

Antonio Leone Carmela Gargiulo  
*Editors*

# Environmental and territorial modelling for planning and design



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*Scuola Politecnica e delle Scienze di Base*

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**4**

# **Environmental and territorial modelling for planning and design**

Antonio Leone Carmela Gargiulo

Federico II Open Access University Press



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This book collects the papers presented at the 10th International Conference INPUT 2018 which will take place in Viterbo from 5th to 8th September. The Conference pursues multiple objectives with a holistic, boundary-less character to face the complexity of today socio-ecological systems following a systemic approach aimed to problem solving. In particular, the Conference aims to present the state of art of modelling approaches employed in urban and territorial planning in national and international contexts.

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This book is the latest 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 2018 Conference and evaluated with a double peer review process by the Scientific Committee of the Conference. In detail, this publication, including 63 papers grouped in 11 sessions, for a total of 704 pages, has been edited by some members of the Editorial Staff of "TeMA Journal", here listed in alphabetical order:

- Rosaria Battarra;
- Gerardo Carpentieri;
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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  
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## COLLABORATIVE APPROACH IN STRATEGIC DEVELOPMENT PLANNING FOR SMALL MUNICIPALITIES

APPLYING GEODESIGN METHODOLOGY AND  
TOOLS FOR A NEW MUNICIPAL STRATEGY  
IN SCANZANO JONICO

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### **ABSTRACT**

*Facing urban development in weakest Italian municipalities is a critical technical activity which requires an integrated and inclusive approach for strategic goal selection together with effective monitoring tools describing local trends (concerning economy, services, employment, etc.) and local communities' needs. The case study of Scanzano Jonico in Basilicata represents an interesting strategic planning laboratory due to the fact that the municipality is characterized by sensible territorial resources (mainly un-exploited), a developed agricultural system, a weak urban structure characterized by a generalized lack of effective public service, insufficient infrastructures. In a perspective of concrete and feasible strategic development planning, based on the lack of public resources and facing the challenge to guarantee better living conditions for local communities, the operative methodological framework of GEODESIGN was applied. A bottom up workshop oriented to identify a shared development scenario was performed including local relevant stakeholders. The paper presents territorial analyses represented in "systems" of suitability maps according with Geodesign Approach; then the results from the workshop are discussed in order to assess strengths and weaknesses of the application. The strategic design obtained through the participative workshop is characterized by a strict link with territorial features and local community ambitions and represents a "context-based" scenario suitable to implement regional cohesion policy main objectives.*

### **KEYWORDS**

*Strategic Planning; Geodesign; Participative Workshop*

## 1 INTRODUCTION

To face urban development in weakest Italian municipalities, is a critical technical activity which requires an integrated and inclusive approach for strategic goal selection together with effective monitoring tools describing local trends (concerning economy, services, employment etc.) and local communities' needs.

Among recent approaches, "Tactical Urbanism" may be considered an innovative approach in urban planning, mainly oriented to urban regeneration. It includes quick, often temporary, cheap projects that aim to make a small part of a city more livable: "short term action for a long long term change" (Lydon et al., 2015). Tactical urbanism actions are often promoted by social groups acting at local level, who are moved by the awareness that current planning tools are no longer effective to meet the immediate needs of communities. We can affirm that Geodesign methodology (Steinitz, 2012; Steinitz et al., 2017) represents an effective methodological background in promoting innovations: bottom up and participatory planning (Campagna et al, 2016; Rivero et al., 2015). In fact it foresees a close collaboration between technicians, geographic sciences, information technology and "local people", decision makers in order to propose shared solutions (or/and strategies) for urban and territorial development. Steinitz defines Geodesign as "meta-planning": an explicit design of the planning process. According with Campagna (2016) meta-planning, at the same time, can support the construction of the framework for the territorial design and it also contribute to the development of IT systems supporting planning process according to the Geodesign approach. We consider such view coherent with a wider definition of planning: an advanced form of social agreement oriented to preserve public interests (Las Casas, 1995; Las Casas et al., 2017; Las Casas et al., 2018) and, under an operational dimension we include Geodesign in the sustainable planning toolkit (Las Casas et al., 2009; Las Casas et al., 2016).

In a perspective of concrete and feasible strategic development planning in weak municipalities, where the on the lack of public resources represents a precondition for any strategic proposal, the operative methodological framework of GEODESIGN was applied in order to define challenging scenarios oriented to guarantee better living conditions for local communities (Campagna et al., 2014; Moura et al., 2016; Nyerges et al., 2016). This work presents the results achieved through a Geodesign workshop in Scanzano Jonico, a small municipality of Basilicata Region (Italy), located along the Ionian coast.

It should be noted that this work contributes to a wider research, the Geodesign International Collaboration, a worldwide research network promoting experimentations of Geodesign method in local case studies founded by C. Steinitz.

## 2 THE CASE STUDY OF SCANZANO JONICO

The case study area represents an interesting strategic planning laboratory due to the fact that the municipality is characterized by: sensible territorial resources (mainly un-exploited) including natural and cultural heritage sites; a strongly developed agricultural system, a weak urban structure characterized by a generalized lack of effective public service; un-effective stock of mobility infrastructures. Moreover Scanzano Jonico Municipality is an emblematic case representative of the wide number of small municipalities settles in peripheral and marginal territorial contexts, expressing critical socio-economic development demand.

Scanzano is a coastal town in southern Italy, characterized by sandy coasts near which extends a pine forest declared protected areas under 92/43/CEE "Habitat" EU directive as to the Sites of Community Importance. In addition to the significant natural heritage, the municipality only includes a few buildings and places that

can be an expression of a sense of identity. They are: the Baronial Palace, the Aragonese tower rising close to the sea, the Recoleta farmstead and the archaeological site of Termitito. However, all these resources are not well exploited due to the lack of an integrated territorial promotion strategy and consequently they are poorly valued and actually rest in a state of decay.

A large part of the territory is constituted by the agricultural system that represents the driving sector of the local economy. Among agricultural products, the "candongia" (a strawberry variety) is renowned at national and international level. Even if agriculture is predominant, the sector suffers relevant problems such as the progressive fragmentation of land property and the consequently reduction of income for small farmers. Additional criticalities regard and the unproductivity of some areas due to soil salinization and desertification processes.

The urban structure is very weak in correlation to the ineffective public service supply. Main critical issues regard: inefficient public lighting, waste emergencies, the isolation of some suburbs of the municipality strongly disconnected from the main urban center, stray dogs, lack of infrastructures for local public transport. These problems show a degraded and highly inhomogeneous urban context.

The inadequate public services produced widespread social degradation resulting in an increase in crime, depopulation of rural areas and migration especially of the younger population as there are no adequate job opportunities.

There are worrying shortages for logistics and urban transport, especially in the connections between the urban center and the rural units belonging to the municipality (namely: Recoleta, Terzo Cavone, Terzo Marzocco, Andriace) as well as the coastal part of the territory, the main tourist attracting area of the municipality.

From the synthetic information described so far it is clear that in order to start an effective process of strategic development based on territorial specialization, an inclusive approach based on participation and targeted planning is relevant in order to deliver suitable scenario based on a (in)formal agreement among local actors.

### 3 THE GEODESIGN WORKSHOP IN SCANZANO JONICO

The most important part of the case study was the Geodesign Workshop held the municipal house of Scanzano Jonico on 25<sup>th</sup> and 26<sup>th</sup> June 2018. The workshop was attended by: a significant representation of the municipal administration (Mayor, Deputy Mayor and Councilor for Culture), the president and vice-president of the UNI3 association, the technicians of the municipal office and two university students.

The identification of the actors was based on LFA methodology. Potential stakeholder was compared with the others in terms of "Influence Capacity" (concerning decision making process) and "Commitment" in the implementation of the proposals. They have also been divided into three categories: Institutions, Organized Groups and Informal Groups. Then, depending on interest and influence, some representatives were chosen as spokesperson of several parties. For example, for the associations the president and vice president of UNITRE were chosen. In this way multiple interest were represented inside the workshop participants. In the same way, the Councilor for culture as well as the tourism entrepreneur and the Councilor of the Minority Party and agricultural entrepreneur of the municipality of Scanzano Jonico were chosen. Concerning the citizens' group, instead, two local students were invited to participate.

The workshop took place in 2 days. During the first day, the importance of participatory planning was explained using the advantages of the Geodesign framework methodology. We shared with participants the key points of the methodology and main findings of the context analysis (the Systems).

Before approaching the "Geodesign Hub" platform, we asked them to draft intervention proposals (the Diagrams) on printed paper evaluation maps. Afterwards each participant was asked to report the respective proposals within the platform. Those two steps allowed to reconsider first hypothesis drafted on paper when each participants used the platform to draw the final diagram according Geodesign Method.

On the second day two "change teams" were settled-up. The "change team" represent a way to overcome the individual approach in proposing projects and intervention toward the development of a collective vision of strategic scenario based on the selection of available project proposals.

According with workshop results and participants characteristics, two groups were identified: separating the members of the administration and all the other participants.

Each group discussed the proposed interventions by selecting the best ones. Then the choices of both groups were compared. The results could be considered quite compatible according with the following diagram comparing decision model.

#### COMPARE DECISION MODELS

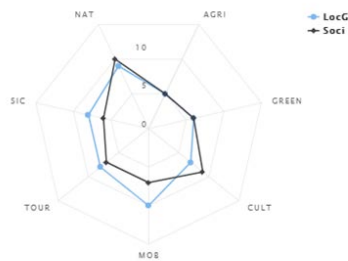


Fig.1 Decision Model defined by the two change team

After that the negotiation phase began. During this final stage the groups discussed and evaluated the two proposed development scenarios in order to reach "one" shared vision of intervention strategy.





Fig.2 Workshop participants during individual design phase

#### 4 SELECTED INTERVENTION DOMAINS AND RESULTS

According with Geodesign Methodology the context based assessment for the strategic decision making and negotiation process was organized in a number of "Systems". Each System represents an intervention domain and was identified according to a technical interpretation of local characteristics. The final result of such technical interpretation was presented to the workshop participants in term of Land Suitability assessment. It is a way allowing an effective communication of technical concepts and results also to common people without specific background in urban planning. The selected intervention systems for Scanzano Jonico case study were: Security; Culture; Mobility infrastructures; Tourism; Green areas; Environment and ecosystems; Agri-food. The first 3 systems represent the elements of vulnerability of the municipal area while the remaining elements represents the main components generating territorial attractiveness.



Fig.3 7 Systems for Scanzano Jonico Geodesign



From the preliminary discussion of the 7 Systems, through the individual identification of desired intervention projects and policies, all the participants delivered a final negotiation map: it represents the shared intervention scenario. The analysis of the results obtained shows that the development of the agri-food system and the related strengthening of rural tourism are not among the priorities of any of the established groups. The majority of the interventions concern the tourism system for which a policy of valorization is envisaged with targeted interventions to recover the most attractive areas of the territory, such as: restructuring the equipped dune, creating an archeopark in the area of Termitito archaeological excavations, pursuit of the "green flag" project. Interventions on the infrastructural mobility system have been concentrated on the rebuilding and maintenance of those roads connecting the potential historical-cultural attractions of the municipality (the Recoleta farmstead and the archaeological excavations) as well as the arteries connecting the beaches. On the other hand, cultural system was mainly considered in terms of redevelopment of historical-architectural elements such as the Aragonese tower and the Federici Palace in the Recoleta area. As far as the security system is concerned, the interventions mostly regard the installation of an urban video surveillance system in those areas where, in the last year, crime phenomena were concentrated and in the areas most frequented by children and young people. To improve the efficiency of urban video surveillance, an intervention policy has been proposed for public lighting in the inhabited center and in correspondence with tourist facilities. The proposals concerning the "environment and ecosystems" focused on the stabilization of the banks of the Agri and Cavone rivers by means of gabions (to limit the risk of flooding) and the conversion of the hydrovera with purifier, as well as the adhesion to the RENDIS project "National Repertory of interventions for the defense of soil " (<http://www.rendis.isprambiente.it/rendisweb>). Finally, for green areas, it was decided to recover those disused green urban areas and to apply a recovery policy for the SIC areas that are currently not exploited.



Fig. 4 La mappa finale di negoziazione

## 5 FINAL REMARKS

The present work was conducted in order to test the Geodesign methodology for the evaluation of strategic development scenarios through a participatory approach and the involvement of the local community and a multiplicity of stakeholders. Scientific literature highlights the role that this methodology can play in current spatial planning practice featured by a meaningful complexity mainly linked to the multi-dimensional context characterizing its processes (Cocco et al., 2018). It has been demonstrated how the use of Geodesign is well suited to be applied to tackle complex problems involving a multitude of actors of different backgrounds and to supports complex processes encouraging shared conception and choice of scenarios of sustainable future development scenarios (Campagna, 2014; Campagna et al., 2018; Di Cesare et al., 2018). Participation represent a way to improve and to realize inclusive planning approach, that has been mentioned many times, also in the context of commitments by the international community (UN HABITAT 2015, 2016, 2017). In fact we may affirm that it is mainly relevant in terms of problem identification: people can highlight criticalities and priorities that are not included in the technical territorial assessment (Ballal, 2015; Moura et al., 2018). The urban community represents a resource for the planning for the "future-city" as it provides "alternative" visions of the problems and objectives to realize an effective context-based strategic planning. In the case study we synthetically discussed in this paper, the actors have in fact provided a creative contribution in proposing interventions during the workshop. The intensity of their participation was variable (depending on the commitment level of each actor). The case study of Scanzano Jonico, then, shows how the use of Geodesign as a participatory planning methodology represents an useful tool to tackle complex problems on municipal scale, involving a multitude of actors from different backgrounds. Although GEODESIGN cannot be the only methodological support for the implementation of the principles of sustainability of urban development, it can certainly contribute to a substantial renewal of the tools of the planning discipline that is now facing new challenges and problems.

### REFERENCES

- Ballal, H. (2015). *Collaborative planning with digital design synthesis* (Doctoral dissertation, University College London, London, United Kingdom).
- Campagna, M. (2016). Metapanning: about designing the Geodesign process. *Landscape and Urban Planning*, 156, 118-128.
- Campagna, M., & Di Cesare, A.E. (2014). *Geodesign from theory to practice: in the search for geodesign principles in italian planning regulation*.
- Campagna, M. (2014). *Geodesign: dai contenuti metodologici all'innovazione nelle pratiche*.
- Campagna, M., Di Cesare, E. A., Matta, A., & Serra, M. (2018). Bridging the gap between strategic environmental assessment and planning: A geodesign perspective. *International Journal of E-Planning Research*, 7, 34-52.
- Campagna, M., & Matta, A. (2014). *Geoinformation technologies in sustainable spatial planning: a Geodesign approach to local land-use planning*. Cyprus.
- Campagna, M., Steinitz, C., Di Cesare, E. A., Cocco, C., Ballal, H., & Canfield, T. (2016). Collaboration in planning: the Geodesign approach. *Rozwój Regionalny i Polityka Regionalna*, 35, 55-72.
- Cocco, C., & Campagna, M. (2018). Toward a geodesign process analytics. *DISEGNARECON*, 11.
- Di Cesare, E. A., Floris, R., Cocco, C., & Campagna, M. (2018). Linking knowledge to action with geodesign. *Green energy and Technology, part F12*, 179-201.

Las Casas, G. B. (1995). L'etica della Razionalità. *Urbanistica e Informazioni*, 144.

Las Casas, G. B., & Scorza, F. (2009). Un approccio "context-based" e "valutazione integrata" per il futuro della programmazione operativa regionale in Europa". In A. Bramanti and C. Salone (Eds.), *Lo Sviluppo Territoriale Nell'economia Della Conoscenza: Teorie, Attori Strategie, Collana Scienze Regionali*. Milan, IT: Franco Angeli.

Las Casas, G., & Scorza, F. (2016). Sustainable Planning: A Methodological Toolkit. In O. Gervasi, B. Murgante, S. Misra, C. A. M. A. Rocha, C. Torre, D. Taniar, ... and S. Wang (Eds.), *Computational Science and Its Applications -- ICCSA 2016: 16th International Conference, Beijing, China, July 4-7, 2016, Proceedings, Part I* (pp. 627–635). Cham, CH: Springer International Publishing. doi: [http://doi.org/10.1007/978-3-319-42085-1\\_53](http://doi.org/10.1007/978-3-319-42085-1_53)

Las Casas, G. B., & Scorza, F. (2017). *I conflitti fra lo sviluppo economico e l'ambiente: strumenti di controllo*. In Atti della XIX Conferenza nazionale SIU, Cambiamenti, Responsabilità e strumenti per l'urbanistica a servizio del paese. Catania 16-18 giugno 2016. Rome and Milan, IT: Planum Publisher.

Las Casas, G. B., Scorza, F., & Murgante, B. (2018). Razionalità A-Priori: una proposta verso una pianificazione antifragile. *Italian Journal Of Regional Science*. (In press).

Lydon, M., & Garcia, A. (2015). *Tactical Urbanism. Short-term action for long-term change*. ISLANDPRESS

Moura, A. C., & Campagna, M. (2018). Co-design: Digital tools for knowledge-building and decision-making in planning and design. *DISEGNARECON*, 11.

Moura, A. C., Marino, T., Ballal, H., Ribeiro, S., & Motta, S. (2016). Interoperability and visualization as a support for mental maps to face differences in scale in Brazilian Geodesign processes. *Rozwój Regionalny i Polityka Regionalna*, 35, 89–102.

Nyerges, T., Ballal, H., Steinitz, C., Canfield, T., Roderick, ... & Thanatemanerat, W. (2016). Geodesign dynamics for sustainable urban watershed development. *Sustainable Cities and Society*, 25, 13-24. doi: <https://doi.org/10.1016/j.scs.2016.04.016>

Rivero, R., Smith A., Ballal H., & Steinitz C. (2015). Promoting Collaborative Geodesign in a Multidisciplinary and Multiscale Environment: Coastal Georgia 2050, USA. *Digital Landscape Architecture 2015 – Landscape Architecture and Planning*, 42–58.

Steinitz, C. (2012). *A framework for Geodesign. Changing Geography by Design*. Redlands, USA: Esri Press.

Steinitz, C., & Campagna, M. (2017). *Un Framework per il Geodesign: Trasformare la Geografia con il Progetto*.

UN HABITAT (2015). *International Guidelines on Urban and Territorial Planning*. UN-Habitat.

UN HABITAT (2016). *New Urban Agenda*. UN-Habitat.

UN HABITAT (2017). *Action Framework for Implementation of the New Urban Agenda UN UN-Habitat*.

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