

# XI ECOECO

VII Congreso Iberoamericano  
Desarrollo y Ambiente

XI ENCONTRO NACIONAL DA ECOECO  
Araraquara-SP - Brasil

---

RESEARCH OF TRADITIONAL VALUES USING THE METHODOLOGICAL INTEGRATION  
BETWEEN MACBETH SOCIOTECHNICAL PROCESS OF MULTICRITERIA DECISION AID AND  
ENVIRONMENTAL PERCEPTION

**SUZANA RASTELLI SATTAMINI** (UNICAMP- Inst de Economia/ PETROBRAS) - suzasattamini@yahoo.com.br  
*Doutoranda*

**Lucas Ferreira Lima** (FMU) - lucaslima.eco@gmail.com  
*Mestre*

# **Research of traditional values using the methodological integration between MACBETH Sociotechnical Process of Multicriteria Decision Aid and Environmental Perception**

## **ABSTRACT**

Until now, the literature shows that many interesting works have been done to evaluate traditional community-based participatory approaches in Brazil and internationally. However, several of these methodologies fail for not directing the focus of their analysis on values derived from traditional communities and populations in this divided society.

The question that permeates this work is: **Is it possible to achieve a methodological integration of multiple criteria analysis and environmental perception in the pursuit of traditional values?** (Emphasis added by the authors).

The theoretical framework that will fund this research is supported by Funtowicz and Ravetz (2003), regarding the aspects of problem solving that tend to be neglected in scientific practice: uncertainty, consideration of cultural values, and a plurality of legitimate perspectives when it addresses the Post-Normal Science (PNS).

The Post-Normal Science (PNS) considers these elements as an integral part of science. By its inclusion in the formulation of complex issues, the PNS is capable of providing a coherent collection regarding aspects of extended participation decision making, providing a new basis for assuring the quality research.

The ideas and concepts in the field of PNS bring new strategies for solving problems where the role of science is assessed in the context of the complexity and uncertainty of natural systems and of the relevance of human values and commitments.

For Funtowicz et al. (1993), different types of uncertainty can be expressed and used for evaluating the quality of scientific information. The difficulties of decision making would depend on the point formed from the components of two attributes: the risk regulatory decisions, that would contain arguments of high uncertainty, and a high objection regarding the quality of the scientific knowledge presented by the opponent.

A new science challenges the calculation possibilities, recognizing the importance of factors arising from indeterminacies, uncertainties of random phenomena and their contradictions, giving freedom to contribute to the advancement of knowledge. In fact, the conflict between experts and the public can lead to an increase of scientific

knowledge, since there is, for the latter, know-how, and an understanding of local conditions that could identify at least laboriously relevant data and thus help in solving problems. These new participants, named as extended peer community, act in order to ensure the quality of the results and transmit specific skills, besides enhancing traditional research communities.

For FUNTOWICZ (1997), since the uncertainties of the system permeate both the reaction capabilities of citizens as to how their rights are ensured, at first by the State, this third element – of social vulnerability – appears to settle the dynamics through which the decision making is engendered.

Based on the theory of decision analysis (Decision Analysis) a decision is thought of as a choice between alternatives that will produce uncertain futures, for which there are preferences. That is, this theory explicitly considers the uncertainty about the values of the criteria. Subsequently a decision tree is made with selected levels of attributes, as random variables in which are associated probability distributions at each level. Finally, the calculation of expected utility is made, that is the weighting of the probabilities for each level.

The MACBETH Sociotechnical Process of Multicriteria Decision Aid and the Environmental Perception are two methodologies that focus on the people's values and perceptions, both those of individual character and those measured from their participation in social groups they belong to, on which they have an affect and by whom they are affected.

To make decisions in complex situations, it is absolutely necessary to incorporate subjective aspects, being measured qualitatively and quantitatively and the alternatives must be analyzed in terms of their impacts on objectives. Finally, the complex decision to be made must consider the values, aspirations and perceptions of all the decision makers involved in the process (BANA e COSTA, 1993; LIMA, 2012).

Therefore, the approach Multicriteria Decision Aiding (MCDA - Multiple Criteria Decision Aid) considers and incorporates the subjective part and the information specialists' judgments about uncertainties or the identification of and structuring of multiple conflicting objectives through its three fundamental convictions (BANA e COSTA, 1993).

Studies of environmental perception have been used for different purposes. Research in ethno-botany, geography, anthropology, biology, medicine, history,

sociology, philosophy, education, art, architecture, engineering, tourism and other disciplines utilize it as a management and prospecting tool for industries, researchers, and public agencies (such as municipal, state and federal governments) to improve the understanding of issues, related particularly to the culture of the people, whether they come from traditional communities or just human groups with strong and different sociocultural characteristics in contrast with the globalized contemporary mainstream culture.

Thus, in the context of conservation and / or sustainable development of natural areas where human activities are developed, the environmental perception highlights the differences that come out of this relationship, mediating the dialogue necessary to the contemporary life establishment, in keeping with the significant traditions and cultural factors for individuals and social groups to which they belong.

Environmental Perception is the apprehension of a given real object, the establishment of a link between empirical knowledge (a posteriori) and a real object (feeling) for the interpretation of the stimuli and the construction of their meanings. It tries to establish, as a process: receipt, capture, feeling, thinking, and understanding, in the clash of memories with the present data and the withholding of those that harmonize with changes that count for the individual and their community.

Therefore, the aim of this paper is to find a methodological approach to integrate MACBETH Multicriteria Decision Support and Environmental Perception, whose knowledge acquisition methodologies are supported by **the Post-Normal Science**, which is also their theoretical basis.

In the second part of this work the theory of Decision Analysis and subsequently the theoretical basis of socio-technical process of MACBETH Multicriteria Decision will be presented. In the third part, the theoretical basis of Environmental Perception and its specific application to this socioeconomic cropping will be shown, and in the fourth section, the possibilities for integration and final methodological considerations will be exposed.

## BIBLIOGRAPHY

ABBAGNANO, N., *Dicionário de Filosofia*, Traduction of Alfredo Bossi e Ivone Castilho Benedetti. 4a.Ed.São Paulo, Martins Fontes., 2000, 1014 p.

ALTMAN, E., CHEMERS, M. M., *Culture and environment*, Cambridge: Cambridge University Press, 1989, 337p.

BANA E COSTA C.A., ENSSLIN L., CORRÊA E.C., VANSNICK J.-C., *Decision support systems in action: Integrated application in a multi-criteria decision aid process*,

[European Journal of Operational Research](https://fenix.ist.utl.pt/disciplinas/maad/2011-2012/1-semester/teaching-material-for-the-dama-course), 1999, vol. 113, no. 2, pp. 315-335, disponível em: <https://fenix.ist.utl.pt/disciplinas/maad/2011-2012/1-semester/teaching-material-for-the-dama-course>

BANA e COSTA, C. A., *Processo de apoio à decisão: actores e acções; estruturação e avaliação*. Publicação CESUR, S.l., v. 618, p. 31, 1993a.

BANA e COSTA, C. A., *Três convicções fundamentais na prática do apoio à decisão*. Pesquisa Operacional, S.l., v. 13, n. 1, p. 9-20, 1993b.

ENSSLIN, L.; MONTIBELLER, G.N.; NORONHA, S.M. *Apoio à Decisão: Metodologias para Estruturação de Problemas e Avaliação Multicritério de Alternativas*. Insular, Florianópolis, 2001.

FANTINATTI, P. A. P., *Abordagem MCDA como ferramenta de mudança de paradigma no planejamento dos recursos hídricos*. 399 p. Phd. Thesis - Faculdade de Engenharia Civil, Arquitetura e Urbanismo, Universidade Estadual de Campinas, Campinas [Brasil], 2011.

FUNTOWICZ, S., RAVETZ, J.R. , *Post-normal science*, Economics Internet, Encyclopaedia of Ecological Economics, 2003.

FUNTOWICZ, S., RAVETZ, J. R., *Ciência pós-normal e comunidades ampliadas de pares face aos desafios ambientais*. História, Ciências, Saúde. Manguinhos, vol. IV(2), 1997

FUNTOWICZ, S., RAVETZ, J.,R. *The worth of a songbird - ecological economics as a post-normal science*. Ecological Economics 103: 197-207, 1994.

FUNTOWICZ, S., RAVETZ, J. R. *Science for the post-normal age*. Futures, 25(7), pp. 739-755, 1993.

GALDINO, Y. da S. N. *A casa e a paisagem pantaneira percebida pela comunidade tradicional Cuiabá Mirim, Pantanal de Mato Grosso*. Cuiabá, 2006. 83 f. Ecology Dissertation (Master Course) - Programa de Pós Graduação em Ciências Biológicas do Instituto de Biociências, Universidade Federal de Mato Grosso, Mato Grosso, Cuiabá, 2006.

KANT, I. *Crítica da razão pura*. Tradução de Valério Rohden e Udo Balduer Moosburger. Coleção Os Pensadores, São Paulo, Ed. Nova Cultural Ltda., 2000.

KEENEY, R. L. *Decision analysis: An overview*. Operational Research, 30(5), p. 803-838, 1982.

LIMA, L. F. *Processo Sóciotécnico MACBETH de Apoio Multicritério à Decisão e a organização de comunidades tradicionais: O caso da Comunidade do Marujá no Vale do Ribeira* – SP. 195 p. Dissertation (Master Course) – Instituto de Economia, Universidade Estadual de Campinas, Campinas, [Brasil], 2012.

MARSICO, J. *Petróleo e gás na bacia de Campos (RJ): percepção dos impactos ambientais pela população*. Dissertation (Master Course) – Departamento de Ecologia, UFRJ, 2008, 75p.

MERLEAU-PONTY, M., *Fenomenologia da percepção*, Tradução de Carlos Alberto Ribeiro de Moura, 2ª. Ed'. São Paulo, Martins Fontes, 1999, 662 p.

PEDRINI, A.de G., *Metodologias em educação ambiental*. Petrópolis: Vozes, 2007; 239p.

SAES, B. M., *Macroeconomia ecológica: O desenvolvimento de abordagens e modelos a partir da economia ecológica*. 2013. 144 f. Dissertation (Master Course - Concentration Area: Economic Development, Space and Environment- Instituto de Economia- Universidade Estadual de Campinas, Campinas).

SATTAMINI, S.R.; SILVA, G.H., *Percepção ambiental como estratégia de responsabilidade ambiental na indústria do petróleo e do gás*, Rio Oil and Gas Expo and Conference, Anais, 2010, ANL, 17556, CD 665.5, R585, 2010, disponível em <http://ibp.org.br/main.asp?Team={B10B372D-D0EB-4B5A-8A5D-0B6F0FC8810B}>, acesso em 06/10/2011.

TUAN, Y. Topofilia: *Um estudo da percepção, atitudes e valores do meio ambiente*. São Paulo, Difel, 1980, 288p.

WHYTE, A.V.T. *Guidelines for field studies in environmental perception*, UNESCO- Intergovernmental Programme on Man and the Biosphere (MAB)- Institute of Environmental Studies, Toronto- Canada, The United Nations Educational, Scientific and Cultural Organization, Paris. 1977.