

Sustainable Planning: A Methodological Toolkit

Giuseppe Las Casas and Francesco Scorza^(✉)

Laboratory of Urban and Regional Systems Engineering, School of Engineering,
University of Basilicata, 10, Viale dell'Ateneo Lucano, 85100 Potenza, Italy
{giuseppe.lascasas, francesco.scorza}@unibas.it

Abstract. This paper proposes a methodological appraisal developed in order to face the recurring conflict between environment and economic development assessed in a specific implementation context: the Val d'Agri in Basilicata (Italy), where protection and exploitation requests include the safeguard of particular traditions and culture of communities located in inland areas of the Apennines, as well as environmental resources (natural, agricultural, historical and artistic resources). In this view, we selected strategies in order to promote innovation required by the self-centred part of the development and we referred to a right of rationality of choices, based on: equity, efficiency and conservation of resources; accountability instruments and uncertainty sharing means to which connect the integrated cycle of assessment/governance. The Logical Framework Matrix (LFM) was proposed for this purpose and, through the derived call, applicants will have to work on the basis of a set of procedures oriented to the construction of ended and integrated supply chains.

Keywords: Planning · Tools and techniques · Territorial specialization · Regional development · Impact assessment

1 Introduction

This paper examines territorial organization choices defined during LISUT activities supporting the administration of the Project Val d'Agri, with reference to the formation of Inter-Municipal Structure Plan, still in progress.

Val d'Agri is placed in a territorial context where water landscapes take on an unique role: while on one side they ensure the supply for water systems in a wide region, even outside Val d'Agri area, on the other side they enrich landscapes and open realistic use perspectives for tourism purposes. These opportunities has to be compared with the presence of oil fields whose mining and processing generates significant impact risks.

We cannot ignore current political and judicial events affecting Val d'Agri territory, but we think that in spite of these highly current events, the technical and methodological instances at the base of this work do not change: accountability, systematic and independent frameworks of knowledge, sharing of uncertainty and transparency remain the basis of our research project.

The strong demand of employment opportunities, the tragic demographic crisis, the vulnerability of the building stock make the refusal of opportunities offered by concession proceeds very difficult.

In particular – at local level – on one hand we find people that consider hydrocarbon revenues as a chance to reverse impoverishment and economic and socio-demographic trends, besides the possibility to increase political approval, and on the other hand, there are ranchers, farmers and part of the scientific community that invoke at least the precautionary principle.

The composition of these conflicts makes the case study an example of the complexity challenge through a rational approach.

In this framework, the developed methodology expects to implement an integrated strategy characterized by significant steps of shared and joint processing.

It corresponds with the search for the three safeguard principles that we consider as the logical basis of our proposal:

- i. efficient allocation of resources
- ii. equity in the distribution of opportunities
- iii. protection of non-renewable resources

and it expects to test the research of an a-priori rational logic, in which the targets-products-activities-means-input connection becomes clear, starting by problems and through the Logical Framework Approach (LFA) implementation.

This methodology is based on an operative vision of the Falaudi's "proceduralist approach" [1] that – besides the desired scenario - proposes a process to define and to monitor objectives and strategies and promotes synergies in order to ensure the concentration of efforts on a few well-defined directions.

The strengths of this approach are the three above-mentioned principles and the explicit sharing of objectives: this represents Popper's demarcation principle that, by following Falaudi [1], identifies what can be called "a good plan."

Conclusions regard possible application and perspectives for improving and supporting regional development planning considering the exploitation of open data sources and spatial analysis.

2 Bounded Rationality, Incrementalism and Sustainable Strategic Planning

At the end of the seventies, the "classical" period of the so-called *systemic approach*¹, relevant elements of dissatisfaction about the transition from analysis to project persisted.

Such transition remained predominantly linked to the optimization attempt connected to Operative Research [6] and to the flourishing production of simulation models (cfr. [7]).

¹ Among the authors, besides the best known McLoughlin [2] and Ghadwick [3], we find a very interesting reconstruction of Wegener [4], proposing a survey 10 years later Lee's article [5].

According to our approach [8], the rationality of decisions about citizens' needs and aspirations and the use of common goods and non-renewable resources must be considered as a citizen's right and so a prerequisite in the development of plan proposals. An approach whose method focuses on:

- collective learning processes that feed themselves through the awareness of the interaction system complexity connected to social fabric, economy and environment²;
- governance processes that could be applied after the definition of objectives, means and activities, logical links between the achievement of the desired scenario and available means, an adequate system of indicators measuring effectiveness and efficacy
- The references of this approach are:
- from the technical point of view, the Logical Framework Approach, included SODA, about whom we'll talk at the point 3;
- from the point of view of the legal feasibility, the GPRA (Government Performance and Result Act of 1993 of the United States) [12, 13];
- from a theoretical point of view, our main reference is Faludi, whose proposal considers the transition from a static concept of planning, that adopts technical knowledge to the development of a desired future scenario, to a dynamic vision, focused on the decision as a process [1].

In this research of rationality we propose the following presentation and comparison of three instruments, already applied in heterogeneous environments: cognitive maps, ontologies, the logical framework approach of the objectives (LFA).

3 Toolkit for Renewing Planning and Governance: 'Cognitive Maps' and SODA; Ontologies; Logical Framework Approach

'Cognitive maps' are useful elaborations to represent the perception of a specific object/domain of interest for an individual or, more precisely according to the specific feature of this work, for an "actor", or a group of actors. They are simplified and expressive abstractions based on the identification of concepts interconnected through links that express hierarchies and mutual dependencies.

In methodological terms, the use of mental or cognitive maps is part of Problem Structuring Methods [14]: a family of support methods at the first stage of the decision process that intends to achieve the involvement of mixed groups, in a complex context, with the aim to help participants. We are therefore at an early stage of the planning process.

² Cfr. the conspicuous production of Roy Benard's group with reference to what was produced in the field of understanding and modeling of decision processes. Among others, see Roy [9]; Ostanello and Tsukias [10]; Las Casas [11].

Among different techniques, the SODA (Strategic Option Decision Analysis) is a method to identify problems, based on the use of cognitive maps as a support to explain and record individual or collective opinions as a reference point for the discussion of a group, led by a facilitator. This is a useful technique for including different and often conflicting opinions on a specific issue³. It is based on Kelly's personal construct theory [15] according to which each individual, influenced by his own experience and culture, is a representation of reality through a system of concepts linked by different connections depending on the considered complexity degree.

When concepts are expressed and organized on a map, connected with each other to form propositions, learning is simplified by the presence of these relationships, which help to link new concepts to concepts already set in the personal wealth of knowledge [14].

The use of cognitive maps responds to a more general need of knowledge structuring with reference to a domain of detailed study. Therefore, the usefulness of this instrument belongs to the management of consultation/participation processes and of the interaction space assessment [16], where the vision, not necessarily formalized, should include multiple points of view by identifying key concepts ordered through relationships.

This is a not much formalized approach, in which facilitator's role contributes to establish general agreement on a comprehensive view of a particular domain.

Considering recent experiences [17–19] the application of ontologies in planning processes and territorial management, and more generally to governance processes of place-based development, represents a research field that connects ICT tools with operative procedures and deals with the problem of interoperability between databases for this purpose. Instead, what we call "ontological approach" [20] is an attempt to link processes of knowledge construction by integrating the program structure, the system of actors, resources and context.

Starting from the concept of ontology as a meta-model of reality, or rather, of the domain examined, where concepts and logical connections are used as part of the interpretive model and as generators of rules and constraints of relation system, we consider the following definition of "ontology": "formal and explicit description of a domain of interest" in which:

- "Description" is a form of knowledge representation;
- "Formal" means "symbolic" and "that can be mechanised";
- "Explicit" means all concepts used and constraints on their use are explicitly defined;
- Domain: "a certain subset of the system, faced from a certain point of view" [21].

In our methodological proposal, in a rational approach for plan process, in the synthesis phase, the Logical Framework (LF) helps to organize the logic of plan activities in order to simplify their assessment during the different phases of the Project Cycle Management.

³ Lack of facilities or organizations, but also of efficiency, equity and respect of non-renewable resources.

LF represents the hierarchy of objectives in a grid composed by at least four rows and four columns [22–24] (Fig. 1):

Intervention logic	Objectively verifiable indicators			Sources of verification	Assumptions
1. Overall Objective	Context Analysis: 1. Obj.'s Pertinence 2. Obj.'s Relevance	Efficacy Indicators	Effectiveness Indicators		
2. Project Purposes					
3. Results/outcomes					
4. Activities	5. Inputs				
Preconditions					

Fig. 1. Log frame scheme [25]

Our proposal aims at emphasizing the principles of effectiveness and efficiency of public expenditure and at clarifying coherence and relevance of policy choices for the context of implementation, according to the research of a context or place-based policy [25], by introducing a specific box in the Logframe Matrix.

Generally, assessment is intended as the identification of policy effects, in connection with the given objectives and constraints (terms of reference).

Aune [26] warns us of the danger: “*Form over substance*”. As for aids to enterprises, the “form” of LFA often replaces the “substance”. In fact, in the widest applications of LFA, the “compiling of matrix” beyond the utility levels required by the project [27] can represent the victory of form over substance. Coleman [28] argues that LFA approach is an “aid to think” rather than a set of procedures.

4 Case Study

It seems to be evident that the dramatic point around which the decision-making process is tangled up is the connection among protection issues, exploitation and endogenous development of territory.

In the case of Val d’Agri, this aspect concerns research, extraction, transportation, processing of hydrocarbons and their link with natural and agricultural system.

We recorded the highest levels of uncertainty on which the debate, or better the dispute, became livelier about this key topic. These regard:

- objective, updated and forecasting data on the location and extent of activities;
- impacts on the air;
- effects on surface and underground hydrology system;

- effects on the quality of water transported by water schemes or reintroduced into surface water bodies;
- impacts on inhabitants' health;
- the allocation of revenues;
- future of the area after the depletion of deposits;
- direct and indirect impacts on employment, for activities related to hydrocarbon processing but also for agriculture and tourism;
- desires of a population that leaves the valley with a dramatic trend and achieves aging rates which, for some centres, do not foretell the permanence of inhabitants in the near future.

As for these and other problems, we cannot ask the question in a radical way: **yes oil/no oil**. Conversely, we have to attempt the research of appropriate context or place-based compromises, based on the sharing of information and uncertainty. Only through awareness and sharing of uncertainty sources, debate and negotiation can develop a process whose main product is information [29]. Financial resources from oil production could support such difficult research even if the total amount is not fully predictable for the future.

The proposed *vision* is based on the hypothesis of an area where the cultivation of oil fields and subsequent processes can coexist with the preservation of the most important share of natural features and the reinforcement of traditional activities and other innovations connected with local peculiarity.

We propose in fact a territory where the main mountain crests that enclose the valley and more internal ones, that include the greater and more significant natural areas, crown a valley where, conversely, the oil centre, pipelines and other innovative activities are dominant.

The hydrological system of the highest quotas will be protected and subject to monitoring procedures and aquifers will be effectively defended. The water collected in Pertusillo reservoir will be conveyed in a suitable pre-treatment plant before being introduced into the aqueduct.

Above all the idea to explore, produce and process oil in Val d'Agri must correspond to the exclusion of all other specified locations, avoiding the dissemination of plants without limits whose negative impact to land degradation has proved to be very serious.

The price paid in terms of environment is certainly high and it will be balanced by a development through which the activities of the valley may be partially sacrificed to the inevitable impacts (but not only those) derived from the exploitation of hydrocarbons.

Therefore, the measures of prevention, mitigation and precaution will be pre-condition for the reinforcement of an image, only dreamed nowadays, in which the weakest economic asset based on niche products, such as certified productions, or on the highly sensitive landscape natural elements and cultural heritage can be exploited through an integrated offer that links hiking, culture, food and wine to proposals such as the widespread museum of energy, widespread welcome and for the elderly (Table 1).

Table 1. Strategic functions and types of intervention.

Function	Typology			
	a	b	c	d
Nature tourism	Walking tours	Horse	Cycle tourism	Environmental education
Cultural and religious tourism	Museum	Fruition of energy museum	Festivals	Religious celebrations
Tourist accommodation	Hotel	B&B	Farmhouse	Libraries and homeland history
Health and old age	Senior housing	Health aid		
Recovery and re-use for residences and services	Recovery and re-use for leisure and socialization	Recovery and re-use for culture, entertainment and training	Education in the field of recovery and re-use and energy efficiency	
District/Energy museum	Oil refining and monitoring	Energy history and economy	Technological park and innovative R.E.S. systems	The water mills
Industry	Energy Production	Electrochemistry	Metallurgy	Electronics
Agro-Zootechnics	IGP bean	Ovine slaughter, preserves and dairy products	Podolica slaughter, preserves and dairy products	Restaurants
Mobility and communications	Freight transport	Purifiers and water schemes	ICT for people transport	Organization LPT
				Connection with tourist demand

5 Conclusions

A complex problem, for the harshness of conflicts, has been faced through instruments of plan rationality. This is an a-priori rationality based on the methodological assumption according to which a good plan can be managed only if an explicit, falsifiable system of goals and links between goals and strategies are available.

The next months will tell us if the proposed strategies are coherent with the requirements of a shared fulfilment.

For this purpose, some techniques were thought despite the risk to stiffen the process: in our opinion, this depends on the care and time that we can devote to their development through strong social interactions, free from political conditioning. These connections can generate a kind of collective intelligence in order to better develop the knowledge both of events and of dynamics, above all those from which all needs and aspirations, and awareness evolve [30].

References

1. Faludi, A.: *A Decision-Centred View of Environmental Planning*. Elsevier, Amsterdam (1987)
2. McLoughlin, J.B.: *Urban and Regional Planning: A Systems Approach*, p. 329. Faber, London (1969)
3. Chadwick, G.: *A Systems View of Planning: Towards a Theory of Urban and Regional Planning Process*. Pergamon Press, Oxford (1971)
4. Wegener, M.: Operational urban models: state of the art. *J. Am. Plan. Assoc.* **59**, 17–29 (1994)
5. Lee, D.B.: Requiem for large-scale models. *J. Am. Inst. Planners* **39**, 163–178 (1973)
6. Friend, J.K., Jessop, W.N.: *Local Government and Strategic Choice: An Operational Research Approach to the Processes of Public Planning*. Tavistock Publications, London (1969)
7. Wilson, A.: New roles for urban models: planning for the long term. *Reg. Stud. Reg. Sci.* **3** (1), 48–57 (2016). doi:10.1080/21681376.2015.1109474
8. Las Casas, G.B., Sansone, A.: Un approccio rinnovato alla razionalità nel piano. In: Depilano, G. (a cura di) *Politiche e strumenti per il recupero urbano*. EdicomEdizioni, Monfalcone (2004)
9. Roy, B.: *Méthodologie Multicritère d'Aide à la Décision*. Economica, Paris (1985)
10. Ostanello, A., Tsoukias, A.: An explicative model of' public interorganizational interactions. *Eur. J. Oper. Res.* **70**, 67–82 (1993). North-Holland
11. Las Casas, G.B.: criteri multipli e aiuto alle decisioni nel processo di piano (2010). https://www.researchgate.net/publication/268262221_CRITERI_MULTIPLI_E_AIUTO_ALLE_DECISIONI_NEL_PROCESSO_DI_PIANO. Accessed 29 Apr 2016
12. Government Performance and Result Act, United States (1993)
13. Archibugi, F.: *la pianificazione sistemica: strumento della innovazione manageriale nella pa, negli usa e in europa* (2002). http://win.progettosynergie.it/pianificazionestrategica/formarchibugi/L0.1/letture/pianificazione_sistemica.pdf. Accessed Apr 2016

14. Las Casas, G.B., Tilio, L.: Seismic risk reduction: a proposal for identify elements enhancing resilience of territorial systems. In: Popovich, S., Elisei, Z., (eds.) Proceedings REAL CORP 2012 Tagungsband 14–16 May 2012, Schwechat (2012). ISBN: 978-3-9503110-2-0
15. Kelly, G.: *The Psychology of Personal Constructs*. Norton, New York (1995)
16. Casas, G.B., Tilio, L., Tsoukiàs, A.: Public decision processes: the interaction space supporting planner’s activity. In: Murgante, B., Gervasi, O., Misra, S., Nedjah, N., Rocha, A.M.A., Taniar, D., Apduhan, B.O. (eds.) ICCSA 2012, Part II. LNCS, vol. 7334, pp. 466–480. Springer, Heidelberg (2012). doi:[10.1007/978-3-642-31075-1_35](https://doi.org/10.1007/978-3-642-31075-1_35)
17. Zoppi, C.: Ontologie ed analisi territoriale: un’introduzione al tema. *Scienze Regionali* **2011** (2), 121–123 (2011)
18. Rabino, G.: Le ontologie nella società dell’informazione. *Scienze Regionali* **2011**(2), 125–131 (2011). doi:[10.3280/SCRE2011-002006](https://doi.org/10.3280/SCRE2011-002006)
19. Las Casas, G.B., Scorza, F.: Redo: applicazioni ontologiche per la valutazione nella programmazione regionale. *Scienze Regionali* **10**(2), 133–140 (2011). doi:[10.3280/SCRE2011-002007](https://doi.org/10.3280/SCRE2011-002007)
20. Scorza, F., Casas, G.B., Murgante, B.: That’s ReDO: ontologies and regional development planning. In: Murgante, B., Gervasi, O., Misra, S., Nedjah, N., Rocha, A.M.A., Taniar, D., Apduhan, B.O. (eds.) ICCSA 2012, Part II. LNCS, vol. 7334, pp. 640–652. Springer, Heidelberg (2012)
21. Gruber, T.: Toward principles for the design of ontologies used for knowledge sharing? *Int. J. Hum. Comput. Stud.* **43**(5–6), 907–928 (1995). doi:[10.1006/ijhc.1995.1081](https://doi.org/10.1006/ijhc.1995.1081)
22. UsAid Guidelines, Australian Agency for International Development (2009)
23. European Commission: Europe Aid Co-operation Office General Affairs Evaluation. *Manual Project Cycle Management*, Bruxelles (2001)
24. NORAD (Norwegian Agency for Development Cooperation): *The Logical Framework Approach (LFA)* (1999)
25. Las Casas, G.B., Scorza, F.: Un approccio “context-based” e “valutazione integrata” per il futuro della programmazione operativa regionale in Europa. In: *Lo Sviluppo Territoriale Nell’economia Della Conoscenza: Teorie, Attori Strategie*. Collana Scienze Regionali, vol. 41 (2009)
26. Aune, J.B.: *Logical Framework Approach. Development Methods and Approaches*, 214 (2000)
27. Bakewell, O., Garbutt, A.: *The Use and Abuse of the Logical Framework Approach*, p. 27. Swedish International Development Cooperation Agency (Sida), Stockholm (2005)
28. Coleman, G.: Logical framework approach to the monitoring and evaluation of agricultural and rural development projects. *Proj. Appraisal* **2**, 251–259 (1987)
29. Las Casas, G.B.: L’etica della Razionalità. In: *Urbanistica e Informazioni*, vol 144, (1995). ISSN: 0392-5005
30. Las Casas, G., Murgante, B., Scorza, F.: Regional local development strategies benefiting from open data and open tools and an outlook on the renewable energy sources contribution. In: Papa, R., Fistola, R. (eds.) *Smart Energy in the Smart City*, pp. 275–290. Springer International Publishing, Switzerland (2016)