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A PARTICIPATORY MULTI-CRITERIA DECISION PROCESS IN PUBLIC ADMINISTRATION

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Abstract

In public administration, different methodological approaches can be adopted to facilitate interventions for different problem situations. Multi-criteria aid models (MCDA) are proposed to the solving problems which deal with several complexities and obstacles. Many facets must be considered to present a decision process for which an analyst's intervention has been requested: to name the involved actors and to explain their roles, the decision aiding process and its orientation towards a specific aim in relation to the decision process, the evaluation model, the modelling process and its validation, the use of the adopted multi-criteria method, the results produced and their use.

A first aim of the paper is to distinguish between different Public Administration problem situations and decision contexts in which MC applications are developed, taking in consideration that societal complexity calls for stakeholder participation, for facilitating communication between the government, citizens, stakeholders and interest groups, and businesses regarding a specific decision or problem. A second aim consists on pointing out how to build a participatory decision process and to apply it in a real case.

Key words: *public administration, decision, complexity, MCDA, participation.*

Introduction

The topic of a decision in a public administration is quite complex and has always raised a lively cultural debate. To make it easier we see briefly to identify and illustrate some basic propositions. First of all the purpose of the decisions of a public administration is to promote the social well-being and the elements constituting the social welfare are given by the levels of the individual members of society well-being. Then, any changes on individual well-being are, therefore, important for social welfare. Conversely, an action that has no effect on individual well-being, has not even on social welfare and, with a few exceptions, the feedback of the individuals will be accepted as indicators of individual well-being.

Clearly, it would be desirable to have uniform procedures for aggregating the levels of welfare of different individuals, so you can compare social welfare resulting from different political choices. But, although it is sometimes possible to make judgments unique, there is no procedure applicable in all circumstances. Nevertheless, you

can identify significant aspects of the decision-making process looking at how to properly assess their effects on social welfare.

The five propositions do not translate immediately into concrete courses of action, but so operating intend to offer to the public decision-maker some principles such as to identify the criteria to evaluate different courses of action. Often will have greater weight other factors, primarily political ones, or it may be that in making a decision or analyze a situation on behalf of others, it is considered appropriate to seek solutions dictated by ethical or theoretical justifications, especially when choices have to be made operational made at higher levels. We see still in operation mode process phases that characterize the identification of the objectives of the decisions of a pa.

In this context for social welfare we shall understand precisely what a community, understood as the set of persons whose interests are affected when taken a certain decision. Now what we want to achieve with a decision? With

which kind of criteria we will decide that a certain set of actions is preferable to another? It's clear that a public decision in a democratic society should act as a servant to the people, trying to make the most appropriate choices for those on whose behalf it acts. The general objectives of public policies must reflect the fundamental values on which a community reaches the widest consensus, although there will be areas of disagreement on how to translate values into criteria or specific objectives, and in the choice of the concrete programs of action. For example, a rough consensus on the respect due to the individual leads many to believe that decreasing unemployment was a desirable goal. However, they are the legitimate conflicting opinions on the role of the state in this process, or how much you have to sacrifice other goals, such as the control of inflation, the reduction of one percentage point in unemployment. We must recognize that, ultimately, the goals are personal judgments, on which even well informed people may disagree. At the same time, policy makers, which mostly relate to already established objectives, should understand that part of their job is to make sure that their choices are in line with the fundamental values of the society or community in which they operate. In reality, few policy makers have the time needed to deal with the daily problems of principle. We can only hope that the analytical tools, criteria and evaluation systems that they seek in decision making are in fact, rooted in the principles of ethics and core values of the company.

The decisional model

The divergence of views on the effects of the decisions in public administration would be reduced, and perhaps disappear altogether if it were possible to predict with certainty the consequences of each course of action that you would like to follow. How to measure the consequences of a decision is quite complex and a solution can be found starting from the identification of preferences, in relation to the cardinal or ordinal evaluations between two different situations. Most of the public decisions require difficult choices, both from an ethical and political point of view, between some alternative courses of action that favour different social groups. The impossibility of finding conclusive criteria for resolving social conflicts requires efficient decision making process which could be accepted as legitimate. Relying on well-defined

decision-making process for a community implies that even when individuals are completely disagreed on the decision to be taken, however, are in agreement on who should take it, and on the procedures to be correct. They believe that the way in which decisions are taken is more important than the content of those decisions. What then must be the characteristics of a correct decision-making process, especially in the case in which more responsible, with objectives also between their conflicts, take part in a decision?

For the public service, so operating, a choice problem is divided into several stages starting from the context, from problem identification and the specific objectives to be pursued on fronting it. It follows the description of the alternatives or courses of action and information gathering. Then the identification of the possible effects of each of the different lines of action and what the appropriate techniques to predict them. Finally the evaluation of the results that is, how to measure the success achieved in the pursuit of a certain goal and what the course of action to choose from. Of course, they will not follow the steps set out a strict procedure, but they will have succession in an iterative and interactive way so that the analyst can move forward and backward in an attempt to centre the problem, to specify the objectives, identify the lines of action prosecutable, predict its consequences, to establish the evaluation criteria, to assess the existing trade-off, in order to gradually refine the analysis.

The managers of the public choices operate in any event through a model representing an intentional reduction of a staggering mass of facts, assessments and information to a size and controllable form. The analyst's job is to eliminate non-essential elements that hide the problem to describe so the structural relationships between the relevant variables, so that you can limit the consequences of a particular public choice.

Recent developments of decision theory to a descriptive approach it is more and more often associated an approach of constructive type, which bases its rationality on the responses to the preferences system, and exactly on their consensual and consequential construction and their interrelationship. After the descriptive part that includes all possible choices for who makes the decision and provides predictions about the consequences of each of them, it follows the part made up of all procedures to make a choice between alternatives, as soon as the preferences

between the different results has been expressed. In any case, as long as the alternatives are not described with sufficient accuracy, one cannot choose effectively. The construction of a model provides many elements to locate the necessary information to make a decision and to evaluate the different types of information. If more information will become available at a later time, it becomes obviously useful to postpone the whole or a part of the decision to keep a certain degree of flexibility. It may also be advisable to devote resources to obtaining additional information before deciding.

At any case, the construction of a model is based on the communication between the analyst (decision aider or DA) and those who deal with a particular issue because they can clarify the definition of the problem and explain in clear terms what would otherwise remain implicit in the mind. To deepen the analysis of public decisions is good to know, through the help of the DA, which conceptual models can shed light on the problem, their plausibility, and their actual working environment in which decisions, which kind of inserted parameter values become significant. Concisely, the essential elements of each act of choice are the alternatives or courses of action available to those who make the choice (decision makers or DM) and its preferences between them.

It should be stressed that the decision-making process revolves around a real world and a symbolic world. The DM position is in between the real world and the symbolic world. In the real world the decision is becoming operational not only for testing and development of the results, but especially in the identification of stakeholders, the set of actions, criteria and evaluations, and the DM will provide for their collection upon specific indications of the DA. The DA is located in the symbolic world, supporting and interacting with the DM, collecting and analyzing the data; only when and all the necessary information has come from the real world, through a process of abstraction, he selects the mathematical model and processes the results. These results are interpreted with DM and, if found to be robust and consistent with certain expectations, can be operationalized, or reprocessed for their further refinement. DM will be in his position as the first responsible for the decision, to judge whether the process should be revisited or satisfaction.

It should also be considered that every decision model forces the DM to express in units of

measurement is comparable alternatives available both his preferences among them. Some preferences are measurable in a more or less objective way, others not at all. Then the model must possess a certain flexibility to be able to operate with all types of variables, constituted by simple numbers or judgments, with which the preferences of the decision maker are expressed.

Multi-criteria analysis

The first task element of the model is a description of the courses of action available to the decision maker to be evaluated according to specific criteria. It's rare that best combinations of criteria is promptly clear, and, at times, it is difficult to make a rational comparison between two courses of action that have complex set of attributes. Since the criteria used in a problem determine the final choice, great attention should be devoted to their selection. The set of criteria needs to be comprehensive, that is, there must not be any gain (or loss) of well being that is not reflected in an improvement (or deterioration) of at least one attribute. It must be relevant, that is, in their dynamic and socio-economic aspect must be truly significant in identifying the most appropriate decision. It must be measurable, that is easy to interpret to express the preference values communicative and useful for comparisons between different actions. It must be reliable, for the basic data available; have analytical consistency, that is, to be operational in the forward looking terms such as to allow modifications in the various scores and expressed in the comparison of lines of action.

The decision problems that public authorities have, cover a lot of goals that could be economic, social, physical and chemical, psychological, administrative, engineering, ethical and aesthetic; certainly, they cannot be summarized in a single lens that to achieve economic efficiency. The appearance of multi-objective includes some heterogeneity which often results in a lack of comparability and incommensurability; also most of the time they are incompatible and conflicting with each other, for which the attainment of one of them is not necessarily compatible with that of another. And do not forget that a certain incompleteness of knowledge and information introduces uncertainty into the process, so it is necessary to use their rational procedures for dealing with situations and ambiguities that gradually arise.

The definition of the set of attributes related to a certain problem constitutes the most of the work. First you need to decide which criteria most interested in, that you have to make a comparison or weighting between the same attributes considered, so that you can assign them the weights in an objective way. On the basis of each criterion, the alternatives must be an ordered set in the sense that for each pair is possible to express a preference or indifference over the other and that such preferences are transitive.

Once the preferences expressed are very elementary methods which could be a useful tool in certain situations or at least provide guidance to solve a complex problem.

Finally, and not least, is the variety of stakeholders around the decision-making process; while the singularity of a decision maker ordinarily translates into an overall evaluation, the plurality of actors gives rise to a diversification of assessments, for which it is necessary to resort to a series of procedures that have been identified in the presence of a group of decision makers and ranging under the name GDSS (Group Decision Support Systems).

Ultimately a public decision-making process must in all cases include human preferences, through a specification of the trade-offs between the objectives; should be changed to a rationality of sequential procedures and not so much the result of rationality, that is, be a "process-oriented" and not an "outcome-oriented"; must be interactive, that is, such as to adapt to the improvement and quality of information so that solutions can be reshaped continuously and sequentially; It must make it possible, through a hierarchical structuring of more decision-making levels, to reduce the complexity and ambiguity of objectives, partitioning and coordinating the objectives eventually stuck to each other and to mitigate the conflict situations in order to achieve compromise solutions result of various mediations. The rationality of the process must be such as to follow the principle of maximum satisfaction rather than the classical optimality. Economists generally tend to use decision-making tools based on the construction of utility functions, the efficiency of borders, of the decision trees related to probabilistic distributions of the states of nature. We believe such approaches only sophisticated and attractive from a mathematical point of view, but useless from a point of its operational view for the considerable difficulties that are encountered in

constructing the individual utility functions, and then group. We believe that, as conceived in the loading issues with the government, given the presence of stakeholders with objectives more often fully conflicting, given the large number of criteria that can be identified for evaluation of the chosen courses of action and their mutual weighting, as thick assessment consists of attributes that translate into semantic and ordinal scales and therefore the need to combine quantitative and qualitative data, the belief is that only multicriteria models, newly developed, can obtain an evaluation lines of action, in a decision-making part and transparent. Alongside sustained process of economic growth, the emergence of new social, psychological and environmental (reduced productivity rate deterioration of natural resources, growth in demand for water and energy shortages or misdistribution of food, environmental pollution, urbanization and the dissolution of traditional society) that make complex territorial reality and determine the delicate management systems. Those costs are understood as entities with objectives summarized by many mutually interrelated components and interaction from a diversity of individual actors with specific orientations and interests towards the gratification of their own needs. Only genuine participation in decision-making can be such as to accept an actor a particular solution that does not meet certain individual expectations and as a gratification that motivation. The adopted decision, whatever it may be, will not drop from above, as set by an outsider to the local context. We believe that very often the dissatisfaction with a certain decision, withholding tax by a foreign sphere, both because of discontent and causes in some places even the abandonment of the territory.

The decision model

The multi-criteria analysis (MCA) is identified with a variety of methods and models traditionally used in a decisional process a decision, in order to evaluate or compare alternatives with respect to a variety of criteria or points of view. In any case, the purpose of the AMC is to provide an aid in making the best decision even if some are obvious limitations on the objectivity of this concept, for various factors including the not complete definition of the set of actions, that the person really capable of making decisions is a great person and is often confused with the one who ratifies decisions. When a real decision maker

exists, rarely his preferences have been clearly defined in their analytical form; sometimes they are uncertain, arbitrary, conflicting and contradictory. Also, not to be overlooked that only by a mathematical model is impossible to say whether a decision is totally good or not: non-mathematical aspects, but managerial, psychological and cultural, very often contribute to the quality and success of the decision.

Then it would seem impossible to provide a truly scientific tool for the achievement of a good decision and that the search for suitable instruments not overlaid no interest. However, the Multi-Criteria Decision Making (MCDM) own research tools capable of providing answers in a context in which the mentioned limitations are mitigated as much as possible.

Given the dynamics of their situations of decision-making, it is more appropriate to speak of MCDA (Multiple Criteria Decision Aid) which, in a continuous interaction between analyst and decision-maker, wants to basically empower the decision maker to increase the degree of compliance and consistency between the evolution of the decision-making process, the amount of information acquired and the value systems and objectives included in the process itself.

The purpose of the "decision aid" is to help to find a way for the solution of decision problems, in the presence of ambiguities, uncertainties and plenty of bifurcations. It is essential that research is then conducted taking into account that concepts and procedures are not designed as a pre-existing truth that can be universally imposed, in addition to a methodical decision-making aid, can be beneficial to the development of the decision-making process and that the resulting solutions are a key starting point for a possible refinement of the same.

In MCDA a decision problem can be summarized in a diagram (A,G,V), i.e. "*Alternatives, Criteria, Evaluation*", where A is the set of courses of actions subject to the decision; G the set of at least two criteria that express different levels of some dimension (both quantitative and qualitative) underlying the decision; V set of evaluation expressed by each of the alternatives according to each of the selected criteria. A multicriteria problem is then synthetically expressed by means of a data array in which each action is identified by a row vector of evaluation according to selected criteria.

If A contains a reduced number of alternatives, the solution of the problem is trivial. Unlike the case when A is extended, or the analysis of the consequences of the actions leading to the construction of more criteria. In this complex situation, based on the performances of all the action on various criteria, the problem is to consider what the reasons, calculations and deductions that may justify the submission of choice "in the action is better or no worse than b". The structure of a multicriteria decision problem is summarized in the following phases:

1. Defining the problem (motivations, actors expectations, environment concerned);
2. Set the definition of actions or strategies;
3. The issue request;
4. Definition of specific targets or points of view;
5. Construction of criteria;
6. Choice of the most suitable combinations

In a decision-making context, one can speak of optimal solution when the problem, instead of a set A well-defined and fixed, is formulated so that the solutions considered are mutually exclusive and can be classified beyond any doubt from the worst to the best.

The best known decision models are based on two different philosophies of thought; there is a French school (Electre models, Promethee) based on the concept of outranking (outranking relation) and an American school (AHP models) based on pairwise comparison.

To report outranking mean that action at outclasses the action b if there are sufficient arguments to assert that is at least as good as b without there being a really important reason to deny this assertion. The pair wise comparison is based on assigning to the preference of a with respect to b, or vice versa, a score through a default semantic scale.

Furthermore, it should be stressed that the various models allow to solve various decision-making problems whose distinction resides essentially in the fact that in some use is made of a mutual comparison of the actions, is to arrive at a set as few as possible, that to subdivide the set A into equivalence classes to be ordered by preference. In other you deal considering the intrinsic value of the alternatives, allowing the assignment of alternatives in predefined categories. The choice of an AMC method strongly depends on the decision problematic reference and therefore must make distinctions.

The *problematic α* (choice) is to select a group of actions of A that for the decision maker appear as the best, through a succession of subsets of A, always as small as possible, it contains the actions that are gradually configuring as the "best".

The *problematic β* (sorting) involves the selection of actions that appear "good", the exclusion of those not satisfactory and a possible supplementary investigation with a request for more information for the other (selection of projects, candidates in a competition, etc.). It leads to a trichotomy segmentation of A, that is, at a set of actions A division into three categories or subsets, between their mutually exclusive.

The generic action is assigned to the best category if it deserves to be accepted without the intervention of the decision maker; the worst category if it is rejected for lack of requirements for acceptance; the intermediate category if deserves further examination by, for example, the decision to intervene. Depending on the problem and its classification requirements, the segmentation may be extended to a greater number of categories of three.

The *problematic γ* (ranking) is to construct a ranking of the alternatives of A, from best to worst or achieve an ordered series of indifference classes that go from best to worst. There are numerous cases in which the decision maker knows he has the possibility of choosing more than one action, but he also knows a priori while accepting all satisfactory actions. This can happen when the set A consists of still viable projects (Research and Development) for a company, or for more skilled candidates to fill certain positions, substrates used in an advertising campaign, to build a portfolio of securities, etc. It prevails in a sense the spirit of the competition: it comes to group items of A into equivalence classes by defining a complete system of A. The decision maker will choose the different actions according to this law and its financial resources.

Cases study

a) Airport location

In a region [1] the two airport facilities have very specific characteristics. One stop away from the city, chosen by the national carrier and other international is fully operational and in anticipation of growth, needs a restructuring, extension, and links functionality with the capital city. The other structure on the outskirts of the city, presents a continuous urban settlement near

the track, due to significant issues such as social, environmental and liveability of the area.

Then it has needed the selection of the new airport and the deputy to that location area. The various hypotheses for a location have been formulated based on the function that the new airport structure should play as the host of low cost airlines that currently use the airport to be dismantled. The amount of flow is classified as a national of an airport between 10 and 5 million passengers a year. The main routes are then to Italian resorts served by a regional airport and in most major European capitals. Airports of this type and size typically arise in non-areas close to city centres and are served by connecting infrastructure, which have undergone upgrades or have been built from scratch. Such systems allow an easy and proper use thereby avoiding inter alia of overcrowding and local traffic congestion, in conjunction with the continuous arrival of users. The high flows therefore require infrastructure links that do not create or interfere with the problems already present in the local urban settlements, to facilitate the users and also the near municipalities that are efficient and adequate compared to the urban plan and the network already present in the territory.

Tools for a rational implementation reside in different PRG that trigger classification of the intended use of the areas and used to plan a strategy of adequate development in relation to local and regional realities. And also in the presence of an adequate rail network and the latest apt to solve the issues of the road network congestion if this were deficient or obsolete concept or a local or overcrowded for the presence of commuters and frequent users.

The sizing is logically related to the catchment flow that could take advantage of the structure. The main and direct influence on the territory is the occupation of the area on the ground which must be appropriate and compatible with the existing reality for the environmental and socio-economic aspect. Overloading a small company to push it towards an economic Forced launch would have an economic heavy feedback and would result in a significant lowering of the quality of life for social and environmental problems. The social aspect is also of interest to the tourist part of the territory on which there may be consequences in the event that the goods are present and sites of historical, artistic and cultural interest, which could be an alteration of their state unless an elimination from the reality in which

they appear. Environmental issues likely to be aggravated by the presence of the airport itself and the presence of a cross road communication, which would increase in a huge urban pollution and the risk to the health of citizens of the affected area.

The areas affected by the presence of a structure of this type, is defined catchment area: this can be defined according to economic influence of socio bands and the reach ability methods relating to the characteristics of the communication routes and to the receiving capacity of the area in where the structure resides. An airport compatible with the area under the environmental aspect, the cultural and social reality should be the aims for a fair and targeted investment. It should be the aim to obtain a location of the area of revitalization.

Regional authorities, national association of pilots, the companies intended for logistics services of the airports for a choice of participatory alternatives to localization, conducted through a multi-criteria analysis have identified the factors that represent the breakdown of the main problem.

The criteria were as follows: proximity to the population, interconnection, visibility and manoeuvrability, economy, environment (natural, air quality, protected areas, alternative energies), geological properties, flood risk, seismic risk. Each of the criteria has been examined in order to determine the most appropriate scale of assessment possible.

Proximity population: to carry out the calculation of the population directly affected by the work it was first verified the population municipality.

Interconnection: with it the routes that connect the sites with the city of Rome, its volumes disposed of and the time taken to cover them were identified.

Visibility and manoeuvrability: this criterion proceeded in an empirical reporting of the comparison values in pairs as established by professional drivers from the long flight experience.

Cost-effectiveness: to evaluate this entry is a comparison of the value of land was made at the alternative sites and any transfer costs or demolition of structures.

Environment: the item includes four sub criteria (naturalness, air quality, protected areas and alternative energy), which were analysed separately with a weight determined on the basis of a comparison internally couples.

Natural landscape: To evaluate this item you used

the Territorial Regional Landscape Plan (PTPR) available in that region.

Ambient air quality pre-construction: to check the air quality in the areas in question took consulted the Health Environment Report, in particular bio-monitoring of air quality campaigns.

SCI (Sites of Community Importance) and SPA (Special Protection Zone) was also verified the presence of any protected areas in the nearby of the sites of interest that may be affected by the construction work.

Alternative energies: to estimate this criterion has performed a pairwise comparison between the sites. Were taken into account the presence of geothermal sources in the affected areas, the topography of the area and the presence of waste to energy plants or waste treatment.

Geological properties: has been studied the geology of the sites to determine which substrate is more suitable to accommodate the structure in question.

Flooding risk: this criterion is estimated based on morphological characteristics and the slopes of the study area with the information derived from the presence of streams that the surface drainage network.

Seismic risk: this ratio was calculated using the specific seismic classification of the region in question.

Based on the above criteria have been identified four areas in the north of the region involved and after assigning weights to criteria, conducted in concert with the heads of the decision, it proceeded to the application of the model that has led to a solution different from that which the regional administration had indicated as the most plausible.

b) The land consolidation

The problem [7] of land consolidation is very relevant and Agricultural Policy has ruled particular conditions in the sales of farms. The adjacent neighbours must be involved (pre-emption right) and in the case of more than one available for the stated price, the choice of the candidate having priority is not an easy task. It has, then, to be considered not only the subjective ability of the farmer, but also the nature, productivity, endowments of his farm with respect to the adjacent one in sale. The adopted procedure takes into account all the attributes related to the farm on sale, to the prospective buyers and their farms.

The problem of ranking farms is attacked through a hierarchic procedure, similar to that of other decisional models, which, however, with respect to this one, do not allow the real and exhaustive integration of information. The goal is to obtain the preferable pre-emption with respect to neighbours, on the base of attributes assigned to them and to their farms. The decisional attributes are subdivided into two levels, see tab. 1. On the first level of attributes *F* we put the following ones: land feature similarity (*SIF*), professional qualification (*QPR*), production efficiency (*EFP*), family working units (*ULF*).

At the second level *S*, let us consider the following division in sub-attributes:

SIF: cropping pattern (*SOC*), homogeneity (*SPI*), boundary barriers (*SBC*) and land size (*SES*); *QPR*: years of activity in agriculture (*QLA*), high school degree in agriculture (*QDP*), degree in agricultural sciences (*QLR*), other diplomas (*QLV*) and professional qualifications (*QQV*); *EFP*: age (*EET*), field yields (*ERS*), mechanization (*EMC*), irrigation availability (*EIR*), industrial or tree crops (*ECI*) and greenhouse or horticultural crops (*ECO*); *ULF*: number of family workers (*UNF*), active family workers (*UFA*), family workers qualified as farmers (*UCD*) and other incomes (*UAR*). The joint evaluations are fundamental in the selection process: for each sub-attribute they are obtained by multiplying the value of those subordinate by that relating to the first level attribute to which it belongs. All that bearing in mind that, by belonging to a sub-attribute related to a strong attribute, its weight in decisional terms is enhanced. We can say that the least the value of resolution rate, the greatest is the associated preferability to the attribute. For example, the attribute of least relevance relates to the age (*EET*), whilst that of greatest relevance to the other incomes (*UAR*). By the increase of the importance stated for each of the second level attributes, the corresponding values of resolution rates decrease, coinciding with a rising differentiation and informational order in the decisional process. The entropy decreases and we are closer to the ideal point. The same evaluation procedure is now passed on to the single farms according to each attribute of second level. Having, for instance, chosen the sub-attribute *UCD*, on its base are stated the preferences with respect to adjacent farms by means of differentiation rates. From this stage, subordinate and joint evaluations and resolution rates are

derived. The evaluation of each farm gets, therefore, a weighted relevance by the corresponding sub-attribute in consideration.

We can then say that farm *F4*, according to the attribute *UAR* has the highest preferability, while low preferability relate, for example, to farm *F1* according to the attribute *EET*. Through the preferability shown by each farm, according to the various sub-attributes, it is calculated the global preferability associated to the first level attributes. As comment of these partial results, we can say that the highest preferability relates to farm *F4* according to attribute *ULF*, while the lowest to farm *F2*, according to attribute *EFP*. By multiplying amongst them the results from primary attributes, we obtain the total values of absolute preferability associated to each farm. The outranking relation yields the following ranking of preference, from the farm with highest pre-emption right to the lowest one.

c) Solid waste disposal

The problem [8] is born with the aim to find the most reasonable solution for the best system of the treatment of municipal solid waste in the long run. The area in consideration of 3,700 sq km had an urban centre with the 50% of the 44,000 inhabitants of the entire area, with a total of municipal solid waste of approximately 19,800 tons/ in and of industrial waste in 336,000 ton/year. Industrial waste material by three paper mills and paper milling. Three modes of waste treatment have been considered: hygienic landfill, an incinerator, or an incinerator composting, to give paper and pulp to be allocated to energy for 22,000 MWh, or derivable from other sources. In addition, the treatment methods resulted in three possible levels of cooperation: decentralized, centralized, and intermediate between the two. Each method of treatment, except for the incinerator, or may be used separately in each municipality, or in an inter-municipal cooperation at various levels. In the decentralized system, each municipality takes charge of their own waste. In the intermediate system, the region was divided into the possible real cooperation area. In the centralized system the waste should be treated in situ. The level of recycling is varied depending on the method of its treatment. In any case, the chosen methods fall under the current legislation. Composting and burning for energy production involve separation at source. After the separation, a quality control is done manually and via

magnetic separation. In the final stage, the waste is homogenized with a grinder on which 6 of centralized alternatives, 5 decentralized point and 3 intermediate type have been identified.

That Country in the final decision of environmental problems lies with the municipal councils on the basis of the proposals of the central government regulations. The technical and environmental staff of the municipalities has been involved in data preparation and issues: key role as the funds for the treatment of solid waste coming from their own waste producers. So, the economic responsibility left to the municipal councils is rather marginal.

The decision-making group supervisor who then represents the DM, that is, the stakeholders, in this case was made up of various stakeholders including the heads of the municipalities involved, the associations related to the regional and district planning for water and environmental management. The supervisor group has an important role in the planning process as it oversees the project as a planning time frame.

The choice of the weights assigned to the various criteria has been delegated to the environmental technical staff of each municipality. In addition, each decision maker has submitted a preliminary proposal of weights and then discussed in the final stage by the entire group.

In order to compare the different alternatives we are then introduced visa criteria as tools of decision and their determination, understanding and acceptance by all actors is the central problem and most complex of the entire decision-making process. Especially in environmental issues it is quite unlikely that the parties involved have the perception of causal relations of the problem and affects every single action of choice. This highlights how important the role of the decision-aider in their identification and selection. In this case the final choice of the criteria family is occurred in a first phase in the full definition and hierarchical arrangement of the various objectives which may derive both from the effects of the landfill functional elements (F) and extrapolation from the literature relating to the treatment of waste (L), which on the location (W) and a series of investigations made by decision makers on stakeholders (D). A second phase involved the identification of a possible hierarchical structure of the problem in the preliminary criteria and operational criteria with the final choice of the criteria Family more conforms to the problem and shared by the group of supervisors. In this

case, possible macro-criteria to be considered could be economic, technical, environmental, political, labor and resource recovery. In turn, each of them is summarized in sub-criteria for the economic factor (F,L,W,D) may be the cost of capital (F,L,C), operating costs (F,L,C), returns (L,C), the net cost per ton (L,W,D), the annual net cost per household (D), financial supports (L). For the technical implementation: feasibility (F,L,W,D), adaptability to local conditions (L,D), operation (L), reliability (L), the continuity of the process (L), potential future developments (L). For the environmental aspect (F,L,W,D) is a supplementary level hierarchy factors that summarize global aspects (F,L,D) as the effects on greenhouse (F,L); regional (F,L), such as the release of acidifying compounds (F,L), release of surface water (F,L,D), release of substances into the air and water tables with health effects (F,L,W,D); Local (F,L), such as the environmental hygiene (D), release of scattered surface water (F,L,D), release of substances into the air and water tables with health effects (F,L,D). The political factor (L,D) could be summed up in the consensus-local and regional dissent (L,D), while the employment factor (L,D) in the number of direct employees and induced (L,D). Energy recovery factor (F,L,W,D) could share in products recovered (F,L,W,D), net electricity demand in the effect of the direct supply of energy (L), activated potential markets (L), different destination and reallocation of land (L,D).

The solution of the problem has led to a system with a tie of the alternatives showing a substantial preferable for actions at intermediate or inter-municipal cooperation, relegating centralized systems in very different positions from those directions of the Ministry of Environment had suggested.

Conclusions

What has been proposed is an approach that, through different methodological tools, can help to facilitate and improve decision-making processes in public administration. Some of PA problems have been described, by placing them in their decision-making context (system that includes decision-makers and actors, rules and relationships among decision-makers and other actors) and in the decision process which has characterized them. Some cases have been examined in their structure through the elements that in general, or in the particular case, could

make the decision complex. We saw the multi-criteria approach in its essential components such possible actions, different criteria to evaluate and parameters, including primarily the weights to be associated with the criteria. The cases proposed have focused the path taken to structure the model and ensure its validity and usability, especially when multiple stakeholders and their degree of participation and involvement.

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