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Status quo and willingness to pay for reduction of risk of erosive runoff

Abstract. In this paper the problem of Status Quo and willingness to pay by inhabitants of Haute-Normandy region in France for reduction of risk of erosive runoff was researched. The paper is dedicated to the definition of the factors which influence people's willingness and unwillingness to pay for protection from erosive runoff. Analysis of data requires statistical methods that can properly account for the correlation of respondents with the risk of missing values due to drop-out of study respondents.

Key words: erosive runoff, risk reduction, willingness to pay, Status Quo, Choice Experimental Design.

Introduction

This paper estimates the willingness to pay for protection from erosive runoff and the problem of Status Quo among the people in the area of Haute-Normandy region in France, which is presented on a map in Figure 1.

This area was chosen because it is highly impacted by erosive runoff, which has strong economic issues at a local and regional level. Protection against this phenomenon exists but is expensive and requires people's agreement to be implemented. It is thus important to understand the decision-making process in order to provide decision tools to decide whether such protection should be implemented.

Nowadays the problems of climate change have become more and more important. The speed of these changes is increasing from year to year. According to the results of a research paper [Nearign et. al 2005], soil erosion and runoff are significantly affected by changes in rainfall and cover. Among the reasons which can cause soil erosion, the most direct one is the erosive power of rainfall.

Many scientists have written papers about increasing global temperatures and that the earth is warming. That is why this problem should be taken into account by many countries.

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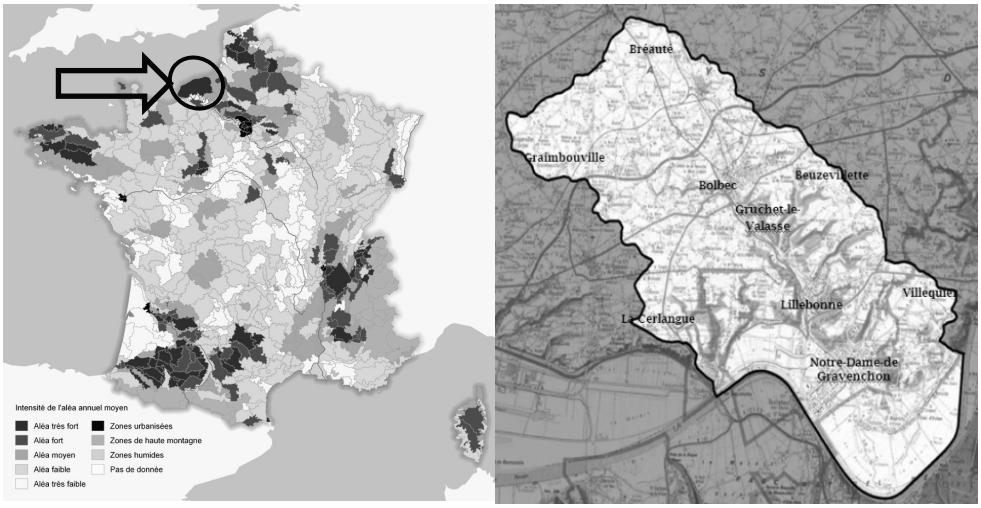
Research method and subject of research

The study is based on a two-round survey. The first survey was made in 2012, with a sample of 773 respondents. The second survey was made in 2013 with a one year time difference, with a sample of around 350 respondents. Because it was not possible for interviewers to survey the same people, the two samples are not equal. Therefore in this research only the same respondents from both surveys were taken into account – which represent a group of 151 respondents.



a) b)

Fig. 1. Map of researched region

Source : a) Gis Sol – Inra – SOeS, 2010; b) Made by authors using Google Maps.

The methodology "Choice Experimental Design" was used to create the part of questionnaires concerning the amount which people would like to pay to protect themselves from erosive runoffs. The Choice Experimental Design method allows us to see the difference between the same questions answered by the same people but in different sequences.

The two questionnaires included questions about gender, age, profession of respondent and respondent's role in family. The questionnaire also allows us to know if the respondents plan to live in this region during the next 20 years.

Another focus in the questionnaires is for people's awareness of erosive runoff. The questions address respondents' knowledge of the occurance and whether they have ever been affected by this phenomena during the past 10 years.

The main problem of this study is the choice of Status Quo or in other words the research question is: "Why don't people want to pay for erosive runoff protection and why don't they want to change the current situation?" There are many reasons . Using Choice Experimental Design methodology and after analyzing the results with STATISTICA 10 software, the main factors which can explain the decision-making process for respondents'

choices are obtained (Status Quo choice, agreement to pay, and reasons why opinion changed between the two surveys).

Choice Experiment is used by many scientists to value the environment. For example, Hanley, Wright and Adamowicz made a study on forest landscape changes in the UK and their economic consequences [Hanley et. al 1998, Hoyos 2010].

In the surveys, respondents were asked to choose between different combinations of environmental protection such as: improvement of communication, agriculture and infrastructure which are described in terms of their characteristics or attributes. One of these characteristics is the price which respondents are willing to pay for erosive runoff protection. Different combinations of actions with different prices were presented. People were asked to choose one of the most preferable choices among six different practices.

Erosive runoff protection includes the following actions connected with:

- Communication development about erosive runoff related risks.
- Modification of agriculture practices (responsible water management, restoration of the wooded area, land policy connected with water retention).
- Reinforcement of protective infrastructures against erosive runoff related risks.

According to scientific works, it was observed that respondents choose the Status Quo quite disproportionally. However, questions about the reasons which make people choose the Status Quo were not answered. Jurgen Meyerhoff discussed in his paper three potential determinants of status quo such as protest beliefs, attitudes towards environmental change and perceived task complexity. Choice Experiments has been used to investigate this problem quite often. In this case people are asked to choose several times between alternatives (which change the current situation) and the Status Quo (current situation). According to rational theory, people usually choose the alternatives, which increase their utility. But there are other factors which influence people's choices and which depend on the attributes presented in other alternatives. In order to evaluate this influence the alternative specific constant (ASC) and status-quo bias are used [Mayerhoff 2006, Hoyos 2010, Samuelson 1988].

Research results

The first step was starting with data from 2012. The following variables were chosen: Status Quo of year 2012 as dependent variable; as the independent – Age (interval scale); Gender (male or female); Continue residence for next 10 years (yes or no); knowledge about erosive runoff (open text); touched by erosive runoff (yes or no); City (city – 1; village -0); and politics(from 1 to 10, where 1 – more left and 10 more right preferences).

Table 1. Mixed Model Analysis (significant variables, 2012)

Characteristics (indicators)	Values
Age	0,256
Gender	-0,230
Politics	0,236
P-value(F test)	0,038

Source: made by author using STATISTICA 10software.

Based on the results of Linear mixed model with incomplete data, three variables were found, which significantly influence SQ choice. These variables are the following: age; gender and politics (Table 1).

The explanation of the significance of the politics variable is quite straightforward and could be explained within the context of the election in 2012.

The second step was choosing the combination of variables which can describe the Status Quo in year 2013. The Status quo from 2013 was chosen as a dependent variable, and as independent variables the following were chosen: Age; Gender; Continue residence for next 10 years; knowledge about erosive runoff; touched by erosive runoff; City (city – 1; village – 0); and politics; and the last variable is "increasing of the revenue in comparison with previous year" (code: revenue increased – 1, revenue not increased – 0).

Table 2. Mixed Model (significant variables, 2013)

Characteristics (indicators)	Values
Age	0,274
knowledge about erosive runoff	0,234
P-value(F test)	0,095

Source: made by author using STATISTICA 10software.

Results show that increase of revenue does not have significant influence for choosing the Status Quo. It means that money does not really influence the people's willingness to pay for erosive runoff protection.

An interesting characteristic about the variable "knowledge about erosive runoff" was noticed. Here it is possible to see that during the second survey people already knew and started to understand the problem of erosive runoff (during the first survey respondents got information about problem of erosive runoff). Maybe during the first survey respondents didn't understand yet the importance of the problem of erosive runoff and that is why they didn't want to pay for something they had no idea about (So they chose SQ).

In order to see the impact of full understanding of the problem, it is important to estimate the influence of factors which change people's willingness to pay for the erosive runoff protection during two surveys in 2012 and 2013. This variable was chosen as dependent and coded as following: 1 – changed their opinion, 0 – didn't change).

Results show that the significant influence for people's changes of SQ choices in 2012 and 2013 had such factors as age, gender and continuation of residence (P-value = 0,001, F test). This means that it depends on independent variables chosen: age, gender and people plans to continue to live in this area, respondents changed their mind about SQ during second surveys.

To show the influence of variation of revenue within the decision-making process, a dependent variable - not paying in 2012 but paying in 2013 – was chosen, but the variable "increasing of revenue" was replaced by the variable "decreasing of revenue". Results then show that variables connected with revenue don't have any significant influence for the people's willingness to pay. This means that changes of revenue are not important for respondents during their decision-making about willingness to pay for erosive runoff protection.

After calculations it was seen that these types of actions don't have significant influence on the people's Status Quo choice.

Conclusions

In this paper the main factors which significantly influence people's Status Quo choice were defined.

Based on statistical results obtained using a mixed model, the following conclusions were made:

- The "Age" variable is a significant factor. It means that respondents' age has important influence on their willingness to pay for erosive runoff.
- The political situation in France in 2012 had significant influence on respondents' willingness to pay for erosive runoff protection.
- Continuation of residence significantly influenced respondents' SQ choice during the first survey.
- Knowledge and awareness about the problem of erosive runoff significantly influenced the respondents during the second survey.

This research has to be continued and data collected from similar surveys in the future. In fact the analysis in longitudinal data requires statistical methods that can properly account for the internal correlation of respondents [Vebeke and Molenleberghs, 2000]. There is also the risk of missing values due to drop-out of study respondents.

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