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NATIONAL SURVEY ON DEMAND FOR RECREATION IN FRENCH FORESTS

by

**Jean-Luc Peyron,
Patrice HAROU, Alexandra NIEDZWIEDZ and Anne STENGER**

with the collaboration of ENGREF forest students

This study is dedicated to Dominique NORMANDIN, who took part in the implementation of the survey, but very unfortunately died in July 2002 and did not see the results he had contributed to.

December 2002

With a grant agreement of **EUROSTAT**

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INTRODUCTION

National accounting deals more and more with economic and environmental information considered in an integrated general frame. It is particularly the case for natural resource accounting and, among other natural resources, for forests. However, the statistical system is not as developed on the environmental side as it is on the economic one. Information availability is thus a major constraint when such accounting processes are carried out. This limitation exists when physical variables need to be monitored and is still stronger when a monetary valuation is needed. For forest accounts, this difficulty has been encountered in almost all non-wood functions such as the production of non-wood goods, recreation (including hunting), biodiversity, ecosystem protection, carbon sequestration, water regulation... It even concerns a particular wood assortment: fuelwood.

Among all forest functions, recreation is known to be increasingly important in our urban societies and its annual value is probably of the same size as the wood removals one. However, it is often estimated on the basis of local studies that are then extrapolated to the whole national territory and that can hardly be compared with data from other countries. For example in France, several studies have been done but they generally concern only the number of visits (except in Lorraine) and are very different one from the other (study area, period...). Finally, a better knowledge of recreational activities is absolutely necessary for integrated management and accounts.

This is the reason why a project has been worked out in order to:

- measure forest recreational activities at the French level and on an annual basis, both in physical and monetary terms;
- seize this opportunity to quantify goods other than industrial roundwood that are associated with forest recreation such as mushroom, berry and flower picking, game hunting, firewood harvesting;
- grasp in addition the true feeling of the public in front of wood harvesting and utilisation, that is often commented or interpreted but seldom directly studied; what is at stake is the compatibility or antinomy between social expectations and the main source of forest revenues,
- test a method to estimate the biodiversity value of the French forests in general;
- analyse the results according to broad forest regions, the forest nature, the type of forest activities, possible substitutes to forest activities, the social characteristics of forest visitors;
- use a robust, simple and rather cheap method that is likely to be repeated from times to times on a regular basis and that is easy to implement in other countries;
- discuss the sample size and its implementation in other countries.

The project has been based on a national survey of a large sample of French households. Some 4 500 households have been initially considered. This survey has been carried out by telephone during the year 2002 with the year 2001 as reference period (and the

change from 2000 to 2001 as reference evolution) . Forest students who were much motivated and had many competencies for that experiment have led it. This report aims at presenting the main results obtained from this survey. It is organised in the following sections:

- **Sample description** that will allow to extrapolate the results from the sample to the general population;

- **People statement about forests and forestry;**

- **Detailed analysis of forest visits;**

- **Conclusion.**

Although their content is not absolutely necessary to the comprehension of the results, the survey form (in French), survey recommendations (in French) and sample size per “*département*” are annexed to this report. Moreover, the raw data file is available on request.

1. SAMPLE DESCRIPTION

1.1. Sample selection

Some 4 500 French households have been chosen in the French directory, 4 504 precisely.

This **sample size** was considered to assure a statistical accuracy not only to national figures but also to regional results, once France is divided into two to three areas.

The household has been chosen as the **sample unit** because of several reasons:

- recreation is very often a family activity as it was known from previous surveys and as the survey shows once again;

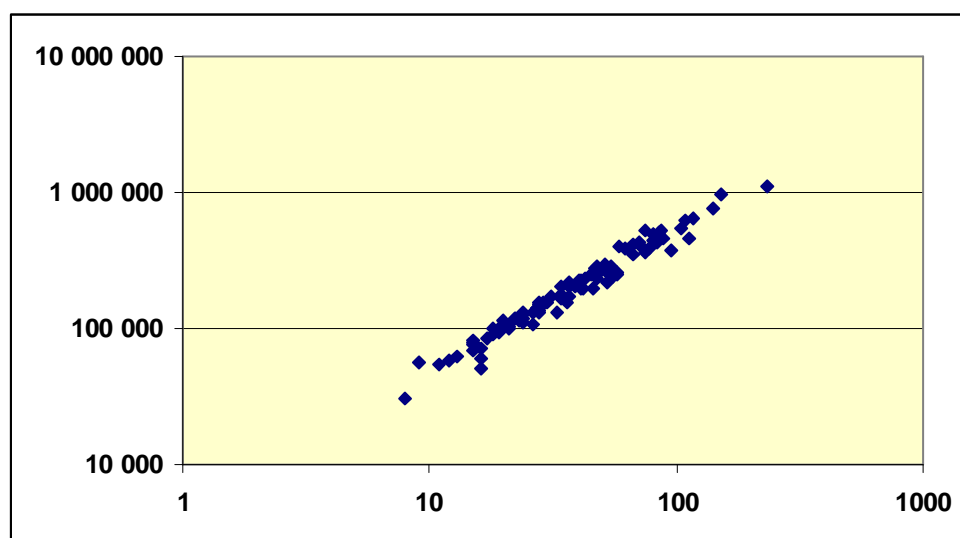
- it often requires the family car and collective costs;

- the individual behaviour itself cannot be explained only by individual features but also by households characteristics such as revenues, life style...

- the home telephone is a collective equipment that could hardly be used to keep in touch with individuals whose characteristics are not previously known.

The **French directory** contains 60 840 pages and the sample has been systematically selected at the rate of about one household every 13,5 pages. The sample has been considered at the level of each of the 95 French “*départements*”, then aggregated at the national level. The comparison can be made for each *département* between the total household number and the sample household number. The sample rate ranges from 1/3 200 to 1/7 000 with an average of 1/5 286. The general correlation is shown on figure 1.

Figure 1: Correlation between the sample household number (horizontal X-axis, logarithmic scale; source: LEF ENGREF/INRA) and the total household number (vertical Y-axis, logarithmic scale; source: INSEE) considered in each of the 95 French “*départements*”.



1.2. Willingness to answer

The selection process allowed to substitute the next household in the directory when one had been five times unsuccessfully contacted at different hours, on different days, during different weeks. Consequently, a communication has been impossible during the survey period for a limited number of households that amounts to 78. Finally 4426 households have been touched.

Of course, not all households accepted to respond to the questionnaire; many households refused because of various reasons that need to be analysed. It is important and necessary to distinguish those who are not available because they have no time or never answer such survey, or for any other reason that is not linked at all with the forest subject. These households who were unwilling to answer for a non-forest reason were finally 1 851. This number is rather large but this situation is very common in such surveys.

On the contrary, 577 other households refused to answer because of a forest reason, mainly because they were not at all motivated by the forest subject and definitively did not go to any forest. These refusals must be interpreted as important information from the survey. They have to take part to the final sample from which an extrapolation ratio to the total household number has to be derived.

Finally, depending on the question, the final actual sample contains either 1 998 households (for non forest topics) or 2 575 households (for forest topics). The extrapolation ratio to the total population is thus either $23\,810\,161 / 1\,998 \sim 11\,917$ (for non forest topics) or $23\,810\,161 / 2\,575 \sim 9\,247$ (for forest topics).

Table 1: Household sample and willingness to answer (source: LEF ENGREF/INRA, survey led in year 2002).

Total household number in the initial sample	4 504
Households impossible to get in touch with	78
Households actually contacted	4 426
Households unwilling to answer for a non-forest reason :	1 851
Lack of time	1 158
No survey	506
Other non-forest reason	187
Household number in the final sample	2 575
Households unwilling to answer for a forest reason	577
Households accepting to answer	1 998

Owing to the fact that some households were not willing to answer to some questions that they considered lacking discretion, the number of answers to one question can be slightly lower than this maximum of 1 998.

1.3. Household composition

Each surveyed household comprises on average 2,7 members, of which 2,0 are at least 18 years old and 0,7 are less than 18 years old. These data can be compared with the average number of 2,4 persons per household given for 1999 by INSEE in the frame of the French population census. They show that the sample overestimates a little bit this average.

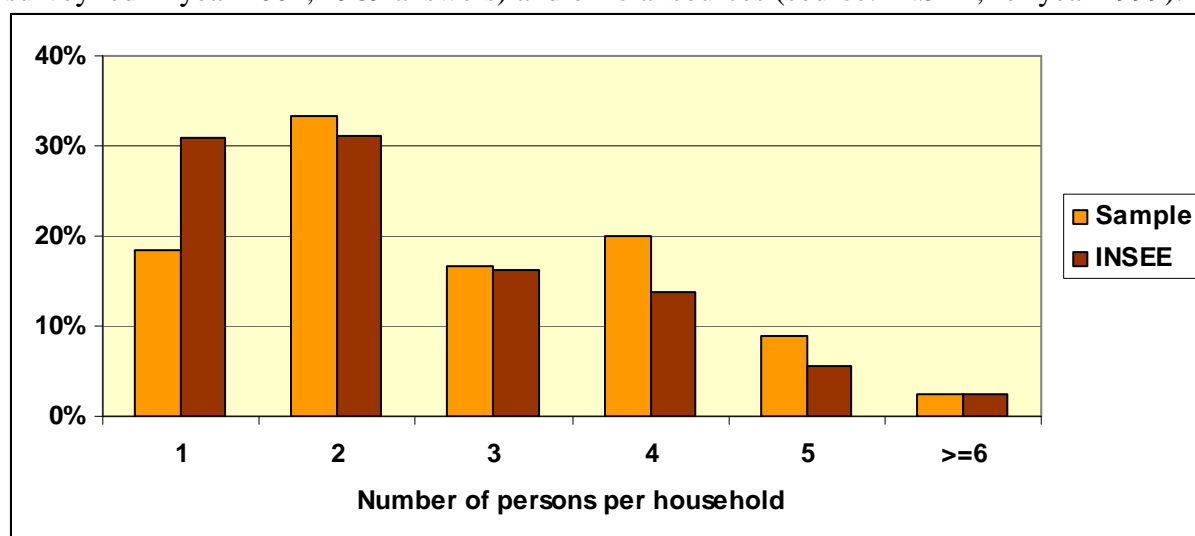
A more precise comparison can be done on the basis of the household composition (table 2). The results show that the sample underestimates the number of one-person households. As a counterpart, it overestimates all other categories, and especially the four- and five-person households. The explanation of this fact is at least three-fold: firstly, small households are less concerned by forest recreation and activities than large households with several children: they are likely to be much more numerous among people unwilling to answer; secondly, small households could have no telephone or refuse to be mentioned in the directory more often than large ones; thirdly, the definition of a household could be slightly different for the INSEE and in the sample: some one-person households living with another household could consider both households as only one in their answers.

Let us consider people unwilling to answer for a reason associated to the forest subject; if we assume that 75% of them are one-person households, then the percentage of one-person households in the final sample of 2 575 households could be 31,0%, that is just the INSEE percentage of one-person households in the total French population.

Table 2: Household composition according to the sample (LEF ENGREF/INRA, survey led in year 2002, 1989 answers) and official sources (INSEE, for year 1999).

Number of persons	Sample	INSEE
1 person	18.5%	31.0%
2 persons	33.4%	31.1%
3 persons	16.6%	16.2%
4 persons	20.1%	13.8%
5 persons	8.9%	5.5%
6 persons and over	2.5%	2.4%
Altogether	100.0%	100.0%

Figure 2: Household composition according to the sample (source: LEF ENGREF/INRA, survey led in year 2002, 1989 answers) and official sources (source: INSEE, for year 1999).



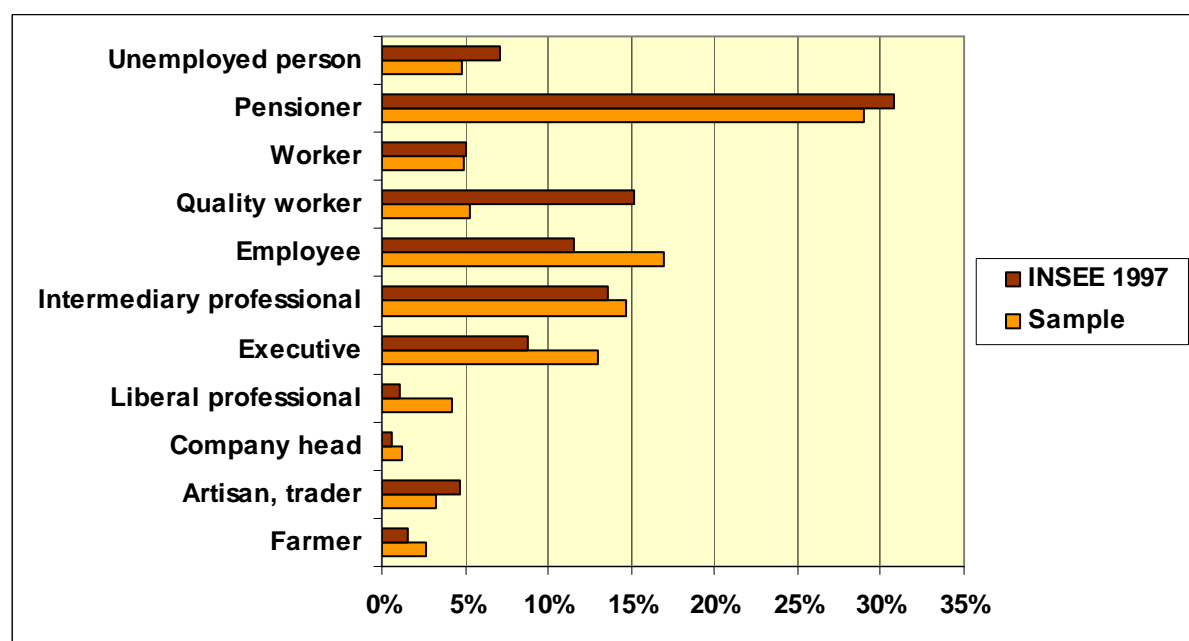
1.4. Social categories

The distribution of households among social categories is important because it provides a proxy for revenues. The sample underestimates the share of unemployed and retired persons, perhaps less than it could be expected. It also strongly underestimates the share of quality workers. On the contrary, it overestimates the share of company heads, liberal professionals, executives and employees. Finally, the theoretical average annual revenue resulting from the sample distribution is about 29 100 Euros/yr, some 9% higher than the official average of 26 600 Euros/yr.

Table 3: Distribution of households among social categories determined by the reference persons, according to the sample (LEF ENGREF/INRA, survey led in year 2002, 1981 answers) and official sources (INSEE for year 1997). The last column gives the mean annual household revenue before taxes for each social category (INSEE for year 1997)

Social categories	Sample	INSEE 1997	Annual revenue 1997
Farmer	2.6%	1.6%	23.3 KEuros/yr
Artisan, trader	3.3%	4.7%	33.8 KEuros/yr
Company head	1.2%	0.6%	38.2 KEuros/yr
Liberal professional	4.2%	1.1%	78.1 KEuros/yr
Executive	13.0%	8.8%	47.6 KEuros/yr
Intermediary professional	14.7%	13.6%	31.0 KEuros/yr
Employee	17.0%	11.5%	20.8 KEuros/yr
Quality worker	5.3%	15.1%	24.7 KEuros/yr
Worker	4.9%	5.1%	19.2 KEuros/yr
Pensioner	29.0%	30.8%	22.1 KEuros/yr
Unemployed person	4.8%	7.1%	14.9 KEuros/yr
Altogether	100.0%	100.0%	26.6 KEuros/yr

Figure 3: Distribution of households among social categories determined by the reference persons, according to the sample (source: LEF ENGREF/INRA, survey led in 2002, 1981 answers) and official sources (source: INSEE for year 1997).



1.5. Life style

The **type of residence** (house or flat) and its location (rather in town or in the countryside), influences the activities of one household and conversely. It could also be considered as a proxy for revenues. Table 4 shows some results of the survey concerning these features and still compares them with official statistics.

Table 4: Distribution of household residences for the sample (LEF ENGREF/INRA, survey led in year 2002, 1986 answers) and official sources (INSEE for year 1999).

Residence	Rather in town	Rather in countryside	Altogether	INSEE data
In a house	23%	45%	68%	56%
In a flat	29%	3%	32%	44%
Altogether	52%	48%	100%	100%
INSEE data	82%	18%	100%	

Surveyed households live mainly in houses. People who have no telephone or are in a collective residence have not been surveyed and don't live in residential houses. This can explain the high rate of houses in the sample. As for the rather urban or rather non-urban location of this residence, the official statistics overestimate urban areas because they classify whole communes in urban or non-urban areas. On the contrary, in the survey, people have given their own feeling on their location and probably consider that some residential places around towns look more like the countryside than an urban area.

Because wood is a well-spread energy in France, although it is only seldom used alone, it was interested to study the **heating systems** of households and, eventually, their wood consumption. Some households use only one energy (gas, electricity, fuel oil, wood, ...); some others use wood with one or more energy, or sometimes a combination of other energy sources than wood. Table 5 gives their relative importance in the sample and the resulting consumption of fuelwood.

Table 5: Distribution of households according to their energy sources and to the sample (LEF ENGREF/INRA, survey led in year 2002, 1958 answers). The last column gives the mean annual fuelwood consumption per household (and the fuel wood share in annual heating).

Energy sources considered...	... alone	...with fuelwood	Fuelwood consumption
Gas	35.2%	2.4%	5,0 steres/hh/yr (36%)
Electricity	21.7%	5.9%	7,2 steres/hh/yr (52%)
Fuel oil	18.2%	3.4%	6,8 steres/hh/yr (49%)
Other individual sources	4.2%	0.2%	3,0 steres/hh/yr (22%)
Combinations without wood	1.2%	0.6%	3,8 steres/hh/yr (28%)
Fuelwood		7.0%	13.8 steres/hh/yr (100%)

Taking into account its share when it is used jointly with another energy source, fuel wood represents about 13% of heating energy sources. The average fuel wood consumption for the sample is 1,77 steres/hh/yr. Extrapolating this result to the total French population, the annual fuelwood consumption ranges between 33 and 42 million steres, depending on the way the extrapolation is carried out. If we assume that people unwilling to answer to the whole survey because they are not interested by forests consume neither the same fuel wood quantity as the others, nor no fuel wood at all, but half of the quantity consumed by others, then the total fuel wood quantity consumed by households annually in France amounts to 37,5 million steres or about **25 million cubic meters**.

1.6. Leisure activities

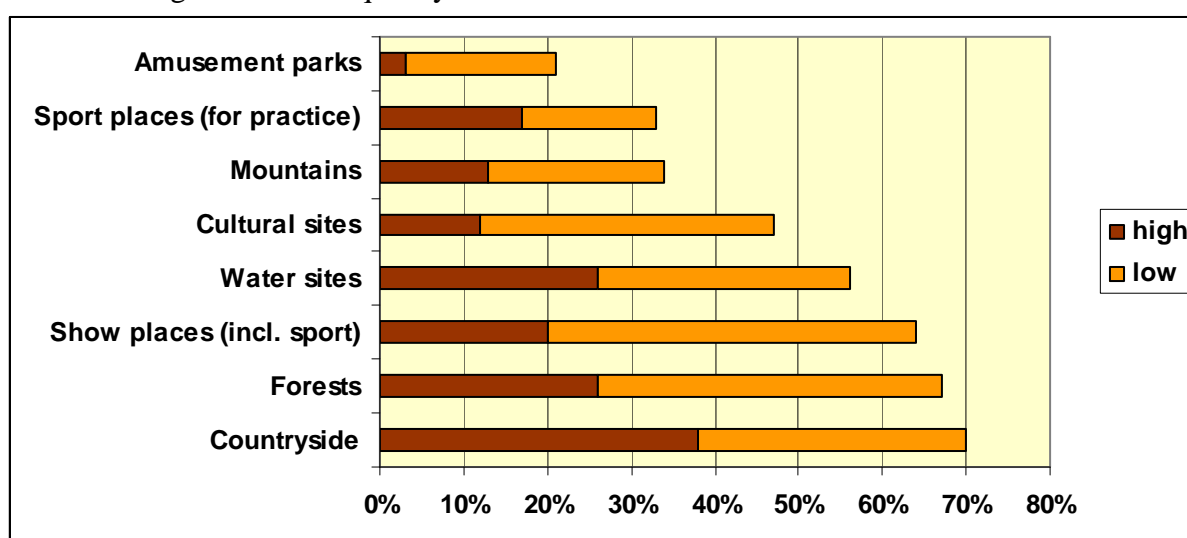
Forest visits depend on other leisure activities of households. The importance of the main different possibilities have been tested in terms of leisure places since one place accept many types of leisure activities (for instance, a walk is possible not only in forests but also in mountains or in the countryside). Each leisure place has been classified in three categories according to the high, low or nil number of visits of the household during one year. Because of its particular situation and the fact that everybody has some leisure at home, the residence is excluded from the analysis. Results are given in table 6 and figure 4.

The first leisure place is clearly the countryside, immediately followed by forests. However, comparing them, it appears that forest frequenting is less intense than countryside frequenting. Show places and water sites are a bit less visited with a higher intensity for the latter. Sport places are less visited but many other sites are favourable to sport entertainment, like forests, countryside, seaside, mountains, ...

Table 6: Leisure places of households during the year 2001 (other than the residence and miscellaneous other places), with high or low frequency, for the sample (LEF ENGREF/INRA, survey led in year 2002, 1984 answers).

Leisure place	high	low	altogether
Forests (all activities)	26%	41%	67%
Countryside (all activities)	38%	32%	70%
Mountains (all activities)	13%	21%	34%
Water sites (all activities)	26%	30%	56%
Cultural sites (monuments, towns, etc)	12%	35%	47%
Amusement parks	3%	18%	21%
Sport places (for practice)	17%	16%	33%
Show places (incl. sport)	20%	44%	64%

Figure 4: Leisure places of households during the year 2001 (other than the residence and miscellaneous other places), with high or low frequency, for the sample (source: LEF ENGREF/INRA, survey led in 2002, 1984 answers). The classification is made according to the sum of high and low frequency occurrences.



2. PEOPLE STATEMENT ABOUT FORESTS AND FORESTRY

Two kinds of statements had to be formulated concerning forests : one on roundwood harvest and one on biodiversity. Biodiversity was also the opportunity to test a contingent valuation method and provide an estimate of its value.

2.1. About roundwood harvest

Opinion polls often consider wood utilisation through the scope of logging troubles for walkers. Because this only point of view cannot lead to a global judgement on wood as a raw material, inadequate conclusions are sometimes drawn on this subject. For this reason, it seemed useful to ask the agreement or disagreement of each household on four statements regarding wood harvest. Two of them were negative: “it spoils the landscape and hamper forest access” (trouble); “it jeopardises the survival of forests” (danger). The two others were positive: “it contributes to the maintenance of forests” (maintenance); “it provides a natural and renewable material” (material).

The results (table 7) show that the public opinion toward roundwood harvest is very positive since about 3/4 of polled people have a positive view of harvesting. The remaining quarter corresponds either to a negative or an ambiguous view (when both positive and negative statements are agreed with).

The maintenance role is accepted in total by more than 3/4 of people and the fact that wood is a natural renewable resource is less consensual since only about 1/3 of households are convinced by it. Negative statements are never shared by more than 20% of the sample.

Finally, roundwood harvest is not rejected as it is often said; but its importance for the wood-processing industries and for the final consumer of end-use wooden products doesn't seem to be much emphasised.

Table 7: Agreement or disagreement of the households with four statements about roundwood harvest; two statements are negative (trouble, danger); two statements are positive (maintenance, material); (LEF ENGREF/INRA, survey led in year 2002, 1983 answers).

a)Share/type of agreements	Negative agreements		Positive agreements	
	Trouble	Danger	Maintenance	Material
1 agreement	4.6%	8.1%	46.9%	7.3%
2 agreements, same group	1.7%		18.9%	
Unambiguous answers	14.4%		73.1%	
3 agreements	4.1%		1.8%	
Answers with a majority	18.5%		74.9%	
2 agreements, different groups	5.1%			
4 agreements	1.5%			
Answers with no majority	6.6%			
Altogether	100.0%			
b)Total score	Negative agreements		Positive agreements	
	Trouble	Danger	Maintenance	Material
For each statement	14.8%	19.4%	76.1%	31.6%

2.2. About biodiversity

A test of contingent valuation has been elaborated in the frame of this survey and concerned biodiversity. The formulation of contingent valuation questions are very important. This is the reason why it is given below:

- 1st question: “In France, among animal species (vertebrates) living in forests, 2% are threatened with disappearance; moreover, 12% are vulnerable and 6% are rare; as for plants, about 2% are threatened or vulnerable. Thus the biological diversity of forests appears as a patrimony to be preserved by various protection and maintenance measures that have direct and indirect costs. On behalf of your household, would you be ready to dedicate annually to the biodiversity of the French forests an amount of [6p €, p going from 1 to 15]”; of course, the amount was clearly pronounced as 6, 12, 18, 90 €; the choice of the amount proposed to one given household was done according to both systematic and random procedures: for the first time the question was raised by one given surveyor, the amount was determined through a random procedure; then, it was incremented by 6 € for the next household or decreased to 6 € when 90 € had been reached; in such a way, all amounts have been proposed about the same number of times at least higher than 100;

- 2nd question: “Which contribution would you accept at the most?”; the question was the same, no matter the previous answer had been “yes” or “no”; of course, if the answer had been “yes”, the maximum amount ought to be at least equal to the proposed amount and, in the opposite case, it ought to be at most equal to the proposed amount;

- 3rd question: “If it is equal to zero, is it because the forest biodiversity isn’t really of interest for you or because you consider that you haven’t to pay for that ?”: it was asked only to those who had answer “0” to the second question (and thus “no” to the first question).

The results obviously show that the highest the proposed amount, the lowest the probability that it is accepted by the respondents (figure 5). Whatever the proposition, at least 35 to 40% of households are not prepared to pay anything for biodiversity. On the contrary, 15% of households are willing to pay at least 90 €. Within the tested range from 6 to 90 €, the trend appears quite clearly. Under an exponential assumption, the acceptance rate of an amount of 160 € is expected to be approximately 5%: this means that the variation range of the proposed amount could have been extended up to about 160 €.

However, households who don’t accept the proposed amount can be divided into two categories: those who accept to pay for biodiversity at a lower level than the proposed one and those who don’t accept to pay anything. The latter represent 80% of the households who don’t accept the proposed amount. Figure 6 shows the variation of this rate with the proposed amount. Among the reasons given to explain this refusal, the feeling that households have not to pay for forest biodiversity is predominant (81%); other households are not interested by forest biodiversity (17%) or have no money for this goal (2%). Finally, the total sample can be distributed into three broad categories (figures 7 and 8):

- households who accept to pay at least the proposed amount represent 34% and they accept on average to pay 48 €/household/year

- households who don’t accept the proposed amount but would accept a lower one are 13% and they accept to pay on average 20 €/household/year;

- households who don't accept to pay anything at all.

Figure 5: Share of households accepting to pay annually for forest biodiversity, at least up to an amount proposed between 6 and 90 € and varying by intervals of 6 € (source: LEF ENGREF/INRA, survey led in 2002, 1883 answers). Each household is subject to one amount that is chosen both randomly and systematically within this range.

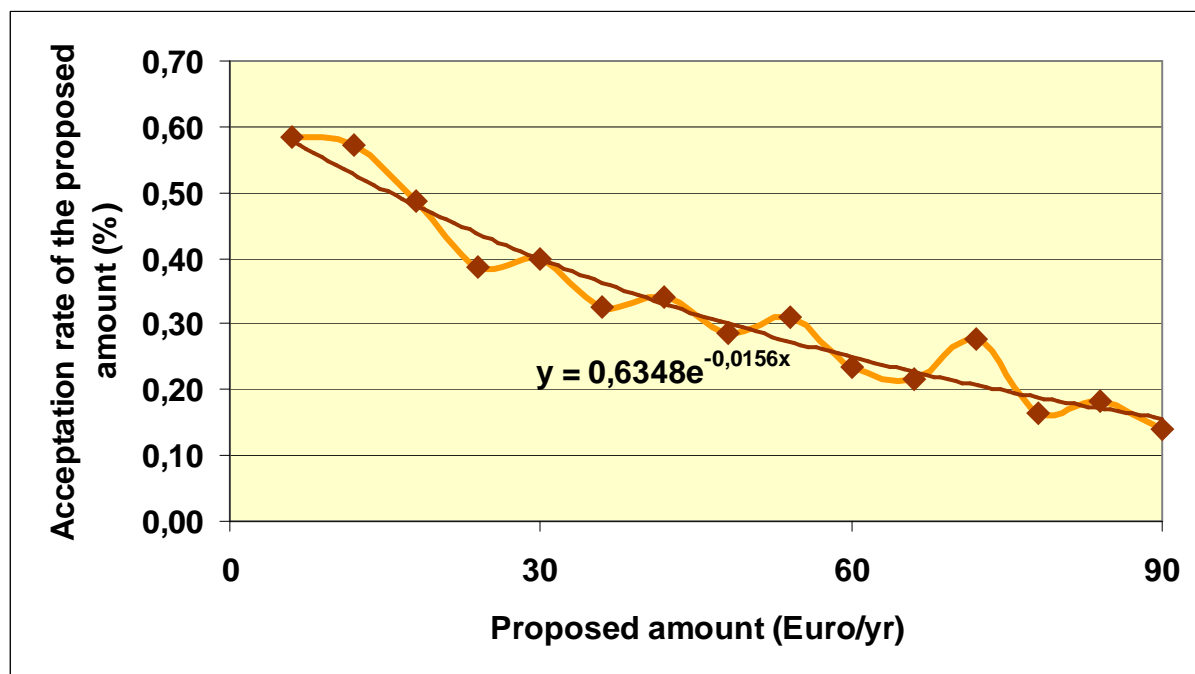


Figure 6: Share of households refusing to pay anything for forest biodiversity among those who don't accept the proposed amount (source: LEF ENGREF/INRA, survey led in 2002, 1883 answers).

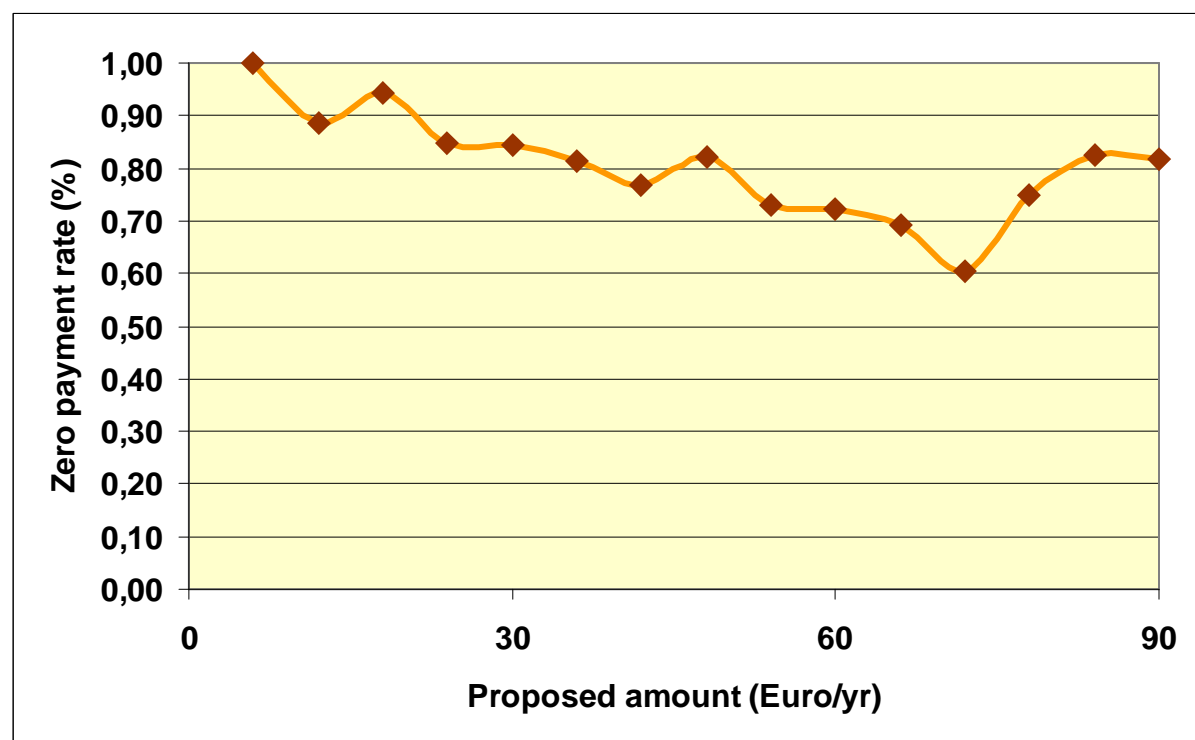


Figure 7: Distribution of households into three categories according to their willingness to pay for forest biodiversity: those who don't accept to pay anything (upper area), those who accept to pay less than the proposed amount (middle area) and those who accept to pay at least the proposed amount (source: LEF ENGREF/INRA, survey led in 2002, 1883 answers).

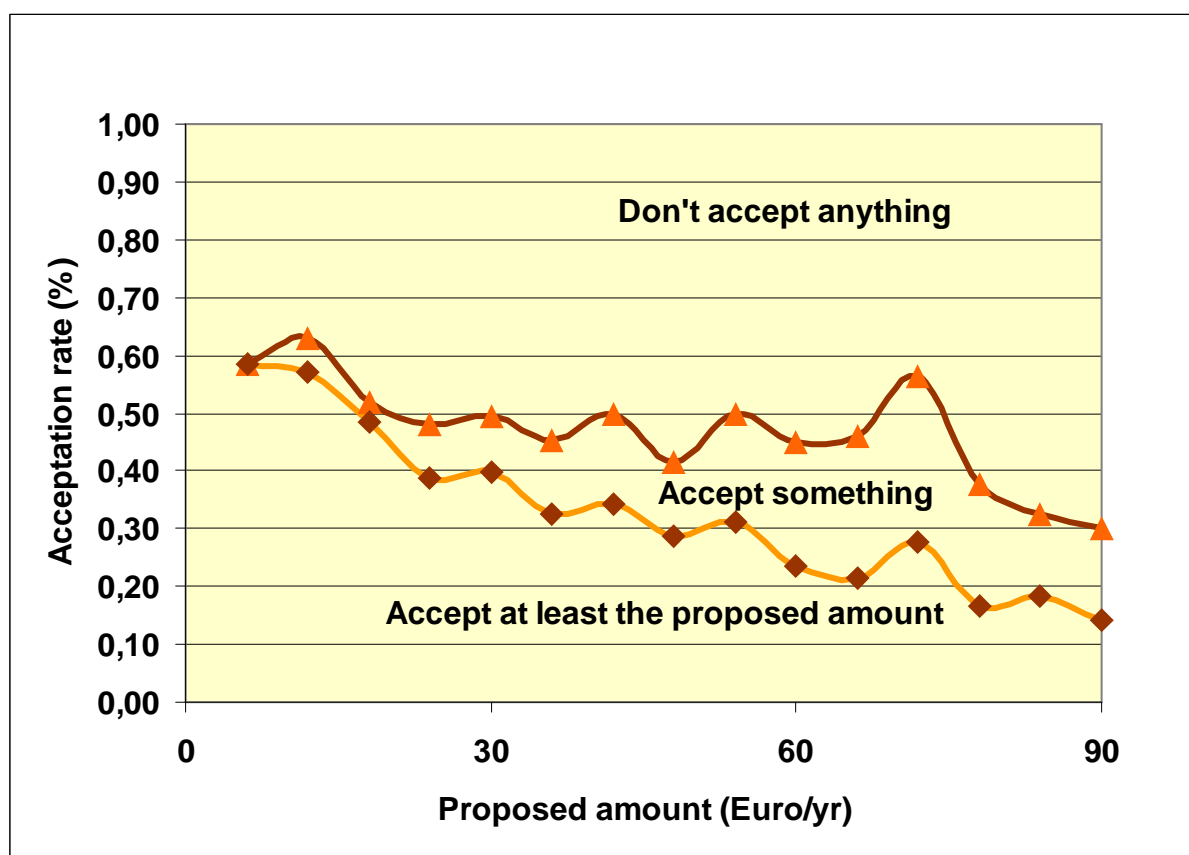
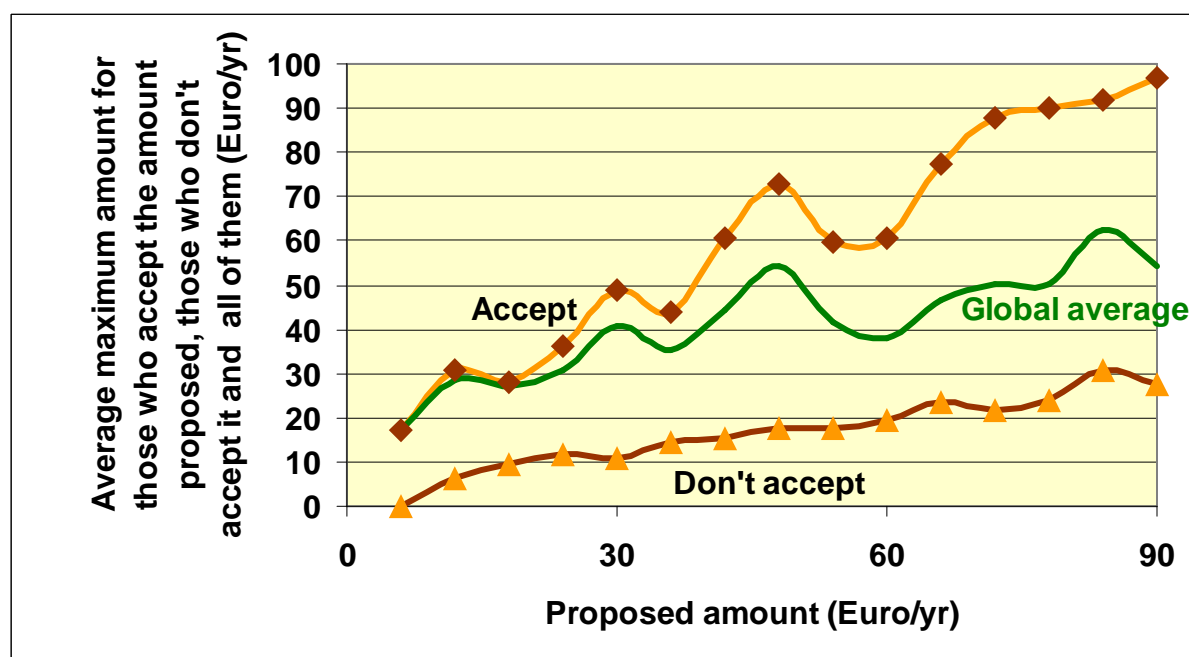


Figure 8: Average positive maximum amount that households accept to pay for biodiversity in total (global average) on the one hand, according to the proposed initial amount and their acceptance of it or not, on the other hand (source: LEF ENGREF/INRA, survey led in 2002, 1883 answers).



One question can be raised about the effect of the initial proposed amount on the willingness to pay of households. To answer it, it is of course necessary to consider only what is relevant from the strict point of view of the willingness to pay and to forget the normal variations with the initial amount when two populations are distinguished on whether they have accepted or not this initial amount proposed. And what is relevant from the strict point of view of the willingness to pay is here twofold:

- the rate of households who accept to pay something (upper curve of figure 7); it is clear from figure 7 that it depends not very much on the initial amount, at the exception of low or high initial amounts:

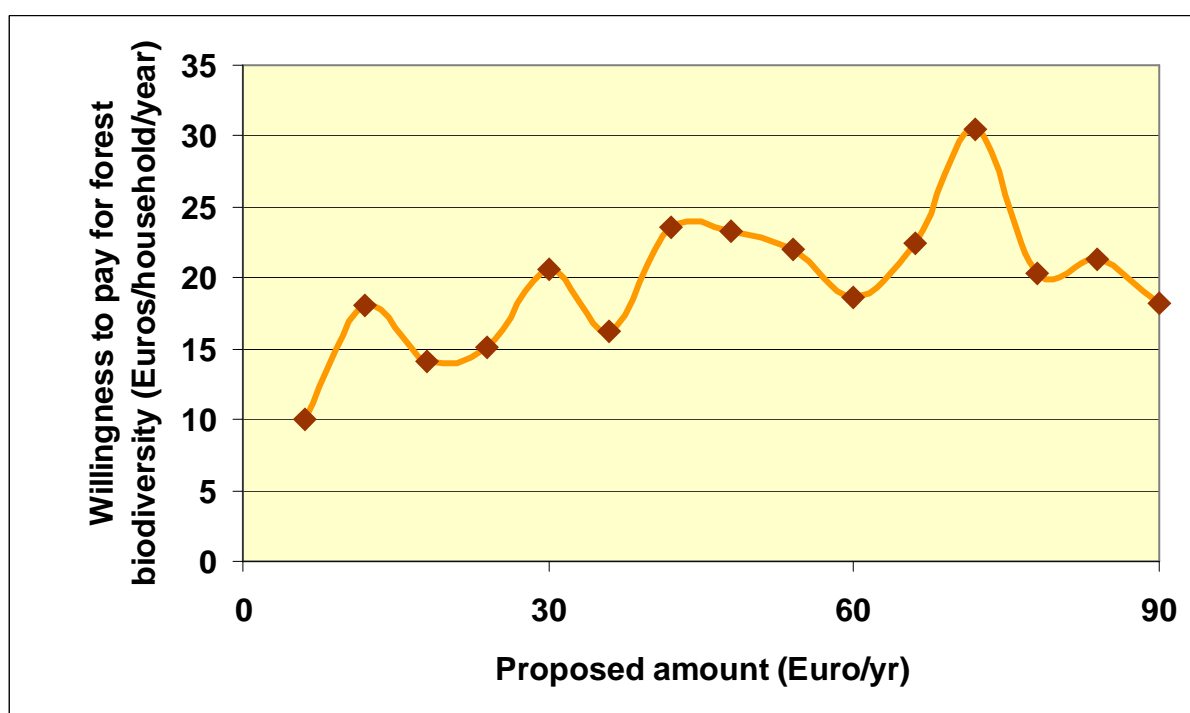
- the actual willingness to pay of the corresponding households (medium curve of figure 8); the results show here a slight correlation between the initial amount proposed and the final answer of households; however, this effect appears limited in size.

From this analysis, a first estimation of the total willingness to pay of the French population can be derived in different ways and particularly the two following ones:

- the average a respondent household would accept to pay for forest biodiversity is given from the previous probabilities and average amounts for the two first categories of households that have been distinguished: $0,34 \times 48 + 0,13 \times 20 = 19,2 \text{ €/household/year}$;

- a detailed calculation for each proposed amount followed by an arithmetic average provides a similar result, $19,6 \text{ €/household/year}$; the variation according to the initial proposed amount is showed on figure 9 (it differs from the medium curve on figure 8 due to households who did not accept to pay any amount of money).

Figure 9: Average willingness to pay per household and per year for forest biodiversity and for each class of proposed initial amount (source: LEF ENGREF/INRA, survey led in 2002, 1883 answers).



However, these results are relative to respondent households only and have to be corrected in order to also take into account households who don't feel concerned by forest problems (correcting factor 1998/2575). This means that, selecting the second and more detailed method, the average willingness to pay for a mean French household is **15,2 €/household/year**. An extrapolation to the total French population shows a global biodiversity value of **362 M€/year** (million euro per year). Thus, taking into account the overall French surface area of 15,922 Mha (million hectares) on January 2001, 1st, the per hectare biodiversity value is **22,8 €/ha/an**

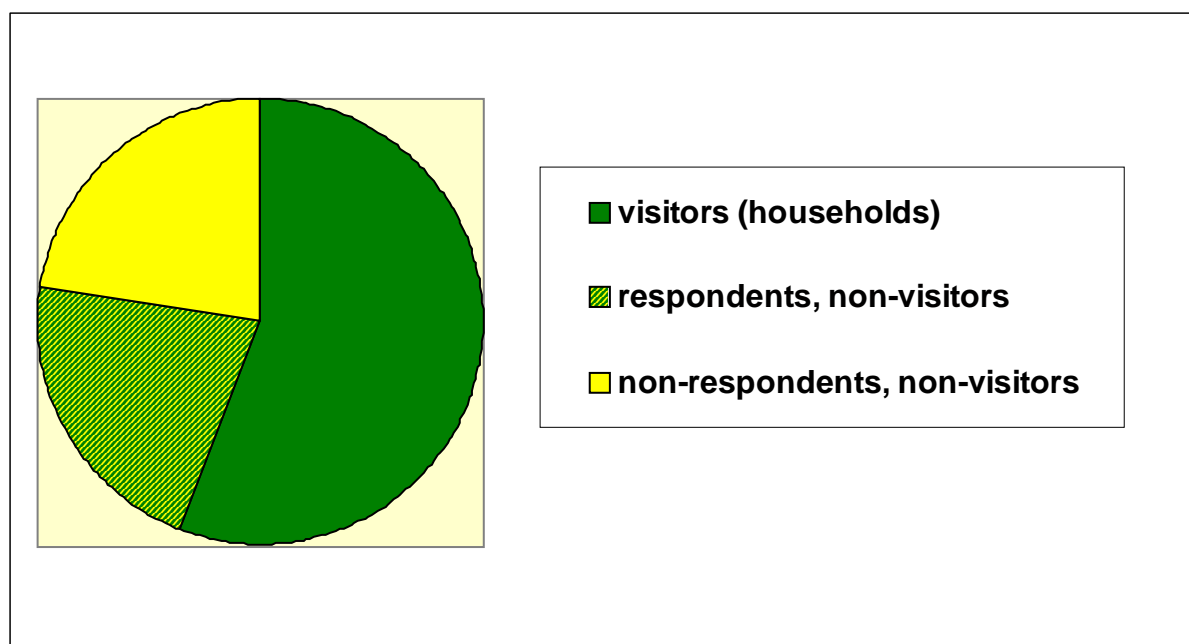
3. DETAILED ANALYSIS OF FOREST VISITS

The main objective of the survey was to analyse and value forest recreation in France. It can be divided into several sub-objectives that are successively commented: the share of the total population visiting forest areas, the reasons that are put forward by those who have no visit, the travel means used and distances covered to go the forest visit place, the activities for which visitors go into the forest, the forest products collected through these activities, the type of forests that are concerned by these activities, regional considerations, the corresponding cost and the resulting recreational value and changes from one year to another.

3.1. Share of the population visiting forest areas

Among the 1998 respondents, 1436 households have visited at least once and one forest. However, to provide a complete view of the proportion of households visiting forests, those who have not accepted to answer the questionnaire because they were not interested by the subject are supposed to be non-visitors. Taking them into account, the sample contains 2576 households. Thus the share of the population having visited at least once and one forest is $1436/2575=56\%$ (figure 10). This share is rather high but lower than results given by other surveys, particularly those that don't take into account non respondents and those that are led by post mail (the probability that a person who is interested by the subject answers is higher than the average).

Figure 10: Distribution of the sample into three categories of households: those who visited at least once one forest during the year (visitors), those who declared they have had no visit (respondents, non-visitors), those who did not answered the questionnaire but declared they were not interested in the subject (non-respondents, non visitors) (source: LEF ENGREF/INRA, survey led in 2002 on year 2001, 2574 households in total).



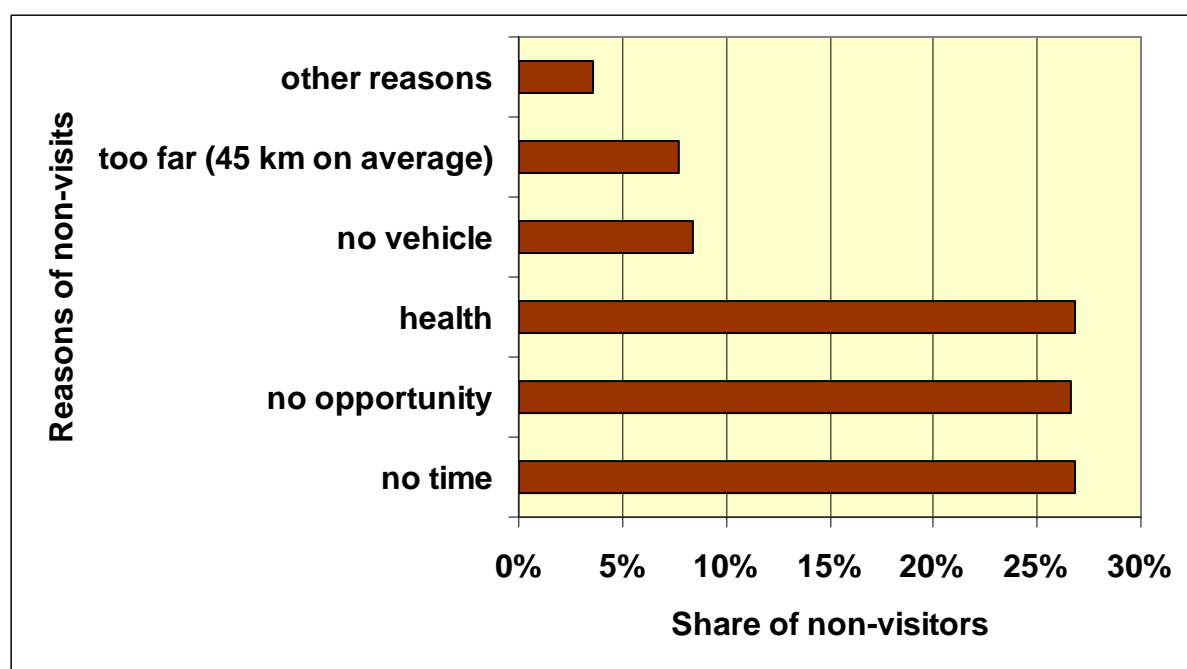
3.2. Non visit reasons

Non-visit reasons have been analysed from the households who accepted to answer despite the fact that they don't went to any forest during the year (figure 11). They represent 22% of the total sample (1998-1436)/2575).

The lack of time and opportunity explains one half of non-visits. Of course, these reasons illustrate the absence of motivation and will.

The other half is the result of difficulties to move to the forest. Among these difficulties, a bad health is a frequent case: for example, many old persons stay at home or around their home and have no real possibility to go to forests. The lack of adapted transport means is another problem, sometimes combined with the previous one. Then, the far distance to the forest is also given, but in less than 10% of cases. The far-distance concept can be very different from one person to another and depends also on the transport means. Some households consider that a few kilometres are a far distance. However, this distance is 45 km on average for those who mention this reason: such a level can be considered as an actual constraint. It is given by people living in the north, the north-west or the west of France (regions with a low forest rate and few public forests), by people from the south of France (although the forest rate is high, high forests are rather scattered) and by people living in big cities (Paris, Lyon, Toulouse, ...) where the transportation time comes certainly in addition to the distance.

Figure 11: Non visit reasons (source: LEF ENGREF/INRA, survey led in 2002 on year 2001, 562 households concerned within the total sample of 2574 households).



3.3. Travel means and distances

Several questions were asked on travel means and distances. They were closely connected to the overall objective: the assessment of the forest recreational value by a method based on the travel cost.

A given household is supposed to have several types of visits depending on the visit region, the number of household members concerned, the main activity aimed at and the travel means used. For each of these types of visits, the annual number of visits, the access distance (outward journey) and the forest visit length were demanded.

Figure 12 shows the distribution of visit types and visits according to the travel means used to go to the forest. Car appears to be the main travel means. It is mentioned by households for 70% of their forest visit types. However, when they use their cars, households repeat less frequently their visit type than they do with other travel means. As a consequence, car is used in less than half of forest visits made by households and it allows to introduce some diversity in the practices (locations, activities). On the contrary, walking is less often mentioned by households as a travel means. But when it is, it corresponds to a rather high frequency. Finally, although walking is mentioned in only 20% of cases, it is used for almost half of visits. Thus it corresponds to a repeatedly practice. Bicycle is also significantly used by households. Public transports and other means such as motorcycles, horse riding, tractors, are only seldom used.

Figure 12: Travel means relatively to visit types, on the one hand, and visits on the second hand (source: LEF ENGREF/INRA, survey led in 2002 on year 2001, 2 295 types of visits).

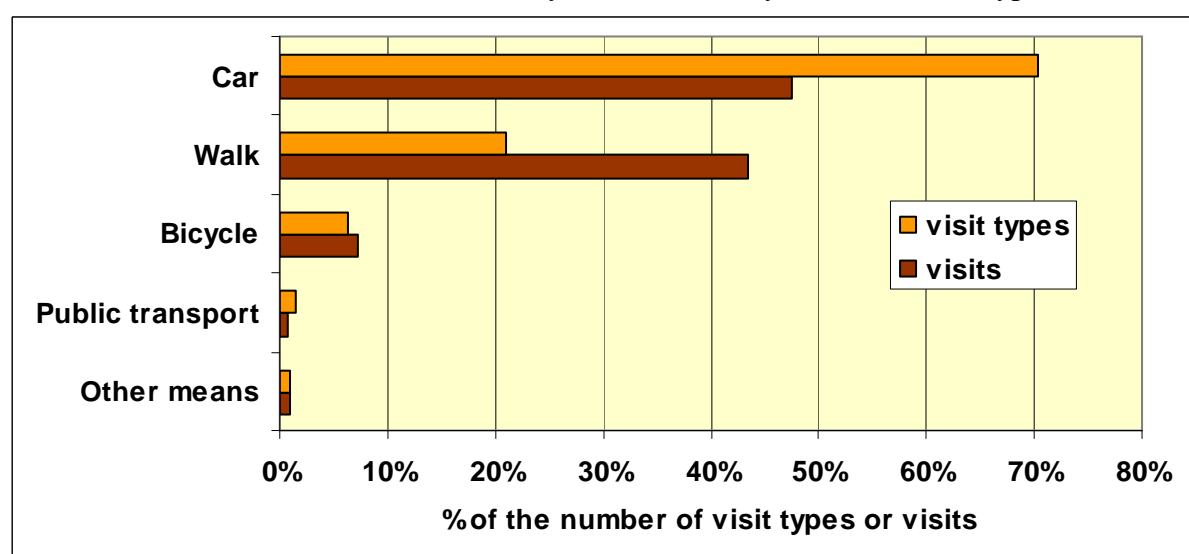


Table 8 gives the main characteristics of forest visits according the travel means used, in terms of annual visit number, average number of visitors per household, average access distance and average time length. The average visit number per household is a little less than twenty per year. The distribution of this number among the various travel means corresponds to the dark series in figure 12. The number of persons in each visit is 2.5 on average and does not vary much from one major travel means to another.

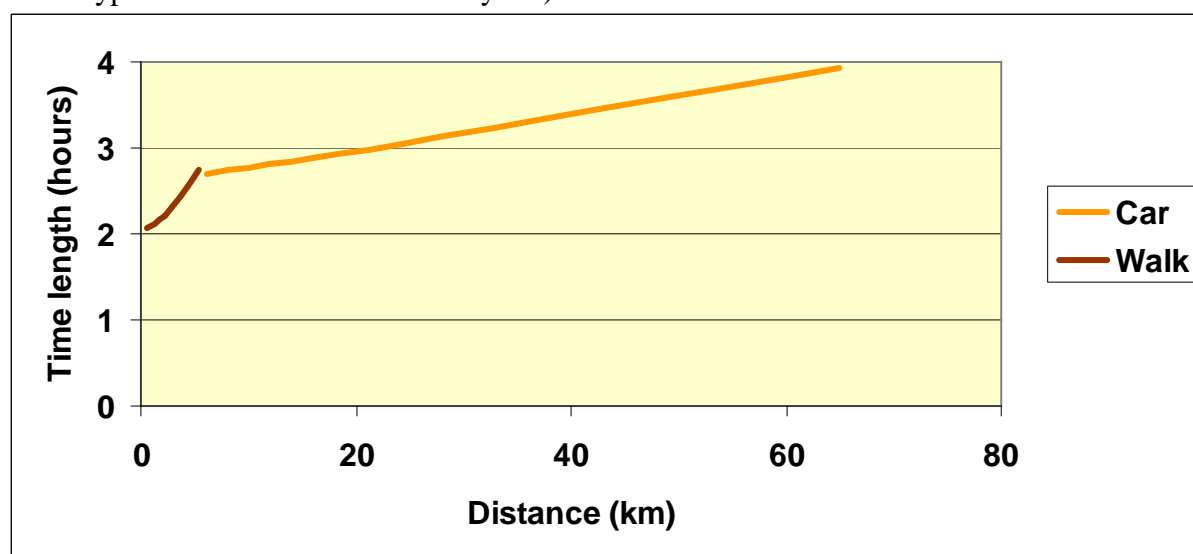
The average access distance is just above 10 km. It is doubled when a car or a public transport system is used. It is much less for other means and particularly, of course, for walking. The average time length is about half a day when a car, a bicycle or a public

transport is used; it is less than 2 hours when people walk to the forest. The use of a public transport is certainly chosen in special circumstances and with a high motivation; moreover, it involves schedule constraints. This is the reason why this choice is related to a rather long visit. In the same way, usually, when the travel distance increases, the time length increases also (figure 13). Yet, the time length includes only the forest activity and does not include the travel time. One could influence the other in the memory of the respondent but, more probably, the travel length must be considered as an investment that has to be used efficiently: the time length in forest is some sort of counterpart of the travel cost. Figure 13 shows this relationship for the two main travel means: walk and car. The effect of the travel distance on the visit length is higher for walking because of a lower speed.

Table 8: Main characteristics of forest visits according to the travel means used; the visit number per household is given for the whole sample, should households answer or not, should they visit forests or not (source: LEF ENGREF/INRA, survey led in 2002 on year 2001, 2 295 types of visits among which 2 145 provide relevant information on distances and time length).

Travel means	Visit number (nb/households/yr)	Persons/visit (nb/visit)	Average distance (km)	Average length (hours/visit)
Car	9.0	2.5	19.2	2.9
Walk	7.6	2.1	1.1	1.8
Bicycle	1.3	2.3	4.6	3.0
Public transport	0.2	1.1	19.5	3.8
Other means	0.2	1.1	2.9	2.6
Altogether	18.6	2.3	10.5	2.5

Figure 13: Relationship between the travel distance and the forest visit length for two travel means: walk and car; it is based on three distance classes in each case (source: LEF ENGREF/INRA, survey led in 2002 on year 2001, 476 types of visits with a walk access and 1 479 types of visits with an access by car).



3.4. Forest activities

Walking is the main reason of three quarters of the visit types and two thirds of the visits (figure 14). However, some activities are less often mentioned but practised frequently: animal exercise, sport, fuelwood harvesting, observation of fauna and flora, ... Animal exercise is very frequent, one to two times a week on average but up to once or twice a day in some cases. Other activities are not so frequent but require a long time in forest, such as hunting and other activities (scouting, forest works, drawing, painting; table 9). Hunting or observation of fauna and flora justify longer travel distances than animal exercise. Sports practised are first of all bicycle (39%), then running (jogging, footing, 31%), hiking (18%), horse-riding (4%), skiing (3%) and miscellaneous other activities (5%).

Figure 14: Forest activities (source: LEF ENGREF/INRA, survey led in 2002 on year 2001, 2 295 types of visits).

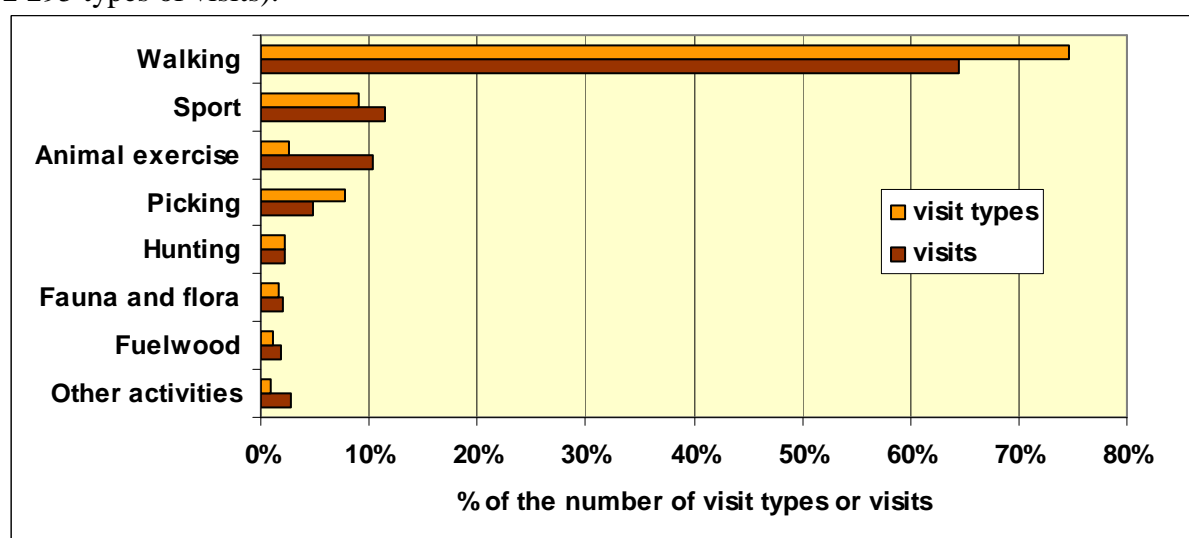


Table 9: Main characteristics of forest visits according to the activities practised; the visit number per household is given for the whole sample, should households answer or not, should they visit forests or not (source: LEF ENGREF/INRA, survey led in 2002 on year 2001, 2 295 types of visits among which 2 145 provide relevant information on distances and time length).

Activities	Visit number (nb/households/yr)	Persons/visit (nb/visit)	Average distance (km)	Average length (hours/visit)
Walking	12.0	2.5	11.1	2.5
Sport	2.1	2.1	7.7	2.1
Animal exercise	1.8	1.6	3.2	1.3
Picking	0.9	2.5	9.0	2.3
Hunting	0.4	1.7	21.0	4.7
Fauna and flora	0.4	1.5	20.2	2.5
Fuelwood	0.3	1.4	7.4	2.9
Other activities	0.5	1.9	10.2	6.2
Altogether	18.6	2.3	10.5	2.5

3.5. Forest products collected

Among forest activities, picking, hunting and harvesting consists in collecting forest products such as mushrooms, fruits, decoration features, fuelwood and venison. The survey was likely to estimate the quantities of these forest products. Concerning the latter, data were actually existing but either they described a part only of the total quantity (for example the marketed one) or, conversely, they had a larger scope than the forest one (non forest lands produce many goods that are encountered in forests but not specific to these areas). One goal of the survey was thus to measure more precisely the quantity of forest goods collected each year.

Many precautions have to be taken for the analysis and particularly the following:

- the number of households concerned is very low for some forest activities and the result is subject to errors and biases; this is the reason why it is better to give results at an appropriate level of aggregation that realise a compromise between quantitative and qualitative precision; here, quantitative precision refers to the confidence that is associated to the results and increases with the aggregation level whereas qualitative precision depends on the availability of detailed information and decreases with the aggregation level;

- some households are in position to declare an activity but they don't have any idea of the quantity of goods they have collected all along one year: a correction has to be made in order to take this fact into account; basically, the assumption is made that the quantity collected on average is the same for households having this activity, whether they are in position to declare the quantity they collect or not;

- the unit is the kilogram or the number of animals in case of hunting; although the use of a general unit is necessary, some products are hardly measured in terms of kilograms (decoration features for example).

Table 10: Forest products collected during forest visits and one year (source: LEF ENGREF/INRA, survey led in 2002 on year 2001).

Forest products	Nb of households declaring the activity/ declaring a quantity (N/M)	Total quantity declared at the sample level (Q)	Extrapolated quantity at the national level (9 247*Q*N/M)
Mushrooms	310/277	1 222 kg/yr	12 650 t/yr
Fruits	85/71	394 kg/yr	4 363 t/yr
Flowers, decoration	64/20	11 kg/yr	326 t/yr
Wild boars	23/17	47 animals/yr	588 000 animals/yr
Red and roe deer	24/17	34 animals/yr	444 000 animals/yr
Small game	56/32	326 animals/yr	5 277 000 animals/yr
Fuelwood	56/48	715 steres/yr	5 669 000 steres/yr

Despite the statistical problems that have just been mentioned and under the cover of the necessary precautions associated to these problems, table 10 gives several interesting results:

- before this survey, only marketed quantities of forest mushrooms were known from the organisation of producers; these quantities were about 5 000 tons/year; non-marketed quantities were estimated to be approximately of the same size; one result of this survey is that, probably, these non-marketed quantities were under-estimated since they appear to amount to 2.5 times this former estimation and to represent 70 to 75% of the total quantities instead of 50%;

- as for forest fruits, the quantities are much less than for mushrooms and the statistical confidence is lower; however, no data were available except for industrial outlets (blueberries were estimated to be 5 000 to 10 000 tons/year for food and pharmacy uses but come mainly from open lands); the estimation here is of the same magnitude but concern mainly chestnuts (75 to 80%); other important fruits to be collected in forests are blackberries (6%), blueberries (5%) and raspberries (3%);

- flowers and other features for decoration account only for some 326 tons, much less than industrial outlets that are estimated to 3 700 tons; lily of the valley is an important component of this collection made by households;

- the number of animals killed by hunters has been estimated for broad categories in order to reach a sufficient level of confidence; it has been compared to other data: for boars, the estimation is 1.5 times the data published by the hunting organisation for the whole territory (ONC: 383 000 boars for 2000/2001); according to the small number of hunters in the sample used here, this difference is not surprising; for deers, the result is consistent with the realisation of the hunting plan (ONC: 466 000 animals) although it is also subject to statistical imprecision; for small game, only general data are available and amount to about 31 million animals, mainly birds; a forest share can be estimated by a combination of these data and the survey results: it appears to be 17%, much less than the forest percent (29%); owing to the fact that hunting is much more expensive in forest than in the countryside, it is acceptable that relatively less small game are killed in forests; finally, this forest hunting result for small game is composed mainly by woodcocks, pheasants, hares, pigeons, partridges and rabbits (in decreasing order);

- the quantity of fuelwood declared here (5.7 million steres/year) is much less than the quantities burnt each year by households: 37.5 million steres (see §1.5); the conclusion of this difference is that fuelwood is often cut by people specialised on this product, at least up to a certain extent, and then sold under unformal patterns; it means also that the expression “self-consumption” used to call this kind of harvest is not appropriate since households declare quite different quantities cut and used; the most accurate data is certainly the consumption one that is consistent with the forest accounts that are established elsewhere.

3.6. Forest status

Do people know the status (public, private) of the forests they visit? The answer is “yes” for a large majority of them (82%). The following comments are made according to this majority.

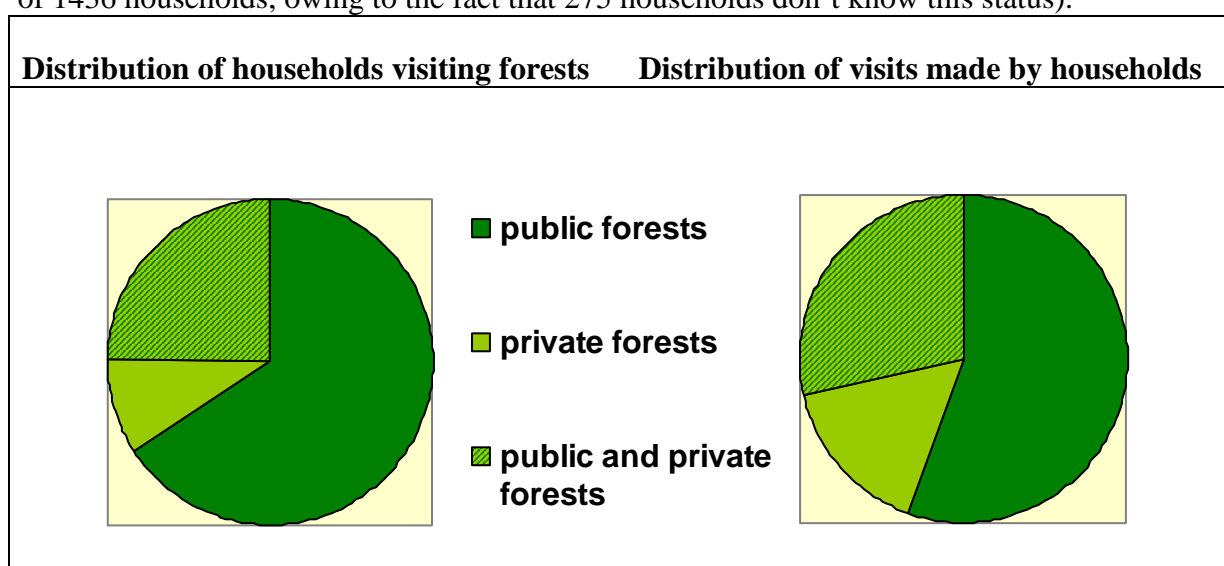
Thus, according to visitors, public forests are mainly concerned as shown on figure 15. Two thirds of households declare they go and visit exclusively public forests. Only 10% of households declare they visit only private forests. This result is not surprising since public forests, contrary to most private ones, strive towards social goals, among others, and are partly subsidised for that. Moreover, walking in a private land is not clearly authorised, in general, and recreation is not a definite vocation of private forests. However, three remarks have to be made:

- Public forests cover only 26% of the wooded area in France; consequently, the tourist pressure on public forests is all the more intense;

- Public opinion on the property status of forests could be biased because many people think that non-closed forests are public, because information is done in public forests but usually not in private ones, and also because many public forests are surrounded by private ones that are not clearly distinguished by visitors;

- Households who declare that they go only to public forests make less numerous annual visits than those who visit only private forests: this is clear from the difference between the two graphs of figure 15; one explanation could be that people visiting frequently forests have a better forest knowledge and go more readily to private areas, unless they are likely to better estimate the private forest status.

Figure 15: Status of forests visited, according to visitors. The distribution is based on the number of households (on the left) and on the number of visits made by these households (on the right) (source: LEF ENGREF/INRA, survey led in 2002 on year 2001, 1171 answers out of 1436 households, owing to the fact that 275 households don't know this status).



3.7. Regional considerations

The regions where households have their main residence was known from the telephone directory. The regions where forests have been visited were also systematically asked for within the survey. Regional flows of households related to forest recreation are thus available. However, because of the limited size of the sample, they are not statistically significant at the administrative region level. This is the reason why region groups have been defined in order to gather data at a sufficient level of aggregation (figure 16). These groups are the same as those that are proposed for a geographic distribution of French forest accounts, except for the Ile-de-France that has been distinguished only here from the rest of the Grand-Ouest because of its high population around Paris. The main visit flows between these region groups are shown on figure 16. They represent only 7% of the visits and one extra % is directed toward foreign countries (not shown on the figure).

These five region groups are quite different one from the other: the Grand-Ouest and the Ile-de-France are less mountainous and wooded than the Midi Méditerranéen, the Nord-Est and the Arc Montagneux; the Ile-de-France is much highly inhabited than the four other groups where the Nord-Est and the Arc Montagneux are much below the French average; the share of public forests is low in the Grand-Ouest and the Arc montagneux, but above 50% in the Nord-Est (table 11).

The visit rate does not vary much from one group to another. It is lower in the Grand-Ouest where forest areas (particularly public ones) are not so large and it is much higher in the Nord-Est where the forest percent is high and the forest feeling strong among the population (the result for the Nord-Est is quite similar to a previous survey realised in Lorraine, one of the five regions or this region group). In the same way, the number of visits per household is also higher in the Nord-Est. Two paradoxical results can be noted: first, in the Midi méditerranéen, the most wooded group (39%), the average access distance is the highest of all groups and the number of visits per household is low; then, there are only a few public forests in the Grand-Ouest, but they receive most visitors; probably, access difficulties explain these two cases, because of forest fire risks in one case (access prohibition), fences in the other.

Figure 16: Main visit flows between 5 broad French regions; the arrow breadth is proportional to the size of the flow (source: LEF ENGREF/INRA, survey led in 2002 on year 2001, 1437 households and 2270 different types of visits within France).

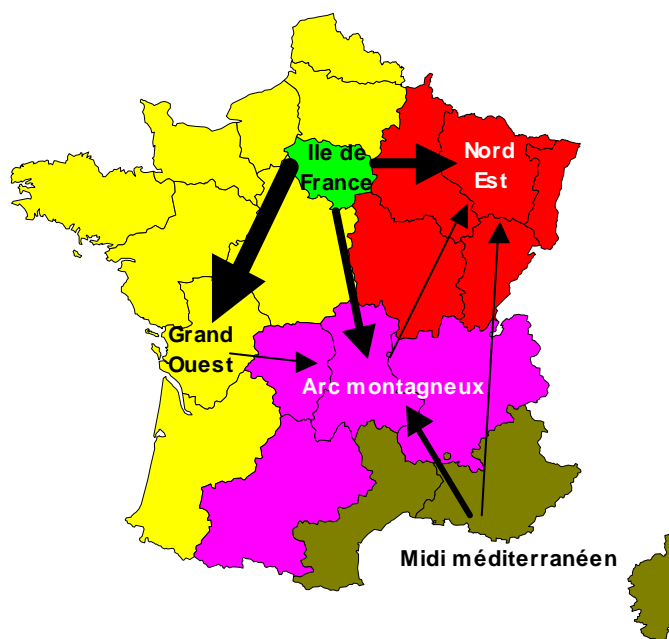


Table 11: Some characteristics of the five region groups distinguished here (sources: SCEES-TERUTI, IFN, INSEE, LEF ENGREF/INRA, survey led in 2002 on year 2001).

Region groups	Arc montagneux	Grand Ouest	Ile-de-France	Midi méditerranéen	Nord-Est	France
Land Mha	13.4	22.9	1.2	6.8	10.6	54,9
Forest cover %	32%	22%	26%	39%	35%	29%
Rate of public forest %	18%	13%	29%	29%	51%	26%
Population Inhab/km2	72	92	849	93	75	101
Pressure/forests Inhab/ km2	22	18	204	34	25	27
Households Million	4.2	8.9	4.5	3.0	3.3	23,8
Ref. sample households Nb/sample	505	998	389	352	331	2 575
Responding households Nb/sample	375	784	281	282	276	1 998
Response rate %	74	79	72	80	83	78
Visiting household Nb/sample	283	521	213	202	217	1436
Visit rate %	56	52	55	57	66	56
Forest status known % (nb of households)	73%	85%	87%	80%	81%	82%
Public status % (nb of households)	54	70	82	58	61	66
Private status % (nb of households)	17	10	6	6	7	9
Public and private % (nb of households)	30	20	12	36	32	25
Nb of visits Nb/ household/yr	17.4	16.7	20.7	16.9	25.7	18,6
Persons/visit Nb/visit	2.5	2.2	2.6	2.3	2.0	2,3
Access distance (single) Km/visit	11.6	9.3	10.2	15.3	8.4	10,5
Duration Hour/visit	2.7	2.5	2.3	2.7	2.2	2,5

3.8. Recreational value

All these data allow to assess a recreational value of the French forests. One very simple way to do that is to estimate the travel cost for these visits. People accept this cost because forest visits have for them at least the same value. The travel comprises several components and usually the following:

- a vehicle cost: when a car is used, it consists of fuel, maintenance and annual fixed costs: it has been estimated to 0,24 €/km on average for 2001 (0,24 €/km in 2000 and 0,23 €/km in 1999); when a public transport is used it consists of a fare; this case has been neglected here;

- the time cost due to the travel distance; it has not been taken into account here in order to avoid debates and overestimation.

Finally, there are in France 23,810 million households. On average, each of them go 9,0 times a year in forests by car and covers 19,2 km to go and the same distance back, that means 38,4 km. The total number of km covered in that purpose is thus 8,229 million km. The resulting cost is thus 1 997 million € that can be rounded to **2 G€/year** (billion euro a year). It represents **83 €/household/year** and **126 €/ha/year**

Beyond this cost, households are likely to attribute an extra value to their forest visits: this is the consumer surplus. The data collected allow to derive such an information from the relationship between the number of visits and their distance. Actually, the decrease of the number of visits with the travel distance helps in estimating the number of visits and their distances that would correspond to various amounts of fictitious tolls. Thus the consumer surplus value can be provided. The first calculations done for this tend to show that the consumer surplus is really high, about four times the actual travel cost. But they are quite technical, notably at the level of the econometric estimation of the relationship between the number of visits and the travel distance; for this reason, they require more work that could be done further in a scientific and educational frame (by a student through a master degree thesis).

3.9. Changes between 2000 and 2001

Finally, two qualitative questions were asked on the changes between 2000 and 2001. The first one tried to identify whether changes had occurred in terms of number of visits, travel distance and visit length. The second question aimed at looking for the reasons of changes if any. The results are that 2001 is not very different from 2000: on figure 17 the proportion of households who have increased their number of visits (the longer part on the right for “visits 2001” compared to “visits 2000”) is just higher than the proportion of households who have reduced their number of visits (the shorter part on the left for “visits 2001” compared to “visits 2000”). The travel distance and the visit length have been even less modified with the same kind of balance between reduction and increase of the variable under consideration.

Among the reasons for these practice changes, forest changes have been mentioned more than one time in three (figure 18). It is true that the year 2000 was following severe forest damages caused by exceptional windfalls and had been a difficult year for forest

visitors. However, a former local survey (in Lorraine) has shown that the number of visits had only slightly fallen between 1999 and 2000 (-10% in Lorraine, a strongly damaged region) due to the damages. Thus the damages could explain the most part of the reduction in 2000 and a certain recovery in 2001. Private and professional events play also an important role to explain these changes.

Figure 17: Changes between 2000 and 2001 according to households, for each of the three criteria number of visits, travel distance, visit length; on the left (respectively on the right), the difference between 2000 and 2001 shows the share of households who have reduced (respectively increased) the criterion (source: LEF ENGREF/INRA, survey led in 2002 on year 2001, 1998 households surveyed among which less than 100 didn't answer this question).

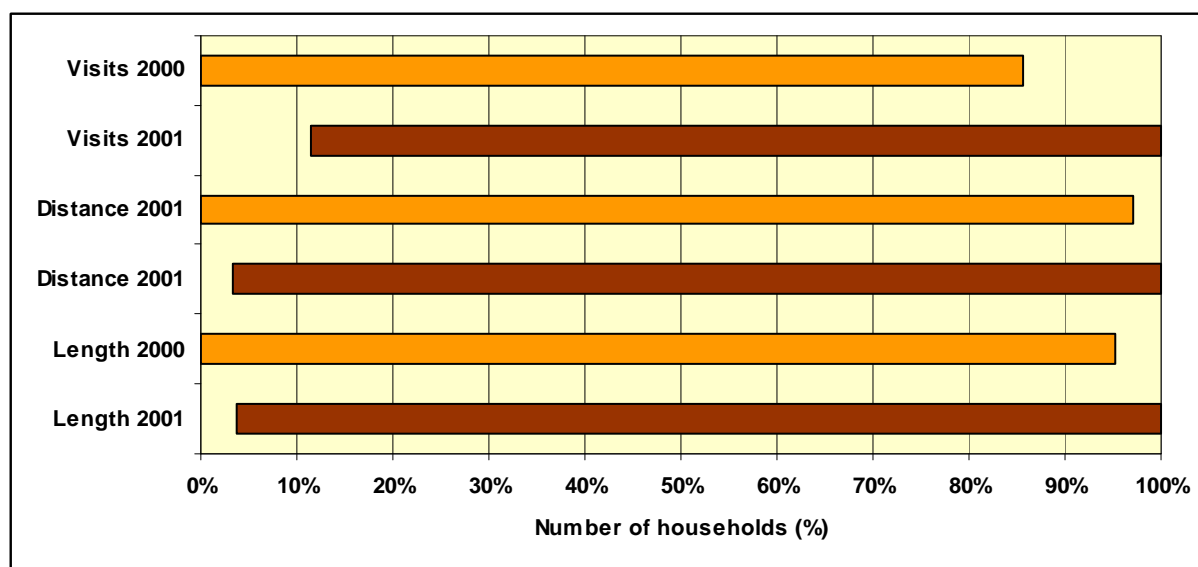
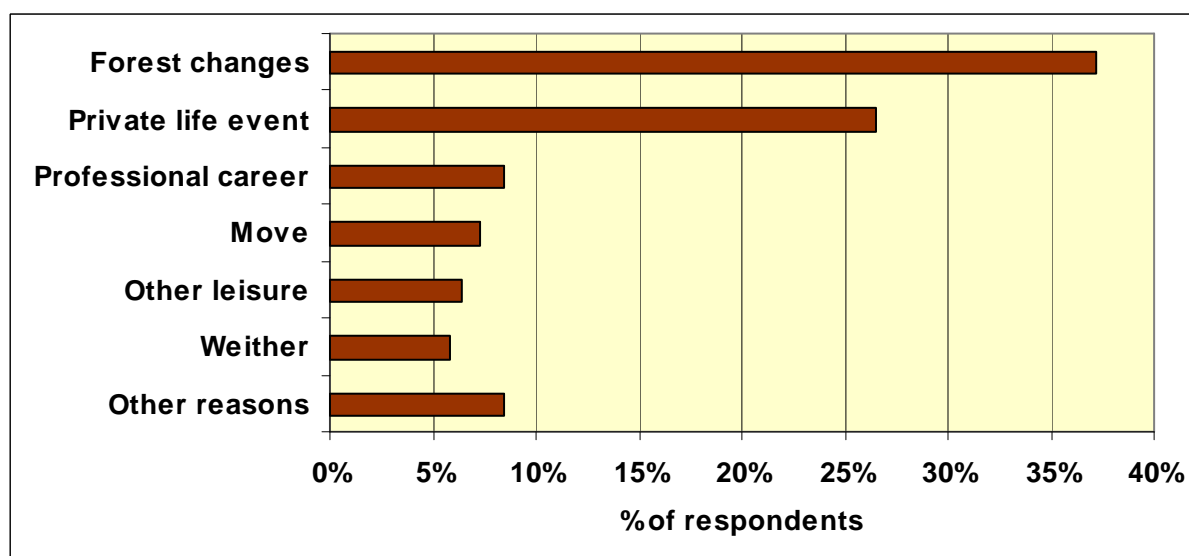


Figure 18: Reasons of the changes according to the respondents who have changed their practice between 2000 and 2001 (source: LEF ENGREF/INRA, survey led in 2002 on year 2001, 652 households were concerned by this question).



CONCLUSION

This survey has allowed to precise many points that were badly known and yet fundamental in order to complete integrated economic and environmental accounts for forestry. First of all, the recreational value of the French forests has been assessed; it amounts to as much as 1.5 times the stumpage value of marketed removals on the basis of the travel costs involved, and much more when the consumer surplus is taken into account. Then the quantity of non wood products annually collected in forests has been evaluated in physical terms and this is a quite new information in the case of France; it is mainly related to mushrooms, fruits and decoration features; in the same way, game killed by hunters in forests have been estimated and compared to other sources. A third important point concerns biodiversity: it is possible to affirm that its value for the public is quite significant but far below recreation, even though different methods have been used and different values are assessed. At last, many other information pieces have been provided on people, their forest activities and views.

One result is also that this kind of survey can be easily implemented and useful results obtained: it could be applied to other countries. Data analysis show that the sample should remain of the same size, particularly in consideration of products collected; this condition is actually necessary in order to obtain a view accurate enough to distinguished broad categories of products. The consideration of several region groups also requires a sample as large as the one used here.

Finally, a data base has been elaborated that will allow many further studies and researches until the decision to realise a new survey like this one is taken.

ANNEXES

Annex 1: Survey questionnaire

Annex 2: Survey recommendations

Annex 3: Sample size per « *département* »

ANNEX 1: Survey questionnaire

INFORMATIONS GENERALES

Enquêteur : _____

ENQUETE :					
N°	Nom	Téléphone	Code postal	Commune	Observations
1					
2					
3					

QUESTION 1 : POSITION PAR RAPPORT A L'ENQUETE

Bonjour,

L'Ecole forestière de Nancy analyse les loisirs en forêt des français. Accepteriez-vous de répondre à certaines questions sur ce sujet pendant quelques minutes ?

NON → pourquoi ?

<input type="checkbox"/> PT	Vous n'avez pas le temps
<input type="checkbox"/> PE	Vous n'aimez pas ce type d'enquête
<input type="checkbox"/> PF	Ni vous, ni d'autres membres de votre foyer n'allez en forêt
<input type="checkbox"/> PF	Ni vous ni d'autres membres de votre foyer n'êtes intéressés par la forêt
<input type="checkbox"/> →	Autre raison à préciser : _____

→ FIN

OUI

QUESTION 2 : RELATION BOIS-FORET

Avec lesquels des jugements suivants concernant la coupe de bois en forêt êtes-vous d'accord ?

<input type="checkbox"/> GN	Elle gâche le paysage forestier et gêne l'accès aux forêts
<input type="checkbox"/> EF	Elle contribue à l'entretien de la forêt
<input type="checkbox"/> SU	Elle met en péril la survie de la forêt
<input type="checkbox"/> MA	Elle permet de bénéficier d'un matériau naturel et renouvelable

QUESTION 3 : COMPOSITION DU MENAGE

Au sein de votre foyer, quel est le nombre de personnes :

au total, vous compris ?

de moins de 18 ans ?

de plus de 18 ans ?

QUESTION 4 : EXISTENCE OU NON DE SORTIES EN FORET

Certaines personnes de votre foyer, vous compris, sont-elles allées en forêt en France pendant leur temps de loisirs (donc hors activités professionnelles) au cours de l'année **2001** ?

NON → pourquoi ?

<input type="checkbox"/> SA	Vous avez des problèmes de santé ou de mobilité
<input type="checkbox"/> DE	Vous n'avez pas de moyen de déplacement
<input type="checkbox"/>	La forêt est trop loin → distance <input type="text"/> km
<input type="checkbox"/> TP	Vous n'avez pas le temps d'y aller
<input type="checkbox"/> ID	Vous n'avez pas l'idée d'y aller
<input type="checkbox"/> AT	Vous supportez mal l'atmosphère forestière (allergie, insécurité, humidité)
<input type="checkbox"/> →	Autre raison à préciser : _____

→ QUESTION 9

OUI

QUESTION 5 : LIEUX DES SORTIES

Dans quelles régions vous ou d'autres membres de votre foyer avez effectué en **2001** des sorties en forêt dans le cadre de vos loisirs ?

<input type="checkbox"/>	AQ	Aquitaine	<input type="checkbox"/>	LI	Limousin
<input type="checkbox"/>	AL	Alsace	<input type="checkbox"/>	LO	Lorraine
<input type="checkbox"/>	AU	Auvergne	<input type="checkbox"/>	LR	Languedoc-Roussillon
<input type="checkbox"/>	BN	Basse-Normandie	<input type="checkbox"/>	MP	Midi-Pyrénées
<input type="checkbox"/>	BO	Bourgogne	<input type="checkbox"/>	NO	Nord-Pas-de-Calais
<input type="checkbox"/>	BR	Bretagne	<input type="checkbox"/>	PA	Provence-Alpes-Côte-d'Azur
<input type="checkbox"/>	CA	Champagne Ardenne	<input type="checkbox"/>	PC	Poitou-Charentes
<input type="checkbox"/>	CE	Centre	<input type="checkbox"/>	PI	Picardie
<input type="checkbox"/>	CO	Corse	<input type="checkbox"/>	PL	Pays de la Loire
<input type="checkbox"/>	FC	Franche-Comté	<input type="checkbox"/>	RA	Rhône-Alpes
<input type="checkbox"/>	HN	Haute-Normandie	<input type="checkbox"/>	EU	Reste de l'Europe : _____
<input type="checkbox"/>	IF	Ile de France	<input type="checkbox"/>	RDM	Reste du Monde : _____

Savez-vous si les forêts concernées appartiennent essentiellement à des collectivités publiques (elles sont alors légalement gérées par l'Office national des Forêts) ou à des propriétaires privés ?

<input type="checkbox"/>	OUI	→ quelle est donc leur nature ?	<input type="checkbox"/>	CPU	essentiellement publique
			<input type="checkbox"/>	CPR	essentiellement privée
			<input type="checkbox"/>	CPP	à la fois publique et privée
<input type="checkbox"/>	NON				

Quelles sont les principales forêts concernées, désignées par leur nom ou celui d'une commune voisine, et mentionnées si possible dans un ordre d'importance décroissante par rapport aux sorties de votre foyer en **2001** ?

Nom des forêts	Nom des communes voisines

QUESTION 6 : NATURE DES SORTIES

Pour quels motifs vous ou d'autres membres de votre foyer êtes allés en forêt en **2001** (hors motifs professionnels) ?

<input type="checkbox"/>	EX	Exercice d'un animal domestique (chien, ...)
<input type="checkbox"/>	PR	Promenade, détente
<input type="checkbox"/>	FF	Observation de la faune et de la flore
<input type="checkbox"/>	SP	Sports → lesquels ? _____
<input type="checkbox"/>	CU	Cueillette → nature (quantité) : _____ (/ kg/an) / _____ (/ kg/an) / _____ (/ kg/an)
<input type="checkbox"/>	CH	Chasse → animaux tirés : sangliers (/ an) — cerfs (/ an) — chevreuils (/ an) — _____ (/ an) — _____ (/ an) — _____ (/ an) — _____ (/ an)
<input type="checkbox"/>	BC	Collecte de bois de chauffage → quantité : _____ stères/an
<input type="checkbox"/>	→	Autre à préciser : _____

Comment s'effectuent en général les sorties ?

<input type="checkbox"/>	IN	De manière individuelle
<input type="checkbox"/>	FA	En famille ou entre amis → nombre de personnes du foyer : _____ → nombre de personnes dans le groupe : _____
<input type="checkbox"/>	CO	Dans le cadre d'activités collectives organisées → nombre de personnes du foyer : _____ → nombre de personnes dans le groupe : _____

QUESTION 7 : MODE D'ACCES A LA FORET

Pouvez-vous indiquer les divers moyens de déplacement que vous ou d'autres membres de votre foyer utilisez pour vous rendre en forêt depuis votre résidence (principale, secondaire ou occasionnelle) ?

VT	Voiture → type ? <input style="width: 100px;" type="text"/>	MA	Marche			
	Carburant ? Consommation : <input style="width: 50px;" type="text"/> /100km		VE	Vélo		
	→ SUP (super) ?			CV	Cheval	
	→ SPB (sans plomb) ?				TC	Transport en commun
	→ DIE (diesel) ?					→
→ GPL ?						

QUESTION 8 : CARACTERISTIQUES DETAILLEES DES SORTIES EN FORET

Quelles ont été approximativement les caractéristiques des sorties en forêt de votre foyer au cours de l'année **2001**, selon les différentes modalités liées aux régions, activités, modes d'accès à la forêt ?

Région de situation	Divers cas envisageables									
	Nombre de membres du foyer									
Activité principale										
Mode d'accès										
Nombre de sorties dans l'année										
Distance moyenne d'accès (km)										
Durée moyenne en forêt (h)										

QUESTION 9 : CHANGEMENTS ENTRE 2000 ET 2001

En **2000**, étiez-vous allés en forêt plus autant moins de fois qu'en **2001** ?
 La distance d'accès était-elle plus aussi moins longue qu'en **2001** ?
 La durée passée en forêt était-elle plus aussi moins longue qu'en **2001** ?

Des changements sont-ils constatés entre 2000 et 2001 ?

OUI	S'expliquent-ils par	AL	L'existence d'autres loisirs
		DE	Un déménagement
		PF	Des évolutions professionnelles
		VP	Des événements dans votre vie privée
		FO	Des changements dans les forêts
		TE	Des différences de temps (météo)
		→	Autre raison à préciser : <input style="width: 150px;" type="text"/>
NON			

QUESTION 10 : AUTRES LOISIRS DANS VOTRE REGION ADMINISTRATIVE

Dans la liste suivante, quels sont les lieux de loisirs que vous ou d'autres membres de votre foyer avez fréquentés beaucoup, moyennement, pas du tout en **2001** et dans votre région administrative ?

Beaucoup	Moyennement	Pas du tout	
			Forêt, toutes activités
			Campagne
			Montagne
			Milieux aquatiques et mer
			Lieux culturels (monuments, musées, villes, ...)
			Parcs d'attraction
			Clubs sportifs (en tant que pratiquant)
			Lieux de spectacle (cinéma, concerts, sport, ...)
			Atelier (art, bricolage, travaux manuels)
			Autre loisir à préciser : <input style="width: 150px;" type="text"/>

QUESTION 11 : ANALYSE CONTINGENTE

En France, parmi les espèces animales (vertébrées) vivant en forêt, 2% sont menacées de disparition ; en outre, 12% sont vulnérables et 6% sont rares ; quant aux plantes, 2% environ sont menacées ou vulnérables. La diversité biologique des forêts apparaît ainsi comme un patrimoine à préserver par diverses mesures de protection ou d'entretien qui représentent des coûts directs ou indirects. Au nom de votre foyer, seriez-vous prêt à consacrer chaque année à la biodiversité de la forêt française la somme de (à entourer à l'avance pour chaque entretien) :

€ :	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
Près de F :	40	80	120	160	200	240	280	320	360	400	440	480	520	560	600

<input type="checkbox"/>	>	OUI
<input type="checkbox"/>	<	NON

Quelle contribution accepteriez-vous au maximum ? →

Si cette contribution maximale est nulle, pourquoi ?

<input type="checkbox"/>	IN	La biodiversité forestière ne vous intéresse pas vraiment
<input type="checkbox"/>	PA	Vous considérez que ce n'est pas à vous de payer

QUESTION 12 : AUTRES CARACTERISTIQUES DU FOYER

Quelle est la catégorie socio-professionnelle de la personne de référence du ménage :

<input type="checkbox"/>		Agriculteur exploitant
<input type="checkbox"/>		Artisan ou commerçant
<input type="checkbox"/>		Chef d'entreprise
<input type="checkbox"/>		Profession libérale
<input type="checkbox"/>		Cadre
<input type="checkbox"/>		Profession intermédiaire (enseignants, infirmières, techniciens, ...)
<input type="checkbox"/>		Employé
<input type="checkbox"/>		Ouvrier qualifié
<input type="checkbox"/>		Ouvrier (y compris agricole)
<input type="checkbox"/>		Retraité
<input type="checkbox"/>		Sans profession ou sans emploi

Vivez-vous :

<input type="checkbox"/>	MA	En maison ?	<input type="checkbox"/>	VI	Plutôt en ville ?
<input type="checkbox"/>	AP	En appartement ?	<input type="checkbox"/>	CA	Plutôt en campagne ?

Pour votre chauffage, quelle énergie utilisez-vous ?

<input type="checkbox"/>	BO	Bois → nombre de stères utilisés annuellement : <input type="text"/>
<input type="checkbox"/>	EL	Electricité
<input type="checkbox"/>	ES	Energie solaire
<input type="checkbox"/>	FU	Fuel
<input type="checkbox"/>	GA	Gaz
<input type="checkbox"/>	RC	Réseau de chaleur
<input type="checkbox"/>	→	Autre énergie à préciser : <input type="text"/>
<input type="checkbox"/>	NSP	Ne sait pas.

CONCLUSION

Commentaires éventuels :

Merci pour votre amabilité.

ANNEX 2. Survey recommendations

NB : L'attention des enquêteurs est attirée sur l'extrême rigueur avec laquelle les consignes données ici doivent être suivies. Cette enquête apparaît fondamentale et stratégique dans la mesure où aucune enquête similaire n'a été réalisée au niveau national. Compte tenu du fait supplémentaire qu'elle s'adresse au grand public, ses résultats ont naturellement vocation à être divulgués à tous les médias nationaux. Elle mérite donc d'être réalisée de la manière la plus scrupuleuse qui soit, de préférence sans excès de précipitation. Son coût est globalement élevé et le plus grand soin est d'autant plus indispensable. Les organisateurs se réservent la possibilité de contrôler certains questionnaires.

Enquête : Elle a pour but d'appréhender la fréquentation des forêts françaises par le public, de la mesurer quantitativement (en nombre de visites) et en valeur (par la méthode des coûts de déplacement), puis d'expliquer les différences pouvant apparaître entre régions, ménages, années. Elle ambitionne également de combler certaines autres lacunes en matière d'information dans le domaine des biens et services autres que le bois et notamment sur la cueillette, les tableaux de chasse, le ramassage de bois. Elle a enfin la prétention d'expérimenter une méthode d'évaluation de la biodiversité forestière. Elle est réalisée dans le cadre d'un programme de recherche qui vise par ailleurs à tester une méthode robuste, simple et suffisamment bon marché pour pouvoir être utilisée de manière répétée dans l'espace (notamment au niveau européen) et dans le temps (en évolution).

Enquêteur : Ne pas oublier de mentionner systématiquement le nom de l'enquêteur sur chaque formulaire.

Enquêté : L'unité enquêtée est un **ménage** figurant dans l'annuaire téléphonique. En effet, les enquêtes téléphoniques sont relativement aisées à mettre en œuvre et permettent plus facilement d'obtenir un échantillon représentatif. Par ailleurs, les sorties en forêt se déroulent souvent en famille et utilisent le véhicule familial, d'où le choix de raisonner au niveau du ménage. L'enquête s'appuie cependant aussi sur la composition détaillée du ménage de telle sorte que des statistiques individuelles puissent également être dérivées et les comportements différents selon les membres d'un ménage être pris en compte. Au cours de l'enquête, il convient donc de bien penser que les questions ne concernent pas seulement l'interlocuteur mais aussi l'ensemble de son foyer.

Echantillonnage : Il est proposé de sélectionner les ménages dans les annuaires téléphoniques départementaux (pages blanches uniquement) de la manière suivante :

→ le premier **particulier** de la 3^{ème} colonne de chaque page numérotée

15	30	40	55	70	80	95	110	120	135	150	160	175	190	200
215	230	240	255	270	280	295	310	320	335	350	360	375	390	400
415	...													

cette procédure assure de sélectionner un ménage toutes les 13,5 pages en moyenne, soit environ 4 500 pour la France entière ; il convient évidemment d'éviter tous les abonnés qui ne sont manifestement pas des particuliers ;

→ si le numéro n'est plus attribué ou si **au moins** cinq appels effectués à des heures, jours et semaines **différents** sont restés infructueux, prendre le ménage suivant dans l'annuaire téléphonique ; ce changement ne doit cependant être opéré qu'à l'extrême limite ; son éventualité explique que trois lignes aient été prévues dans la désignation du ménage enquêté.

QUESTION 1 : Il est important de délivrer à chacun les mêmes informations simples et efficaces, donc de lire précisément la phrase d'introduction et les questions. Par ailleurs, l'expérience montre que le fait de se présenter comme étudiant (d'où le terme d'école forestière) permet de s'attirer une certaine sympathie.

Parmi les personnes ne souhaitant pas contribuer à l'enquête, il est important de bien distinguer ceux qui ne veulent pas répondre parce qu'ils ne vont pas en forêt de ceux pour lesquels aucun lien ne semble exister entre le sujet de l'enquête et le fait de ne pas vouloir y répondre. C'est pourquoi on a bien distingué le code PF qui correspond aux deux cas pour lesquels l'enquêté ne veut pas répondre parce qu'il ne va pas en forêt.

QUESTION 2 : Son ambition est limitée à la mesure de l'intensité du découplage, dans l'esprit des français, entre la forêt et le bois. Sur les quatre jugements proposés, deux sont positifs et deux négatifs. Par ailleurs, deux correspondent à une impression concrète éventuelle du promeneur tandis que les deux autres sont des points de vue plus intellectualisés.

QUESTION 3 : La composition du ménage permet de comprendre par la suite qui va en forêt et comment.

QUESTION 4 : Elle détermine si les réponses 5 à 7 sont susceptibles de recevoir une réponse. Attention : la période de référence est l'année 2001.

QUESTION 5 : Elle permet de cerner le champ géographique des visites, y compris à l'étranger. Cependant, par la suite, les questions ne concernent que la France métropolitaine. Il peut être fastidieux pour l'enquêteur de lister toutes les régions. Dans un premier temps, il est donc préférable d'écouter les réponses données et d'essayer de les traduire en régions administratives (en cas de doute, noter provisoirement un nom de ville, de département, de petite région, à traduire ensuite). Après une phase d'énumération, ne pas hésiter cependant à faire d'autres propositions, à faire penser aux sorties de vacances, ... afin d'être sûr d'avoir bien obtenu une liste exhaustive.

La question sur la nature de propriété est formulée de manière volontairement floue pour tenir compte du fait que les massifs forestiers appartiennent généralement à des propriétaires de différentes natures. On ne peut donc se rapporter qu'au caractère prépondérant. Par ailleurs, il s'agit typiquement d'une question d'opinion dont la réponse n'est pas forcément objective. La liste des forêts qui vient ensuite peut permettre ultérieurement d'y voir plus clair.

La désignation précise des forêts permettra de dresser une liste des forêts les plus visitées de France et de produire éventuellement quelques résultats de site : il convient donc d'insister pour avoir un nom de lieu (commune, petite région, massif) à défaut du nom précis de la forêt.

QUESTION 6 : Cocher simplement les motifs pour lesquels les ménages vont en forêt en essayant d'identifier le ou les principaux d'entre eux pour préparer la suite (question 7). Il est important d'accorder la plus grande attention aux nature et quantité cueillies, notamment en ce qui concerne les champignons, châtaignes, noix, fruits rouges, ... ; de même pour les tableaux de chasse pour lequel certaines espèces ont été laissées en blanc ; de même pour la récolte de bois pour des usages non commerciaux.

Les sorties ne concernent pas forcément la totalité du ménage et peuvent concerner plusieurs ménages séparément; d'où la seconde partie de la cette question. Il convient, à ce stade, d'avoir conservé en mémoire la composition du ménage renseignée à la question 3 (éviter de demander à une personne seule combien de membres de son foyer vont en forêt). NB : lorsqu'il est question des membres du foyer, c'est toujours y compris l'interlocuteur.

QUESTION 7 : Les indications concernant le véhicule sont précises afin de permettre une estimation du coût de déplacement, c'est-à-dire du coût que le ménage accepte de dépenser pour aller en forêt. Si le renseignement du type de véhicule pose problème, on peut s'en dispenser à condition d'avoir la consommation ; si plusieurs véhicules différents sont utilisés pour aller en forêt, il serait souhaitable de prendre alors une moyenne pondérée (si le carburant est le même), le véhicule principal, sinon.

QUESTION 8 : Elle est essentielle pour l'enquête. Elle doit être conduite avec la plus grande rigueur. C'est la raison pour laquelle elle se présente sous la forme d'un tableau à remplir pour tenir des différents cas de figure envisageables, qui sont fournis par les quatre premières caractéristiques : il faut utiliser autant de colonnes qu'il y a de modalités différentes en termes de région, de membres du foyer, d'activité principale, de mode d'accès. Il faut en particulier apporter un grand soin aux accès en voiture qui vont déterminer l'essentiel de la valeur récréative. Il peut être important, au cours de l'enquête, de se référer aux questions précédentes qui sont venues préparer celle-ci et qui figurent au dessus ou en vis-à-vis (questions 5 à 7). Les codes qu'elles proposent seront utilement utilisés.

La distance d'accès ne concerne que la liaison entre la résidence (principale, secondaire, ou occasionnelle) et la forêt. La durée en forêt ne doit pas comprendre la durée de déplacement. Dans les deux cas, on demande une moyenne pour la modalité concernée représentée par la colonne en cours de remplissage.

QUESTION 9 : La question 9 peut être posée aussi bien aux foyers n'étant pas allés en forêt en 2001 qu'aux autres, de même que toutes les suivantes. Il est en effet possible qu'un foyer soit allé en forêt en 2000 sans y aller en 2001. Le changement correspondant doit alors être analysé. NB : on juge 2000 par rapport à 2001, donc l'année la plus ancienne par rapport à l'année qui vient de s'achever. Les changements ne sont pas quantifiés de manière extrêmement précise mais uniquement en trois classes.

QUESTION 10 : Il est probable que les forêts des régions dans lesquelles de nombreux loisirs sont accessibles ont tendance à être moins fréquentées par le public. Il est donc important de voir quelles sont les autres possibilités de loisirs. Les loisirs sont ici désignés par le lieu et non par l'activité (comme on tient compte des diverses activités pratiquées en forêt). Les renseignements ne concernent à nouveau que 2001. Il convient de mentionner chaque ligne successivement en cochant chaque fois l'une des trois cases.

QUESTION 11 : L'analyse contingente expérimentée ici est très délicate d'utilisation. Elle nécessite de préparer à l'avance les questionnaires. La somme d'argent proposée à

l'appréciation des ménages varie d'un ménage à l'autre. Il y a quinze modalités différentes. Il faut, à la fin, que chaque montant ait été posé au même nombre de ménages. Si 3600 ménages répondent à cette question, alors il faut essayer de faire en sorte que 240 fassent l'objet de chaque montant. Chaque enquêteur essaiera d'équilibrer autant que possible son propre lot. La méthode proposée pour cela est la suivante : un enquêteur né le 1^{er}, le 16 ou le 31 du mois, propose 6€ au premier ménage enquêté, 12 au second et ainsi de suite ; arrivé à 90, il reprendra à 6 ; un enquêteur né le 2 ou le 17 du mois commencera à 12 puis décalera régulièrement de 6€ de la même façon que précédemment ; un enquêteur né le 15 ou le 30 du mois commencera à 90€ puis questionnera le ménage suivant à hauteur de 6€. Ainsi, le premier ménage enquêté par un enquêteur né le 8 avril 1980 se verra poser la question suivante : « En France, parmi les espèces animales (vertébrés) vivant en forêt... Au nom de votre foyer, seriez-vous prêt à consacrer chaque année à la biodiversité de la forêt française la somme de 48€ (soit près de 320F) ? ». Que la réponse soit oui ou non, il lui demandera ensuite quelle somme maximale serait acceptée. Dans le cas où il est répondu « non » à la première question et « 0 » à la somme maximale acceptée, il convient de savoir si cette réponse tient au manque d'intérêt pour la biodiversité de la forêt ou bien à la volonté de profiter d'une amélioration sans vouloir y participer (comportement dit « du passager clandestin »). Remarquons que la question ne précise pas la forme sous laquelle cette contribution pourrait être versée (cotisation directe à une association, impôts, ...). NB : ne pas oublier d'entourer le montant ayant fait l'objet de la question ; le mentionner également aussi bien en Euros qu'en Francs comme indiqué sur l'exemple ci-dessus. Evidemment, le ménage suivant de l'enquête se verrait proposer le montant de 54€ (soit près de 360F).

QUESTION 12 : C'est le dernier groupe de questions, mais il est très important. La personne de référence est celle dont les revenus sont les plus élevés ou, en cas d'égalité de revenu, la plus âgée. Les catégories sont celles de l'INSEE. En ce qui concerne l'énergie, plusieurs réponses sont évidemment possibles, d'autant plus qu'il convient de considérer ici aussi bien la résidence secondaire que la résidence principale. En cas de chauffage au bois, il faut essayer d'évaluer la quantité utilisée.

COMMENTAIRES : Au niveau des commentaires, il est bon de noter les personnes désirant recevoir les résultats de l'enquête (dans un délai de l'ordre de l'année ou un peu plus), avec leur adresse (postale ou électronique).

SAISIE DES RESULTATS : Elle sera faite dans le fichier informatique prévu à cet effet. Ce travail sera d'autant plus facile qu'il sera effectué progressivement, d'une part pour en diminuer le caractère fastidieux et la fatigue correspondante, génératrice d'erreurs, d'autre part pour réduire au maximum le délai entre l'entretien téléphonique et la saisie.

Les informations à saisir sont mentionnées sur le questionnaire avec une trame en grisé pour la plupart d'entre elles.

RENDU : Il conviendra de retourner au LEF, pour la FIN AVRIL au plus tard :

- les fichiers informatiques saisis
- les annuaires ou extraits d'annuaires
- les formulaires remplis.

ANNEX 3. Sample size per « département »

N°	Département	Pages of telephone directory	Surveyed households	Total nb of French households
1	AIN	554	41	199 063
2	AISNE	466	34	205 942
3	ALLIER	384	28	151 173
4	ALPES DE HTE PROVENCE	215	16	59 549
5	HAUTES ALPES	215	16	51 246
6	ALPES MARITIMES	1 513	113	454 982
7	ARDECHE	334	24	116 629
8	ARDENNES	273	20	113 320
9	ARIEGE	172	12	58 331
10	AUBE	303	22	119 259
11	AUDE	388	28	130 386
12	AVEYRON	331	24	110 043
13	BOUCHES DU RHONE	1 884	141	750 987
14	CALVADOS	695	52	258 513
15	CANTAL	186	13	63 281
16	CHARENTE	371	28	140 813
17	CHARENTE MARITIME	735	55	237 194
18	CHER	328	24	132 165
19	CORREZE	291	21	100 251
20	CORSE (DU SUD ET HTE)	357	26	106 236
21	COTE D'OR	537	40	209 213
22	COTES D'ARMOR	651	48	229 382
23	CREUSE	157	11	54 581
24	DORDOGNE	462	34	163 835
25	DOUBS	505	37	201 531
26	DROME	463	34	176 163
27	EURE	523	39	205 454
28	EURE ET LOIR	394	29	157 614
29	FINISTERE	1 001	75	359 502
30	GARD	658	49	255 173
31	HAUTE GARONNE	1 085	81	446 875
32	GERS	215	16	71 432
33	GIRONDE	1 395	104	540 234
34	HERAULT	1 048	78	383 405
35	ILE ET VILAINE	897	67	354 524
36	INDRE	262	19	99 491
37	INDRE ET LOIRE	577	43	231 405
38	ISERE	1 118	83	429 047
39	JURA	293	21	103 836
40	LANDES	441	33	132 982
41	LOIR ET CHER	353	26	130 601
42	LOIRE	693	51	297 681
43	HAUTE LOIRE	236	17	84 730
44	LOIRE ATLANTIQUE	1 195	89	460 758
45	LOIRET	607	45	248 686
46	LOT	206	15	68 456
47	LOT ET GARONNE	323	24	127 444
N°	Département	Pages de	Ménages	Ensemble

		l'annuaire téléphonique	soumis à enquête	des ménages
48	LOZERE	113	8	30 176
49	MAINE ET LOIRE	727	54	288 312
50	MANCHE	570	42	194 795
51	MARNE	542	40	228 443
52	HAUTE MARNE	214	15	79 002
53	MAYENNE	316	23	113 501
54	MEURTHE ET MOSELLE	641	48	289 953
55	MEUSE	202	15	76 160
56	MORBIHAN	734	54	266 260
57	MOSELLE	838	62	389 858
58	NIEVRE	254	18	98 687
59	NORD	2 045	153	957 388
60	OISE	653	48	280 256
61	ORNE	305	22	118 711
62	PAS DE CALAIS	1 153	86	534 305
63	PUY DE DOME	643	48	257 107
64	PYRENEES ATLANTIQUES	787	58	248 083
65	HAUTES PYRENEES	267	19	93 371
66	PYRENEES ORIENTALES	497	37	169 514
67	BAS RHIN	964	72	402 935
68	HAUT RHIN	638	47	275 902
69	RHONE	1 558	116	646 619
70	HAUTE SAONE	252	18	90 922
71	SAONE ET LOIRE	557	41	227 716
72	SARTHE	535	40	215 248
73	SAVOIE	487	36	154 838
74	HAUTE SAVOIE	766	57	253 813
75	PARIS	3 091	231	1 110 912
76	SEINE MARITIME	1 076	80	493 109
77	SEINE ET MARNE	945	70	432 351
78	YVELINES	1 148	85	503 096
79	DEUX SEVRES	370	27	139 343
80	SOMME	496	37	214 773
81	TARN	362	27	140 177
82	TARN ET GARONNE	211	15	82 087
83	VAR	1 276	95	379 389
84	VAUCLUSE	628	46	200 149
85	VENDEE	708	52	214 921
86	VIENNE	417	31	169 918
87	HAUTE VIENNE	377	28	156 771
88	VOSGES	413	30	152 707
89	YONNE	382	28	135 340
90	TERRITOIRE DE BELFORT	134	9	55 835
91	ESSONNE	907	67	420 603
92	HAUTS DE SEINE	1 468	109	624 926
93	SEINE SAINT DENIS	1 006	75	524 387
94	VAL DE MARNE	1 079	80	499 404
95	VAL D'OISE	798	59	394 690
	FRANCE METROPOLITAINE	60840	4504	23 810 161