Stakeholder reactions to new policies for forest-biodiversity protection

The capacity to determine in advance the behaviour of stakeholders in charge of implementing public policies and to foresee the reactions of the public and consumers impacted by those policies would be a decisive advantage for decision-makers. That was the goal of an experiment to simulate and model the reactions of stakeholders. The initial results are presented here.

Protection of ordinary biodiversity in French forests is addressed by specific public policies. Implementation of a policy raises at least two questions for the policy manager. The first deals with how the concerned stakeholders will react to the policy in their area. Will they accept it easily, i.e. support the goals and adopt the proposed measures? Or will they attempt to work around it, adapt it, adopt only part of the measures, even fight it? Will groups for or against the policy emerge? Who could be the people making up each group? What might be the capacity of each group to influence other people? The second question deals with how the policy managers could convince a majority of stakeholders in the area to cooperate. On which local stakeholders should efforts be based? Who could be the key persons in forming coalitions in favour of the policy? Which parts of the policy could serve for promotional efforts? These questions represent important issues for public authorities. Any answers available beforehand could help. But it is not easy to "test" in the field in order to predict the reactions of stakeholders. The manager could have difficulties in maintaining control over the situation created for the test. Modelling offers an alternative solution.

The study presented here provides an example of how modelling can simulate probable behaviours. It concerns a fictive, but plausible public policy for the protection of ordinary biodiversity in forests, in a region where wood production dominates other forestry activities.

We discuss here how we created a fictive policy to protect ordinary biodiversity in forests, adapted an existing model to address the policy and, in this context, determined which persons to contact. We then collected the necessary information, determined, using the model, the current positions of the stakeholders and produced simulations on future changes in the positions (see table ❶). We finish the discussion with observations on the limitations of the method.

Defining a fictive policy to protect biodiversity in forests

We decided to test a plausible policy and benefitted from the advice of Yves Poss, a member of the forestry section of the GREF (Water and forestry advisory group) general council. We examined the existing PEFC [1] charters to draw up demanding fictive technical specifications applicable to the local context of the Thiers mountain range. The policy contained 30 items (e.g. clearcutting limited to single plots not exceeding 25 hectares), representing significant constraints for at least certain shareholders *and grouped according to three sets of objectives, O1. Improve forest-management practices*, O2. *Develop conservation zones for habitats and species*, O3. *Prepare the forest for climate change*. The questionnaire was first tested on forest owners and the technician for the Thiers-mountain development plan. It was then used on 30 carefully selected persons. Each person (sawmill owners, mayors, contractors for forestry work, etc.) gave their opinion on the 30 items.

1. A PEFC (Forestry certification label programme) charter is a document listing the sylvicultural requirements that a public or private forest owner must meet in order to 1) be certified for sustainable forestry management and 2) sell wood under the PEFC label.

❶ **Excerpt from the coded positions of stakeholders. This table lists the coded positions of stakeholders on each of the tested policy options. The table must be filled out by the person who interviewed the stakeholder.**

Actor (i)	Label	Category (role) Public owner (PO) Private owner (PP) Operator manager (GE) Merchant transformer (NT) Transformer (T) Regulator (R) Local government (CT) Other (A)	Salience (S) of objectives (1..4)					Political expectations (X) (−1..1)						Natura 2000 Extension Option B	PEFC Extension Chart A	PEFC Extension Chart B	PEFC Extension Chart C
			Biodiversity 1	Biodiversity 2	Wood quality	Wood quantity	Objective 4...	Biodiversity 1	Biodiversity 2	Wood quality	Wood quantity	Objective 4...					
A	L	C	01	02	03	04	...	01	02	03	04	...		P1b	P2a	P2b	P2c
	PO1	PO	2	1	3	4		0	1	1	−1			1	3	4	1
	PO2	PO	4	1	2	1		1	1	1	1			1	4	3	1
...																	
			Question to get Si					*Question to get Xi*									
			How important to you is O... ?					Would you like O... to be									
			Unimportant	1				Maintained	0					1			
			Not particularly	2				Increased	1					2			
			Quite	3				Decreased	−1					3			
			Very	4										4			

Adapting a model

The model was drawn from the theories of Bueno de Mesquita and Stockman (1994) concerning the forming of collective decisions. It was designed and produced by Jean-Paul Bousset (Bousset et Marsat, 2004) in the framework of the European project SPRITE[2]. The goal was to model the probable negotiating behaviour of stakeholders based on their opinions and characteristics at the time of the study (see box ❶).

In short, the model assumes that the stakeholders are likely to modify their opinion on the items to be undertaken:

- if the situation proposed would enable them to become part of a coalition that would appear most likely to hold the dominant position and thus significantly influence the policy;
- if the items on which they must change their opinion are not too numerous nor too important for them.

The model can thus be used to explore the dynamics of the stakeholder system that policies can generate and the influence of various factors.

The persons questioned and data collection

o find the right set of persons for questioning, we asked the technician for the development plan to provide us the names of potential participants for the five model categories, whose opinions would be the most varied possible.

❶ THE MODEL

A multi-agent model was used, i.e. comprising a set of agents (partially autonomous entities) located in an environment described by the model and interacting according to set rules. In this case, the agents are people, the ones we question. The model simulates a negotiation process between stakeholders confronted with different proposals for collective action (different policies).

The simulated negotiation process comprises three phases.

1) Proposal. Efforts by each stakeholder i to find stakeholder j whose support would most reinforce the capacity of stakeholder i to influence the future collective action.

2) Evaluation. Each stakeholder j determines the value of accepting/refusing the proposals to change his/her position.

3) Taking sides. Finally, when evaluation results are positive, each stakeholder j adopts the positions of the stakeholder i that they have decided to support.

The model has five stakeholder categories representing different functions. The types of functions depend on the problem analysed. In this case, there were forest-resource owners, forest-resource transformers, forest-resource advocates, living communities and public institutions.

Each stakeholder-agent is represented in the model by an acronym for five attributes with specific values, i.e. importance (salience) of the problem, political expectations concerning the problem, strategic position on desired action, personal resources and degree of integration in the social system.

2. The goal of the project was to assess in advance and compare the impact of different options for tourism-development policies on sets of local stakeholders in a dozen small regions in six EU countries.

We then checked that the list included all the relevant stakeholder categories, based on Mitchell *et al.* (1997). These authors identified eight stakeholder categories that should be taken into account for problem solving under participative conditions (see box ❷). We finally questioned 30 people.

persons. The results were checked and completed by the technician, based on her personal opinion on the attributes of each person.

The 30 policy measures were presented to the interviewees in the chronological order of their execution in forestry work. During each interview, the person indicated:

- their expectations with respect to each goal;
- their opinion on the importance of each measure;
- their opinion on the relevance and effectiveness of each measure.

Another part of the questionnaire informed on the parameters concerning the person's resources and degree of integration in the social system.

The results were then coded and entered into the model.

Model output

The model output first describes the situation, then changes in stakeholder positions concerning the three proposed objectives for collective action, e.g. O2. *Develop conservation zones for habitats and species.* The model distinguishes three types of network, Supporters [3], Opponents [4] and Neutrals [5]. Each network will thus comprise at least one and at most five categories of stakeholders.

3. The network of Supporters comprises the stakeholders who approve a given goal.

4. The network of Opponents comprises the stakeholders who disapprove a given goal.

5. The network of Neutrals comprises the stakeholders who are neutral toward a given goal.

❷ STAKEHOLDER CATEGORIES

In 1997, Ronald K. Mitchell proposed classifying stakeholders in a participative or negotiated process according to three criteria, power, legitimacy and urgency. Power is the capacity of a stakeholder to impose his/her will on others. Legitimacy is the perception, by the other stakeholders, that actions of an entity are desirable, proper or appropriate.
Urgency is the impression on the part of the stakeholder that his/her claim is important and merits immediate attention. These three criteria are used to classify stakeholders in eight categories. Those possessing all three attributes are called "definitive stakeholders" and must absolutely be included in the negotiations.
The importance of stakeholder participation then decreases depending on the number of attributes possessed. Those with two attributes are stakeholders said to be dependent (having urgency and legitimacy), dangerous (having power and urgency) or dominant (having power and legitimacy). Those with only one attribute are stakeholders said to be dormant (having only power), discretionary (having only legitimacy) or demanding (having only urgency). Finally, those possessing no attributes may be excluded from the process.

Source: DEA dissertation by Audrey Sirvente (2005).

The initial situation

The initial results present the number of persons and the categories in each network. They also describe the internal cohesion of each network with respect to the proposed measures by identifying groups of stakeholders with similar preference "structures". Each group is considered potentially independent. The presence of different preference structures in a given network is interpreted as a negative factor for cohesion and a source of potential conflict.

In this case, the analysis of positions revealed four political networks which could form coalitions if politics became an issue and the persons in question met. Everyone said they supported objective O1. *Improve forest-management practices.* That is also the only objective supported by network no. 4. Network no. 1 supported the proposed measures to reach all three objectives (see table ❷). Network no. 2 supported objectives O1 and O2. *Develop conservation zones for habitats and species.* Network no. 3 supported O1 and O3. *Prepare the forest for climate change.* In this initial situation, the opponents to O2 are powerful. Analysis of the make-up of each network produced an estimate of its power. A network is

❷ Example of attribute analysis for network A "Supporters of objectives O1, O2 and O3" (power, strategy, capacity for action).

Strategy	Composition		Number	Resource index		Network-integration index	
	Role	Type of stakholder		Total	Avg/ind	Total	Avg/ind
Strategy 1 (measures D3, F2...)	2 institutions 1 sawmill owner 1 living community	2 dependent 1 dangerous 1 discretionary	4	1,2	0,8	–	–
Strategy 2 (measures A1, B2...)	3 operators 4 owners		7	0,7	0,45	–	–

❶ Forest in Alsace.

© V. Pagneux (Cemagref)

more powerful when it comprises all types of stakeholders because this reduces the need to form alliances. In this case, each network included several types of stakeholders. The types of stakeholder were not distributed randomly throughout the four networks, but people were not trapped in their professional roles either. For example, two sawmill owners belonged to different networks.

Simulating changes in position

Through successive simulations, the model describes the changes in the capacity of each coalition to influence the formulation/success of the policy in the region, assuming that the influence is proportional to the resources of its members (Ri), to their likelihood to mobilise to achieve the objective in question (Si) and to their degree of insertion in local structures (Gi). The capacity of a coalition to influence is also deemed proportional to its heterogeneity because if all types of stakeholders are present in a network, there is less need to accept compromises in forming alliances with others. Launching the simulation is equivalent to organising a "Forest-biodiversity convention", i.e. a series of meetings providing stakeholders with the opportunity to meet, learn to know each other and assess their respective resources and positions. The model can vary two characteristics of the negotiation and analyse the impacts of the changes on the positions of the stakeholders. Those characteristics are:

- the topic selected for debate (O1, O2, O3 or a combination thereof);
- the bilateral or multilateral nature of the negotiation.

In this case, discussion of O2 or O3 in bilateral negotiations (e.g. a public agency as policy manager meeting each stakeholder individually) resulted in the creation of a group opposing the two objectives. However, if objectives O2 or O3 are addressed during a large number of multilateral meetings, the positions tend progressively toward a consensus. This is because during multilateral meetings, stakeholders in favour of O2 and O3 meet and convince the Neutrals and the Opponents to join them. A new form of legitimacy is created.

Limitations of the method

This study revealed the initial situation of the local forces and the possible changes in position. The method would appear to be applicable to other forest regions (see photo ❶) if certain precautions are taken.

The topic addressed is often "politically sensitive", which is why this type of study must be approved or commissioned by the concerned institutions. It is also important to select realistic political objectives and measures. Otherwise, the results would be of no value.

Model effectiveness depends on how well it is initialised. The person setting up the model must be familiar with the subject at hand. In particular, when an industrial sector is studied, such as wood production from conifer forests, the modeller must set up all the various types of stakeholders likely to participate. The "field" covered will thus depend on the areas in which the activities of stakeholders take place. Each category carries out its (forest) activities over a more or less large area, e.g. departmental authorities cover the entire department. The activities of sawmill owners can span a number of departments. For the model, the field is the smallest area covered by all five categories, when all stakeholders in each category are taken into account. In this case, the field is the area covered by the development plan because it is the smallest of the areas in question. It symbolises the area of the forest-resource owners (forest-owner stakeholders).

We must also highlight the central role played by a contact person (technician, advisor, elected official, etc.) familiar with the area. This person takes part in preparing

each phase of the study, ensuring that it remains suitable and relevant to the area. It is also this person that will name the categories identified at the start of the study. It is not a problem if the contact person is not totally familiar with the topic [6], but he/she must indicate the stakeholders having the most diverse opinions possible for each of the categories.

Model parameter-setting requires input of data collected from at least 30 carefully selected persons, representing the eight stakeholder categories identified by Mitchell *et al.* (1997) and divided into the five categories for the model. The 30 persons must be questioned under good interview conditions in order to collect reliable data. The advantage of a face-to-face interview is the researcher can detect any reticence on the part of the interviewee, e.g. if the person "lies" to please during the discussion. The researcher must detect such situations and pause to dig deeper. Interviewees may criticise measures considered absurd and in the process indicate why, in their opinion, the measures do not correspond or correspond poorly to the objectives. This precious information is entered in the model and contributes to the quality of the collected data.

The last recommendations deal with model sensitivity. Entry of various parameters, e.g. on stakeholder resources, must produce plausible results for the simulated situations. The opinion of the contact person familiar with the area is indispensable when assessing the results of the parameter-setting phase.

It should be noted that the research project does not result in the actual forming of coalitions or changes in opinion because the stakeholders never meet and the measures are presented as fictive.

6. We tested the model by asking a single person, who was very familiar with the area, to play the role of the five types of stakeholder identified. The result was a partial, but accurate view of the landscape comprising all 30 persons questioned.

Conclusion

It is probable that an experienced public decision-maker could intuitively foresee the reactions of stakeholders or at least some of those reactions. However, this type of study clarifies the positions of stakeholders without "stirring things up" in the field and provides indications on how alliances could form. An ethical question must be raised because the policy manager may decide to run a study with two very different intentions in mind.

In the first case, the manager retains all information, places great importance on the results and uses them to manipulate the stakeholders. The manager may decide to favour one stakeholder, encourage closer ties between others, etc. But unforeseeable consequences are always a possibility.

In the second, the manager makes all the collected information available (maintaining the anonymity of interviewees) so that each participant can appreciate the diversity of opinions. There is no doubt that this will initiate series of more or less formal negotiations. In this second case, the imperfections in the model or in the data collected are less a problem because the new information will, in all cases, modify the prior positions! ■

Key bibliographical references...

BOUSSET, J.-P., MARSAT, J.-B., 2004, *Supporting and promoting Integrated Tourism in Europe Lagging Rural Regions (SPRITE)*, Deliverable 18, 83 p.

BUENO DE MESQUITA, B., STOKMAN, F., 1994, *European Community Decision Making: Models, Applications and Comparisons*, New Haven, Yale University Press.

CHOQUET, C., 2008, *Simulations des jeux d'acteurs : comment favoriser une demarche d'action concertée en faveur de la biodiversité forestière*, mémoire de DAA, École nationale supérieure agronomique de Toulouse, encadré par J.P. Bousset et C. Macombe.

MITCHELL, R.K., AGLE, B.R., WOOD, D.J., 1997, Toward a theory of stakeholder identification and salience: defining the principle of Who and What really counts, *The Academy of management Review*, vol. 22, n° 4, p. 853-886.

SIRVENTE, A., 2005, *La construction du consensus : mieux s'entendre pour mieux se faire entendre*, mémoire Master 2 de recherche Environnement, milieux, techniques et sociétés, Université Paris VII Paris Diderot, Museum d'histoire naturelle, INA Paris-Grignon, encadré par C. Macombe.

Authors

Jean-Paul Bousset, Claire Choquet and Monique Bouchaud
Cemagref, centre de Clermont-Ferrand,
UMR METAFORT, Mutations des activités, des espaces et des formes d'organisation dans les territoires ruraux,
Campus universitaire des Cézeaux,
24 avenue des Landais, BP50085, 63172 Aubière Cedex
monique.bouchaud@cemagref.fr

Catherine Macombe
Cemagref, centre de Montpellier,
UMR ITAP, Information et technologie pour les agro-procédés,
361 rue Jean-François Breton, BP 5095, 34033 Montpellier Cedex
catherine.macombe@cemagref.fr

More information...

From 2006 to 2008, our research team participated in the project titled "How can forest resources be regulated and sustainably managed to preserve biodiversity?
An analysis based on local coordination groups", part of the "Biodiversity and forest management" programme set up by the ECOFOR professional group with funding from the Agriculture ministry. We wish to thank Caroline Bruyère, the technician for the Thiers-mountain development plan for her invaluable assistance and advice.