

FACOLTÀ DI AGRARIA

ALMA MATER STUDIORUM · UNIVERSITÀ DI BOLOGNA

Recent Developments in multi-criteria evaluation of regulations

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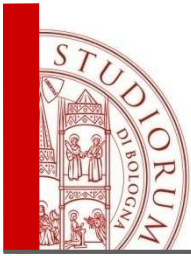
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Outline

- Introduction
- Objective
- Policy evaluation
- Multicriteria analysis (MCA)
- Application of MCA to policy evaluation
- Discussion
- Concluding remarks



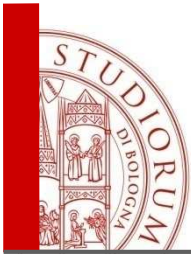
Introduction (1)

- Agricultural and Agri-food activities are affected by a wide set of regulations and prescriptions due to agricultural and non-agricultural policies
 - Decision Makers' (DM) actions affect society and impacts on democracy, ethics, transparency, responsibility and accountability
 - Complexity of human interactions, uncertainty, value conflicts make it difficult to foresee and estimate the effects/impacts of public DM actions



Introduction (2)

- Demand for public evaluations have increased in recent years with the aim of:
 - improving the quality of policy making
 - Improving the policy implementation process
- In EU context it is common to have ex-ante and ex-post evaluations realised by:
 - Same Institution
 - Consultants
 - Researchers



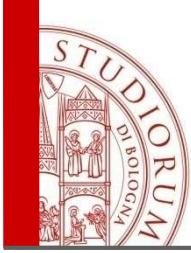
Introduction (3)

- A wide body of literature exists on the assessment of agricultural and food policies
 - evaluated through a quantification of efficiency or effectiveness
 - entire program or a single measure
 - evaluation tools: Cost Benefit Analysis or Multi-criteria Analysis



Introduction (4)

- Policy evaluation results provided by available tools are not completely satisfactory due to:
 - representation of a complex system (Funtowicz et al., 1999; Munda, 2000);
 - an operational definition of “value”: representation of the importance placed by different social actors at different elements (Munda 2004)
 - uncertainty (Stirlings 1998)
 - temporal distance between the policy implementation and the policy impact
 - limited knowledge about the future states of nature/conditions



Objective

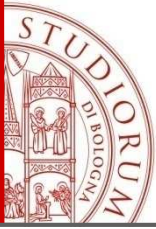
- The objective of this presentation is to provide a literature review of the Multi-criteria Analysis applied to the context of policy and regulation evaluations



Policy Evaluation (1)

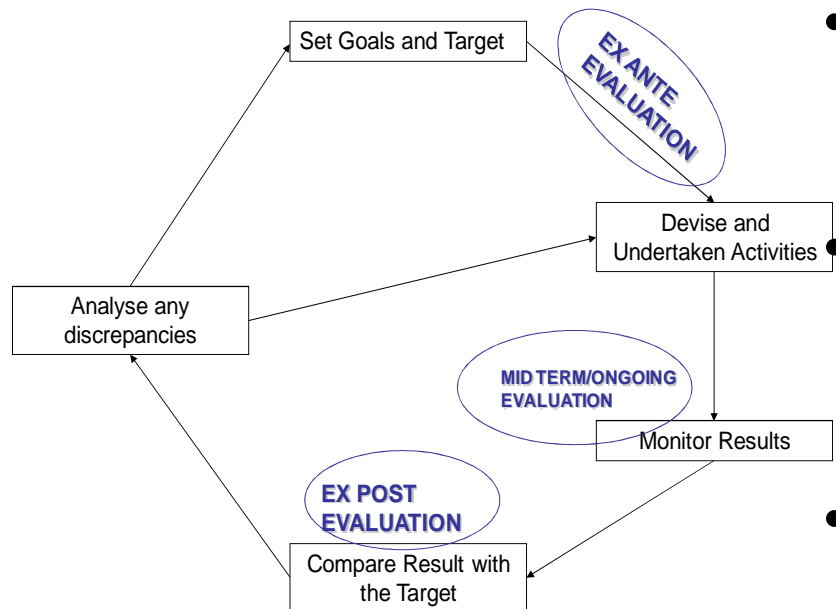
Definition

- “objective, systematic, empirical examinations of the effects ongoing policies and public programs have on their targets in terms of the goals they are meant to achieve” Nachmias (1979)



Policy Evaluation (2)

Typology



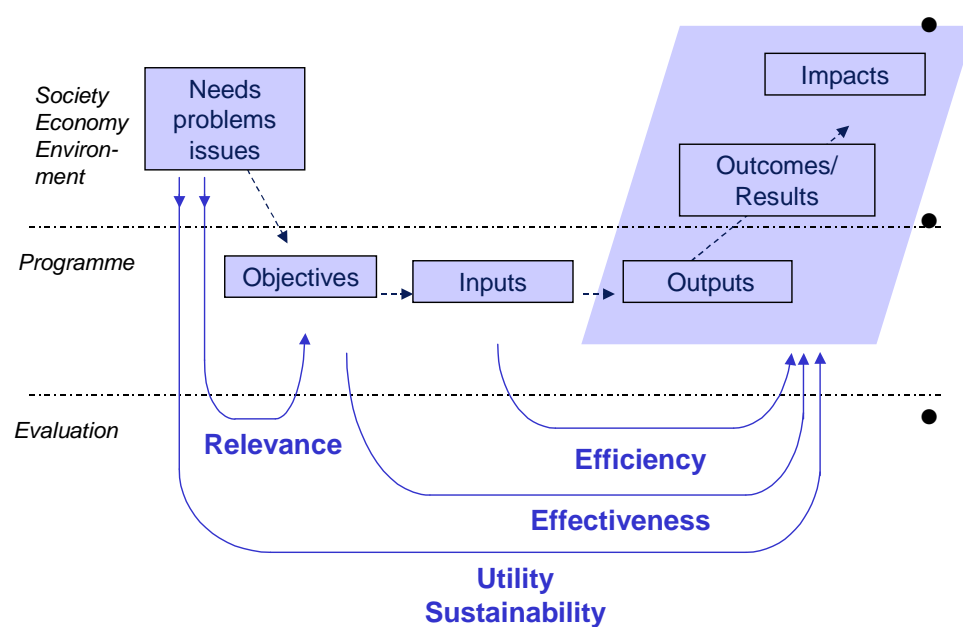
Source: Bartolini et al., 2005

- Ex-ante:
 - policy is still to be implemented
 - to define/choose policy parameters (policy design)
- Ex-post:
 - the policy has already taken place.
 - to evaluate policy outcome in order to gain information useful to revise policy design
- Mid-term/ongoing:
 - between the ex-ante and ex-post
 - check of the preliminary results and the achievement of the policy objectives,
 - used to collect information about the feasibility of the ex-post evaluation



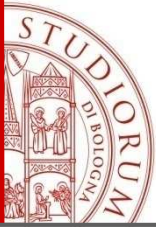
Policy Evaluation (3)

Evaluation Criteria



Source: Evaled 2009

- **Relevance:** measures the coherence and pertinence of the policy with the society, economy or environmental needs
- **Utility:** judgment on the degree to which the impacts obtained by the program are in relation to broader societal and economic needs
- **Sustainability:** judgment on the degree to which the impacts obtained by the program are in relation to broader societal and economic needs and are durable over time
- **Effectiveness:** the extent to which a policy achieves its objectives
- **Efficiency:** the extent to which a policy may achieve these objectives at a minimum cost.



Policy Evaluation (4)

Evaluation Purposes

Criteria	Evaluation typology		
	ex-ante	mid-term	ex-post
Relevance	X	X	
Effectiveness	X	X	X
Efficiency	X	X	X
Sustainability			X
Utility			X

Source: European Commission 2004, modified

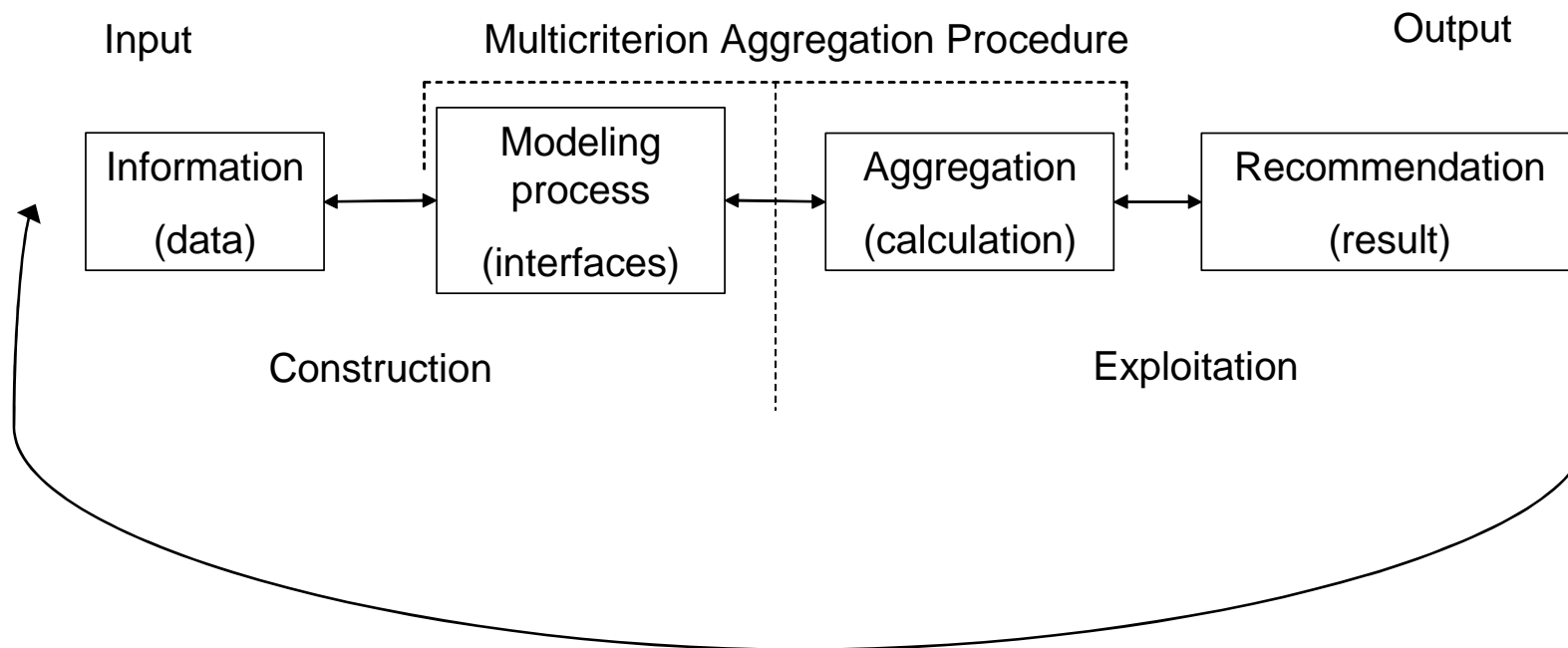


MCA (1)

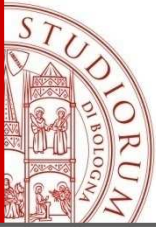
- MCA:
 - Tools to evaluate (compare) items (alternatives) on the basis of more than one criteria or objective
 - Useful for multi-dimensional problems
- Assumptions:
 - Many criteria have a role in guiding the evolution of a system
 - Such criteria are, at least locally, in conflict with each other
 - Criteria tend to require a compromise or a choice (*arbitrage*)



MCA (2) Phases



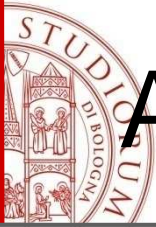
Source: Guitouni and Martel, 1998, modified



MCA (3)

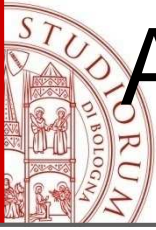
Multi-criteria aggregation procedure

- Three main families of multi-criteria aggregation procedures:
 - a) Elementary methods
 - a simple criterion of the choice is used (Sum, Lexicographic, Maxmin, Maxmax)
 - b) Single synthesising criterion
 - the preference is based on choice of alternative that provides the higher DM utility function
 - corresponding to the sum/products of the utility provided by all criteria or by the lower distance with respect to ideal situations
 - full compensatory
 - c) Outranking method
 - introduce aggregation procedures based on concordance or discordance concepts (Hayashi, 2000).
 - preference structure more articulated (strict or weak preferred) >>> identifying thresholds of concordance or discordance index
- Fuzzy approach (applied to the existing MCA aggregation procedure)
 - concept of fuzzy sets
 - each value a degree of membership to a specified set (between 0 and 1)



Application to policy evaluation (1)

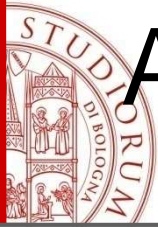
- Wide literature of application of MCA to the policy evaluation
- From project evaluation to policy evaluation
- Crucial points:
 - setting the problem
 - identification and quantification of evaluation criteria
 - weighting
 - results interpretation and analysis



Application to policy evaluation (2)

Setting the evaluation problem (1)

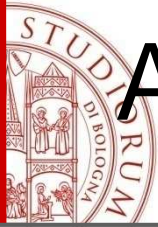
- MCA applied to policy analysis
 - used to support decision making regarding alternative project/policy options
 - based on a comparison of the performance of a policy (efficiency, effectiveness or cost-effectiveness)
- MCA applied to:
 - a) ex-ante:
 - compare/rank project alternatives in order to decide which one to implement
 - b) ex-post:
 - compare results among cases/areas
 - classify cases
 - compare real outcomes with expected/counterfactual/optimal outcomes
 - compare cases at different points in time.



Application to policy evaluation (3)

Setting the evaluation problem (2)

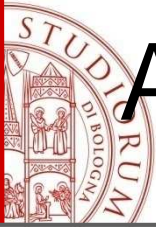
- Interaction between evaluator and Decision Maker
 - Institutional analysis
 - representation of the implementation process
 - causal relationships between policy designs and outcomes
 - understand and formulate the explanation hypothesis
 - identify the main actors involved in the policy process and those affected by the policy
 - generate the alternative options
 - Identify and adapt methodology/methods
 - role of Decision Maker in the evaluation (interactive methods vs. non-interactive methods)
 - level of complexity and transparency required in the process
 - quality and robustness of information available



Application to policy evaluation (4)

Identification and quantification of evaluation criteria

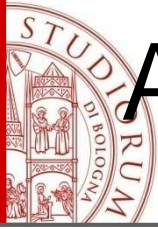
- Evaluation criteria are aimed at quantifying the consequences of alternative actions
- Characteristics:
 - exhaustiveness: all relevant criteria belonging to economic, environmental & social factors must be considered
 - consistency: the overall judgment of DM shall be coherent with the preferences, according to the criteria
 - non-redundancy: to avoid duplication and overlapping of criteria.
- Measured through indicators:
 - outputs
 - outcome/Results
 - impacts



Application to policy evaluation (5)

Weighting

- Weights represent the relative importance of each criterion in determining the social welfare associated to each alternative
- Weighted vs. un-weighted methods
- Several approaches are used to elicit weights
 - ranking criteria; rating methods; verbal statement; paired comparison
- Problems:
 - identification of relevant DM /stakeholders/ actors
 - policy makers are target respondents >>> expected to interpret the collective preferences
 - public could be interviewed in a contingent valuation style
 - include several groups of stakeholders/actors (farmers, consumers..)
 - eliciting weights when several groups are involved
 - group-based
 - individual-based



Application to policy evaluation (6)

Results interpretations

- Reading and discussing with the DM/actors/stakeholders could be useful to revise the MCA evaluation process
 - include/exclude indicators
 - add additional effects
 - add or remove alternatives
 - use different aggregation procedures
 - use a different criteria prioritisation (weights)
- Interpretation means answering the following questions:
 - altogether are the results stable and trustable?
 - what are the determinants of the results?
- ‘Trustability’ and stability of the results:
 - sensitivity analysis
 - scenario analysis
- Determinants of the results
 - classifying alternatives according to design/results
 - analysing components of the final result/score >>>> understand the determinants



Discussion

- Several MCA for policy evaluation (ex-ante and ex-post)
- Applications highlight room for improvement
 - difficulties in bringing a methodology from project to a policy (set of decisions)
 - common problem to the CBA but seem to suffer more when applied to wider issues.
- Literature on MCA still strongly focused on generating new algorithms (new aggregation procedure)
- Literature on MCA applied to policy evaluation increasing the attention on the significant evaluation problem (no needed to create new MCA algorithm)
- Areas where MCA needs improvement for the policy evaluation process:
 - selection of basic parameters (alternative, objective, indicators)
 - better incorporation of preferences beyond the use of weights
 - comparison of monetary costs and multi-criteria effects



Concluding remarks

- Several evaluation procedure are implicitly or structurally a typology of MCA problem
- MCA is particular interest/useful for policy analysis
- Development in the consistency of MCA and deployment of the decisions
- Improving the interaction between DMs & stakeholders - participative approach
- Improving the foundation of MCA in the administrative process and economic conceptualisation (monitoring and gathering of data).



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