

## Public perception on forestry issues in the Region of Valencia (Eastern Spain): diverging from policy makers?

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### Abstract

Are the policies designed by decision-makers differing from society's wishes and preferences? The present paper analyzes the divergences between forest policy and public opinion in the Region of Valencia (*Comunidad Valenciana*) in Eastern Spain. The data is based on an extensive telephone survey of the general public on their perception of forestry issues. The issues studied include attitudes regarding forest fires, silvicultural treatments, the externalities produced by forest owners, and the state forest service's role related to these issues. In total, the answers of 823 respondents were analyzed using classification trees. The results of the analysis showed a large divergence between the desires, preferences and priorities of society, on the one hand, and the policies implemented by the regional government, on the other. The study concludes that communication strategies concerning sustainable forest management need to be further developed by the responsible authorities, with the input of the research community.

**Key words:** environmental communication; society-policy interface; natural resources management; forest governance; forest attitudes; rurality classification.

### Resumen

**Percepción pública sobre el sector forestal en la Comunidad Valenciana (Este de España): ¿divergiendo de los responsables de la toma de decisiones?**

¿Difieren las políticas diseñadas por los responsables de la toma de decisiones, de los deseos y preferencias de la sociedad? El presente artículo analiza las divergencias entre la política forestal y la opinión pública en la Comunidad Valenciana. Los datos están basados en una amplia encuesta telefónica dirigida al público en general sobre su percepción en temas forestales. Los temas estudiados incluyen actitudes hacia los incendios forestales, los tratamientos silvícolas, las externalidades generadas por los propietarios forestales, y el papel de la administración forestal hacia estos temas. En total se analizaron las respuestas de 823 encuestados utilizando árboles de clasificación. Los resultados del análisis mostraron una amplia divergencia entre los deseos, preferencias y prioridades de la sociedad, por una parte, y las políticas implementadas por el gobierno regional, por la otra. El estudio concluye que las estrategias de comunicación referentes a la gestión forestal sostenible necesitan ser desarrolladas por las autoridades responsables, con el aporte de la comunidad científica.

**Palabras clave:** comunicación medioambiental; interfaz sociedad-política; gestión de recursos naturales; gobernanza forestal; actitudes forestales; clasificación de ruralidad.

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### Introduction

Inclusivity as a cornerstone of sustainable forest management brings new stakeholders to the forest policy arena (Carrow, 1999). These stakeholders come with perceptions, values, attitudes, and interests re-

garding forests and the forest sector (Krott, 2005). This is a part of the development of societies moving beyond their economic dominated relationships with the forests, to one based on consideration of the ecological, social (including cultural), as well as economic needs of society (see e.g. Bengston, 1994; Carr,

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1995; Saastamoinen, 2005), as a reflection of post-materialism attitudes (Buijs, 2009). This naturally places additional pressure on government agencies regarding balancing the interests and values of the increasing number of stakeholders, as Westoby (1989), the former FAO director put it “forestry is not about managing trees, but people”.

In this context studies of the public’ perceptions are a prerequisite for a bottom-up approach for governance of the natural resources, theoretically the process involved sees society at large being consulted and considered in the decision-making process by first analyzing the public’ values, preferences, wishes and opinions on an issue (Bengston, 2000). The benefits of getting public opinion on natural resource management include accessing local knowledge, as well as increasing public support for the management (e.g. Sheppard and Achiam, 2004).

One can define these types of public opinion surveys as being part of two way communication process (bottom-up and top-down). In other words it is a way through which society communicates with the policy and decision makers, one of the results being that politicians are encouraged to design a better plan of communication in order to explain to citizens, classified by their profiles, about the reasons, the causes and the consequences of their policies being implemented, and to smooth out the differences between the desires of society as whole, or as individuals and groups, and the policies as they are designed and implemented. These surveys underline the democratic principles of the process, in other words a participatory process, as well as strengthening the design and implementation of the policies (Fiorno, 1990; Renn *et al.*, 1993; Rowe and Frewer, 2000), thereby further legitimizing the work of the policy makers (Suchman, 1995).

Social research is often instigated by government departments with the basic goal of social inclusion, cultural integration and well being, in other words societal development (Sanesi *et al.*, 2011). In the USA these studies of public perceptions of the forests, and their management, have been historically well developed and applied (e.g. Cortner and Moote, 1994; Germain *et al.*, 2001). In Europe one of the principal innovations in the last 40 years has been the application of methodologies of social sciences to the forest sector (Schmithüsen *et al.*, 1998), pioneered in the Central European countries (Germany, Austria, Switzerland). Considering this subject, most of the surveys have been

regarding the management and forest conservation for outdoor and leisure purposes (Rametsteiner and Kraxner, 2003).

At the European level public opinion has been identified as being among the key research priorities by the Technology Platform for the Forest-based Sector in Europe which was established in 2004. The platform aims to define and implement the sector’s R&D roadmap for the future, and is supported by a wide range of stakeholders in its Scientific Research Agenda. Research Area 5 entitled “The sector in a societal perspective”, contains a subarea (5.3) entitled “Citizens’ perceptions”, which has the aim of acknowledging, at the European scale, the values and perceptions of different social and economic groups that will help the sector to adapt to change (Forest-based technology platform, 2006). Generally speaking throughout Europe these kinds of surveys are very patchy, with Finland being the only country to have carried out surveys of public opinion on forestry on a regular basis, having conducted a survey ten times between 1993 and 2009 (Finnish Forest Association, 2010).

The European Union has created a unique space for conducting politics, allowing the consideration of public opinion, continuously carrying out comparative studies related to the environmental sector among member countries (European Commission, 2010). An example of this is a qualitative study to analyze and understand existing perceptions and to identify how forest industries are perceived by the population (European Commission, 2002). However, in Europe the most complete work summarizing social forest studies is the publication of “Europeans and their forests” (Rametsteiner and Kraxner, 2003), that uses 47 representative surveys as information sources. The surveys were carried out in 16 European countries, though starting in the 1970s, the main focus was on the 1990s. This was subsequently followed by the work “Europeans and wood” (Rametsteiner *et al.*, 2007) and eventually, at the end of 2009, came the synthesis of this work, published as: “Shaping forest communication in the European Union: public perceptions of forests and forestry” (European Commission, 2009).

National and Regional Forest Programmes were established as a political process, with increasing public participation as one of its more important principles (Glück, 1999; FAO, 2006). This is the case in Spain, where the first major sociological research was carried out through the Forest Programme of Galicia (Xunta

de Galicia, 1992), followed more recently by other regional forest programmes e.g. Navarra (Gobierno de Navarra, 1998), Valencia (Generalitat Valenciana, 2004; Generalitat Valenciana, 2011a) and Cantabria (Gobierno de Cantabria, 2005); the results of these surveys have often been useful to prepare and to complement public participation and therefore, to make strategic decisions in forest planning (Alcanda and Fabra, 2003). The Spanish Forest Programme (Ministerio de Medio Ambiente, 2002) proposed to conduct a nationwide study of the general public's perception of forests and their management. However, the survey has not been conducted yet.

In Spain forest policy is implemented by Forest Services at the Regional level, and the Spanish Government only keeps the duty to coordinate the regional policies. Municipalities also have the right to ask for their right of subsidiarity, even if in general this has not occurred.

The present paper focuses on the analysis of public opinion regarding forest policy in the Region of Valencia. The paper aims at describing the main views of the citizens through the use of a questionnaire, and at comparing the main findings in key forest topics with the forest policies developed during recent years. The final aim is to contribute to a better understanding of the interrelations between public opinion and policy makers, and to help to find channels to a more efficient communication between both players in the development of forest policies.

## Material and methods

### Data origin

The questions for the survey were prepared with input from several experts in the field, including academics as well as agents of the Forest Service. The survey covered different areas of the current forest policy in the Region of Valencia. The survey was divided into four sections, including: 1. functions, uses and problems of the forest, 2. forest management and administration, 3. forest industry, and 4. environmental finances. In each section, 4 to 6 questions were asked resulting in a total of 22 questions. The full survey is available at the web pages of Generalitat Valenciana (2011b). The answers included dichotomous-choice form and multiple choices. The survey was conducted during 19-21 October, 2009. The scope of the sample was addressed to the residents of the Re-



**Figure 1.** Location of the Region of Valencia and its division in provinces (*provincias*) and counties (*comarcas*).

gion of Valencia aged 18 or above, accounting for nearly 4.2 million people (INE, 2011).

A specialized company performed the collection of data through a telephone survey. The total number of people completing the survey was 823, which corresponded to the assumed sampling error (3.5%). The targeting of the respondents aimed to be geographically distributed across all municipalities and provinces of the Region of Valencia (Figure 1).

In addition to standard variables concerning age group, gender and education level, a variable was created for the analysis from the combination of the density of population and the forest area by inhabitant, resulting in 5 typologies (Figure 2, Table 1). The working hypothesis was that the relationship of the respondents with the surrounding environment where the respondent lives, with regards to forest areas, can be an important factor for their perception of forest related issues (Corbett, 2006). Finally, the respondents were grouped in seven areas of similar socio-economic conditions, in order to address potential regional differences.

Inhabitants	Forest area / inhabitant							
	< 0.01	0.01-0.1	0.1-0.5	0.5-1	1-4	4-10	10-20	20-50
> 500,000	Typology 1 "Metropolitan"							
500,000-50,001	Typology 2 "Urban"							
50,000-20,001	Typology 3 "Urban-rural"							
20,000-5,001								
5,000-2,501	Typology 4 "Agro-rural"							
2,500-1,001								
1,000-200								
< 200								
								Typology 5 "Forest-rural"

**Figure 2.** Definition of the regional typologies used, according to forest area per inhabitant, and total number of inhabitants.

**Table 1.** Number of municipalities and number of people interviewed according to the rurality types defined

Zones	Definition	N municipalities	N questionnaires
Type 1	Metropolitan	1 (Valencia)	31
Type 2	Urban	13	55
Type 3	Urban-rural	137	224
Type 4	Agro-rural	178	217
Type 5	Forest-rural	215	296
Total		544	823

**Table 2.** Number of answers by group category used in the analysis. (N/S: No studies, Secondary 1<sup>st</sup> cycle lasts until the students are 12-14 years old, Secondary 2<sup>nd</sup> cycle 15-18 years)

Age groups	N	Rurality framework	N
18-29	204	Type 1	31
39-49	210	Type 2	55
59-64	211	Type 3	224
> 65	198	Type 4	217
		Type 5	296

Education level	N	Forest Ownership	N
N/S	23	Owners	153
Primary incomplete	32	Rest	668
Primary	58		
Secondary 1 <sup>st</sup> cycle	328	<b>Gender</b>	
Secondary 2 <sup>nd</sup> cycle	226	Male	407
BSc	89	Female	416
MSc / PhD	66		
No answer	1		

Therefore, the answers were classified by the respondents' age group, rurality type, education, gender and forest ownership (Tables 2 & 3).

**Table 3.** Age description by education level and forest ownership. (N/S: No studies, Secondary 1<sup>st</sup> cycle: 12-14 years old, Secondary 2<sup>nd</sup> cycle: c. 15-18 years)

	Mean	Standard Error of Mean	Maximum	Minimum
N/S	71.5	1.5	86.0	60.0
Primary incomplete	70.0	1.7	81.0	40.0
Primary	61.1	1.8	88.0	20.0
Secondary 1 <sup>st</sup> cycle	52.8	0.9	86.0	18.0
Secondary 2 <sup>nd</sup> cycle	36.9	1.1	87.0	18.0
BSc	42.7	1.7	82.0	18.0
MSc / PhD	41.7	2.1	87.0	20.0
Not answer	67	–	67	67
Forest Owner	56.5	1.2	87.0	23.0
Rest	46.3	0.7	88.0	18.0

## Methodology

The method chosen for the questionnaires was CATI (Computer Assisted Telephone Interview) conducted by a specialized company, following simple random calls and completing the fixed quota by equal gender and age intervals. The survey was conducted in the Region of Valencia (Spain). The design of the questionnaire facilitated this method of questioning. When a questionnaire on citizens' perceptions is designed different question typologies are included (knowledge, activities and uses, values, opinion, attitude and behavior) that need to be classified because they have different meanings for the analysis of the results and the implications on communication required afterwards (Corbett, 2006). In this case questions relating to values and opinion were the largest group.

The results of the questionnaire were statistically analyzed in order to identify differences between the groups of psycho-demographic profiles and all possible crossed variables. A preliminary examination of the variables was based on  $\chi^2$  tests. However, due to the large number of potential combinations of variables that can explain the attitudes of the respondents, a second analysis was performed based on classification trees. This method allows the partitioning of the data recursively, chosen at each step the explanatory variable that has the strongest interaction with the dependent variable. For every explanatory variable, different categories or values were grouped if they are not significantly different with respect to the dependent variable. The method provides a final port-

folio of explanatory variables and their interactions, grouped in levels (branches or nodes), which define the most homogeneous groups for the different questions analyzed. This was used as the basis for profiling the respondents. Among the method's advantages there is the fact that the explanatory variables are not pre-specified, it facilitates the data mining and to visualize the potential interactions between different combinations of explanatory variables, and it helps to reveal possible confounding factors. The classification trees were applied based on the CHAID (Chi-squared Automatic Interaction Detection) method provided in the statistical package SPSS v15.0. For both the  $\chi^2$  and the classification trees method, significant interactions were considered using the 0.05 threshold. Finally, the results of the analysis of the questionnaire were compared to policies implemented in four pre-defined fields of forestry in the Region of Valencia: strategies to reduce forest fire occurrence, policies oriented to reforestation, organisms and administration responsible for the management of public forests and externalities derived from forests. Finally, the policies concerning public participation and opinion concerning the topics discussed were studied based on a content analysis.

## Results

### Socio-demographic profile

The results of the  $\chi^2$  tests applied to the studied groups by questions are presented in Table 4. There were important differences according to age concerning

forest fires, and all variables except age were significant concerning reforestation measures.

Concerning taxation, significant differences were found regarding age, level of education and forest ownership (p-values < 0.001 in all cases), whereas there were only slight differences regarding the rurality framework (p-value = 0.031) and no significant differences concerning gender (p-value = 0.674). The mean age was 48 years (57 years for the forest owners respondents, and 46 years for the rest). The average gender proportion was 49.5% male, (56.9% in the forest owner group and 47.8% for the rest of the respondents), which suggests a demographic deviation towards older males among forest owners.

### Attitudes towards forest fires: prevention vs. suppression

According to the results of the survey representing the society, it is perceived that there needs to be more money invested in forest fire prevention strategies than suppression (Table 5) or, in other words, the effort being made to prevent forest fires is not enough. In general, different opinions were found according to age groups (Pearson  $\chi^2$ , pvalue < 0.001). Differences due to gender and rurality framework were not significant.

Differences in the 18-29 age class can be observed, with there being a trend as age increases on parallel lines to the importance given to suppression measures. This age group also seems to have less knowledge about management measures such as land use or wood, and therefore give much higher importance to surveillance measures.

**Table 4.** Estimates of the significance of the variables studied resulting from a  $\chi^2$  test

	Forest fires measures	Reforestation measures	Subsidies	CO <sub>2</sub> Tax	Compensations	
Level of education	0.252	0.000	0.000	0.000	0.000	
Gender	0.082	0.004	0.260	0.006	0.089	
Age	0.000	0.280	0.000	0.001	0.001	
Rurality	0.208	0.003	0.569	0.316	0.300	
Forest Owner	0.011	0.003	0.039	0.000	0.000	
	Owner decisions	Owner responsibilities	Regional administration	Municipality entities	Private Owners	Non profit associations
Level of education	0.000	0.007	0.033	0.577	0.355	0.311
Gender	0.001	0.000	0.438	0.253	0.447	0.104
Age	0.000	0.000	0.145	0.076	0.177	0.003
Rurality	0.442	0.359	0.984	0.816	0.056	0.001
Forest Owner	0.061	0.296	0.098	0.026	0.114	0.041

**Table 5.** Opinions on the best means of reducing forest fires occurrence (top) and actions to be taken to improve the forest conditions (bottom)

Variable		Management (wood)	Management (land use)	Infrastructure	Surveillance	Suppression
Node 0		14.5	16.2	31.2	29.3	8.8
“Age Group” p-value < 0.000, Chi square = 32.870						
Node 1	< =18-29	6.9	10.4	31.2	36.6	14.9
Node 2	> 18-29	17.1	18.3	31.2	26.8	6.7
“Gender” p-value = 0.002, Chi-square = 16.813						
Node 3	Female	16	12.8	34	31.6	5.6
Node 4	Male	18.1	23.5	28.5	22.1	7.7

Variable		Management	Reforestation	No Action
Node 0		63.3	30.6	6.2
“Rurality type” p-value = 0.001, Chi square = 18.728				
Node 1		65	26.8	8.2
Node 2		59.9	38	2.2

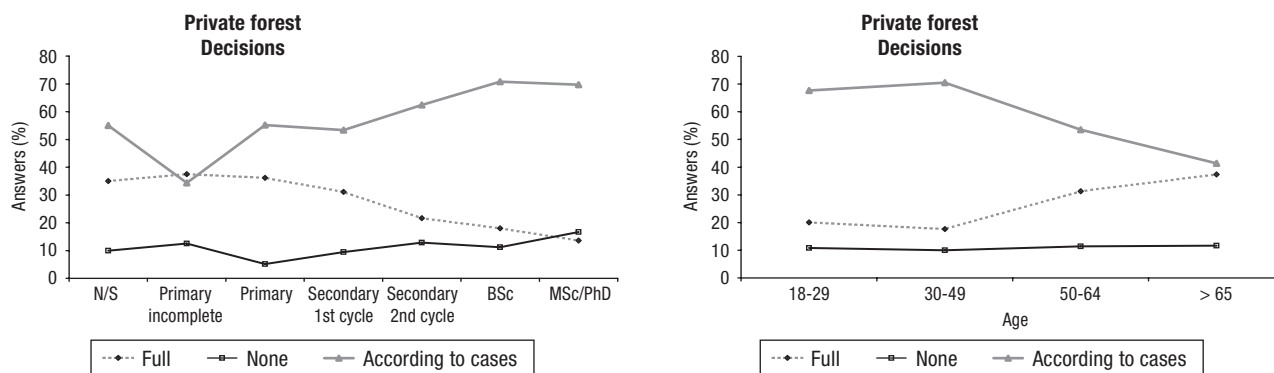
Node: refers to the grouping level derived from the selected variable. M: male; F: Female. Increase: refers to increase the reforestation areas, Management (land use) includes the maintenance of traditional mountain agricultural practices, Management (wood) includes the use of wood and wood-like products from the forest, Infrastructures includes to increase the firewall structures, the forest accesses and the water supply facilities, surveillance includes to increase the surveillance to detect early forest fires, and extinction includes to increase the means of extinction (i.e. fire brigades, airplanes...). Reforestation: refers to increase the reforestation areas, Management: refers to improve the management and overall conditions of the current forest areas. Type: Rurality framework being 1: Metropolitan; 2: Urban; 3: Urban-rural; 4: Agro-rural; 5: Forest-rural.

### Attitudes towards actions regarding nature conservation: re-forestation vs. silvicultural treatment

Concerning attitudes taken towards the different actions to improve conservation and management of forests, the debate here is centered on improving forest management options (such as silvicultural treatments) chosen by most of the respondents rather than to in-

crease the current forest area through reforestation measures.

There are, however, significant differences concerning the gender and rurality types. Concerning gender a difference can also be observed regarding nature conservation, even though gender differences were seldom found. Concerning educational level, people with higher education generally have an opinion on the issue and therefore the “no answer” rate is lower.



**Figure 3.** Opinions concerning the responsibilities of the forest owners. Decision margin of the forest owner concerning uses and functions of their forest land, according to level of studies (left) and age (right). Full: the forest owners must have full decision margin to decide upon their property. None: the forest owners should be always conditioned to the common interest of the society. N/S: No studies, Secondary 1<sup>st</sup> cycle: 12 - 14 years old, Secondary 2<sup>nd</sup> cycle: 15 - 18 years.

### Attitudes towards forest administration: local vs. regional

The image of forest is closely related to the Forest Service as key regulators, financiers and managers of forests. Therefore it becomes important to analyze the citizens' understanding on who is the most convenient manager of forests. As a result of the survey there is a clear demand from society for a change in the current administrative model with only one third of those respondents supporting the current regional structure of the Forest Services. The preferred model for the Region of Valencia according to nearly 50% of the respondents is forest management by the municipalities. Administrative models involving private owners or non-governmental organizations (NGOs) managing forests were rejected. The acceptability of NGOs is lower for those from rural areas. Citizens with higher levels of education were more favorable regarding the role of regional Forest Services (Table 4).

### Attitudes towards externalities produced by forest owners

A clear majority of respondents considered the option of private forest owners being awarded financial compensation for managing their forests in a sustainable way to be acceptable (e.g. storing CO<sub>2</sub>,

fighting climate change, preserving biodiversity) (Figure 4).

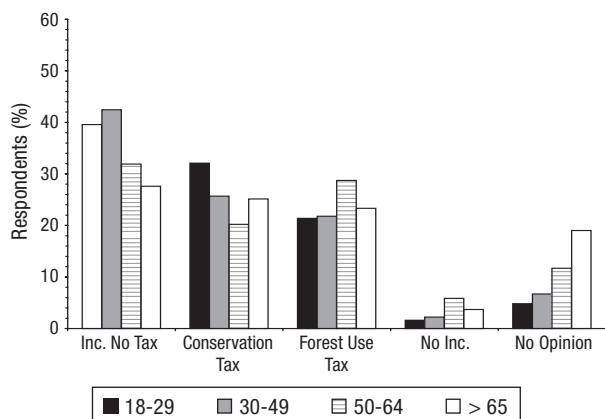
It was also observed that percentage majority (56%) had the opinion that the owners do not have capacity for decision making, but they could be economically compensated for this reduction in power.

Regarding the subject of private forest owners' capacity for decision making, age and level of studies are found to influence the responses of public. It can be seen that the trend increases with the level of education and decreases with age. This translates into the young and well educated being more reluctant to let forest owners make their own decisions concerning forest management. Older and less educated people are more in favor for giving full control to the forest owners.

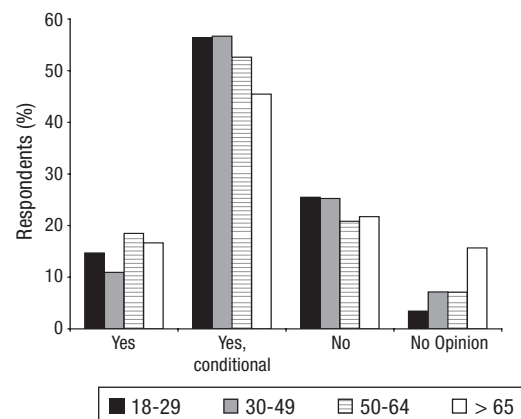
There was a high degree of acceptance to the establishment of a forest tax for funding forest conservation, or over several specific forest uses (e.g. hunting, mushroom picking). It can be seen from the results that people aged between 18 and 29 years are more willing to accept a new tax on forests (Figure 4).

In so far as forest owners are concerned, a degree of support can be observed that is above the average of society, claiming for economic compensation on the services and externalities they provide to the rest of society free of charge. They are not currently being awarded any compensation, in spite of the wide support found in the survey (75%). Therefore there is a clear message from

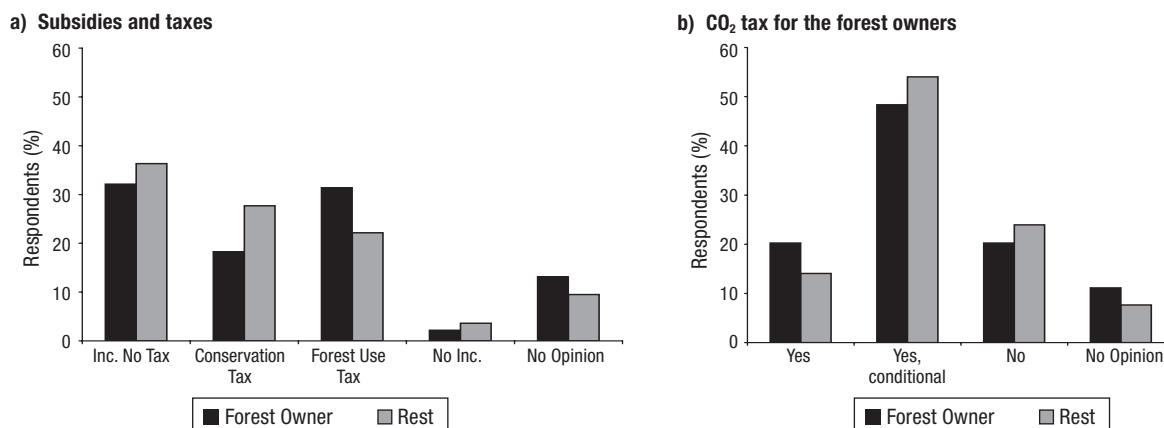
a) Subsidies and taxes



b) CO<sub>2</sub> tax for the forest owners



**Figure 4.** Attitudes towards taxations and subsidies according to the age of the respondent. a) Opinion towards subsidies and public investment. Inc. No Tax: In favor to increment the public investment in the forest areas, at the expense of other investments, Conservation tax: In favor to introduce a tax for the conservation and management of the forest areas, Forest use tax: In favor to introduce a tax for the utilization of forest areas (hunting, non-timber uses...), No Inc: In favor of not increase the public investment in forest areas. b) Opinion towards the payment to the forest owners of a special tax for the benefits derived from their forest including CO<sub>2</sub> fixation, reduction of climate change effects, landscape conservation, biodiversity conservation... Yes: In favor under any conditions, Yes, conditional: In favor if properly managed by the owners.



**Figure 5.** Attitudes towards taxations and subsidies according to forest ownership. a) Opinion towards subsidies and public investment. Inc. No Tax: In favor to increment the public investment in the forest areas, at the expense of other investments, Conservation tax: In favor to introduce a tax for the conservation and management of the forest areas, Forest use tax: In favor to introduce a tax for the utilization of forest areas (hunting, non-timber uses...), No Inc: In favor of not increase the public investment in forest areas. b) Opinion towards the payment to the forest owners of a special tax for the benefits derived from their forest including CO<sub>2</sub> fixation, reduction of climate change effects, landscape conservation, biodiversity conservation... Yes: In favor under any conditions, Yes, conditional: In favor if properly managed by the owners.

society to the politicians that society is ready to support compensation for the positive externalities that forest owners generate for society in general through sustainable management of their forests (Table 6).

## Policy frame analysis

The forest legislation of Valencia (Generalitat Valenciana, 1993) considers public participation only through the Forest Council, which is a consultative body where the main stakeholders are represented, in other words public opinion polls are not considered. Spanish legislation (Gobierno de España, 2003) also does not consider any special measure for gathering public opinions for inputting into forest policy formulation. The first Regional Forest Programme (Generalitat Valenciana, 2004)

wanted to establish participatory forums, but it was never implemented. In the second RFP (Generalitat Valenciana, 2011a) there is one measure on “new strategies on communication”, however it is unidirectional, from the Government to the citizens, without any feedback from society programmed.

## Discussion

### Validity of materials and methods

Although the study includes a large sample of the population, it must be taken into account that the questionnaire may include possible biases in the selection of the respondents. The use of CATI as selection criteria aims at randomize as much as possible this selec-

**Table 6.** Opinions concerning the responsibilities of forest owners and their entitlement to compensation (p-value < 0.001). Values in percentages

Decision range for the forest owner	Compensation for forest owners for maintaining the forest uses and functions				
	No Compensation	Compensation	Voluntary compensation	No Opinion	Total
Full	39.9	39.0	11.5	9.6	100
None	26.7	55.6	10.0	7.8	100
According to some criteria	29.3	47.4	15.4	7.9	100
No Opinion	26.5	23.5	17.6	32.4	100

“Compensation” refers to when the forest owner is entitled to compensation from the Forest Services. “Voluntary compensation” refers to when the forest owner is entitled to voluntary compensation from other non-public actors.

tion, although it presents possible deficiencies, e.g.: some people might not have been registered or included in the catalogue. The work presented here used a similar approach that was successfully employed by Karanth *et al.* (2008) to analyze conservation attitudes and perspectives in India, based on a survey.

Regarding the psycho-demographic profile, the opinions of people with higher levels of education differ from the rest, this is correlated with the fact that these people happen to be younger in age than the average. In general, the analysis of the results shows significant differences by age groups, in questions concerning responsibilities of forest owners and taxation instruments and there are also differences between the rurality types defined. The similarities between types 1 and 2 in the one hand, and types 4 and 5 in the other can partially be explained by the demographic trends and migration from rural areas to urban areas. This migration patterns involved mostly people living in rural areas moving to large cities and not to middle size towns. However, it is not clear whether the demographic and psychographic profile have much bearing on the answers, and only occasionally does gender, level of education, age or rurality framework seem to define a pattern in the answers.

Finally, there is an over-representation of forest owners in the sample (19%). There is limited information concerning the exact number of forest owners in the Region of Valencia. The average forest area by owner in Valencia was around 23 ha in the 1990s (Pérez Turado, 1991). This figure updated to the current forest area, would result in less than 1% of forest owners in the Region of Valencia. The reasons for this bias may be due to a higher interest in answering the questionnaire by those people who are forest owners, as well as by shared feelings of forest ownership by different members of the same family.

## Overview and implications of results

Concerning the role of private forest owners in providing positive externalities for society has been recognized, and it is thought that they should be compensated economically (Merlo and Croitoru, 2005). This represents one of the biggest challenges in forestry policy in the Mediterranean region (Forest Based Sector Technology Platform, 2009). Society needs to be aware that private forest owners actually carry out sustainable forest management, and therefore a set of

planning tools and follow up indicators have to be fully met leading to transparency and clear information being produced and communicated to society.

Considering the seven areas in which the territory of the Region of Valencia was divided for the study, few differences have been found, meaning that perception of forests is no longer on a local scale, but on a regional scale. The same result of there not being big sub-regional differences was found in a landscape study (Conselleria de Medi Ambient, 2009).

Recurrent forest fires are the biggest threat to forests in Mediterranean regions, and policies addressed to their prevention and control receive great public attention (Biro, 2009). The general policies of the Regional Valencian government in recent years have been oriented towards forest fire suppression rather than prevention. For example, the Official Regional Budget during 2007-2009 includes an average total investment of €12 million per year in forest fire prevention (Generalitat Valenciana, 2009). The investment in forest fire suppression is difficult to quantify as there is no official distinction between urban fires and forest fires, which together amount to about € 70 million. A rough estimate would result in at least half of this amount per year invested in suppression measures for forest fires in the Valencian region. However, the results of the analyses show that this favoring of suppression over prevention diverge from the public opinion's expectations, especially among older respondents, which suggests that their opinion is based on long-term experience. Related to fires prevention, the forest owner group clearly presents stronger support for land use management policies, such as keeping agricultural practices. In this group, the little support for surveillance can be explained as forest owners feel they are capable of carrying out their own surveillance on forest fires. The popular phrase that best summarizes such approach is: "forest fires are suppressed in winter", meaning that it is much more efficient to invest in prevention in winter than in summer (Velez, 2000). In fact, some authors argue that fire suppression policies do not seem to have an effect on the fire regime, especially on large area fires (e.g. Bridge *et al.*, 2005). This has also been observed in the nearby Region of Catalonia, based on a characterization of forest fires during the last 50 years (González and Pukkala, 2007), which did not find a significant effect of the recent suppression policies on the regime of the large fires.

A similar divergence was observed in the reforestation policies. Over recent years the regional govern-

ment has invested significantly more in reforestation actions rather than in silvicultural treatment. As an example, the Plan 40 000, aimed at the reforestation of that number of hectares, has accounted for a total investment of € 100 million since 2005. During that period, the estimated investment in silviculture was € 5 million annually (Generalitat Valenciana, 2011b). These policies contradict the answers observed in the survey. One must also consider the fact that the public's level of knowledge may not match their willingness to provide an opinion (Sheppard and Achiam, 2004).

The public opinion survey in this case concerning forest policy in the Region of Valencia served to stress that investments in reforestation as well as those in forest fire suppression are regarded by the majority as not being the most ideal policies. The structures of power for the Forest Service have been questioned over recent years throughout the democratic world by most stakeholders, and bottom-up approaches for governance are felt to be those preferred (PROFOR, 2001). In different countries and regions, different Forest Service models are followed both for public forests and privately owned forests. Increasing transfer of competence to local governments is being strongly demanded by society (Larson and Soto, 2008). This is particularly relevant in the forest sector. According to the results, there is strong support for increased power for decision making by municipalities or by private forest owners. However, despite demands by some of the municipalities to have the right to manage their own forests, which is recognized under the Valencian Forest Law (1993), the regional Forest Service is not facilitating the transfer of competences to them, which according to the survey had an important support among both stakeholders and the general society.

Even if, however, public opinion has an important role when defining policy implementation, at the end forest owners are to a certain extent the decision makers concerning the management of their own forests. In the Region of Valencia, 55% of the total forest area is privately owned (Generalitat Valenciana, 2011c), and therefore their opinion has to be considered to be more relevant. In the analysis, the profile of forest owners was specifically treated differently because of the relevance of their viewpoint for the forest policy implementation as well as their role regarding the administration responsible for the management of public forests.

The establishment of new tax measures depends on citizen acceptance, and these changes are linked to

society dynamics. A possible explanation is that younger respondents are yet incorporated to the labour market, and therefore lack negative perceptions towards taxation. However, the high acceptance, found in our survey, of new tax measures among the young people can be also understood in a positive way that the younger generation has a stronger connection with the philosophy of Payment for Environmental Services (PES) (Wunder, 2005) for the multiple services that forests provide (Reid, 2005).

The results of the study show that there is a large gap between the forest policies implemented by the regional government and public views, therefore future policies need to consider public opinion and aim at getting the citizens' views on forest policy, increasing people's knowledge and positive attitudes towards an environmentally sound use of domestic forests by promoting sustainable forest management. Public perception studies are needed in order to set up proper, two-way communication (from society to decision makers, and vice-versa). These studies on public opinion have to be regular in order to see the evolution, and to be able to follow up the dynamics of citizens' perceptions and the efficiency on changing and shaping it by any measures taken. Such studies have to be completely integrated into the planning process. For that purpose, opinion polls have to be carefully designed and analyzed in order to better integrate the results into the strategic planning process.

Stakeholders (forest owners, ENGOs, etc) are more often than not closer to society than to politicians, and tend to lead opinions (Beder, 2002). Some stakeholders have been lobbying on such issues in recent years through the mass media (Fabra, 2011): the association of forest professionals on silviculture and forest fires, forest owner associations on externalities, association of municipalities on transference of competencies. Follow up of campaigns and messages communicated by lobbying stakeholders should also be considered in research. It has also to be complemented with mass media analysis to determine the effect on shaping citizens' perceptions. It is important to identify the source of perception and relate it to the drivers and variables of those perceptions: mass media.

Follow up is also needed in order to assess the efficiency and suitability of communication methods, ensuring they are directed at the right receiver, using the appropriate channel. The final goal is to measure whether are effective in terms of changing citizens' perceptions, to make any necessary corrections to the

approach used when appropriate. Further research can be oriented towards dynamics of citizens' perceptions, drivers and weak signals of change and for increased efficiency of communication actions by forest stakeholders towards society.

## Conclusions

The work presented here shows that the implementation of the legislation in the Region of Valencia and the allocation of funds are not always in line with the opinion of the general public. Forest policy researchers should analyze these facts to better advice policy making for the benefit of society. It makes sense to consider the demographic and psychographic profile, not only when it is statistically significant, but whenever it is possible to differentiate among communication strategies for each profile group.

It should be stressed that perceptions on market changes of forest products and industries are also equally important for the whole forestry chain. Therefore much more attention should be paid to these aspects. If we as society are able to combine public opinion surveys with foresight exercises on future policy scenarios, then we will better understand the dynamics of citizens' perceptions, and thus will be better prepared to influence them and react to their changes. Forest stakeholders are lobbying on some issues through different means, and one of them is to shape public opinion by sending messages to wide audiences and therefore pushing grassroots lobbying strategies.

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