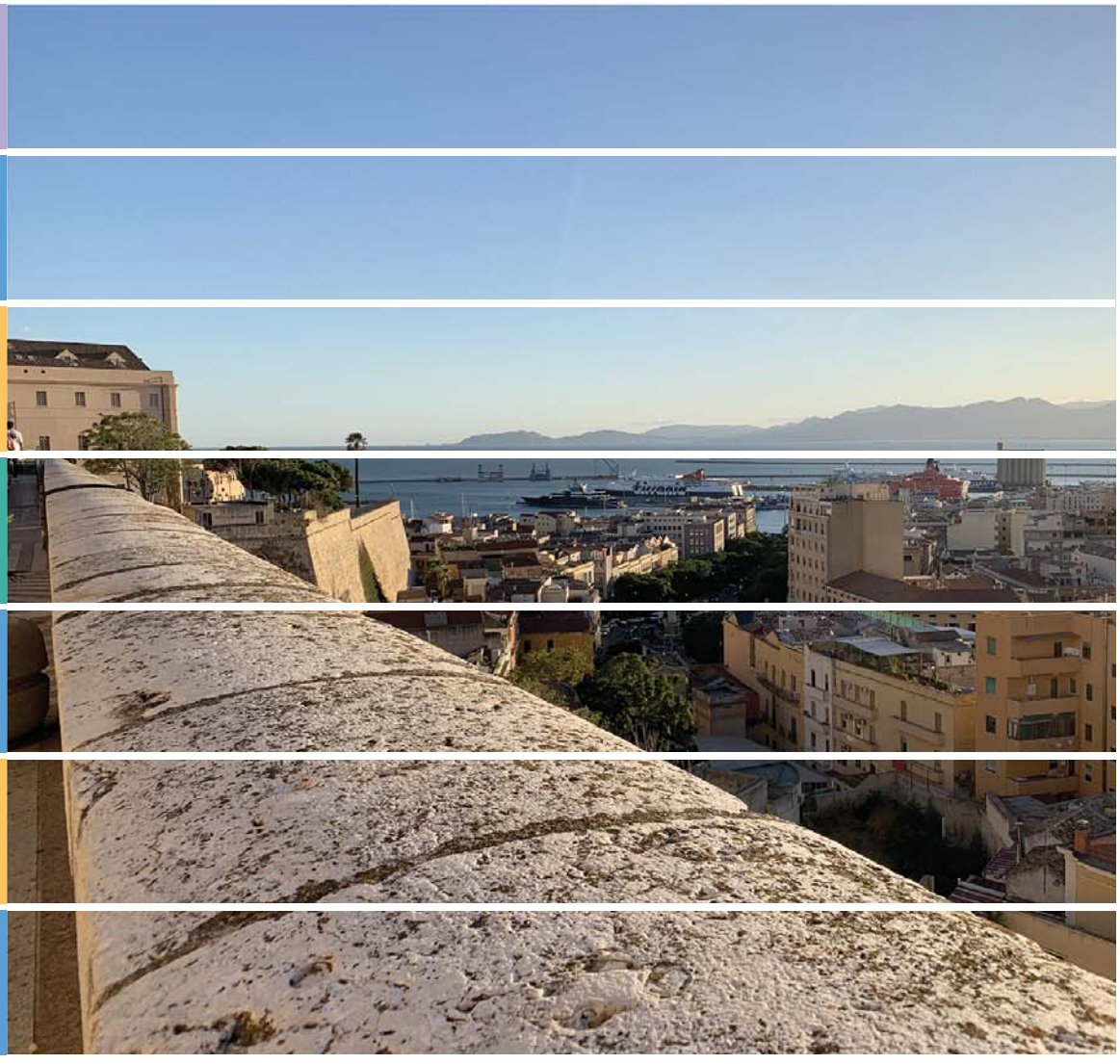
Carmela Gargiulo Corrado Zoppi
Editors

Planning, Nature and Ecosystem Services



INPUT TeMALab Dicea UniNa

Federico II Open Access University Press
fedOAPress

Università degli Studi di Napoli Federico II
Scuola Politecnica e delle Scienze di Base

Smart City, Urban Planning for a Sustainable Future

5

Carmela Gargiulo Corrado Zoppi

Editors

Planning, Nature and Ecosystem Services

INPUT aCAdemy 2019

Conference proceedings

Federico II Open Access University Press

fedOAPress

Planning, nature and ecosystem services / editors Carmela Gargiulo, Corrado Zoppi - Napoli: FedOAPress. 2019 - (Smart City, Urban Planning for a Sustainable Future. 5).

Web link:
http://www.tema.unina.it/index.php/tema/Monographs

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

Selection and double blind review under responsibility of INPUT aCAdemy 2019 Conference Committee

Università degli Studi di Napoli Federico II
Centro di Ateneo per le Biblioteche "Roberto Pettorino"
Piazza Bellini 59-60 - 80138 Napoli, Italy
http://www.fedoapress.unina.it

Published in Italy

Cover and graphic project: TeMA*Lab*

INPUT aCAdemy 2019

This book collects the papers presented at INPUT aCAdemy 2019, a special edition of the INPUT Conference hosted by the Department of Civil and Environmental Engineering, and Architecture (DICAAR) of the University of Cagliari.

INPUT aCAdemy Conference will focus on contemporary planning issues with particular attention to ecosystem services, green and blue infrastructure and governance and management of Natura 2000 sites and coastal marine areas.

INPUT aCAdemy 2019 is organized within the GIREPAM Project (Integrated Management of Ecological Networks through Parks and Marine Areas), co-funded by the European Regional Development Fund (ERDF) in relation to the 2014-2020 Interreg Italy – France (Maritime) Programme.

INPUT aCAdemy 2019 is supported by Società Italiana degli Urbanisti (SIU, the Italian Society of Spatial Planners), Istituto Nazionale di Urbanistica (INU, the Italian National Institute of Urban Planning), UrbIng Ricerca Scientifica (the Association of Spatial Planning Scholars of the Italian Schools of Engineering) and Ordine degli Ingegneri di Cagliari (OIC, Professional Association of Engineers of Cagliari).

This book is the most recent scientific contribution of the "Smart City, Urban Planning for a Sustainable Future" Book Series, dedicated to the collection of research e-books, published by FedOAPress - Federico II Open Access University Press. The volume contains the scientific contributions presented at the INPUT aCAdemy 2019 Conference. In detail, this publication, including 92 papers grouped in 11 sessions, for a total of 1056 pages, has been edited by some members of the Editorial Staff of "TeMA Journal", here listed in alphabetical order:

- Rosaria Battarra;
- Gerardo Carpentieri;
- Federica Gaglione;
- Carmen Guida;
- Rosa Morosini;
- Floriana Zucaro.

The most heartfelt thanks go to these young and more experienced colleagues for the hard work done in these months. A final word of thanks goes to Professor Roberto Delle Donne, Director of the CAB - Center for Libraries "Roberto Pettorino" of the University of Naples Federico II, for his active availability and the constant support also shown in this last publication.

Rocco Papa
Editor of the Smart City, Urban Planning for a Sustainable Future" Book Series
Published by FedOAPress - Federico II Open Access University Press

Table of contents

Session: 2 - Integrated management of marine protected areas and Natura 2000 sites

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

Session 3 - Rural development and conservation of nature and natural resources

Session 4 - Geodesign, planning and urban regeneration

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

Session 5 - Green and blue infrastructure

Session 6 - Smart city planning

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

Session 7 - Water resources, ecosystem services and nature-based solutions in spatial planning

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

Session 8 - Conservation and valorisation of architectural and cultural heritage

Session 9 - Accessibility, mobility and spatial planning

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

Session 10 - Tourism and sustainability in the Sulcis area

Special session 1 - Ecological networks and landscape planning

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

KNOWLEDGE-BUILDING MODELS FOR ENVIRONMENTAL PLANNING: THE CASE STUDY OF BARI

STEFANIA SANTORO, DOMENICO CAMARDA
PASQUALE BALENA

Department of Civil, Environmental, Land,
Construction and Chemistry (DICATECh)
Polytechnic University of Bari, Italy
e-mail: stefania.santoro@poliba.it
domenico.camarda@poliba.it
pasquale.balena@poliba.it
URL: ww.poliba.it

How to cite item in APA format:
Santoro S., Balena P. & Camarda D. (2019). Knowledge-building models for environmental planning: the case study of Bari. In C. Gargiulo & C. Zoppi (Eds.), *Planning, nature and ecosystem services* (pp. 120-129). Naples: FedOAPress. ISBN: 978-88-6887-054-6, doi: 10.6093/978-88-6887-054.6

ABSTRACT

The concept of ecosystem services arises as a formal outcome of historical processes of understanding and interpreting settlements as complex ecological systems. Because of a straightforward, bottom-up demand for environment enhancement, that concept increasingly occurs in discourses, in narratives, in the demands of common people, triggering a new urban environmental awareness. This is now often arising spontaneously in the protocols of participatory construction of plans, especially when planning for the future of complex environments such as city areas. The present study tries to elicit reflections around the weight of ecosystem issues in the case study of Bari (Italy), which is experiencing an inclusive process of construction of shared knowledge for the new master plan. Starting from an initial campaign of civic walks along urban neighborhoods and a subsequent questionnaire-based survey on the community, the paper carries out comparative analyses using problem-structuring methods, in order to evaluate and reflect on community behaviors and expectations about ecosystem services.

KEYWORDS
Knowledge Modelling; Spatial Planning; Problem Structuring Methods

1 INTRODUCTION

In the so-called Italian season of *third-generation plans* following earlier post-war planning experiences, issues of qualitative (as well as interstitially speculative) transformation of cities appear, apparently in terms of urban facilities and services.

This type of approach is generally considered as extended until the 1980s, with some medium-sized cities often cited as examples, such as Pavia, Pistoia, Arezzo.

This is also the period, however, of an irruption of the environmental question in scientific debates. New reflections focus on the limits of dissipative growth especially within residential settlements. What emerges is the need for progressively increased attention to natural resources and their regeneration cycles, especially in urban areas. Some observers even deduce from this circumstance an emerging *fourth generation* of spatial plans, contaminated by new increasing socio-environmental operational programs, such as Agenda 21.

Certainly, a new awareness is growing around the need for closing natural cycles must close, to avoid problems of liveability, health, consumption of ecological resources. Settlement areas are increasingly considered, planned and managed as complex ecological systems and not as simple territories to be transformed.

The hand of public administration and policymaking can do much in this framework, in its role as a service provider to support the life and welfare of communities. By the new millennium, the new and simple reading of this commitment is thus immediately turned into operationally considering the role played by service places as also resource regenerators.

Also thanks to this simple, natural evolution, the new concept of ecosystem services arises, a lexical outcome of a historical process of understanding and interpreting settlements as complex ecological systems. It is therefore a formal name which corresponds to a straightforward, bottom-up demand for environment enhancement. It increasingly occurs in discourses, in narratives, in the demands of common people, triggering a new urban environmental awareness. This is now arising spontaneously in the protocols of participatory construction of plans, especially when planning the future of areas at environmental risk.

The present study starts from these considerations, trying to elicit reflections around the weight of ecosystem instances along inclusive processes of cognitive planning, with the aim of verifying their final policy enhancement. The work refers to the case study of Bari (Italy), in which a multi-faceted process of construction of shared knowledge is in progress for the preparation of the new urban plan of the city. After the present introduction, section 2 shows a literature review about ES while section 3 presents the case study. Section 4 describes the methodology applied and section 5 outlines and discusses the case study. Final remarks and future developments close the paper (section 6).

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

2 ECOSYSTEM SERVICES RELEVANT BACKGROUND

Literature offers a large variety of Ecosystem Service (ES) definitions and classification approaches (Binning et al., 2001; Boyd & Banzhaf, 2007; Landers & Nahlik, 2013; Millennium Ecosystem Assessment - MEA, 2005; Wallace, 2007, 2008). However, there is general agreement that human well-being is supported by the existence, processes, and outputs of ES. According to MEA (2005), ES are "the benefits of nature to households, communities, and economies". Studies show that ES can develop neutral, synergic, and trade-off relationships between households, communities, and economies at different scales (e.g. Howe et al., 2014; Lee & Lautenbach, 2016). The comprehension of these relationships is crucial for making more informed and sustainable decisions on economic, environmental and land use policies and practices (Dennis & James, 2017; Holt et al., 2015; Vogdrup-Schmidt et al., 2017).

In order to establish a common system necessary for ES incorporation into decision-making and economic accounting systems, the Common International Classification of Ecosystem Services (CICES) was issued. The CICES framework uses and classifies ES into *provisioning* (e.g., food and fresh water), *regulating and maintenance* (e.g., water purification) and *cultural* (e.g., recreation and aesthetics). In the present study, started from a thesis work at Polytechnic University of Bari, the CICES framework has been synthetized, according to Environmental Protection Agency (EPA) into (i) Natural Resources: water, land, soil and air: (ii) Drivers of change: policy, land use, climate, pollution; (iii) Benefits: economy, well-being, food-water and materials and integrated into the methodology.More in detail, the methodology is based on the combination of a Participatory Modeling Techniques (PMT) analysis and Problem Structuring Methods (PSMs) in order to overcome some critical issues of PMT and to understand the level of knowledge of citizens regarding ES, thanks to the integration of a synthetic framework drafted by EPA.

3 THE CASE STUDY OF BARI

The capital of Apulia in Southern Italy, Bari city is extended over 117,38 km^2 with 324,198 citizens. It is subdivided into five districts (Fig.1). In 2015 its Department of urban planning opened a public channel to citizens at several levels, asking everyone to participate in the drafting of the Master Plan of the city (PUG). The path was designed in different time steps, performed between May and November 2016, through (i) nr.30 *Urban front offices* activated in the Municipal Area, (ii) nr.9 *Civic Walks* (CWs) to single out peculiar aspects and features of relevant areas and (iii) nr.5 *Public Workshops* to include citizens in the decision-making process of PUG drafting.

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

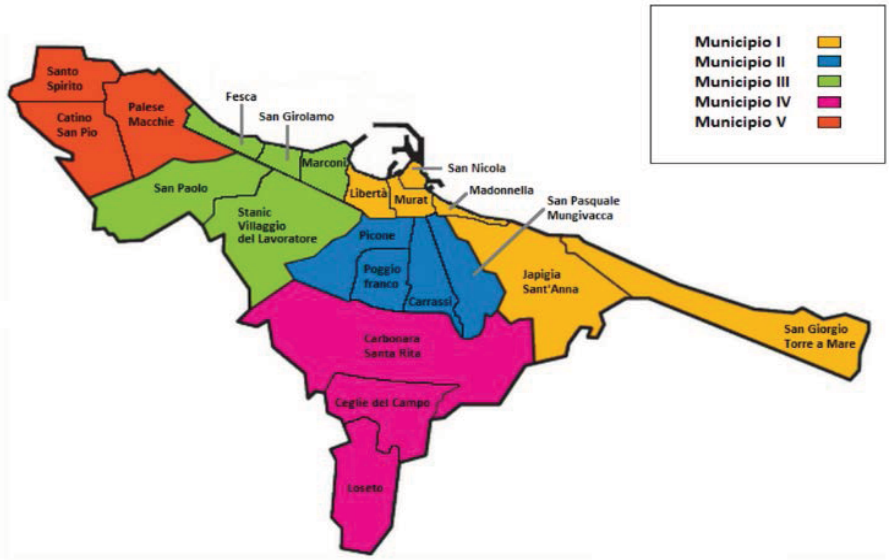


Fig. 1 Municipalities of Bari (Wikipedia 2014)

Starting from some considerations emerged during the CWs, in order to share new visions of the places (Jones, 1990) between *expert* knowledge (scientists, institutional officers, technicians) and *non-expert* knowledge (citizens), the aim of this study is to investigate about the limits of the approach adopted by the Public Administration and to understand the level of knowledge of citizens involved about ES. Section 4 describes the adopted methodology.

4 METHODOLOGY

The present study proposes an approach based on knowledge structuring to (i) overcome the limits emerging during the involvement of citizens, and (ii) to investigate the level of citizens' knowledge about ES.

Specifically, the reflection on CWs raised three critical issues: (i) numerical predominance of considerations by expert knowledge on non-expert knowledge, (ii) the lack of information structuring, broadly following narrative patterns, (iii) a small number of participants, never exceeding 30 units.

In the present study, in order to overcome these limits, information emerged in narrative patterns deriving from CWs has been recorded and formalized using ad-hoc structuring platforms, particularly relevant to PSMs modelling area.

Specifically, a qualitative analysis of the information deriving from CWs was needed to build Causal Loop Diagrams (CLDs) and semi-structured interviews (SSIs). CLDs was oriented to build a problem framework (Homer & Oliva, 2001), whereas SSIs held a dual function of validating CLDs and involving a more significant sample of citizens.

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

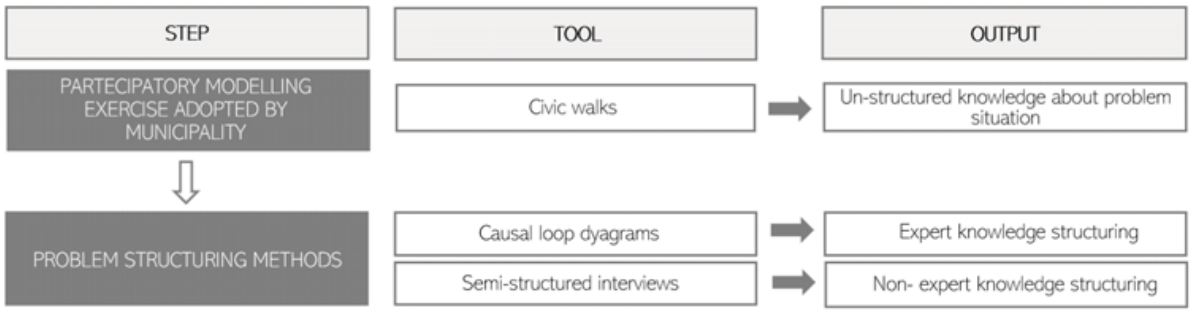


Fig. 2 The developed methodology

The analysis led on one of the nine CWs will be described below, as an explicatory example.

4.1 PARTICIPATORY MODELLING EXERCISE: CIVIC WALK

CWs are an early and widespread instrument of citizens' participation in the field of urban policies in order to activate new forms of knowledge about the city (Jones, 1990). According to literature analysis, CWs seem to ensure some important features: (i) the implementation of *de-professionalization* visions, i.e., not only professionals shape the future of the districts; (ii) a *demystification* of problems, turning territorial planning into real and concrete perspectives, away from a virtual or mediatized knowledge; (iii) the *democratization* of knowledge and decisions, as many citizens are directly involved in the process of reflection and decision, especially those that represent an interest in the future of the districts (Jones, 1990).

Several examples are applied in different parts of the world (Fregolent et al., 2014).

The CW analyzed here has crossed areas coming from two planning seasons of the city of Bari. The first one is the urban plan drafted by Calza-Bini and Piacentini characterized by a traditional urban design (concentric and equidistant road links connected by radial roads with tridents, the medians) that does not relate to the expanding Bari of the post-war years.

The second one is Quaroni's urban plan, characterized by the gigantism of roads and buildings in view of demographic growth and city flows (report PUG, 2016).

During the CW analyzed, 22 citizens and 3 technicians were involved. The CW was focused on three places: Alcide De Gasperi street (Place 1); Gandhi Mohandas street (Place 2); Mother Teresa of Calcutta street (Place 3).

4.2 PROBLEM STRUCTURING METHOD: CAUSAL LOOP DIAGRAM

CLDs are a formal modelling tool of Group Model Building Technique. It aims at setting up a process of mutual understanding of a problem situation between knowledge agents and analysts, typically starting from storytelling, interviews, facts and narratives (Voinov et al.,

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

2010). CLDs are used to identify key factors and the causal relationships between variables (Binder et al., 2004). CLDs is symbolized by variables and links with polarity representing the effect of one variable on another (Richardson, 1995).

In this work, CLDs were used to build a structured approach of problem situations deriving from CWs. According to Basco-Carrera et al. (2017), an un-structured approach is characterized by low degree of consensus and scientific certainty. The recording of conversation emerging during CW were analyzed, dividing the key concepts to be transformed into variables and then creating CLDs (Tab. 1).

QUOTES FROM CONVERSATION	VARIABLES
The road suffers from an urban load unproportionate to what was designed	Road size efficiency
It isn't possible to enlarge the section road now, perhaps it would be possible to think of alternative routes to decrease the traffic	Traffic plan re- building
The traffic has changed especially with the grafts of the ring road	Connection with ring road
The road section is originally from the 1930s. The traffic has changed	City development

Tab. 1 Quotes from expert knowledge translated into variables and relationships (CLD along Place 1)

From the CLD referring to Place 1, two main themes emerged: (i) excessive vehicular traffic and (ii) the lack of public green spaces (Fig. 3a).

Specifically, on one hand, the road section is claimed to be unable to meet contemporary mobility demands. On the other hand, the problem of lacking green public spaces is due to intensive buildings and possibly worsened by the misappropriation of the few remaining areas by some private owners. A re-building of the traffic plan for the management of vehicular flows on the one hand, and the supervision by the Public Administration on the other, are the solutions proposed by the *expert* knowledge in response to the issues raised.

The CLDs show the causes and the effects that these variables entail. Following the same procedure, the other map has been built, in which the CLDs of Place 2 and 3 have been aggregated referring to the same issues (Fig. 3b).The use of land, deriving from the reduction of some road sections firstly conceived as urban highway and never completed, was a central theme referring to the Place 2 and 3. Specifically, two suggestions have been proposed: (i) urban gardens for community along the roads and (ii) the reorganization with partial pedestrianization and bicycle path of the street to reduce the speed of traffic. The need to expand public spaces, by redeveloping the underutilized areas, was claimed in a different part of the district.

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

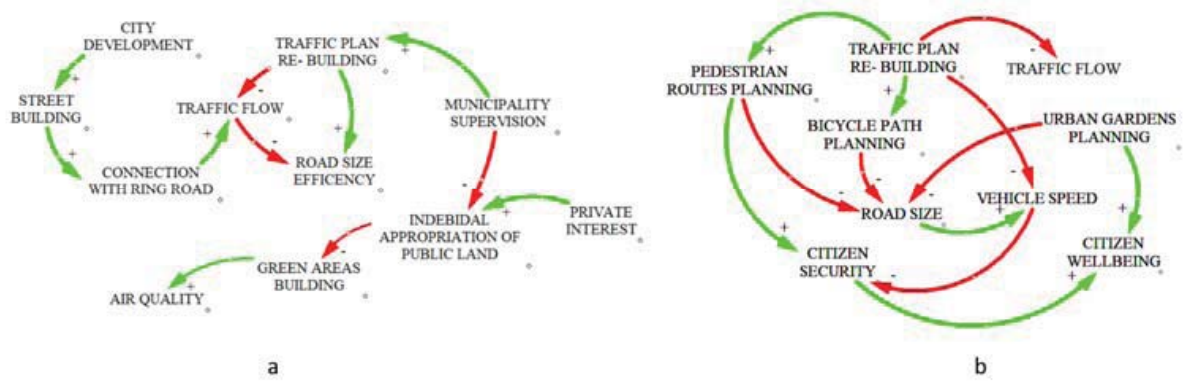


Fig. 3 CLD referring to Place 1 (a), 2 and 3 (b)

4.3 PROBLEM STRUCTURING METHOD: SEMI-STRUCTURED INTERVIEWS

SSIs are commonly used in policy research and are applicable to many research questions (Barriball et al. 2004). They combine some structured, formalized questions with some unstructured exploration. They are useful when dealing with complex systems, thanks to the use of spontaneous approaches able to better explore, understand, clarify answers to questions (Wilson, 2014).

In this context, SSIs have been carried out and submitted to citizens, retracing the same places of the CWs, also aiming at checking the relevance and consistency of issue previously raised by *expert* knowledge. SSIs have been structured in three sections: (i) citizen profiles; (ii) mobility issues and (iii) public space issues.

Citizens could express own preferences on a Likert (1932) 1-5 scale of agreement and to insert a free contribution on the actions to be addressed on the issues raised. A sample of 88 citizens, divided into 53 women and 35 men, aged between 35 and 50 years, were interviewed.

5 RESULTS AND DISCUSSION

CLDs building tried to overcome the limit relating the unstructured approach emerged during CW. The information thus emerging was subsequently connected to ES (EPA) classes, so making it possible to draw out considerations regarding the issues related to ES, by observing Tab. 2.

It can be noted that the most common drivers of change are the Land Use and Policy. The benefits related to Well-Being and Public Health are connected through cause-effect relationships.

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

NATURAL RESOURCES	PLACE	DRIVERS OF CHANGE		BENEFITS	
		Policy	Land Use	Well-being	Pubblic Health
LAND	1	Municipality supervision	traffic plan re- building	decrease traffic flow	increase air quality
			use of public green area	areas for children	
	2/3		traffic plan re- building	increase bicycle path planning	decrease veichle speed
				increase pedestrian route planning	
				decrease traffic flow	
			urban gardens planning	increase citizen well-being	

Tab. 2 ES emerged from CW expert knowledge

The 'traffic plan re-building' variable emerged in all three Place. Referring to Place 1, it was suggested to act on the traffic flow, through a study of vehicular flows, not being able to physically modify the undersized road section. Referring to Place 2 and 3, the construction of cycle paths, pedestrian route and urban gardens was suggested.

The latter seems to meet a dual function of reducing the road section and (consequently) vehicle speed, while promoting sustainable mobility and equipping the district with urban gardens. In terms of benefits, these actions induce an improvement in the well-being of citizenship thanks to the presence of areas for leisure, a decrease in vehicular traffic with more safety for pedestrians, an increase in health and clean air-related benefits.

The above statements have been submitted to citizens' opinion and degree of validation through SSIs. On the one hand, this allowed a general validation by the citizens on the issues emerged from expert knowledge, thus somehow balancing the preponderance of interventions by expert knowledge.

On the other hand, it helped to bring out new issues such as waste management, the inclusion of public lighting and the planting of new plant species. Variables have been relocated to relevant ES categories (Tab. 3).

The issues emerged, which are added to those already known deriving from expert knowledge are: the planting of new tree species in order to reduce the problems linked to allergies that characterize children residing in Alcide De Gasperi street (Place 1); the strengthening of public lighting at Place 2 in order to increase pedestrian safety and finally, at Place 3, the need of improving the waste management system to guarantee adequate hygienic conditions of spaces and healthiness of air.

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

The validation of CLDs took place through the analysis of semi-structured interviews. The preference of citizens in relation to questions have been analysed. For a sake of simplicity one example is show "Corso Alcide De Gasperi is undersized" (Fig. 3a).

NATURAL RESOURCES	PLACE	DRIVERS OF CHANGE		BENEFITS	
		Policy	Land Use	Well-being	Pubblic Health
Land	1		planting of different tree species		decrease of allergies
	2/3		public lighting	pedestrian security	
			waste management	neighborhood cleaning	increase air quality

Tab. 3 ES emerged from semi- structured interviews by non-expert knowledge

48% of citizens involved expressed an agreement at Likert scale 4, whereas 34% of citizens agreed at grade 5 (Fig. 4a). The majority of citizens involved acknowledges that Alcide De Gasperi street is undersized. It is possible to summarize the results obtained from the questionnaire through a histogram in which the abscissas represent the questions, and the ordinates represent the average of citizens' preference for each question (Fig. 4b).

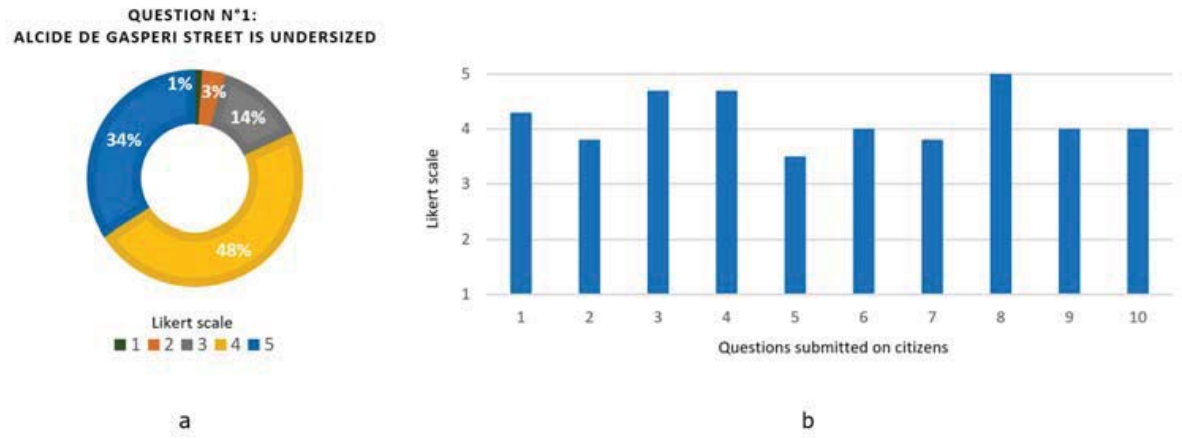


Fig.4 Percentage of citizens' agreement with the question n°1 (a); average of 88 citizens' preferences on each question of the semi- structured interviews (b)

5 CONCLUSION

The application of knowledge structuring models trough PSMs aims to challenge some limits of participatory modelling technique and to investigate the level of citizens' knowledge about ES. The study has brought about some general considerations, that can be synthesized as follows. Firstly, CWs seem to be not completely able to lay out, analyse and understand issues and

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

problem situations emerging along walking discourses. An integration offered by other methods, such as extended SSIs, seems to be effectively integrative of the knowledge building process, being also possible to involve a greater number of people.

Secondly, the concept of ES seems to be now somehow inherent in the culture of citizens. In fact, virtually every action that emerged from CWs and SSIs can be assigned to a category of ES. However, some limitations still appear, such as: (i) emerging ESs take into account only the natural resource *Land*; (ii) the drivers used are only *Policy* and *Land* use and the benefits arising are only related to *Well-being* and *Public Health*.

Interestingly, CLD seem to usefully integrate future-modelling activities -such as scenario-building models. For example, they seem to be useful to investigate on the implications of citizen potential decisions on areas, as well as to facilitate citizens' knowledge about ES and, more broadly, to support the construction of collective futures. In this perspective, more work will be devoted to check such issues on different case studies.

REFERENCES

Barriball K.L, While A., (1994); Collecting data using a semi-structured interview: a discussion paper; *Journal of advanced nursing*, 19, 328-335; doi: 10.1111/j.1365-2648.1994.tb01088.x

Basco-Carrera L., Warren A., Van Beek E., Jonoski A., Giardino A. (2017); Collaborative modelling or participatory modelling? A framework for water resources management; *Environmental Modelling & Software,* 91-95 e 110 DOI:10.1016/ j.envsoft.

Binder T., Vox A., Belyazid S., Haraldsson H., Svensson M., (2004); Developing System Dynamic Models from Causal Loop Diagrams; *proceedings of the 22nd International Conference of the System Dynamics Society.* Oxford, Great Britain

Binning, C., Cork, S., Parry, R. and Shelton, D. (2001) Natural Assets: An Inventory of Ecosystem Goods and Services in the Goulburn Broken Catchment. *CSIRO Sustainable Ecosystems*, Canberra

Boyd J., Banzhaf S. (2007); What are ecosystem services? The need for standardized environmental accounting units. *Ecological Economics*, 63 (2–3), 616-626

Boyd, J., and S. Banzhaf (2005) Ecosystem Services and Government Accountability: The need for a new way of judging Nature's Value. *Resources*, 16-19.

C. Howe, H. Suich, B. Vira, G.M. (2014). Mace Creating win-wins from trade-offs? Ecosystem services for human well-bing: a meta-analysis of ecosystem service trade-offs and synergies in the real world. *Global Environmental. Change*, 28, pp. 263-275

BISE (2019) -https://biodiversity.europa.eu/maes/ecosystem-services-categories-in-millennium-ecosystemassessment-ma-the-economics-of-ecosystem-and-biodiversity-teeb-and-common-international-classification-of-ecosystem-services-cices)

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

Dennis M., James P. (2017), Ecosystem services of collectively managed urban gardens: exploring factors affecting synergies and trade-offs at the site level. *Ecosystem Services*, 26,17-26

EPA, United States Environmental Protection Agency: https://www.epa.gov/enviroatlas/ecosystem-services-enviroatlas

Fregolent L. (2017) in Consumo di suolo, dinamiche territoriali e servizi ecosistemici; report ISPRA

H. Lee, S. Lautenbach (2016), A quantitative review of relationships between ecosystem services. *Ecological Indicators*; 66 pp. 340-351

Holt A.R., Mears M., Maltby L., Warren P. (2015); Understanding spatial patterns in the production of multiple urban ecosystem services. *Ecosystem Services*, 16, 33-46

Homer, J. & Oliva, R. (2001). Maps and models in system dynamics: a response to Coyle. *System Dynamics Review*, 17, 347–355.

Jones B., (1990); Neighborhood planning. A guide for citizens and planner, American Planning Association, Chicago, 1990

Landers, D., and A. M. Nahlik. 2013. Final Ecosystem Goods and Services Classification System (FEGS-CS). EPA/600/R-13/ORD-004914. U.S. Environmental Protection Agency, Washington, D.C., USA.

MEA, Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC.

Report PUG: http://pug.comune.bari.it/report/

Richardson, G. P. (1995); Loop polarity, loop dominance, and the concept of dominant polarity. System Dynamics Review, 11, 67–88. DOI: https://doi.org/10.1002/sdr.4260110106

Vogdrup-Schmidt M., Strange N., Olsen S.B, Thorsen B.J. (2017); Trade-off analysis of ecosystem service provision in nature networks. *Ecosystem Services* 23 pp. 165-173

Voinov A., Bousquet F. (2010); Modelling with stakeholders; Environmental Modelling & Software 25-1268 e 1281; DOI: 10.1016/j.envsoft.2010.03.007

Wallace, K.J. (2007) Classification of ecosystem services: problems and solutions. Biological Conservation 139, 235-246. Wallace, K. (2008) Ecosystem services: Multiple classifications or confusion? *Biological Conservation,* 141, 353-354.

Wilson, C. (2013). Interview techniques for UX practitioners: A user-centered design method. London: MK Publications, Newnes.

Wikipedia (2014) https://it.wikipedia.org/wiki/File:Municipi_di_Bari.png

ISBN: 978-88-6887-054-6
DOI: 10.6093/978-88-6887-054-6

Carmela Gargiulo is full professor of Urban Planning Techniques at the University of Naples Federico II. Since 1987 she has been involved in studies on the management of urban and territorial transformations. Since 2004, she has been Member of the Researcher Doctorate in Hydraulic, Transport and Territorial Systems Engineering of the University of Naples "Federico II". She is Member of the Committee of the Civil, Architectural and Environmental Engineering Department of the University of Naples "Federico II". Her research interests focus on the processes of urban requalification, on relationships between urban transformations and mobility, and on the estate exploitation produced by urban transformations. On these subjects she has co-ordinated research teams within National Project such as Progetto Finalizzato Edilizia - Sottoprogetto "Processi e procedure" (Targeted Project on Building – Subproject "Processes and procedures), from 1992 to 1994; Progetto Strategico Aree Metropolitane e Ambiente, (Strategic Project Metropolitan Areas and Environment) from 1994 to 1995; PRIN project on the "Impacts of mobility policies on urban transformability, environment and property market" from 2011 to 2013. Principal investigator of the Project Smart Energy Master for the energy management of territory financed by PON 04A2_00120 R&C Axis II, from 2012 to 2015. Scientific Responsible Unit Dicea Project by Fondazione Cariplo "MOBILAGE. Mobility and aging: daily life and welfare supportive networks at the neighborhood level" 2018-2020. Scientific Responsible Unit TeMALab Dicea ERASMUS+ Key Action2: Project "Development of a Master Programme in the Management of Industrial Entrepreneurship for Transition Countries" (MIETC), partners: University of Santiago de Compostela (leading organization), University of Ljubljana, Academy of Science of Turkmenistan, Karaganda Economic University of Kazpotrebsouz (2020-2022). Author of more than 130 publications. Since 2008 Associate Editor of TeMA Journal of Land Use, Mobility and Environment.

Corrado Zoppi, Civil engineer, is Doctor of Philosophy in Economics (Northeastern University, Boston, Massachusetts, United States, 1997), Doctor of Research in Territorial Planning (University of Reggio Calabria, 1992), and Master of Science in Economic Policy and Planning (Northeastern University, 1990). Since October I 2015 he is Professor (Full Professor, Scientific Disciplinary Sector ICAR/20 Urban and Regional Technique and Planning)) at the Department of Civil, Environmental Engineering and Architecture. In the past, he taught at the Faculty of Engineering of the University of Cagliari, and at the Faculties of Architecture of the Universities of Rome "La Sapienza" and Sassari-Alghero. He is presently the Official Professor of the Module of Strategic Planning of the Integrated Course of Strategic Environmental Planning and of the Course of Regional and Urban Planning at the Faculty of Engineering of the University of Cagliari, and the Coordinator of the Undergraduate and Magisterial Degree Programs at the Faculty of Engineering and Architecture of the University of Cagliari. He was the Coordinator of the Panel for the Assessment and Evaluation of Public Investments of the Sardinian Regional Administration in the period 2007-2013. He was the Coordinator of the Graduate Committee of Environmental and Territorial Engineering of the University of Cagliari in the period 2012-2015. He is the President of the Faculty Committee of Engineering and Architecture of the University of Cagliari.

ISBN:978-88-6887-054-6
DOI:10.6093/978-88-6887-054-6