, stakeholders, and the local community to modify any of the subjective parameters to produce new maps, able to synthesize the different points of view and related perceived values. Priority should be given to redefining the set of reference zones, which are the most sensitive parameters, influenced also by the objective parameters' characteristics. If conflicts arise among decision-makers, stakeholders, and the local community, they can negotiate the set of subjective parameters, while building consensus on subjective parameters should encourage acceptance of the final shared map through a collaborative incremental process. This process provides an efficient method to produce landscape resource suitability maps based on complex evaluation criteria and may greatly facilitate negotiations between all actors involved. Using the resulting set of suitability maps, one for every possible scenario, it is possible to compare quickly the different scenarios and implement the next steps of the methodological workflow, Step V - *Impact models* and Step VI - *Decision models*, making a decision through an evaluative procedure that favours negotiation with respect to both stakeholders' objectives and constraints, and promoting democratic and collaborative decision-making.

4. Concluding remarks

Development and governance processes guide critical afterthoughts of urban planning and transformation tools, showing ineffectiveness of traditional models. Local development policy always demands more supervision and planning forms, able to support efficient resource management. Their tools are methodologies based on a systemic approach to interventions, to promote strategic actions and alliances, social consensus, collaborative processes, and promotion of planning efforts as the fundamental premise to real feasibility and success. Planning territory means to build local development logics in a dynamic relationship with regional contexts, starting from re-contextualization and existing resources relaunch, supporting sustainable co-management of local resources, developing place-based actions as a fundamental tool in an aware knowledge of local potential. The Green Lucania project became a situated strategy oriented to guide Lucania's future starting from the specific reality of the municipalities that characterize its territory, to understand how so different elements are part of a unique transformation process, in which they become planning alternatives, possible and not absolute, variable and interacting. The experience of Pisticci, still being processed, is the first step in the Green Lucania incremental spatial network, where an integrated perspective considers evaluation as an essential component of the decision process itself, supporting other activities every time in a different role (Strang, 2009).

The multi-methodological decision-making process for cultural landscapes evaluation activates a fundamental link between knowledge and values, to transform this dialogue into goals and actions, identify key-values, explore decision opportunities and possible alternatives, explicate impacts and effects, and manage complex systems with multiple priorities related to multiple landscape values.

The contribution of the Geo-Design approach to defining a Collaborative Spatial Decision-Making process oriented to the landscape evaluation, characterizes the implementation of a hybrid approach in practice, useful to identify opportunities for integrating design approaches into landscape planning (Warren-Kretzschmar, v. Haaren, Hachmann, & Albert, 2012), where the synergy of approaches can improve both the quality and acceptance of final solutions, not only supporting the analytical processes, but also improving the transparency of the decision-making process and stimulating the creativity of the actors involved, becoming an indispensable part of participatory planning and collaborative decision-making.

The implementation of the defined workflow for Pisticci will be completed in the near future with the conclusion of the Green Lucania research project. The validity of the process can then be tested, highlighting necessary changes and possible improvements, not only to make the evaluation process adaptive and flexible to the needs of the policy-making context, but also to activate new synergies among values, resources, and key-actors for innovative and situated strategies of local development.

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