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MOUROUZIDOU MELINA

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Three - member committee
Kostas Bithas, Professor of Panteion University (Supervisor)
Clive Richardson, Professor Emeritus of Panteion University Angelos Mimis, Assistant Professor of Panteion University

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Dedicated to my angel,
Maria Solidaki...

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#### Abstract

The purpose of the present work is to financially evaluate the sound agricultural methods applied in the production of an olive oil which would have the same characteristics as the olive oil already purchased and used by the respondents but would be more environmentally friendly as it would absorb more carbon dioxide thereby reducing climate change. The present research therefore addresses the following question: what would be the maximum amount of money that the average person would be willing to spend, in a hypothetical market, to buy a product - in this case an olive oil - aimed at mitigating climate change? And in the same way if the respondent would be willing, and with what amount annually, to contribute financially to a transparent and trustworthy organization aimed at reducing climate change. For this reason, a questionnaire was created for olive oil consumers and another for olive oil small producers, which were administered for the present work in Thessaloniki, outside supermarkets. The questionnaires were anonymous and contained four types of questions: 1) environmental policy, 2) indirect payment questions, 3) participant demographics, and 4) household spending. A total of 166 questionnaires were collected which resulted in the following conclusions: overall consumers and small producers were willing to contribute 11,94 liters per person per year and $184,67 €$ per person per year for olive oil that comes from environmentally friendly cultivation methods regarding capture of carbon dioxide and for the organization that will help mitigate climate change. Then, using the data of Lambros Tsioris for Athens with whom we collaborated to conduct the questionnaires in Athens and Thessaloniki, I compared the results between the two cities. Finally, after joining the two Athens and Thessaloniki samples, I attempted to categorize the invalid responses into four categories: 1) zero, 2) incomplete information and suspicion, 3) extreme values and other reasons, and 4) protest values. The refusal to pay of the protests has gained the attention of science in general and of this work in particular as this category refuses to give a price for the specific olive oil that will help limit climate change by treating it as a public good.


Keywords: economic valuation, contingent valuation method, protest

## Пєрí̀ $\boldsymbol{\psi \eta}$







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## Introduction

Modern societies are faced with serious environmental problems due to satisfaction of the increasing human needs which tend to infinity creating environmental costs. These costs lead to decline in people's well-being and economics examines the best way of use and allocation of resources which lead to optimal welfare and protection of the environment. The production and allocation decisions involve difficult trade-offs which are induced by the resource scarcity. It is clear, then, that preserving and restoring the natural environment often entails a cost, which is usually paid by citizens through taxation but is also a source of additional income for the state and citizens. Since the valuation of this public environmental good is not carried out by the market, the contingent valuation method is often applied nowadays which aims to explore the importance that citizens attach to the good and therefore how willing they are to pay for its acquisition or how much they are willing to accept its downgrading or destruction. This work uses the contingent valuation method for the financial valuation of environmentally sound farming methods, which, applied to tree crops, and in particular olives, absorb carbon dioxide and lead to climate change mitigation. For this reason, it was considered necessary to analyze it in the next chapter, entitled "Contingent Valuation Method". In Chapter 2, entitled "Methodology", the methodology used in the present work is analyzed in detail. Finally, the "Research results" chapter attempts to analyze the Thessaloniki data and then compare it with the Athens data collected by Lambros Tsioris as well as a sketch of the protest for Athens and Thessaloniki. In the present work these are few in number, only 9, but have been of particular research interest in recent years and a particular profile. Finally, the epilogue presents a summary and some concluding remarks.

## 1.Literature review

### 1.1. Contingent Valuation Method

The question that concerns the present study is to assess the financial-monetary value of an environmental good for which there is no direct or indirect market. The reason for this is to determine the optimal distribution of the environment between use-nuisance and protection. Optimum distribution is that which maximizes the welfare consisting of the sum of use-nuisance plus protection welfare. There are various methods of valuating the financial value of the environment. In this work the contingent valuation method was used. This method is used in estimating economic values for environmental services and ecosystems and it creates market conditions for environmental goods that do not actually exist (Markantonis \& Bithas, 2010). This virtual market creates a questionnaire in which the respondent is asked to indicate the amount he would be willing to give in order to purchase the environmental good or minimum willingness to accept for a degradation in environmental quality or quantity. In most cases this payment is in the form of a special fee, an income tax or even an access ticket when it is a spatial environmental good. Finally, there are many ways to declare a respondent's willingness to pay. He can freely declare the amount to be paid or amounts are proposed to the respondent in succession until he indicates the maximum amount to be paid or, as in the present case, to propose a specific amount and himself if willing to pay or not (take it or leave it) (Bithas,2012). However, there is criticism of the hypothetical method, which is that respondents' opinion may be influenced by their cultural and ethical backgrounds. Moreover, a wrong answer to the willingness to pay does not entail any cost and the motivation to respond accurately is absent. There is still a problem of validity as one can answer strategically (Hoevenagel,1994). So it is not easy to financially evaluate a good for which there is no market or price, Hens, Melnik and Boon (1998) prefer some "valuation techniques available for valuating non-market goods which include the travel cost method, dose response, hedonic pricing, preventive expenditures, relocation costs, shadow prices etc."

### 1.2. Protest

For the purpose of the present study, the definition of protest value is considered necessary. More specifically, there is a significant percentage of people who believe that there are environmental goods that are not commercially viable and should have the absolute right to protect them. These people express a zero willingness to pay for environmental goods that cannot be exchanged for other goods or money. Moreover, according to Hoevenagel and van der Linden (1993) "protest bids were typically zero bids with elucidations, such as those who are responsible for the environmental pollution should pay. In these cases, the stated zero amount was not considered to be a true reflection of the respondent's value for a clean environment". This category of people is named, according to C. Spash and N. Hanley, "lexicographic preferences" and believes that environmental goods should be protected by laws and not by the financial contribution of citizens. This is also the reason they were questioned by
economics as they treated a good immeasurably more important than another (Spash, Hanley,1994). In the same way in the present work, when the refusal of payment is not justified by the inability to pay, considering the characteristics of the participants' incomes, then the protest is not a possible solution to the income constraint but an attitude to life. However, according to Meyerhoff \& Liebe (2006) the protest divides into two categories: protest beliefs and protest zeros and they support that the willingness to pay was influenced by protest beliefs. For this reason, Meyerhoff \& Liebe (2006) support that protest beliefs should be included in the analysis "as an attitude towards the behavior of paying money for a public good. Accordingly, protest zeros should remain in the sample and should be taken as true zeros".

## 2. Methodology

This research was based on the contingent valuation method, which is nowadays the most popular method for evaluating preferences due to the possibility of using hypothetical markets as well as the ability to estimate benefits or costs from the preferences. More specifically, questionnaires are created to reflect respondents' preferences, i.e. how much they are willing to accept for environmental damage and how much they are willing to pay for a public good. This is also a difference between these subjective methods as opposed to the objective ones. Objective valuation methods are concerned with changes in productivity and not with the preferences of respondents which are examined in the subjective approaches (Hens, Melnik, Boon, 1998). In essence, these surveys do not provide an answer to their question but give an indication of how much they would pay. The better the research, the better this approach. This is because there is a high positive correlation between behavior, that is, action and intention as evidenced by the hypothetical question (Hoevenagel, 1994). There are several methods of obtaining a willingness to pay. We, in this research, were using the method "take it or leave it". Initially two questionnaires were created, one for olive oil consumers and one for olive oil small producers. The questionnaires were then conducted in different regions of Thessaloniki in order to have a satisfactory sample size as representative as possible, outside the supermarket, by face-to-face interview. More specifically we visited 8 different areas of Thessaloniki, 17 different supermarkets from the largest supermarket chains in Greece such as: Lidl, Market in,
 questions 1) environmental policy, 2) indirect payment questions, 3) participant demographics, and 4) household spending. After the questionnaires were collected, we began their analysis.

## 3. Research results

The survey conducted in Thessaloniki comprised 166 complete questionnaires out of which 146 include consumers' responses and 20 refer to small producers' responses. A total of 468 people was asked, 166 of whom are surveyed and the other 302 were unwilling to participate in the survey. The ratio of participation is: $166 / 468=0.35$, that is approximately one out of three consented to participate in the research.

Figure 1. Participation rate


Figure 2. Distribution of respondents who granted consent to the survey according to gender


Figure 3. Distribution of consent according to gender


The following conclusions derive from the Figures 1,2 and 3. Firstly, the participation of women seems to be much greater than that of men-almost four times as much - and secondly, the ratio of consent and no consent between men and women varies with the same rate which is about $8 \%$. This means that the frequency of positive responses for men and women is about the same, but men were more willing to participate in the survey when we met them at the exit of a supermarket the day of the survey. The vast majority of men responded to all questionnaire questions, and this was a catalyst for the survey given the fact that the men met at the place and time of the survey were far fewer than women. The initial stages of the analysis indicate that the data consist of consumers and small producers and, for this reason, two different questionnaires were utilized: one for olive oil consumers and one for olive oil small producers. The first step in the analysis of the data is to divide the database answers into a) responses with used financial valuations and b) responses with unused financial valuations since not all financial valuations can be taken into account. International literature uses the terms "usable" and "non-usable" for the usable and unusable financial valuations; in this analysis the terms "valid" and "invalid" will be used to describe the "used" and "nonused" financial valuations respectively. The invalid financial valuations include unreliable answers, too high financial valuations and zero valuations. As unreliable are characterized the answers that revealed some confusion as the respondents found it difficult to understand the questions or wanted to express their opinion on irrelevant issues and therefore their questionnaire answers were unclear. Too high financial valuations are those that exceed $10 \%$ of their family income. As research has shown, it is considered excessive when $10 \%$ or more of a household's total income is intended to be devoted exclusively to climate change, and it is also proposed to identify and remove extreme values from the valuation issue (Hoevenagel,1994). With regard to zero financial valuation there was a question of justification for their response, which categorized them into five distinct groups as 1) those who could not contribute for economic reasons, 2) those who believed that other bodies such as state or European Union had to pay, 3) those who thought that climate change is not a major issue, 4)
those who considered agriculture's contribution to mitigation of climate change insignificant and finally 5) those who were skeptical of the money raised to found actions to mitigate climate change. Figures 4 and 5 show the reasons for zero final valuation given by consumers and small producers, respectively.

Figure 4. Reasons for zero financial valuation of olive oil produced by environmentally friendly cultivation methods for consumers


Figure 5. Reasons for zero financial valuation of olive oil produced by environmentally friendly cultivation methods for small producers


Figure 6. Reasons for zero financial valuation of olive oil produced by environmentally friendly cultivation methods in total


Figure 7. Reasons for zero financial valuation of olive oil produced by environmentally friendly cultivation methods comparing consumers and small producers


As shown in Figures 4,5,6 and 7, most of the zero financial valuations relate to economic reasons ( $75 \%$ ) while the other reasons appear less frequently and range between 3,1 and $12,5 \%$. The overall results are quite similar to those of consumers of olive oil who gave zero valuations since, in this case as well, the economic reasons were the most common cause $(77,78 \%$ ) and the other categories fluctuated between 3,70 and $11,11 \%$. Although the economic reasons were the most frequent response to zerovalued olive oil small producers $(60,00 \%)$, an important reason for refusing to reduce their production was the fact that small producers considered agriculture's contribution to climate change insignificant $(20,00 \%)$ and that other actors such as the state or the European Union should fund such actions ( $20,00 \%$ ).

Table 1. Reasons for zero financial valuation of olive oil produced by environmentally friendly cultivation methods for consumers and producers.

|  |  | CONSUMERS |  |  | SMALL PRODUCERS |  |  | TOTAL |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TOTAL |  |  | 146 |  |  | 20 |  | 32 | 166 |
|  | n | \% | \% | n | \% | \% | n | \% INVALID VALUATION | \% |
| Economi c reasons | 20 | 76,92\% | 13,70\% | 3 | 60,00\% | 15,00\% | 23 | 71,88\% | 13,86\% |
| The climate change is insignific ant | 2 | 7,69\% | 1,37\% | 0 | 0,00\% | 0,00\% | 2 | 6,25\% | 1,20\% |
| Insignific ant contributi on of agricultur e to climate change | 0 | 0,00\% | 0,00\% | 1 | 20,00\% | 5,00\% | 1 | 3,13\% | 0,60\% |
| The state/E. U should cover the differenc e of productio n costs | 3 | 11,54\% | 2,05\% | 1 | 20,00\% | 5,00\% | 4 | 12,50\% | 2,41\% |
| Question able use of money raised | 1 | 3,85\% | 0,68\% | 0 | 0,00\% | 0,00\% | 1 | 3,13\% | 0,60\% |
| No specific reason given | 0 | 0,00\% | 0,00\% | 0 | 0,00\% | 0,00\% | 0 | 0,00\% | 0,00\% |
| Total | 26 | 100,00\% | 17,81\% | 5 | 100,00\% | 25,00\% | 31 | 96,88\% | 18,67\% |

Therefore, according to this research it can be inferred that the only reason for invalid financial valuations is the zero financial valuations, the reasons for which vary between consumers and small producers. At this point the first step of the analysis has been implemented, namely the separation of valid and invalid financial valuations separately for the sample of olive oil consumers and small producers. Tables and charts which follow highlight the demographic characteristics of the participants, comparing consumers and small producers for valid and invalid financial valuation.

Table 2. Distribution of the demographic characteristics of the respondents in total

|  |  | CONSUMERS |  | SMALL <br> PRODUCERS |  | TOTAL |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | n | \% | n | \% | n | \% |
|  | TOTAL | 146 | 100,0\% | 20 | 100,0\% | 166 | 100,0\% |
| GENDER | MEN | 28 | 19,18\% | 6 | 30,0\% | 34 | 20,5\% |
|  | WOMEN | 118 | 80,82\% | 14 | 70,0\% | 132 | 79,5\% |
|  | TOTAL | 146 | 100,00\% | 20 | 100,0\% | 166 | 100,0\% |
| AGE | 22-40 | 63 | 43,15\% | 7 | 35,0\% | 70 | 42,2\% |
|  | 40-50 | 24 | 16,44\% | 3 | 15,0\% | 27 | 16,3\% |
|  | 50-60 | 32 | 21,92\% | 6 | 30,0\% | 38 | 22,9\% |
|  | 60+ | 27 | 18,49\% | 4 | 20,0\% | 31 | 18,7\% |
|  | TOTAL | 146 | 100,0\% | 20 | 100,0\% | 166 | 100,0\% |
| INCOME | TO €5.000 | 7 | 4,79\% | 0 | 0,0\% | 7 | 4,2\% |
|  | $€ 5.000-€ 10.000$ | 28 | 19,18\% | 1 | 5,0\% | 29 | 17,5\% |
|  | $€ 10.000-€ 15.000$ | 29 | 19,86\% | 3 | 15,0\% | 32 | 19,3\% |
|  | €15.000-€20.000 | 32 | 21,92\% | 4 | 20,0\% | 36 | 21,7\% |
|  | $€ 20.000-€ 25.000$ | 25 | 17,12\% | 5 | 25,0\% | 30 | 18,1\% |
|  | $€ 25.000-€ 30.000$ | 13 | 8,90\% | 1 | 5,0\% | 14 | 8,4\% |
|  | $€ 30.000-€ 40.000$ | 8 | 5,48\% | 5 | 25,0\% | 13 | 7,8\% |
|  | MORE THAN €40.000 | 4 | 2,74\% | 1 | 5,0\% | 5 | 3,0\% |
|  | TOTAL | 146 | 100,0\% | 20 | 100,0\% | 166 | 100,0\% |
| EDUCATION <br> AL <br> LEVEL | GRADUATE OF ELEMENTARY SCHOOL | 8 | 5,48\% | 0 | 0,0\% | 8 | 4,8\% |
|  | GRADUATE OF JUNIOR HIGH SCHOOL | 9 | 6,16\% | 0 | 0,0\% | 9 | 5,4\% |
|  | GRADUATE OF HIGH SCHOOL | 35 | 23,97\% | 7 | 35,0\% | 42 | 25,3\% |
|  | HIGHER EDUCATION | 77 | 52,74\% | 10 | 50,0\% | 87 | 52,4\% |
|  | POSTGRADUATE/DOCTORAL TITLE | 17 | 11,64\% | 3 | 15,0\% | 20 | 12,0\% |
|  | TOTAL | 146 | 100,0\% | 20 | 100,0\% | 166 | 100,0\% |
| PROFESSION | PRIVATE EMPLOYEES | 57 | 39,04\% | 7 | 35,0\% | 64 | 38,6\% |
|  | CIVIL SERVANTS | 25 | 17,12\% | 5 | 25,0\% | 30 | 18,1\% |
|  | FREELANCE | 12 | 8,22\% | 1 | 5,0\% | 13 | 7,8\% |
|  | RETIRED | 26 | 17,81\% | 4 | 20,0\% | 30 | 18,1\% |
|  | UNEMPLOYED | 19 | 13,01\% | 2 | 10,0\% | 21 | 12,7\% |
|  | HOUSEWIVES | 7 | 4,79\% | 1 | 5,0\% | 8 | 4,8\% |
|  | OTHER | 0 | 0,00\% | 0 | 0,0\% | 0 | 0,0\% |
|  | TOTAL | 146 | 100,0\% | 20 | 100,0\% | 166 | 100,0\% |

Table 3. Distribution of the demographic characteristics of the respondents who gave an invalid financial valuation to the indirect payment question

|  |  | Non-Usable Bids |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | CONSUMERS |  | SMALL <br> PRODUCERS |  | TOTAL |  |
|  |  | n | \% | n | \% | n | \% |
|  | TOTAL | 26 | 100,0\% | 5 | 100,0\% | 31 | 100,0\% |
| GENDER | MEN | 2 | 7,7\% | 2 | 40,0\% | 4 | 12,90\% |
|  | WOMEN | 24 | 92,3\% | 3 | 60,0\% | 27 | 87,10\% |
|  | TOTAL | 26 | 100,0\% | 5 | 100,0\% | 31 | 100,00\% |
| AGE | 22-40 | 8 | 30,8\% | 3 | 60,0\% | 11 | 35,48\% |
|  | 40-50 | 4 | 15,4\% | 0 | 0,0\% | 4 | 12,90\% |
|  | 50-60 | 9 | 34,6\% | 1 | 20,0\% | 10 | 32,26\% |
|  | 60+ | 5 | 19,2\% | 1 | 20,0\% | 6 | 19,35\% |
|  | TOTAL | 26 | 100,0\% | 5 | 100,0\% | 31 | 100,0\% |
| INCOME | TO €5.000 | 1 | 3,8\% | 0 | 0,0\% | 1 | 3,23\% |
|  | $€ 5.000-€ 10.000$ | 9 | 34,6\% | 0 | 0,0\% | 9 | 29,03\% |
|  | €10.000-€15.000 | 5 | 19,2\% | 0 | 0,0\% | 5 | 16,13\% |
|  | $€ 15.000$ - €20.000 | 5 | 19,2\% | 2 | 40,0\% | 7 | 22,58\% |
|  | €20.000-€25.000 | 4 | 15,4\% | 2 | 40,0\% | 6 | 19,35\% |
|  | $€ 25.000-€ 30.000$ | 2 | 7,7\% | 1 | 20,0\% | 3 | 9,68\% |
|  | $€ 30.000-€ 40.000$ | 0 | 0,0\% | 0 | 0,0\% | 0 | 0,00\% |
|  | MORE THAN €40.000 | 0 | 0,0\% | 0 | 0,0\% | 0 | 0,00\% |
|  | TOTAL | 26 | 100,0\% | 5 | 100,0\% | 31 | 100,0\% |
| EDUCATIONAL <br> LEVEL | GRADUATE OF ELEMENTARY SCHOOL | 0 | 0,0\% | 0 | 0,0\% | 0 | 0,00\% |
|  | GRADUATE OF JUNIOR HIGH SCHOOL | 3 | 11,5\% | 0 | 0,0\% | 3 | 9,68\% |
|  | GRADUATE OF HIGH SCHOOL | 11 | 42,3\% | 3 | 60,0\% | 14 | 45,16\% |
|  | HIGHER EDUCATION | 12 | 46,2\% | 1 | 20,0\% | 13 | 41,94\% |
|  | POSTGRADUATE/DOCTORAL TITLE | 0 | 0,0\% | 1 | 20,0\% | 1 | 3,23\% |
|  | TOTAL | 26 | 100,0\% | 5 | 100,0\% | 31 | 100,0\% |
| PROFESSION | PRIVATE EMPLOYEES | 9 | 34,6\% | 2 | 40,0\% | 11 | 35,48\% |
|  | CIVIL SERVANTS | 3 | 11,5\% | 1 | 20,0\% | 4 | 12,90\% |
|  | FREELANCE | 3 | 11,5\% | 1 | 20,0\% | 4 | 12,90\% |
|  | RETIRED | 7 | 26,9\% | 1 | 20,0\% | 8 | 25,81\% |
|  | UNEMPLOYED | 4 | 15,4\% | 0 | 0,0\% | 4 | 12,90\% |
|  | HOUSEWIVES | 0 | 0,0\% | 0 | 0,0\% | 0 | 0,00\% |
|  | OTHER | 0 | 0,0\% | 0 | 0,0\% | 0 | 0,00\% |
|  | TOTAL | 26 | 100,0\% | 5 | 100,0\% | 31 | 100,0\% |

Table 4. Distribution of the demographic characteristics of the respondents who gave a valid financial valuation to the indirect payment question

|  |  | TOTAL USABLE BIDS |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | CONSUMERS |  | SMALL <br> PRODUCERS |  | TOTAL USABLE BIDS |  |
|  |  | n | \% | n | \% | n | \% |
|  | TOTAL | 120 | 100,0\% | 15 | 100,0\% | 135 | 100,0\% |
| GENDER | MEN | 26 | 21,67\% | 4 | 26,67\% | 30 | 22,22\% |
|  | WOMEN | 94 | 78,33\% | 11 | 73,33\% | 105 | 77,78\% |
|  | TOTAL | 120 | 100,0\% | 15 | 100,0\% | 135 | 100,00\% |
| AGE | 22-40 | 55 | 45,83\% | 4 | 26,67\% | 59 | 43,70\% |
|  | 40-50 | 20 | 16,67\% | 3 | 20,00\% | 23 | 17,04\% |
|  | 50-60 | 23 | 19,17\% | 5 | 33,33\% | 28 | 20,74\% |
|  | 60+ | 22 | 18,33\% | 3 | 20,00\% | 25 | 18,52\% |
|  | TOTAL | 120 | 100,0\% | 15 | 100,0\% | 135 | 100,0\% |
| INCOME | TO € 5.000 | 6 | 5,00\% | 0 | 0,00\% | 6 | 4,44\% |
|  | $€ 5.000-€ 10.000$ | 19 | 15,83\% | 1 | 6,67\% | 20 | 14,81\% |
|  | $€ 10.000-€ 15.000$ | 24 | 20,00\% | 3 | 20,00\% | 27 | 20,00\% |
|  | $€ 15.000-€ 20.000$ | 27 | 22,50\% | 2 | 13,33\% | 29 | 21,48\% |
|  | $€ 20.000-€ 25.000$ | 21 | 17,50\% | 3 | 20,00\% | 24 | 17,78\% |
|  | $€ 25.000-€ 30.000$ | 11 | 9,17\% | 1 | 6,67\% | 12 | 8,89\% |
|  | $€ 30.000$ - €40.000 | 8 | 6,67\% | 4 | 26,67\% | 12 | 8,89\% |
|  | MORE THAN $€ 40.000$ | 4 | 3,33\% | 1 | 6,67\% | 5 | 3,70\% |
|  | TOTAL | 120 | 100,0\% | 15 | 100,0\% | 135 | 100,0\% |
| EDUCATIONAL <br> LEVEL | GRADUATE OF ELEMENTARY SCHOOL | 8 | 6,67\% | 0 | 0,00\% | 8 | 5,93\% |
|  | GRADUATE OF JUNIOR HIGH SCHOOL | 6 | 5,00\% | 0 | 0,00\% | 6 | 4,44\% |
|  | GRADUATE OF HIGH SCHOOL | 24 | 20,00\% | 4 | 26,67\% | 28 | 20,74\% |
|  | HIGHER EDUCATION | 65 | 54,17\% | 9 | 60,00\% | 74 | 54,81\% |
|  | POSTGRADUATE/DOCTORAL TITLE | 17 | 14,17\% | 2 | 13,33\% | 19 | 14,07\% |
|  | TOTAL | 120 | 100,0\% | 15 | 100,0\% | 135 | 100,0\% |
| PROFESSION | PRIVATE EMPLOYEES | 48 | 40,00\% | 5 | 33,33\% | 53 | 39,26\% |
|  | CIVIL SERVANTS | 22 | 18,33\% | 4 | 26,67\% | 26 | 19,26\% |
|  | FREELANCE | 9 | 7,50\% | 0 | 0,00\% | 9 | 6,67\% |
|  | RETIRED | 19 | 15,83\% | 3 | 20,00\% | 22 | 16,30\% |
|  | UNEMPLOYED | 15 | 12,50\% | 2 | 13,33\% | 17 | 12,59\% |
|  | HOUSEWIVES | 7 | 5,83\% | 1 | 6,67\% | 8 | 5,93\% |
|  | OTHER | 0 | 0,00\% | 0 | 0,00\% | 0 | 0,00\% |
|  | TOTAL | 120 | 100,0\% | 15 | 100,0\% | 135 | 100,0\% |

Figure 8. Comparison of men and women participating in the research in total and who gave an invalid financial valuation


As shown in Tables 2,3,4 and in Figure 8 the men and women involved in the research are themselves likely to provide the survey with invalid financial valuation which will not be used eventually in the financial valuation. Therefore, gender does not play a decisive role in the possibility of invalid financial valuation. This is not the case, however, regarding the age of the participants discussed below.

Figure 9. Distribution of the ages, divided into the groups involved in the research as a whole and those who provided invalid financial valuation


As can be seen in Tables 2,3,4 and in Figure 9, the age-groups are categorized as 22-$40,40-50,50-60,60+$. It can be observed that participants in the age groups 22-40 and $50-60$ are distinctively more. The age groups over 50 gave the most invalid financial
valuations, perhaps because they understand less the concept of financial valuation in an unrealistic market for natural resources or because their income does not allow them to contribute to such actions. So, the age plays a central role in the validity of the financial valuations. The youngest participant in the survey was born in 1995 and the oldest in 1943. This means that, the span regarding age-range is 52 years while their average birth is 1972,926 , that is 46,07 years with standard deviation of 14,23 years.

Figure 10. Distribution of the profession in total and in invalid financial valuations


As tables 2,3,4 and Figure 10 illustrate, the groups of private employees, civil servant and retired have the highest participation rates with $39 \%, 18 \%$ and $18 \%$ respectively. Moreover, the group of private employees $(35,48 \%)$ and these of retired following $(25,81 \%)$ have the most invalid financial valuations.

Figure 11. Distribution of the educational level in total and in invalid financial valuations


The data appearing in Tables 2,3,4 and in Figure 11 refer to an additional demographic feature, that of the educational level. More specifically, as shown more than half of the survey respondents stated that their educational level was higher education $(52,4 \%)$, presenting distinct ratio differences when compared to the second category of high school graduates $(25,3 \%)$. It is also clear that the higher the educational level of the respondent, the greater the chances of providing a valid financial valuation to the survey. Therefore, education plays a crucial role in whether we receive valid or invalid financial valuation.

Figure 12. Distribution of the income in total and in invalid financial valuations


The next demographic characteristic to be considered is income, which as can be seen in Tables 2,3,4 and in Figure 12 is divided into eight classes. Although in general there does not appear to be any specific direction of the respondents' family income leading to valid or invalid financial valuations, respondents with an income above $30.000 €$ did not provide the survey with any invalid financial valuation. The last demographic feature presented in the survey is the number of household members of the respondents, adults and minors, as well as the average consumption of olive oil per household as it is directly related to the number of household members.

Table 5. Means and standard deviations for olive oil consumption and number of household members

|  | CONSUMERS | PRODUCERS |  | DIFFERENCES | P.VALUE |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 166 | Mean | SD | Mea <br> n | SD | Mean | SD |  |
| How many liters of olive <br> oil is estimated to be <br> consumed per month | 3,55 | 2,73 | 5,08 | 6,08 | $-1,53$ | 1,38 | 0,26 |
| Number of household <br> members | 2,71 | 1,21 | 3,25 | 1,33 | $-0,54$ | 0,31 | 0,07 |
| Number of adults of <br> household members | 2,34 | 0,97 | 2,60 | 0,88 | $-0,26$ | 0,21 | 0,14 |

In Table 5, the means and the standard deviations of consumers and small producers are calculated for the entire sample. To calculate the differences in the means, the mean of small producers was subtracted from the mean of consumers. To calculate the
standard deviation between consumers and small producers, we used the following formula: $\sqrt{\left(\frac{s 1^{2}}{n 1}+\frac{s 2^{2}}{n 2}\right)}$
where s1 represents the standard deviation of consumers, s2 represents the standard deviation of small producers, $n 1$ represents the number of consumer's observations and n 2 represents the number of small producer's observations. In p -value we write the p value of Students' $t$-test, which indicate whether the difference between consumers and small producers is statistically significant. The mean household of respondents consists of less than 3 members, 2,71 total members and 2,34 adult members in particular in the consumers sample, with small producers presenting significantly higher rations. In particular, small producers appear to have 0,54 more members on average in their household and 0,26 more adult members. Still, the mean monthly consumption of liters of olive oil per household is over 3 liters for consumers and just over 5 liters for small producers, with the difference of 1,5 liters being quite significant. Finally, the results of Student's $t$-test should be emphasized, where it is evident that in the estimation of the monthly consumption of olive oil in relation to the number of household members in total are not below $5 \%$. Given that when the result of $t$-test is less than 0,05 the difference is considered significant. Consequently, there are insignificant differences between consumers and small producers regarding the estimation of the monthly consumption of olive oil by the household and the number of household members in total.
Questions about environmental awareness and knowledge constitute the next step of the analysis. Starting with the analysis of the questionnaires of these issues, the producers were asked if they agreed or disagreed with the following questions on a scale of 1 to 5 , where 1 equals strongly disagree and 5 equals strongly agree. In the last two questions the scale stays from 1 to 5 but in this case, 1 means nothing at all and 5 means too much. In these questions the average of the respondents' answers for both valid and invalid financial valuations was identified and differences between them were explored.

Table 6. Means and standard deviations regarding the responses of valid financial valuations to environmental policy questions for olive oil small producers

| VALID BIDS |  |  |
| :--- | :--- | :--- |
|  | MEAN | SD |
| Climate change and its possible implications <br> concern me very much | 4,67 | 0,62 |
| I find the estimates of the impact of climate <br> change to be overwhelming | 1,33 | 0,72 |
| I believe that immediate action must be taken to <br> mitigate climate change | 4,67 | 0,49 |
| I think it is too late for mitigation measures and <br> we should invest in measures to tackle the risks <br> of climate change (floods, droughts, etc.) | 2,00 | 1,41 |
| I believe that at this point in time, policies and <br> measures concerning the economy and society <br> are at the forefront, and therefore any <br> environmental issue is secondary | 2,87 | 1,51 |
| I would like to know the environmental burden <br> or environmental benefit that comes from every <br> product I buy | 4,13 | 0,52 |
| I would choose and buy a product that is only <br> environmentally friendly | 3,80 | 1,26 |
| The production of agriculture products must be <br> based on agricultural practices of carbon capture <br> (climate change mitigation) | 4,93 | 0,26 |
| Agricultural products resulting from the <br> implementation of good agricultural practices <br> must bear the relevant certification on their label | 4,93 | 0,26 |
| a |  |  |

Table 7. Means and standard deviations of the responses regarding invalid financial valuations to environmental policy questions for olive oil small producers

| INVALID BIDS |  | SD |
| :--- | :--- | :--- |
|  | MEAN | 1,30 |
| Climate change and its possible implications <br> concern me very much | 3,8 | 1,22 |
| I find the estimates of the impact of climate <br> change to be overwhelming | 2 | 1,30 |
| I believe that immediate action must be taken <br> to mitigate climate change | 3,8 | 1,48 |
| I think it is too late for mitigation measures and <br> we should invest in measures to tackle the risks <br> of climate change (floods, droughts, etc.) | 3,2 | 1,64 |
| I believe that at this point in time, policies and <br> measures concerning the economy and society <br> are at the forefront, and therefore any <br> environmental issue is secondary | 2,8 | 0,45 |
| I would like to know the environmental burden <br> or environmental benefit that comes from <br> every product I buy | 4,2 | 1,34 |
| I would choose and buy a product that is only <br> environmentally friendly | 2,6 | 0,45 |
| The production of agriculture products must be <br> based on agricultural practices of carbon <br> capture (climate change mitigation) | 4,2 | 0,55 |
| Agricultural products resulting from the <br> implementation of good agricultural practices <br> must bear the relevant certification on their <br> label | 4,6 |  |

Table 8. Comparison of means and standard deviations regarding the responses to environmental policy questions between olive oil small producers who give valid and invalid financial valuations

|  | DIFFERENCES |  |  |
| :--- | :--- | :--- | :--- |
|  | MEAN | SD | P VALUE |
| Climate change and its possible <br> implications concern me very much | 0,87 | 0,60 | 0,11 |
| I find the estimates of the impact of <br> climate change to be overwhelming | $-0,67$ | 0,58 | 0,15 |
| I believe that immediate action must be <br> taken to mitigate climate change | 0,87 | 0,60 | 0,11 |
| I think it is too late for mitigation <br> measures and we should invest in <br> measures to tackle the risks of climate <br> change (floods, droughts, etc.) | $-1,20$ | 0,76 | 0,08 |
| I believe that at this point in time, <br> policies and measures concerning the <br> economy and society are at the <br> forefront, and therefore any <br> environmental issue is secondary | 0,07 | 0,83 | 0,47 |
| I would like to know the environmental <br> burden or environmental benefit that <br> comes from every product I buy | $-0,07$ | 0,24 | 0,39 |
| I would choose and buy a product that <br> is only environmentally friendly | 1,20 | 0,68 | 0,06 |
| The production of agriculture products <br> must be based on agricultural practices <br> of carbon capture (climate change <br> mitigation) | 0,73 | 0,21 | 0,01 |
| Agricultural products resulting from <br> the implementation of good agricultural <br> practices must bear the relevant <br> certification on their label | 0,33 | 0,25 | 0,13 |

Figure 13. Comparison of mean responses to environmental policy questions between olive oil small producers who give valid and invalid financial valuations


Figure 14. Comparison of mean responses to environmental policy questions between olive oil small producers who give valid and invalid financial valuations


Figure 15. Comparison of mean responses to environmental policy questions between olive oil small producers who give valid and invalid financial valuations


In Figures $6,7,8,13,14$ and 15 the means and standard deviations of each category are calculated. Especially in table the differences in means are calculated by subtracting the mean of the invalid small producers from the mean of the small producers with valid financial valuations. In the differences for standard deviations the following formula is
used: $\sqrt{\left(\frac{s 1^{2}}{n 1}+\frac{s 2^{2}}{n 2}\right)}$
where s1 stands for the standard deviation of the small producers with valid financial valuations, $s 2$ stands for the standard deviation of small producers with invalid financial valuations, n 1 stands for the number of observations of the former and n 2 stands for the number of observations of the latter. Finally, the p-value of Students' t-test is calculated to see if the differences are significant. In most of the answers the mean is above 3, so in most of the questions the participants agree with the question. Moreover, the standard deviation of the participants who provided valid financial valuations is lower than those who provided an invalid financial evaluation. Regarding the questions on environmental information to small producers, it is clear that in the average of their answers that respondents who provided a valid financial valuation show better environmentally informed than those who provided an invalid financial valuation. At this point the analysis places emphasis on the differences between valid and invalid financial valuations in the questions "I think it is too late for mitigation measures and we should invest in measures to tackle the risks of climate change (floods, droughts, etc.)" and "I would choose and buy a product that is only environmentally friendly" where the differences in mean are distinctive even if they are not statistically significant according to calculation of t -test which shows that the differences are important where it is under 0,05 . So, according with $t$-test there are statistically significant differences between valid and invalid financial valuations in the question "The production of agriculture products must be based on agricultural practices of carbon capture (climate change mitigation)" where the $p$-value of the $t$-test is 0,01 . As already discussed, the small producers' responses to the environment have shown that they correlate with their willingness to pay helping us in the economic valuation.
Following the same steps, the extent to which consumers are informed and aware of similar questions will be examined. As with small producers, the same scale is used to
examine the consumers' degree of agreement or disagreement. So again, in the first 6 questions the scale used is of 1 to 5 , where 1 equals strongly disagree and 5 equals strongly agree. In the last 4 questions, the scale remains from 1 to 5 where 1 means not at all and 5 means too much. The method remains the same as before calculating and here the means for both those who provided normal financial valuations and those who provided an invalid, for some reasons, financial valuations. These questions support the understanding of environmental awareness and responsibility affect, and to some extent are related to the follow-up questionnaire question about participants' willingness to pay. As shown in the following infographics.

Table 9. Means and standard deviations regarding the responses of valid financial valuations to environmental policy questions for olive oil consumers

| VALID BIDS |  |  |
| :--- | :--- | :--- |
|  | MEAN | SD |
| Climate change and its possible implications concern <br> me very much | 4,37 | 0,84 |
| I believe that immediate action must be taken to <br> mitigate climate change | 4,74 | 0,59 |
| I think it is too late for mitigation measures and we <br> should invest in measures to tackle the risks of climate <br> change (floods, droughts, etc.) | 2,72 | 1,49 |
| I believe that at this point in time, policies and measures <br> concerning the economy and society are at the forefront, <br> and therefore any environmental issue is secondary | 2,60 | 1,31 |
| I would like to know the environmental burden or <br> environmental benefit that comes from every product I <br> buy | 4,03 | 0,76 |
| I would choose and buy a product that is <br> environmentally friendly | 4,36 | 0,58 |
| The production of agriculture products must be based <br> on agricultural practices of carbon capture (climate <br> change mitigation) | 4,73 | 0,47 |
| Agricultural products resulting from the <br> implementation of good agricultural practices must bear <br> the relevant certification on their label | 4,73 | 0,63 |
| How important such a certification would be <br> (certification of agricultural products for climate change <br> mitigation practices): [When choosing and buying your <br> food and drinks] | 3,81 | 1,29 |
| How important such a certification would be <br> (certification of agricultural products for climate change <br> mitigation practices): [In particular when selecting and <br> purchasing olive oil] | 4,05 | 1,27 |

Table 10. Means and standard deviations regarding the responses of invalid financial valuations to environmental policy questions for olive oil consumers

| INVALID BIDS |  | SD |
| :--- | :--- | :--- |
|  | MEAN | 1,31 |
| Climate change and its possible implications concern <br> me very much | 4,23 | 1,13 |
| I believe that immediate action must be taken to <br> mitigate climate change | 4,38 | 1,66 |
| I think it is too late for mitigation measures and we <br> should invest in measures to tackle the risks of climate <br> change (floods, droughts, etc.) | 2,77 | 1,34 |
| Ibelieve that at this point in time, policies and measures <br> concerning the economy and society are at the <br> forefront, and therefore any environmental issue is <br> secondary | 3,27 | 1,18 |
| I would like to know the environmental burden or <br> environmental benefit that comes from every product I <br> buy | 3,77 | 0,84 |
| I would choose and buy a product that is <br> environmentally friendly | 4,08 | 1,10 |
| The production of agriculture products must be based <br> on agricultural practices of carbon capture (climate <br> change mitigation) | 4,42 | 1,66 |
| Agricultural products resulting from the <br> implementation of good agricultural practices must <br> bear the relevant certification on their label | 4,62 | 0,85 |
| How important such a certification would be <br> (certification of agricultural products for climate <br> change mitigation practices): [When choosing and <br> buying your food and drinks] | 3,69 | 1,41 |
| How important such a certification would be <br> (certification of agricultural products for climate <br> change mitigation practices): [In particular when <br> selecting and purchasing olive oil] | 3,73 |  |
| far |  |  |

Table 11. Comparison of means and standard deviations regarding the responses to environmental policy questions between olive oil consumers who give valid and invalid financial valuations

|  | DIFFERENCES |  |  |
| :--- | :--- | :--- | :--- |
|  | MEAN | SD | P VALUE |
| Climate change and its possible implications <br> concern me very much | 0,14 | 0,27 | 0,31 |
| I believe that immediate action must be taken to <br> mitigate climate change | 0,36 | 0,23 | 0,06 |
| I think it is too late for mitigation measures and <br> we should invest in measures to tackle the risks <br> of climate change (floods, droughts, etc.) | $-0,05$ | 0,35 | 0,44 |
| I believe that at this point in time, policies and <br> measures concerning the economy and society <br> are at the forefront, and therefore any <br> environmental issue is secondary | $-0,67$ | 0,29 | 0,01 |
| I would like to know the environmental burden <br> or environmental benefit that comes from every <br> product I buy | 0,26 | 0,24 | 0,14 |
| I would choose and buy a product that is <br> environmentally friendly | 0,28 | 0,17 | 0,06 |
| The production of agriculture products must be <br> based on agricultural practices of carbon <br> capture (climate change mitigation) | 0,30 | 0,22 | 0,09 |
| Agricultural products resulting from the <br> implementation of good agricultural practices <br> must bear the relevant certification on their <br> label | 0,11 | 0,18 | 0,27 |
| How important such a certification would be <br> (certification of agricultural products for <br> climate change mitigation practices): [When <br> choosing and buying your food and drinks] | 0,12 | 0,30 | 0,35 |
| How important such a certification would be <br> (certification of agricultural products for <br> climate change mitigation practices): [In <br> particular when selecting and purchasing olive <br> oil] | 0,32 | 0,35 | 0,18 |

Figure 16. Comparison of mean responses to environmental policy questions between olive oil consumers who give valid and invalid financial valuations


Figure 17. Comparison of mean responses to environmental policy questions between olive oil consumers who give valid and invalid financial valuations


Figure 18. Comparison of mean responses to environmental policy questions between olive oil consumers who give valid and invalid financial valuations


In a comparable way, in Tables 9,10 and 11 and in Figures 16,17,18 the means and standard deviations of each category are calculated. Especially in table the differences in means are calculated by subtracting the mean of the invalid consumers from the mean of the consumers with valid financial valuations. In the differences for standard deviations the formula below is used: $\left.\sqrt{\left(\frac{s 1^{2}}{n 1}+\frac{s 2^{2}}{n 2}\right.}\right)$
where s1 represents the standard deviation of the consumers with valid financial valuations, s2 represents the standard deviation of consumers with invalid financial valuations, n 1 represents the number of observations of the former and n 2 represents the number of observations of the latter. Finally, the p-value of Students' $t$-test is calculated to see if the differences are significant. As can be observed, the participants who gave us valid financial valuations on the question of their willingness to pay for climate change mitigation have higher means and lower standard deviation than those participants with invalid financial valuations, except for the questions " I think it is too late for mitigation measures and we should invest in measures to tackle the risks of climate change (floods, droughts, etc.)" and "I believe that at this point in time, policies and measures concerning the economy and society are at the forefront, and therefore any environmental issue is secondary" which do not pay much attention to climate change mitigation. This shows that the respondents of valid financial valuations were more concentrated around a higher mean and so they appear more aware and better informed about the environment. In contrast, the respondents of invalid financial valuations were more scattered around a lower mean and so less informed and sensitized about environmental issues. The question "I believe that immediate action must be taken to mitigate climate change" is of greatest interest since there is the largest difference on means between valid and invalid financial valuations considering that the former have 4,74 mean and the latter have 4,38 mean although both groups of respondents give an answer between I agree and I totally agree ( according to the scale). Therefore, it can be inferred that both those who gave us a valid and those who gave us a zero and so an invalid financial valuation for our research place great important on climate change and its mitigation. Finally, the t-test confirms that the differences are
statistically significant on question "I believe that at this point in time, policies and measures concerning the economy and society are at the forefront, and therefore any environmental issue is secondary" by comparing the answers to valid and invalid financial valuations.

Ending with environmental questions we occupied with the questions related to the consumption of olive oil for both consumers and small producers. So, we start by presenting the results of the question where consumers get olive oil.

Table 12. From where consumers consume olive oil

| FROM WHERE OLIVE OIL IS SUPPLIED (CONSUMERS) |  |  |
| :--- | :--- | :--- |
|  | n | $\%$ |
| SUPERMARKET | 84 | $51,2 \%$ |
| MINI MARKET | 3 | $1,8 \%$ |
| COOPERATIVES | 4 | $2,4 \%$ |
| PRODUCERS/FARMER'S MARKET | 72 | $43,9 \%$ |
| OTHER | 1 | $0,6 \%$ |
| TOTAL | 164 | $100,0 \%$ |

Figure 19. From where consumers consume olive oil in percentages


Initially the total number of participating consumers is 146 but here the total is 164 because it was possible to select more than one supplier category. As we can see in table 12 and Figure 19, consumers obtain $95 \%$ of their olive oil from the supermarket ( $51,2 \%$ ) and producers and farmer's market ( $43,9 \%$ ) followed by the cooperatives $(2,4 \%)$, the mini market $(1,8 \%)$ and the other with the lowest $(0,6 \%)$ which are organic stores. Next question in the same category of questions is how often consumers and small producers consume olive oil.

Table 13. How often consumers consume olive oil

|  | CONSUMERS |  |
| :--- | :--- | :--- |
|  | TOTAL | 146 |
|  | n | $\%$ |
| DAILY | 121 | $82,88 \%$ |
| 3-4 TIMES A WEEK | 22 | $15,07 \%$ |
| 1-2 TIMES A WEEK | 3 | $2,05 \%$ |
| RARER | 0 | $0,00 \%$ |
| TOTAL | 146 | $100,00 \%$ |

Table 14. How often small producers consume olive oil

|  | PRODUCERS |  |
| :--- | :--- | :--- |
|  | TOTAL | 20 |
|  | n | $\%$ |
| DAILY | 19 | $95,00 \%$ |
| 3-4 TIMES A WEEK | 0 | $0,00 \%$ |
| 1-2 TIMES A WEEK | 1 | $5,00 \%$ |
| RARER | 0 | $0,00 \%$ |
| TOTAL | 20 | $100,00 \%$ |

Table 15. How often participants in total consume olive oil

|  | TOTAL |  |
| :--- | :--- | :--- |
|  | n | $\%$ |
| DAILY | 140 | $84,34 \%$ |
| 3-4 TIMES A WEEK | 22 | $13,25 \%$ |
| 1-2 TIMES A WEEK | 4 | $2,41 \%$ |
| RARER | 0 | $0,00 \%$ |
| TOTAL | 166 | $100,00 \%$ |

Figure 20. How often participants consume olive oil in total in comparable rates


As we can see in Tables 13,14 and 15 and in Figure 20, most participants either consumers or small producers responded daily to their overwhelming majority of $82,8 \%$ and $95 \%$ respectively, which shows the frequent consumption of olive oil by the participants. We also observe that producers have a slightly higher percentage of choice daily and a little less of the other options, which indicates a higher frequency of use of olive oil by producers and this correlates with the results of previous table where producers appear to have higher average consumption liters of olive oil per month.
The question that follows is what and how important some of the features of the olive oil market are to each. This question was asked only to consumers of olive oil and the scale used here remains from 1 to 5 , where $1=$ not at all and $5=$ too much. We calculated the means for both those who provided valid and those who provided invalid financial valuations. We do this to see if the olive oil selection influence and to some extent are related to the following questionnaire question regarding their willingness to pay.

Table 16. Degree of importance of olive oil characteristics for valid economic valuations

| HOW IMPORTANT ARE THE FOLLOWING FACTORS / CHARACTERISTICS IN <br> OLIVE OIL SELECTION (CONSUMERS) |  |  |
| :--- | :--- | :--- |
|  | VALID FINANCIAL VALUATIONS |  |
|  | MEAN | SD |
| TASTE-SMELL-COLOR | 4,56 | 0,76 |
| APPEARANCE-PACKAGING | 2,46 | 1,25 |
| PRICE | 4,18 | 1,01 |
| QUALITY | 4,84 | 0,41 |
| PRODUCTION COMPANY CIRCULATION <br> REPUTATION | 3,81 | 1,23 |
| ORIGIN OF AREA | 3,52 | 1,30 |
| PRODUCT OF ORGANIC FARMING | 3,40 | 1,44 |

Table 17. Degree of importance of olive oil characteristics for invalid economic valuations

HOW IMPORTANT ARE THE FOLLOWING FACTORS / CHARACTERISTICS IN OLIVE OIL SELECTION (CONSUMERS)

|  | INVALID FINANCIAL VALUATIONS |  |
| :--- | :--- | :--- |
|  | MEAN | SD |
| TASTE-SMELL-COLOR | 4,27 | 1,04 |
| APPEARANCE-PACKAGING | 2,54 | 1,24 |
| PRICE | 4,42 | 1,06 |
| QUALITY | 4,73 | 0,67 |
| PRODUCTION COMPANY CIRCULATION <br> REPUTATION | 3,62 | 1,30 |
| ORIGIN OF AREA | 3,35 | 1,47 |
| PRODUCT OF ORGANIC FARMING | 2,42 | 1,50 |

Table 18. Degree of importance of olive oil characteristics, comparison between valid and invalid economic valuations

| HOW IMPORTANT ARE THE FOLLOWING FACTORS / CHARACTERISTICS |  |  |  |
| :--- | :--- | :--- | :--- |
| IN OLIVE OIL SELECTION (CONSUMERS) |  |  |  |
|  | DIFFERENCES |  |  |
|  | MEAN | SD | P VALUE |
| TASTE-SMELL-COLOR | 0,29 | 0,21 | 0,10 |
| APPEARANCE-PACKAGING | $-0,08$ | 0,26 | 0,38 |
| PRICE | $-0,25$ | 0,22 | 0,14 |
| QUALITY COMPANY | 0,11 | 0,13 | 0,21 |
| PRODUCTION <br> CIRCULATION / REPUTATION | 0,19 | 0,27 | 0,25 |
| ORIGIN OF AREA | 0,17 | 0,30 | 0,29 |
| PRODUCT OF ORGANIC FARMING | 0,98 | 0,31 | 0,00 |

Figure 21. Degree of importance of olive oil characteristics, comparison between valid and invalid economic valuations


Following similar steps, in Tables 16,17 and 18, the means and standard deviations of each category are calculated. In table 18 the differences in means are calculated by subtracting the mean of the invalid consumers from the mean of the consumers with valid financial valuations. In the differences for standard deviations the following formula is used: $\sqrt{\left(\frac{s 1^{2}}{n 1}+\frac{s 2^{2}}{n 2}\right)}$
where s1 represents the standard deviation of the consumers with valid financial valuations, s2 represents the standard deviation of consumers with invalid financial valuations, $n 1$ represents the number of observations of the former and $n 2$ represents the number of observations of the latter. Finally, the p-value of Students' $t$-test is calculated to see if the differences are significant. The most important feature in terms of score for both valid and invalid financial valuations is the quality, while the taste-smell-color continue for the former and price continue for the latter. The appearancepackaging and the product of organic farming have the least important again in terms of rating. The differences between their means and standard deviation are quite small with only one exception in the feature product of organic farming for choice of olive oil. For both categories this question has the highest standard deviation compared to the other questions but the mean of those who gave us a valid financial valuation for the climate change mitigation is significantly higher than those with invalid financial valuations where difference on mean reaches on 0,98 on a scale of 1 to 5 . Therefore, the rating of the importance of being a product of organic farming seems to be related to some degree to the valid financial valuation and willingness to pay. Finally, the t-test confirms this statistical importance given the fact that the $p$-value is under 0,05 .
The next category of questions concerns the consumer spending of consumers exclusively. Initially, consumers make a distribution in percentage of their expenditures into three categories. Firstly, in consumer goods, secondly in luxury goods and thirdly in their financial participation and contribution to climate change mitigation. Participants are asked to rate the mean price of consumer and luxury goods they buy from 1 to 100 , where $1=$ too cheap and $100=$ too expensive depending on how cheap or expensive they are on mean compared to other goods of the same kind. In consumer goods include goods such as food, clothing, rental costs, etc. while in luxury goods include goods such as expensive clothes, leisure travel, jewelry, private education, private health, etc. Tables and charts follow concerning these questions.

Table 19. Consumer expenditures with valid financial valuations

| CONSUMER EXPENDITURES\% (CONSUMERS) |  |  |
| :--- | :--- | :--- |
|  | vALID FINANCIAL VALUATIONS |  |
|  | MEAN | SD |
| WHAT PERCENTAGE OF YOUR INCOME DO YOU <br> SPEND ON CONSUMER GOODS | 75,90 | 15,19 |
| WHAT PERCENTAGE OF YOUR INCOME DO YOU <br> SPEND ON LUXURY GOODS | 23,97 | 15,14 |
| WHAT PERCENTAGE OF YOUR INCOME DO YOU <br> SPEND ON CLIMATE CHANGE ACTIONS | 0,13 | 0,56 |
| WHAT IS THE MEAN PRICE OF THE CONSUMER <br> GOODS YOU BUY | 48,83 | 11,54 |
| WHAT IS THE MEAN PRICE OF THE LUXURY <br> GOODS YOU BUY | 45,83 | 19,06 |

Table 20. Consumer expenditures with invalid financial valuations

| CONSUMER EXPENDITURES\% (CONSUMERS) |  |  |
| :--- | :--- | :--- |
|  | INVALID FINANCIAL VALUATIONS |  |
|  | MEAN | SD |
| WHAT PERCENTAGE OF YOUR INCOME DO YOU <br> SPEND ON CONSUMER GOODS | 82,12 | 18,23 |
| WHAT PERCENTAGE OF YOUR INCOME DO YOU <br> SPEND ON LUXURY GOODS | 17,85 | 18,20 |
| WHAT PERCENTAGE OF YOUR INCOME DO YOU <br> SPEND ON CLIMATE CHANGE ACTIONS | 0,04 | 0,20 |
| WHAT IS THE AVERAGE PRICE OF THE CONSUMER <br> GOODS YOU BUY | 40,77 | 16,95 |
| WHAT IS THE AVERAGE PRICE OF THE LUXURY <br> GOODS YOU BUY | 36,42 | 27,51 |

Table 21. Comparison of consumer expenditures with valid and invalid financial valuations

| CONSUMER EXPENDITURES\% (CONSUMERS) |  |  |  |
| :--- | :--- | :--- | :--- |
|  | DIFFERENCES |  |  |
|  | MEAN | SD | P VALUE |
| WHAT PERCENTAGE OF YOUR INCOME <br> DO YOU SPEND ON CONSUMER GOODS | $-6,22$ | 3,83 | 0,06 |
| WHAT PERCENTAGE OF YOUR INCOME <br> DO YOU SPEND ON LUXURY GOODS | 6,12 | 3,83 | 0,06 |
| WHAT PERCENTAGE OF YOUR INCOME <br> DO YOU SPEND ON CLIMATE CHANGE <br> ACTIONS | 0,09 | 0,06 | 0,07 |
| WHAT IS THE MEAN PRICE OF THE <br> CONSUMER GOODS YOU BUY | 8,06 | 3,49 | 0,01 |
| WHAT IS THE MEAN PRICE OF THE <br> LUXURY GOODS YOU BUY | 9,41 | 5,67 | 0,05 |

Similarly, in Tables 19,20 and 21, the means and standard deviations of each category are calculated. In table 21 the differences in means are calculated by subtracting the mean of the invalid consumers from the mean of the consumers with valid financial
valuations. In the differences for standard deviations the following formula is used:
$\sqrt{\left(\frac{s 1^{2}}{n 1}+\frac{s 2^{2}}{n 2}\right)}$
where s1 represents the standard deviation of the consumers with valid financial valuations, s 2 represents the standard deviation of consumers with invalid financial valuations, $n 1$ represents the number of observations of the former and $n 2$ represents the number of observations of the latter. Finally, the p-value of Students' $t$-test is calculated to see if the differences are significant. As can be inferred, both categories consume most of their income on consumer goods around $80 \%$ and about $20 \%$ on luxury goods, with their participation in climate change actions being below $2 \%$. Still the mean price of consumer goods is about $45 \%$ while of luxury goods is just below $40 \%$. We then interpret the results of the research as comparing the two categories, those who made a valid financial valuation on the question of the willingness to pay for climate change mitigation and those who made us an invalid. We observe that there is a significant difference in the distribution of household expenditures in two categories of $12 \%$ of total money spent on goods, as we have a $6 \%$ shift in the percentage of income spent on consumer goods to luxury goods. Those who provided a valid payment willingness spent about $6 \%$ less of their income than those who provided an invalid payment willingness on consumer goods and respectively about $6 \%$ more money on luxury goods. Also, those who provided a valid financial valuation have about $8 \%$ higher mean prices of goods they buy, namely 8,06 for consumer goods and 9,41 for luxury goods. Therefore, those who gave us a valid financial valuation seem to have more money and more purchasing power on average by buying more expensive overall and have a greater margin of spending their money on luxury goods. Finally, we should point out a difference that in absolute numbers is small, but if we look at it as a percentage between the two categories, we will see that it is a substantial difference. This difference concerns their financial participation in actions to climate change mitigation. Those who provided a valid financial valuation gave a mean of $0,13 \%$ on the willingness to pay on climate change actions, which, as an absolute number, is small but is three times as large as the mean of those who provided an invalid financial valuation which is 0,04 . Even in the same question, those who provided an invalid financial valuation not only had a significantly lower mean spending 0,04 on such actions, but also had a much smaller standard deviation, about two times less. That is, those who provided an invalid financial valuation of their willingness to pay had less purchasing power, less opportunity to buy luxury goods than consumer, and their contribution to climate change actions was much more concentrated around a much lower mean price than those who offered valid valuations. Finally, it is worth highlighting the results of $t$-test, which confirms that in all questions the differences in answer are significant. That is, the results of all the questions on the consumption expenditures of olive oil consumers between those who gave valid and invalid financial valuation, have significant differences according to the Student's t-test p-value.
The analysis continues with the answers of consumers and small producers to the indirect payment questions. Consumers were asked if there was an olive oil with the same characteristics as they had up to that point chosen and they also knew that it come from environmentally friendly cultivation methods that help mitigate climate change, how much more they would be willing to spend on such olive oil. Small producers were asked if they would be willing to apply good olive oil farming practices that would mitigate climate change but would limit their production by a certain percentage. Specifically, the following rates have been chosen: $5 \%, 10 \%, 15 \%$ and $20 \%$ to reduce
their olive oil production. Table 22 and Figures 22 and 23 show the participant's answers to the indirect payment questions.

Table 22. Answers to the question of indirect payment for olive oil

| QUESTION FOR INDIRECT PAYMENT |  |  | PRODUCERS |  |  |  |  | TOTAL |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: | :---: | :---: |
|  | CONSUMERS |  | TOTAL | 20 | 166 |  |  |  |  |
|  | TOTAL | 146 | n | $\%$ | n | $\%$ |  |  |  |
|  | n | $\%$ | 15 | $75,00 \%$ | 70 | $42,17 \%$ |  |  |  |
| YES | 55 | $37,67 \%$ | 5 | $25,00 \%$ | 31 | $18,67 \%$ |  |  |  |
| MAYBE | 26 | $17,81 \%$ | 0 | $0,00 \%$ | 65 | $39,16 \%$ |  |  |  |
| NO | 65 | $44,52 \%$ | 20 | $100,00 \%$ | 166 | $100,00 \%$ |  |  |  |
| TOTAL | 146 | $100,00 \%$ |  |  |  |  |  |  |  |

Figure 22. Percentages of answers to the question of indirect payment for consumers and producers


Figure 23. Answers to the indirect payment question in total


From Table 22 and Figures 22 and 23, it can be inferred that less than one in three participants in total $(39,2 \%)$ answered negatively to indirect payment questions with more than one to two $(42,2 \%)$ responding positively immediately and less than one in five $(18,7 \%)$ initially expressed a hesitation telling us "maybe" but responding positively in the end. Consumers responded immediately affirmatively, i.e., "yes" at the rate of $37,67 \%$ and "maybe", that is, at first, they expressed hesitation but then indicated their willingness to pay at the rate of $17,8 \%$, while 44,5 answered "no". Compared to consumers, small producers were more willing to respond positively $(75,0 \%)$ almost twice as much as consumers and they had zero rate in negative responses, while one to four ( $25,0 \%$ ) chosen the answer "maybe". Summarizing, an overall of $61 \%$ answered "yes" to the indirect payment question and $39 \%$ answered "no". It should also be noted that the small producers were less determined but more positive in the question of indirect payment. Following is the analysis of the data related to the question asked only to consumers about where they would save money for the extra cost of olive oil that they were willing to pay to help mitigate climate change.

Table 23. From what category of goods consumers would choose to reduce their expenditures

FROM WHERE YOU WILL SAVE MONEY (CONSUMERS)

|  | n | $\%$ |
| :--- | :--- | :--- |
| REDUCING CONSUMER GOODS | 60 | $50 \%$ |
| REDUCING LUXURY GOODS | 60 | $50 \%$ |
| TOTAL | 120 | $100 \%$ |

Figure 24. From where consumers would save money to buy olive oil with these specifications


In Table 23 and in Figure 24, about 50\% of the consumers who answered positively in total to the question of willingness to pay chose this reduction come from consumer goods while the remaining $50 \%$ from luxury goods. Therefore, consumers were willing to reduce consumer and luxury goods in the same rate. The participating olive oil consumers were then asked what specific good would be restricted by the category of goods they chosen (consumer or luxury). The interviewers presented lists of the main consumer and luxury goods and the interviewees chose some of them. Finally, they presented their own approach, the reduction to $€$ per year they would make to the goods they choose.

Table 24. From what specific consumer goods and how much would you deduct for buying the most expensive olive oil

## REDUCING CONSUMER GOODS (60 PERSONS)

|  | PRODUCT OPTIONS | \% PRODUCT OPTIONS | TOTAL IN $€$ | \% TOTAL IN $€$ |
| :--- | :--- | :--- | :--- | :--- |
| Flour | 4 | $5,2 \%$ | $61,50 €$ | $1,04 \%$ |
| Milk | 2 | $2,6 \%$ | $1.005,00 €$ | $16,93 \%$ |
| Dishwashing <br> detergent | 11 | $14,3 \%$ | $515,00 €$ | $8,67 \%$ |
| Coffee | 13 | $16,9 \%$ | $405,00 €$ | $6,82 \%$ |
| Seed oil | 6 | $7,8 \%$ | $90,00 €$ | $1,52 \%$ |
| Apples | 0 | $0,0 \%$ | $0,00 €$ | $0,00 \%$ |
| Potatoes | 0 | $0,0 \%$ | $0,00 €$ | $0,00 \%$ |
| Toilet paper | 2 | $2,6 \%$ | $30,00 €$ | $0,51 \%$ |
| Spaghetti | 2 | $2,6 \%$ | $120,00 €$ | $2,02 \%$ |
| Rice | 2 | $45,5 \%$ | $3.581,00 €$ | $60,31 \%$ |
| Clothes | 35 | $100,0 \%$ | $5.937,50 €$ | $100,00 \%$ |
| Total | 77 |  | $2,19 \%$ |  |

Table 25. From what specific luxury goods and how much would you deduct for buying the most expensive olive oil

REDUCING LUXURY GOODS ( 60 PERSONS)

|  | PRODUCT OPTIONS | \% PRODUCT OPTIONS | TOTAL IN $€$ | \%TOTAL IN $€$ |
| :--- | :--- | :--- | :--- | :--- |
| Expensive <br> clothes | 15 | $21,4 \%$ | $1.080,00 €$ | $13,90 \%$ |
| Leisure trips | 7 | $10,0 \%$ | $625,00 €$ | $8,04 \%$ |
| Jewelry | 17 | $24,3 \%$ | $2.086,00 €$ | $26,85 \%$ |
| Alcoholic <br> beverage | 17 | $24,3 \%$ | $2.595,00 €$ | $33,40 \%$ |
| Electronics | 14 | $20,0 \%$ | $1.384,00 €$ | $17,81 \%$ |
| Total | 70 | $100,0 \%$ | $7.770,00 €$ | $100,00 \%$ |

Table 26. Consumer aggregate reductions in euro for olive oil

| CONSUMER <br> GOODS | LUXURY <br> GOODS | TOTAL IN $€$ | TOTAL IN $€ /$ <br> PERSON | STANDARD <br> DEVIATION/PER <br> SON |
| :--- | :--- | :--- | :--- | :--- |
| $5.937,50 €$ | $7.770,00 €$ | $13.707,50 €$ | 114,23 | 171,37 |

Figure 25. Consumer aggregate reductions in euro for olive oil


Figure 26. Comparison in percentages of category of goods that consumers would reduce


Figure 27. Types of consumer goods and how often consumers would choose to decline


Figure 28. Types of consumer goods and amount of euros consumers would choose to reduce in total


Figure 29. Types of consumer goods and amount of euros consumers would choose to reduce per person


Figure 30. Types of consumer goods and how often consumers would choose to reduce in percentage


Figure 31. Types of consumer goods and amount of euros consumers would choose to reduce


Figure 32. Types of luxury goods and how often consumers would choose to reduce


Figure 33. Types of luxury goods and amount of euros consumers would choose to reduce in total


Figure 34. Types of luxury goods and amount of euros consumers would choose to reduce per person


Figure 35. Types of luxury goods and how often consumers would choose to reduce in percentage


Figure 36. Types of luxury goods and amount of euros consumers would choose to reduce


Initially, it is clear that $50 \%$ of participants choose to reduce from consumer goods for the additional cost of olive oil to mitigate climate change and $50 \%$ from luxury goods. It is also worth noting that there is no difference between consumer and luxury goods but it could be, as many participants were not consuming luxury goods at all and were therefore forced to choose to reduce some money of their annual spending by only consumer goods. Regarding the reduction in $€$ that respondents choose to make, the reductions in $€$ are more in luxury than consumer goods. In total, the 120 participating consumers opted to reduce $13.707,50 €$ of the goods they have consumed up to this point to purchase the most expensive olive oil that will have the same characteristics as the olive oil they have bought and consumed up to this point, but it will have an additional cost to mitigate climate change. About $57 \%$ of this money comes from a decline in luxury goods and about $43 \%$ from consumer goods. Therefore, it is concluded that not only are there more who choose to reduce from luxury goods, but also, they have a much greater opportunity to make a larger financial reduction than those who decline from consumer goods. In addition, the participants made an average reduction about $114 €$ per person per year with a standard deviation about 171 . This shows that the mean consumer of olive oil is willing to contribute about $114 €$ per year, that is less than $10 €$ per month for climate change mitigation only by buying more expensive olive oil. Furthermore, those who choose to reduce from consumer goods first of all choose to reduce clothes about $45 \%$, followed by coffee and dishwashing detergent about $17 \%$ and $14 \%$ respectively. Other consumer goods choose to reduce them by between $2-8 \%$. As show in Tables 24, 25 and 26 and in Figure 31 that indicate the percentage reduction in total reduction in $€$, this difference is increasing since the amount of clothing participants would reduce represents more than $60 \%$ of the total reduction in $€$ that they would make from consumer goods. For luxury goods, a proportion of $10 \%$ of participants choose to reduce leisure travels while the proportion for all other goods ranged from $20-24 \%$. That is, the participants who decided to downsize from luxury goods they showed greater difficulty in choosing to reduce leisure travels. The decrease in $€$ per luxury goods category indicates that alcoholic beverage is approaching a decrease of $2.500 €$ while the other categories of goods range from a total reduction of 600-2000€.

Table 27. Consumer answers to the payment question for the olive oil

| VALID FINANCIAL VALUATIONS OF CONSUMERS |  |
| :--- | :--- |
|  | n |
| people who contribute financially to olive oil | 120 |
| total contribution to olive oil in $€$ | $13.707,50 €$ |
| total olive oil in $€$ / person contributor | $114,23 €$ |
| total in olive oil at $€$ / person total | $114,23 €$ |
| standard deviation / person | 171,37 |

Consumers would have been hypothetically saved $13.707,50 €$ in total and $114,23 €$ per person for buying a more expensive olive oil which will contribute to climate change mitigation grace of efficient farming methods.
We then asked olive oil consumers whether in addition to the reduction they made in saving money and buying more expensive olive oil coming from environmentally friendly cultivation methods to mitigate climate change, if they were also willing to contribute financially to a credible organization aimed at mitigating climate change. It is worth noting that the participants expressed their lack of confidence in such organizations and many of them were initially reluctant to contribute to an organization but when we explained to them that if this organization would be credible consumers decided to make a financial contribution.

Table 28. Consumer answers to the payment question for the organization

| PAYMENT - QUESTION FOR ORGANIZATION |  |  |
| :--- | :--- | :--- |
|  | CONSUMERS |  |
| VALID FINANCIAL VALUATIONS | TOTAL | $\mathbf{1 2 0}$ |
|  | n | $\%$ |
| people who contribute financially to the organization | 71 | $59,17 \%$ |
| total contribution to the organization in $€$ | $4.866,00 €$ |  |
| total to the organization in $€$ / person contributing | $68,54 €$ |  |
| total in the organization in $€$ / person total | $40,55 €$ |  |
| standard deviation / person | $70,70 €$ |  |

Overall, about $60 \%$ agreed to contribute financially to the organization but the $40 \%$ who refused to contribute is a large percentage. The participants claimed that if such an organization existed, they would be willing to contribute up to $4.866 €$ in total. The money is less than half of what would have been hypothetically raised in the event of a more expensive olive oil contributing to climate change mitigation and the number of consumers who would hypothetically contribute to such an organization is significantly lower. But even those who eventually agreed to contribute gave a lower amount than that they would have for buying a more expensive olive oil that would help mitigate
climate change. Specifically, the mean amount of money of those who choose to contribute financially to such an organization is about $69 €$ per person and about $41 €$ for all consumers with valid financial valuations. This significant difference occurs because consumers appear to be more skeptical and reluctant to contribute to an organization even in the hypothetical scenario that it would be completely reliable. But there is a second factor that leads to this great distance between the willingness to pay for more expensive olive oil and the willingness to pay the organization and that is the bias in the valuation sequence (Hoevenagel, 1994).According to the bias of the valuation sequence when valuing a good by means of a questionnaire the good we ask for second is less valuable than the first. This is because the respondent has less and less income available for additional valuation. Indeed, when we do an independent valuation of the same good but in a different way as in our own research we may be led to an overvalued result, compared to whether we were asking for both valuations at the same time and then asking them in two separate parts.

Table 29. Answers to the percentages of reduction in olive oil production by producers using the Take It or Leave It method

| VALID FINANCIAL VALUATIONS OF PRODCERS |  |  |
| :--- | :--- | :--- |
| Percentage | n | $\%$ |
| $5 \%$ | 2 | $13,33 \%$ |
| $10 \%$ | 2 | $13,33 \%$ |
| $15 \%$ | 4 | $26,67 \%$ |
| $20 \%$ | 7 | $46,67 \%$ |
| Total | 15 | $100 \%$ |

Figure 37. Answers to the percentages of reduction in olive oil production by producers


Table 30. Small producer answers to the payment question for the olive oil

| VALID FINANCIAL VALUATIONS OF <br> SMALL PRODUCERS | TOTAL |
| :--- | :--- |
|  | n |
| People who contribute financially to olive oil | 15 |
| Aggregate reduction in olive oil production <br> per liter per year | 1612,50 |
| Household mean reduction in olive oil <br> production for climate change by reducing <br> crop production per liter | 107,50 |

Small producers were asked whether they were willing to reduce their olive oil production by $5 \%, 10 \%, 15 \%$ or $20 \%$ in a random order to apply more environmentally friendly cultivation methods so that they could absorb more carbon dioxide from the atmosphere contributing to the climate change mitigation. A total of 2 people would agree to reduce their olive oil production by $5 \%$ and $10 \%, 16$ people in total would agree to reduce their olive oil production by $15 \%$ and 7 people would agree to reduce their production by $20 \%$. Small producers are willing to reduce a total of more than 1500 liters of olive oil per year to apply environmentally sound farming methods

Table 31. Small producer answers to the payment question for the organization

| VALID FINANCIAL VALUATIONS |  | 15 |
| :--- | :--- | :--- |
|  | n | $\%$ |
| People who contribute financially to the organization | 10 | $66,67 \%$ |
| Aggregate contribution to the organization in $€$ | $6.357,50 €$ |  |
| Household mean wtp (81 households) | $635,75 €$ |  |
| Household mean wtp (135 households) | $423,83 €$ |  |
| standard deviation (135 households) | $589,65 €$ |  |

Table 32. Consumer and small producer answers to the payment question for the organization

| CONSUMERS \& SMALL PRODUCERS |  | $\mathbf{1 3 5}$ |
| :--- | :--- | :--- |
|  | n | $\%$ |
| People who contribute financially to the organization | 81 | $60,00 \%$ |
| Aggregate contribution to the organization in $€$ | $11.223,50 €$ |  |
| Household mean wtp (81 households) | $138,56 €$ |  |
| Household mean wtp (135 households) | $83,14 €$ |  |
| Standard deviation (135 households) | $660,35 €$ |  |

Table 33. Consumer and small producer answers to the payment question for the olive oil and the organization

| CONSUMERS \& SMALL PRODUCERS | $\mathbf{1 3 5}$ |  |
| :--- | :--- | :--- |
| Aggregate amount to the olive oil and the <br> organization in liter and $€$ | 1612,50 | $24.931,00 €$ |
| Aggregate amount to the olive oil and the <br> organization in liter and $€ /$ person | 11,94 | $184,67 €$ |

For small producers, about one-third of participants who provided valid financial valuations refuse to contribute to an organization to mitigate climate change, even if it is credible. In order to be able to compare consumers and producers we have converted producers' rates into $€$. In their contribution to the organization, we have multiplied the percentage of their income that they are willing to give to the organization by the average of their income range. Small producers per person are willing to contribute annually to the organization for climate change mitigation $635,75 €$ for those who have decided to contribute and $423,83 €$ for all participating small producers with valid financial valuations, an amount about 10 times that of consumers. This happened not only because of their greater environmental sensitivity but also because of their value-for-money method that demanded a percentage of income, and not an amount in $€$ like consumers, which then were multiplied by their family income.
Then some regressions will follow to see if there are any statistically significant relationships between the various variables. As independent variables I will use the willingness of consumers or small producers to pay either for olive oil or for the organization and as a dependent on respondents' responses to environmental issues and demographics. Below are the regressions which are statistically significant relationship between variables.

Table 34. Regression with independent variable the willingness of consumers to pay
$\left.\begin{array}{|l|l|l|l|l|l|l|l|l|}\hline \text { Regression Statistics } & & & & & & & \\ \hline \text { Multiple R } & \begin{array}{l}0,513 \\ 308\end{array} & & & & & & & \\ \hline \text { R Square } & \begin{array}{l}0,263 \\ 485\end{array} & & & & & & & \\ \hline \begin{array}{l}\text { Adjusted } \\ \text { Square }\end{array} & \begin{array}{l}0,257 \\ 243\end{array} & & & & & & & \\ \hline \begin{array}{l}\text { Standard } \\ \text { Error }\end{array} & \begin{array}{l}147,6 \\ 888\end{array} & & & & & & & \\ \hline \begin{array}{l}\text { Observation } \\ \text { s }\end{array} & 120 & & & & & & & \\ \hline \text { ANOVA } & d f & \text { SS } & \text { MS } & \text { F } & \begin{array}{l}\text { Signifi } \\ \text { cance } \\ F\end{array} & & & \\ \hline & 1 & \begin{array}{l}920769, \\ 4\end{array} & \begin{array}{l}9207 \\ 69,4\end{array} & \begin{array}{l}42,21 \\ 391\end{array} & \begin{array}{l}2,04 \mathrm{E}- \\ 09\end{array} & & & \\ \hline \text { Regression } & 1 & \begin{array}{l}257381 \\ 5\end{array} & \begin{array}{l}2181 \\ 1,99\end{array} & & & & & \\ \hline \text { Residual } & 118 & 119 & 349458 \\ 4\end{array}\right)$

Table 35. Regression with independent variable the willingness of consumers to contribute to the organization

| SUMMARY <br> OUTPUT |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Regression Statistics |  |  |  |  |  |  |  |  |
| Multiple $\mathbf{R}$ | $\begin{aligned} & 0,25104 \\ & 2 \end{aligned}$ |  |  |  |  |  |  |  |
| R Square | $\begin{aligned} & 0,06302 \\ & 2 \\ & \hline \end{aligned}$ |  |  |  |  |  |  |  |
| Adjusted <br> R Square | $\begin{aligned} & 0,05508 \\ & 2 \end{aligned}$ |  |  |  |  |  |  |  |
| Standard <br> Error | $\begin{aligned} & 68,7228 \\ & 2 \end{aligned}$ |  |  |  |  |  |  |  |
| Observat ions | 120 |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |
|  | $d f$ | SS | MS | $F$ | Signific ance $F$ |  |  |  |
| Regressi <br> on | 1 | $\begin{aligned} & 37484 \\ & , 19 \\ & \hline \end{aligned}$ | $\begin{aligned} & 37484 \\ & , 19 \end{aligned}$ | $\begin{array}{\|l} \hline 7,936 \\ 813 \\ \hline \end{array}$ | 0,00568 |  |  |  |
| Residual | 118 | $\begin{aligned} & 55729 \\ & 3,5 \\ & \hline \end{aligned}$ | $\begin{aligned} & 4722, \\ & 826 \end{aligned}$ |  |  |  |  |  |
| Total | 119 | $\begin{aligned} & 59477 \\ & 7,7 \\ & \hline \end{aligned}$ |  |  |  |  |  |  |
|  | Coeffici ents | Stand ard Error | $t$ Stat | $P$ value | Lower $95 \%$ | $\begin{aligned} & \text { Upper } \\ & 95 \% \end{aligned}$ | $\begin{aligned} & \text { Lower } \\ & 95,0 \% \end{aligned}$ | $\begin{aligned} & \text { Upper } \\ & 95,0 \% \end{aligned}$ |
| Intercept | $\begin{aligned} & 113,934 \\ & 7 \\ & \hline \end{aligned}$ | $\begin{aligned} & 26,79 \\ & 328 \\ & \hline \end{aligned}$ | $\begin{aligned} & 4,252 \\ & 36 \\ & \hline \end{aligned}$ | $\begin{aligned} & 4,26 \mathrm{E} \\ & -05 \\ & \hline \end{aligned}$ | $\begin{aligned} & 60,8766 \\ & 9 \\ & \hline \end{aligned}$ | $\begin{aligned} & 166,9 \\ & 927 \\ & \hline \end{aligned}$ | $\begin{aligned} & 60,87 \\ & 669 \\ & \hline \end{aligned}$ | $\begin{aligned} & 166,9 \\ & 927 \\ & \hline \end{aligned}$ |
| The price factor for the purchase of olive oil | $17,5772$ | $\begin{aligned} & 6,239 \\ & 156 \end{aligned}$ | $\begin{aligned} & 2,817 \\ & 24 \end{aligned}$ | $\begin{aligned} & 0,005 \\ & 68 \end{aligned}$ | $29,9324$ | $\begin{aligned} & 5,221 \\ & 94 \end{aligned}$ | $\begin{aligned} & 29,93 \\ & 24 \end{aligned}$ | $\begin{aligned} & 5,221 \\ & 94 \end{aligned}$ |

Table 36. Regression with independent variable the average income of consumers

| SUMMARY OUTPUT |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Regression Statistics |  |  |  |  |  |  |  |  |
| Multiple R | $\begin{aligned} & 0,2409 \\ & 85 \\ & \hline \end{aligned}$ |  |  |  |  |  |  |  |
| R Square | $\begin{aligned} & 0,0580 \\ & 74 \end{aligned}$ |  |  |  |  |  |  |  |
| $\begin{array}{ll} \text { Adjusted } & \text { R } \\ \text { Square } \end{array}$ | $\begin{aligned} & 0,0419 \\ & 72 \\ & \hline \end{aligned}$ |  |  |  |  |  |  |  |
| Standard Error | $\begin{aligned} & 9865,6 \\ & 33 \end{aligned}$ |  |  |  |  |  |  |  |
| Observations | 120 |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |
|  | $d f$ | SS | MS | $F$ | Signific ance $F$ |  |  |  |
| Regression | 2 | $\begin{aligned} & 7,02 \mathrm{E} \\ & +08 \\ & \hline \end{aligned}$ | $\begin{aligned} & 3,51 \mathrm{E} \\ & +08 \\ & \hline \end{aligned}$ | $\begin{aligned} & 3,606 \\ & 763 \end{aligned}$ | $\begin{aligned} & 0,0301 \\ & 99 \end{aligned}$ |  |  |  |
| Residual | 117 | $\begin{aligned} & 1,14 \mathrm{E} \\ & +10 \end{aligned}$ | $\begin{aligned} & 9733 \\ & 0718 \end{aligned}$ |  |  |  |  |  |
| Total | 119 | $\begin{aligned} & 1,21 \mathrm{E} \\ & +10 \\ & \hline \end{aligned}$ |  |  |  |  |  |  |
|  | Coeffic ients | Stand ard Error | $t$ Stat | $P$ value | Lower $95 \%$ | $\begin{aligned} & \text { Uppe } \\ & r \\ & 95 \% \end{aligned}$ | Lowe $95,0$ $\%$ | $\begin{aligned} & \text { Uppe } \\ & r \\ & 95,0 \\ & \% \\ & \hline \end{aligned}$ |
| Intercept | $\begin{aligned} & 657,65 \\ & 69 \end{aligned}$ | $\begin{aligned} & 7473, \\ & 211 \end{aligned}$ | $\begin{aligned} & 0,088 \\ & 002 \end{aligned}$ | $\begin{aligned} & \text { 0,930 } \\ & 026 \end{aligned}$ | 14142, $6$ | $\begin{aligned} & 1545 \\ & 7,96 \end{aligned}$ | $\begin{aligned} & - \\ & 1414 \\ & 2,6 \\ & \hline \end{aligned}$ | $\begin{aligned} & 1545 \\ & 7,96 \end{aligned}$ |
| At this point in time policies and measures relating to the economy and society come first and so any environmental issue is secondary | $\begin{aligned} & 1466,9 \\ & 38 \end{aligned}$ | $\begin{aligned} & 701,1 \\ & 379 \end{aligned}$ | $\begin{aligned} & 2,092 \\ & 224 \end{aligned}$ | $\begin{aligned} & 0,038 \\ & 581 \end{aligned}$ | $\begin{aligned} & 78,370 \\ & 87 \end{aligned}$ | $\begin{aligned} & 2855, \\ & 505 \end{aligned}$ | $\begin{aligned} & 78,37 \\ & 087 \end{aligned}$ | $\begin{aligned} & 2855, \\ & 505 \end{aligned}$ |
| I would choose and buy a product that is environmentally friendly | $\begin{aligned} & 3151,8 \\ & 1 \end{aligned}$ | $\begin{aligned} & 1586, \\ & 849 \end{aligned}$ | $\begin{aligned} & 1,986 \\ & 207 \end{aligned}$ | $\begin{aligned} & 0,049 \\ & 348 \end{aligned}$ | $\begin{aligned} & 9,1391 \\ & 36 \end{aligned}$ | $\begin{aligned} & 6294, \\ & 481 \end{aligned}$ | $\begin{aligned} & 9,139 \\ & 136 \end{aligned}$ | $\begin{aligned} & 6294, \\ & 481 \end{aligned}$ |

Table 37. Regression with independent variable the willingness of producers to pay

| $\begin{aligned} & \text { SUMMARY } \\ & \text { OUTPUT } \end{aligned}$ |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Regression Statistics |  |  |  |  |  |  |  |  |
| Multiple <br> R | $\begin{aligned} & 0,59702 \\ & 6 \end{aligned}$ |  |  |  |  |  |  |  |
| R Square | 0,35644 |  |  |  |  |  |  |  |
| Adjusted <br> R Square | $\begin{aligned} & 0,30693 \\ & 5 \\ & \hline \end{aligned}$ |  |  |  |  |  |  |  |
| Standard <br> Error | $\begin{aligned} & 0,04577 \\ & 9 \end{aligned}$ |  |  |  |  |  |  |  |
| Observat ions | 15 |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |
|  | $d f$ | SS | MS | $F$ | Signific ance $F$ |  |  |  |
| Regressi on | 1 | $\begin{aligned} & \text { 0,015 } \\ & 089 \\ & \hline \end{aligned}$ | $\begin{aligned} & 0,015 \\ & 089 \\ & \hline \end{aligned}$ | $\begin{aligned} & 7,200 \\ & 131 \\ & \hline \end{aligned}$ | $\begin{aligned} & 0,01878 \\ & 2 \end{aligned}$ |  |  |  |
| Residual | 13 | $\begin{aligned} & 0,027 \\ & 244 \\ & \hline \end{aligned}$ | $\begin{aligned} & 0,002 \\ & 096 \\ & \hline \end{aligned}$ |  |  |  |  |  |
| Total | 14 | $\begin{array}{\|l} \hline 0,042 \\ 333 \\ \hline \end{array}$ |  |  |  |  |  |  |
|  | Coeffici ents | Stand ard Error | $t$ Stat | $P$ value | Lower 95\% | $\begin{aligned} & \text { Upper } \\ & 95 \% \end{aligned}$ | Lower $95,0 \%$ | $\begin{aligned} & \text { Upper } \\ & 95,0 \% \end{aligned}$ |
| Intercept | $\begin{aligned} & 0,10690 \\ & 5 \\ & \hline \end{aligned}$ | $\begin{aligned} & 0,020 \\ & 955 \\ & \hline \end{aligned}$ | $\begin{array}{\|l} \hline 5,101 \\ 715 \\ \hline \end{array}$ | $\begin{aligned} & 0,000 \\ & 203 \\ & \hline \end{aligned}$ | $\begin{aligned} & 0,06163 \\ & 5 \\ & \hline \end{aligned}$ | $\begin{aligned} & 0,152 \\ & 175 \\ & \hline \end{aligned}$ | $\begin{aligned} & 0,061 \\ & 635 \\ & \hline \end{aligned}$ | $\begin{aligned} & 0,152 \\ & 175 \\ & \hline \end{aligned}$ |
| It is too late for mitigation measures and we need to invest in measures to deal the risks of climate change | $\begin{aligned} & 0,02321 \\ & 4 \end{aligned}$ | $\begin{aligned} & 0,008 \\ & 651 \end{aligned}$ | $\begin{aligned} & 2,683 \\ & 306 \end{aligned}$ | $\begin{aligned} & 0,018 \\ & 782 \end{aligned}$ | $\begin{aligned} & 0,00452 \\ & 4 \end{aligned}$ | $\begin{aligned} & 0,041 \\ & 904 \end{aligned}$ | $\begin{aligned} & 0,004 \\ & 524 \end{aligned}$ | $\begin{aligned} & 0,041 \\ & 904 \end{aligned}$ |

We observe that the p - value of the regression of the table is as small as those of the variables, less than 0.05 which is our significance level, so the relationship between them is statistically significant. There is a statistically significant relationship between the willingness of consumers to pay for the olive oil and their financially contribution to the organization, between the independent variable of consumers' financially contribution for the organization and the factor price for the purchase of olive oil, between the independent variable of consumers' income and dependent variables a) the fact that at this point in time policies and measures relating to the economy and society come first and so any environmental issue is secondary and $b$ ) I would choose and buy a product that is environmentally friendly. Finally, the independent variable of willingness to pay for the olive oil of small producers depends of the fact that it is too late for mitigation measures and we need to invest in measures to deal the risks of climate change.

### 3.1. Comparison of Athens and Thessaloniki

At this point in this paper, we compare the results of Thessaloniki with those of Athens using the data of Lambros Tsioris' thesis whose work was done in the same context and with the same questionnaires as mine. Our aim is to present the similarities and differences between the two samples with valid financial valuations of consumers and producers of Thessaloniki and Athens in their demographic characteristics, environmental policy questions and willingness to pay for olive oil that will come from environmentally friendly cultivation methods as well as the willingness to make a financial contribution to the organization to mitigate climate change.

Table 38. Distribution of the demographic characteristics of the respondents of Thessaloniki with valid financial valuations

|  |  | CONSUMERS |  | PRODUCERS |  | TOTAL |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | n | \% | n | \% | n | \% |
|  | TOTAL | 120 | 100,00\% | 15 | 100,00\% | 135 | 100,00\% |
| GENDER | MEN | 26 | 21,67\% | 4 | 26,67\% | 30 | 22,22\% |
|  | WOMEN | 94 | 78,33\% | 11 | 73,33\% | 105 | 77,78\% |
|  | TOTAL | 120 | 100,00\% | 15 | 100,00\% | 135 | 100,00\% |
| AGE | 22-40 | 55 | 45,83\% | 4 | 26,67\% | 59 | 43,70\% |
|  | 40-50 | 20 | 16,67\% | 3 | 20,00\% | 23 | 17,04\% |
|  | 50-60 | 23 | 19,17\% | 5 | 33,33\% | 28 | 20,74\% |
|  | 60+ | 22 | 18,33\% | 3 | 20,00\% | 25 | 18,52\% |
|  | TOTAL | 120 | 100,00\% | 15 | 100,00\% | 135 | 100,00\% |
| INCOME | TO € 5.000 | 6 | 5,00\% | 0 | 0,00\% | 6 | 4,44\% |
|  | $€ 5.000-€ 10.000$ | 19 | 15,83\% | 1 | 6,67\% | 20 | 14,81\% |
|  | $€ 10.000-€ 15.000$ | 24 | 20,00\% | 3 | 20,00\% | 27 | 20,00\% |
|  | $€ 15.000$ - €20.000 | 27 | 22,50\% | 2 | 13,33\% | 29 | 21,48\% |
|  | $€ 20.000-€ 25.000$ | 21 | 17,50\% | 3 | 20,00\% | 24 | 17,78\% |
|  | $€ 25.000-€ 30.000$ | 11 | 9,17\% | 1 | 6,67\% | 12 | 8,89\% |
|  | $€ 30.000-€ 40.000$ | 8 | 6,67\% | 4 | 26,67\% | 12 | 8,89\% |
|  | MORE THAN € 40.000 | 4 | 3,33\% | 1 | 6,67\% | 5 | 3,70\% |
|  | TOTAL | 120 | 100,00\% | 15 | 100,00\% | 135 | 100,00\% |
| EDUCATIONAL <br> LEVEL | GRADUATE ELEMENTARY SCHOOL | 8 | 6,67\% | 0 | 0,00\% | 8 | 5,93\% |
|  | GRADUATE OF JUNIOR HIGH SCHOOL | 6 | 5,00\% | 0 | 0,00\% | 6 | 4,44\% |
|  | $\begin{array}{\|lll} \hline \begin{array}{l} \text { GRADUATE } \\ \text { SCHOOL } \end{array} & \text { OF } & \text { HIGH } \\ \hline \end{array}$ | 24 | 20,00\% | 4 | 26,67\% | 28 | 20,74\% |
|  | HIGHER EDUCATION | 65 | 54,17\% | 9 | 60,00\% | 74 | 54,81\% |
|  | POSTGRADUATE/DOCTORAL TITLE | 17 | 14,17\% | 2 | 13,33\% | 19 | 14,07\% |
|  | TOTAL | 120 | 100,00\% | 15 | 100,00\% | 135 | 100,00\% |
| PROFESSION | PRIVATE EMPLOYEES | 48 | 40,00\% | 5 | 33,33\% | 53 | 39,26\% |
|  | CIVIL SERVANTS | 22 | 18,33\% | 4 | 26,67\% | 26 | 19,26\% |
|  | FREELANCE | 9 | 7,50\% | 0 | 0,00\% | 9 | 6,67\% |
|  | RETIRED | 19 | 15,83\% | 3 | 20,00\% | 22 | 16,30\% |
|  | UNEMPLOYED | 15 | 12,50\% | 2 | 13,33\% | 17 | 12,59\% |
|  | HOUSEWIVES | 7 | 5,83\% | 1 | 6,67\% | 8 | 5,93\% |
|  | OTHER | 0 | 0,00\% | 0 | 0,00\% | 0 | 0,00\% |
|  | TOTAL | 120 | 100,00\% | 15 | 100,00\% | 135 | 100,00\% |

Table 39. Distribution of the demographic characteristics of the respondents of Athens with valid financial valuations

|  |  | CONSUMERS |  | PRODUCERS |  | TOTAL |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | n | \% | n | \% | n | \% |
|  | TOTAL | 242 | 100,00\% | 69 | 100,00\% | 311 | 100,00\% |
| GENDER | MEN | 88 | 36,36\% | 29 | 42,03\% | 117 | 37,62\% |
|  | WOMEN | 154 | 63,64\% | 40 | 57,97\% | 194 | 62,38\% |
|  | TOTAL | 242 | 100,00\% | 69 | 100,00\% | 311 | 100,00\% |
| AGE | 22-40 | 87 | 35,95\% | 20 | 29,40\% | 107 | 34,50\% |
|  | 40-50 | 36 | 14,88\% | 14 | 29,17\% | 50 | 17,24\% |
|  | 50-60 | 55 | 22,73\% | 13 | 27,08\% | 68 | 23,45\% |
|  | 60+ | 64 | 26,45\% | 21 | 43,75\% | 85 | 29,31\% |
|  | TOTAL | 242 | 100,00\% | 68 | 100,00\% | 310 | 100,00\% |
| INCOME | TO € 5.000 | 9 | 3,80\% | 2 | 3,03\% | 11 | 3,63\% |
|  | $€ 5.000-€ 10.000$ | 43 | 18,14\% | 11 | 16,67\% | 54 | 17,82\% |
|  | $€ 10.000-€ 15.000$ | 51 | 21,52\% | 15 | 22,73\% | 66 | 21,78\% |
|  | $€ 15.000$ - €20.000 | 51 | 21,52\% | 10 | 15,15\% | 61 | 20,13\% |
|  | $€ 20.000-€ 25.000$ | 23 | 9,70\% | 9 | 13,64\% | 32 | 10,56\% |
|  | $€ 25.000-€ 30.000$ | 21 | 8,86\% | 6 | 9,09\% | 27 | 8,91\% |
|  | $€ 30.000-€ 40.000$ | 21 | 8,86\% | 6 | 9,09\% | 27 | 8,91\% |
|  | MORE THAN € 40.000 | 18 | 7,59\% | 7 | 10,61\% | 25 | 8,25\% |
|  | TOTAL | 237 | 100,00\% | 66 | 100,00\% | 303 | 100,00\% |
| EDUCATIONAL LEVEL | GRADUATE OF <br> ELEMENTARY SCHOOL  | 13 | 5,37\% | 3 | 4,35\% | 16 | 5,14\% |
|  | GRADUATE OF JUNIOR HIGH SCHOOL | 11 | 4,55\% | 5 | 7,25\% | 16 | 5,14\% |
|  | GRADUATE OF HIGH SCHOOL | 51 | 21,07\% | 17 | 24,64\% | 68 | 21,86\% |
|  | HIGHER EDUCATION | 136 | 56,20\% | 40 | 57,97\% | 176 | 56,59\% |
|  | POSTGRADUATE/DOCTORAL TITLE | 31 | 12,81\% | 4 | 5,80\% | 35 | 11,25\% |
|  | TOTAL | 242 | 100,00\% | 69 | 100,00\% | 311 | 100,00\% |
| PROFESSION | PRIVATE EMPLOYEES | 101 | 41,74\% | 11 | 16,18\% | 112 | 36,13\% |
|  | CIVIL SERVANTS | 34 | 14,05\% | 18 | 26,47\% | 52 | 16,77\% |
|  | FREELANCE | 24 | 9,92\% | 19 | 27,94\% | 43 | 13,87\% |
|  | RETIRED | 54 | 22,31\% | 12 | 17,65\% | 66 | 21,29\% |
|  | UNEMPLOYED | 18 | 7,44\% | 4 | 5,88\% | 22 | 7,10\% |
|  | HOUSEWIVES | 9 | 3,72\% | 3 | 4,41\% | 12 | 3,87\% |
|  | OTHER | 2 | 0,83\% | 1 | 1,47\% | 3 | 0,97\% |
|  | TOTAL | 242 | 100,00\% | 68 | 100,00\% | 310 | 100,00\% |

In the Thessaloniki and Athens samples we observe that both consumers and small producers women are more than men. In Thessaloniki from 135 respondents, 105 were women and 30 were men and in Athens from 311 respondents, 194 were women and 117 were men. Most of the participants were in the 22-40 age group, perhaps because it is the largest in the research. The majority of participants' income ranges from 10.000 to $20.000 €$. Finally, half of the participants were in higher education and were private employees.

Table 40. Means and standard deviations regarding the responses of valid financial valuations to environmental policy questions for olive oil consumers for Thessaloniki

|  | VALID FINANCIAL VALUATIONS |  |
| :--- | :--- | :--- |
| Thessaloniki | MEAN | SD |
| Climate change and its possible implications concern me very <br> much | 4,37 | 0,84 |
| I believe that immediate action must be taken to mitigate climate <br> change | 4,74 | 0,59 |
| I think it is too late for mitigation measures and we should invest <br> in measures to tackle the risks of climate change (floods, droughts, <br> etc.) | 2,72 | 1,49 |
| I believe that at this point in time, policies and measures <br> concerning the economy and society are at the forefront, and <br> therefore any environmental issue is secondary | 2,60 | 1,31 |
| I would like to know the environmental burden or environmental <br> benefit that comes from every product I buy | 4,03 | 0,76 |
| I would choose and buy a product that is environmentally friendly | 4,36 | 0,58 |
| The production of agriculture products must be based on <br> agricultural practices of carbon capture (climate change <br> mitigation) | 4,73 | 0,47 |
| Agricultural products resulting from the implementation of good <br> agricultural practices must bear the relevant certification on their <br> label | 4,73 | 0,63 |
| How important such a certification would be (certification of <br> agricultural products for climate change mitigation practices): <br> [When choosing and buying your food and drinks] | 3,81 | 1,29 |
| How important such a certification would be (certification of <br> agricultural products for climate change mitigation practices): [In <br> particular when selecting and purchasing olive oil] | 4,05 | 1,27 |

Table 41. Means and standard deviations regarding the responses of valid financial valuations to environmental policy questions for olive oil consumers for Athens

|  | VALID FINANCIAL VALUATIONS |  |
| :--- | :--- | :--- |
| Athens | MEAN | SD |
| Climate change and its possible implications concern me very <br> much | 4,40 | 0,95 |
| I believe that immediate action must be taken to mitigate <br> climate change | 4,65 | 0,70 |
| I think it is too late for mitigation measures and we should <br> invest in measures to tackle the risks of climate change (floods, <br> droughts, etc.) | 2,88 | 1,65 |
| I believe that at this point in time, policies and measures <br> concerning the economy and society are at the forefront, and <br> therefore any environmental issue is secondary | 2,69 | 1,46 |
| I would like to know the environmental burden or <br> environmental benefit that comes from every product I buy | 4,12 | 0,91 |
| I would choose and buy a product that is environmentally <br> friendly | 4,21 | 0,90 |
| The production of agriculture products must be based on <br> agricultural practices of carbon capture (climate change <br> mitigation) | 4,78 | 0,49 |
| Agricultural products resulting from the implementation of <br> good agricultural practices must bear the relevant certification <br> on their label | 4,80 | 0,48 |
| How important such a certification would be (certification of <br> agricultural products for climate change mitigation practices): <br> [When choosing and buying your food and drinks] | 3,75 | 1,36 |
| How important such a certification would be (certification of <br> agricultural products for climate change mitigation practices): <br> [In particular when selecting and purchasing olive oil] | 3,62 | 1,43 |

Table 42. Differences between Thessaloniki's and Athens's consumers' valid financial valuations

| DIFFERENCES | MEAN |
| :--- | :--- |
| Climate change and its possible implications concern me very <br> much | $-0,03$ |
| I believe that immediate action must be taken to mitigate <br> climate change | 0,09 |
| I think it is too late for mitigation measures and we should <br> invest in measures to tackle the risks of climate change (floods, <br> droughts, etc.) | $-0,16$ |
| I believe that at this point in time, policies and measures <br> concerning the economy and society are at the forefront, and <br> therefore any environmental issue is secondary | $-0,09$ |
| I would like to know the environmental burden or <br> environmental benefit that comes from every product I buy | $-0,08$ |
| I would choose and buy a product that is environmentally <br> friendly | 0,14 |
| The production of agriculture products must be based on <br> agricultural practices of carbon capture (climate change <br> mitigation) | $-0,06$ |
| Agricultural products resulting from the implementation of <br> good agricultural practices must bear the relevant certification <br> on their label | $-0,08$ |
| How important such a certification would be (certification of <br> agricultural products for climate change mitigation practices): <br> [When choosing and buying your food and drinks] | 0,06 |
| How important such a certification would be (certification of <br> agricultural products for climate change mitigation practices): <br> [In particular when selecting and purchasing olive oil] | 0,43 |

Figure 38. Comparison of mean consumers of Athens and Thessaloniki on general environmental questions


To calculate the differences in the means, the mean of consumers of Thessaloniki was subtracted from the mean of consumers of Athens. At this point the analysis focus on the differences between Thessaloniki's and Athens' valid financial valuations of consumers in the questions "How important such a certification would be (certification of agricultural products for climate change mitigation practices): [In particular when selecting and purchasing olive oil]", "I think it is too late for mitigation measures and we should invest in measures to tackle the risks of climate change (floods, droughts, etc.)" and "I would choose and buy a product that is environmentally friendly" where the differences in average are distinctive. From the table, we conclude that the participants of the capital city are probably more aware of the environmentally friendly products and their consequent certification than residents of a smaller city such as Thessaloniki.

Table 43. Means and standard deviations regarding the responses of valid financial valuations to environmental policy questions for olive oil small producers for Thessaloniki

| VALID FINANCIAL VALUATIONS |  |  |
| :--- | :--- | :--- |
| THESSALONIKI | MEAN | SD |
| Climate change and its possible implications concern me <br> very much | 4,67 | 0,62 |
| I find the estimates of the impact of climate change to be <br> overwhelming | 1,33 | 0,72 |
| I believe that immediate action must be taken to mitigate <br> climate change | 4,67 | 0,49 |
| I think it is too late for mitigation measures and we <br> should invest in measures to tackle the risks of climate <br> change (floods, droughts, etc.) | 2,00 | 1,41 |
| I believe that at this point in time, policies and measures <br> concerning the economy and society are at the forefront, <br> and therefore any environmental issue is secondary | 2,87 | 1,51 |
| I would like to know the environmental burden or <br> environmental benefit that comes from every product I <br> buy | 4,13 | 0,52 |
| I would choose and buy a product that is only <br> environmentally friendly | 3,80 | 1,26 |
| The production of agriculture products must be based on <br> agricultural practices of carbon capture (climate change <br> mitigation) | 4,93 | 0,26 |
| Agricultural products resulting from the implementation <br> of good agricultural practices must bear the relevant <br> certification on their label | 4,93 | 0,26 |

Table 44. Means and standard deviations regarding the responses of valid financial valuations to environmental policy questions for olive oil small producers for Athens

| VALID FINANCIAL VALUATIONS |  |  |
| :--- | :--- | :--- |
| ATHENS | MEAN | SD |
| Climate change and its possible implications concern me <br> very much | 4,72 | 0,59 |
| I find the estimates of the impact of climate change to be <br> overwhelming | 1,68 | 1,23 |
| I believe that immediate action must be taken to mitigate <br> climate change | 4,68 | 0,61 |
| I think it is too late for mitigation measures and we should <br> invest in measures to tackle the risks of climate change <br> (floods, droughts, etc.) | 2,55 | 1,56 |
| I believe that at this point in time, policies and measures <br> concerning the economy and society are at the forefront, <br> and therefore any environmental issue is secondary | 2,64 | 1,45 |
| I would like to know the environmental burden or <br> environmental benefit that comes from every product I <br> buy | 4,32 | 0,61 |
| I would choose and buy a product that is only <br> environmentally friendly | 3,93 | 1,15 |
| The production of agriculture products must be based on <br> agricultural practices of carbon capture (climate change <br> mitigation) | 4,86 | 0,35 |
| Agricultural products resulting from the implementation <br> of good agricultural practices must bear the relevant <br> certification on their label | 4,88 | 0,32 |

Table 45. Differences between Thessaloniki's and Athens's small producers' valid financial valuations

| VALID FINANCIAL VALUATIONS | DIFFERENCES |
| :--- | :--- |
| Climate change and its possible implications concern me very much | $-0,06$ |
| I find the estimates of the impact of climate change to be overwhelming | $-0,35$ |
| I believe that immediate action must be taken to mitigate climate change | $-0,01$ |
| I think it is too late for mitigation measures and we should invest in <br> measures to tackle the risks of climate change (floods, droughts, etc.) | $-0,55$ |
| I believe that at this point in time, policies and measures concerning the <br> economy and society are at the forefront, and therefore any <br> environmental issue is secondary | 0,23 |
| I would like to know the environmental burden or environmental benefit <br> that comes from every product I buy | $-0,19$ |
| I would choose and buy a product that is only environmentally friendly | $-0,13$ |
| The production of agriculture products must be based on agricultural <br> practices of carbon capture (climate change mitigation) | 0,08 |
| Agricultural products resulting from the implementation of good <br> agricultural practices must bear the relevant certification on their label | 0,05 |

Figure 39. Comparison of mean small producers of Athens and Thessaloniki on general environmental questions


To calculate the differences in the means, the mean of small producers of Thessaloniki was subtracted from the mean of small producers of Athens. Small producers of Athens, like consumers, also seem more aware of product certifications that come from
environmentally right farming methods; however, in other questions about climate change and its potential effects, Thessaloniki small producers seem more aware and informed.

Table 46. Thessaloniki's consumer and producer answers to the payment question for the olive oil and the organization

|  | THESSALONIKI |  |
| :--- | :--- | :--- |
| Number of questionnaires | $\mathbf{1 3 5}$ |  |
| Aggregate amount to the olive oil and <br> the organization in liter and $€$ | 1612,50 | $24.931,00 €$ |
| Aggregate amount to the olive oil and <br> the organization in liter and $€ /$ person | 11,94 | $184,67 €$ |

Table 47. Athens' consumer and producer answers to the payment question for the olive oil and the organization

|  | ATHENS |  |
| :--- | :--- | :--- |
| Number of questionnaires | $\mathbf{3 1 1}$ |  |
| Aggregate amount to the olive oil and <br> the organization in liter and $€$ | 6181,50 | $64.605,00 €$ |
| Aggregate amount to the olive oil and <br> the organization in liter and $€$ /person | 19,88 | $207,73 €$ |

Table 48. Thessaloniki's and Athens consumer and producer answers to the payment question for the olive oil and the organization

|  | THESSALONIKI + ATHENS |  |
| :--- | :--- | :--- |
| Number of questionnaires | $\mathbf{4 4 6}$ | $89.506,00 €$ |
| Aggregate amount to the olive oil and <br> the organization in liter and $€$ | 7794,00 | $200,69 €$ |
| Aggregate amount to the olive oil and <br> the organization in liter and $€ /$ person | 17,48 |  |

Table 49. Differences between Thessaloniki's and Athens participants answers to the payment question for the olive oil and the organization

|  | DIFFERENCES |  |
| :--- | :--- | :--- |
| Aggregate amount to the olive oil and <br> the organization in liter and $€$ | $-4569,00$ | $-39.674,00 €$ |
| Aggregate amount to the olive oil and <br> the organization in liter and $€ /$ person | $-7,93$ | $\mathbf{- 2 3 , 0 6} €$ |

Concerning the economic valuation of olive oil from good agricultural practices and the climate change organization, we conclude that the Thessaloniki participants are willing to give $184,67 €$ per person while those in Athens are willing to give $207,73 €$.Therefore, the Athens participants are willing to give $23 €$ per person more than those in Thessaloniki, which may be explained by better information and greater sensitivity to environmental issues.

### 3.2. Protest values

At this point in the paper we used the data of Tsioris' work again and then we combined the valid samples of Thessaloniki with those of Athens and the invalid of Thessaloniki with those of Athens. The next step was to divide the sample of invalid questionnaires into 4 categories:1)zero, b)protest value, c)incomplete information and suspicion and d)other reasons in order to better outline the unwillingness of financial contribution to olive oil that will come from environmentally friendly cultivation methods. The economic reasons played the most important reason for refusing to pay either because the participants were not financially able to increase their costs or because they already considered the price of olive oil higher than other oils or because producers already considered marginal their production to their needs. Other reasons follow and they include the outliers i.e. the too high economic valuations. By far too high economic valuations we mean those that exceed $10 \%$ of their family income. $10 \%$ or more of the total income of a household intending to devote itself solely to climate change is considered excessive, and it is also proposed to identify and remove extreme values from the valuation issue (Hoevenagel, 1994). Incomplete information and suspicion follow as many did not consider the issue of climate change to be particularly important or the contribution of agricultural production to its mitigation, and many expressed their suspicion about the money to be collected. Finally, we have the category of protest who refuse to give a price to olive oil that will come from sound farming methods, which they see as a public good and therefore believe that the state or the EU should subsidize farmers the difference in production costs that will result.

Table 50. Thessaloniki's and Athens consumer and producer answers

|  | TOTAL THESSALONIKI'S \& ATHENS' |  |  |
| :--- | :--- | :--- | :--- |
|  | CONSUMERS | PRODUCERS | TOTAL |
| VALID | 362 | 84 | 446 |
| INVALID | 95 | 29 | 124 |
| ZERO | 66 | 4 | 70 |
| PROTEST | 7 | 2 | 9 |
| OTHER REASONS | 10 | 16 | 26 |
| INCOMPLETE <br> INFORMATION- <br> SUSPICION | 12 | 7 | 19 |

Table 51. Distribution of the demographic characteristics of the respondents of Athens with valid financial valuations

|  |  | VALID |  | INVALID |  | PROTEST |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | n | \% | n | \% | n | \% |
|  | TOTAL | 446 | 100,00\% | 124 | 100,00\% | 9 | 100,00\% |
| GENDER | MEN | 147 | 32,96\% | 44 | 35,48\% | 3 | 33,33\% |
|  | WOMEN | 299 | 67,04\% | 80 | 64,52\% | 6 | 66,67\% |
|  | TOTAL | 446 | 100,00\% | 124 | 100,00\% | 9 | 100,00\% |
| AGE | 22-40 | 160 | 35,96\% | 27 | 21,95\% | 3 | 33,33\% |
|  | 40-50 | 67 | 15,06\% | 18 | 14,63\% | 0 | 0,00\% |
|  | 50-60 | 101 | 22,70\% | 30 | 24,39\% | 3 | 33,33\% |
|  | 60+ | 117 | 26,29\% | 48 | 39,02\% | 3 | 33,33\% |
|  | TOTAL | 445 | 100,00\% | 123 | 100,00\% | 9 | 100,00\% |
| EDUCATIONAL <br> LEVEL | $\begin{array}{ll} \text { GRADUATE } & \text { OF } \\ \text { ELEMENTARY SCHOOL } \end{array}$ | 24 | 5,38\% | 10 | 8,06\% | 0 | 0,00\% |
|  | GRADUATE OF JUNIOR HIGH SCHOOL | 22 | 4,93\% | 10 | 8,06\% | 2 | 22,22\% |
|  | GRADUATE OF HIGH SCHOOL | 96 | 21,52\% | 35 | 28,23\% | 2 | 22,22\% |
|  | HIGHER EDUCATION | 250 | 56,05\% | 63 | 50,81\% | 5 | 55,56\% |
|  | POSTGRADUATE/DOCTORAL TITLE | 54 | 12,11\% | 6 | 4,84\% | 0 | 0,00\% |
|  | TOTAL | 446 | 100,00\% | 124 | 100,00\% | 9 | 100,00\% |
| PROFESSION | PRIVATE EMPLOYEES | 173 | 38,79\% | 40 | 32,26\% | 2 | 22,22\% |
|  | CIVIL SERVANTS | 72 | 16,14\% | 17 | 13,71\% | 1 | 11,11\% |
|  | FREELANCE | 44 | 9,87\% | 11 | 8,87\% | 1 | 11,11\% |
|  | RETIRED | 94 | 21,08\% | 44 | 35,48\% | 4 | 44,44\% |
|  | UNEMPLOYED | 39 | 8,74\% | 9 | 7,26\% | 1 | 11,11\% |
|  | HOUSEWIVES | 20 | 4,48\% | 2 | 1,61\% | 0 | 0,00\% |
|  | OTHER | 4 | 0,90\% | 1 | 0,81\% | 0 | 0,00\% |
|  | TOTAL | 446 | 100,00\% | 124 | 100,00\% | 9 | 100,00\% |
| INCOME | TO € 5.000 | 17 | 3,81\% | 8 | 6,45\% | 0 | 0,00\% |
|  | $€ 5.000-€ 10.000$ | 75 | 16,82\% | 24 | 19,35\% | 1 | 11,11\% |
|  | $€ 10.000-€ 15.000$ | 93 | 20,85\% | 27 | 21,77\% | 2 | 22,22\% |
|  | $€ 15.000-€ 20.000$ | 90 | 20,18\% | 15 | 12,10\% | 0 | 0,00\% |
|  | $€ 20.000-€ 25.000$ | 56 | 12,56\% | 19 | 15,32\% | 2 | 22,22\% |
|  | $€ 25.000-€ 30.000$ | 39 | 8,74\% | 13 | 10,48\% | 2 | 22,22\% |
|  | $€ 30.000$ - € 40.000 | 43 | 9,64\% | 11 | 8,87\% | 1 | 11,11\% |
|  | MORE THAN € 40.000 | 30 | 6,73\% | 6 | 4,84\% | 0 | 0,00\% |
|  | She/he did not want to declare family income | 3 | 0,67\% | 1 | 0,81\% | 1 | 11,11\% |
|  | TOTAL | 446 | 100,00\% | 124 | 100,00\% | 9 | 100,00\% |

Table 52. Means and standard deviations of the responses regarding valid financial valuations and protest value to environmental policy questions for olive oil consumers

|  |  |  | PROTEST |  |
| :--- | :--- | :--- | :--- | :--- |
|  | MEAN | SD | MEAN | SD |
| Climate change and its <br> possible implications <br> concern me very much | 4,45 | 0,87 | 4,11 | 0,93 |
| I believe that <br> immediate action must <br> be taken to mitigate <br> climate change | 4,68 | 0,65 | 3,78 | 1,64 |
| I think it is too late for <br> mitigation measures <br> and we should invest in <br> measures to tackle the <br> risks of climate change <br> (floods, droughts, etc.) | 2,76 | 1,59 | 3,00 | 1,58 |
| I believe that at this <br> point in time, policies <br> and measures <br> concerning the <br> economy and society <br> are at the forefront, and <br> therefore any <br> environmental issue is <br> secondary | 2,67 | 1,42 | 3,00 | 1,58 |
| I would like to know <br> the environmental <br> burden or <br> environmental benefit <br> that comes from every <br> product I buy | 4,13 | 0,82 | 3,44 | 0,24 |
| The production of <br> agriculture products <br> must be based on <br> agricultural practices of <br> carbon capture (climate <br> change mitigation) | 4,78 | 0,51 | 4,33 | 0,71 |
| Agricultural products <br> resulting from the <br> implementation of <br> good agricultural <br> practices must bear the <br> relevant certification <br> on their label | 4,80 | 0,46 | 4,33 |  |

Figure 40. Comparison of mean valid financial valuations and protest value on environmental policy questions


In a total sample of valid and invalid, consumers and producers in Athens and Thessaloniki, we find only 9 protesters, of whom 6 are women and 3 men are divided equal into age groups of $22-40,50-60$ and $60+$ most with higher education and retirees in profession with an annual family income of 10 to $30,000 €$ in the majority. On environmental policy questions the scale used is 1 to 5 , where 1 equals strongly disagree and 5 equals strongly agree and it is clear that respondents with protest value present a significant interest for environmental issues and especially for the climate change mitigation measures. The category of protest support the production of agriculture products which be based on agricultural practices of carbon capture so they contribute to the climate change mitigation and protesters believe that these products resulting from the implementation of efficient agricultural practices must bear the relevant certification on their label. Therefore, although they refuse to answer the question of indirect payment for olive oil as they consider that the State or the EU should subsidize farmers the difference in production costs incurred are deeply concerned about environmental issues that they consider to be public good.

## 4. Conclusions

This work using the Contingent Valuation Method attempted an economic evaluation of environmentally sound farming methods applied to crops and in particular olive oil. Of the 166 completed questionnaires in Thessaloniki, the following conclusions emerged: the women in the survey were overwhelmingly more than men ( $79,5 \%$ ), with the majority in the 22-40 age group ( $42,2 \%$ ), with an annual family income of around $15.000 €-20.000 €$, higher education in their majority $(52,4 \%)$ and private employees in $38,6 \%$. In addition, there was a significant difference between consumers and producers, with the former totaling 146 while the latter being only 20 . In environmental policy questions, regarding valid financial valuations, small producers are more concerned than consumers and give a great deal of importance to the labeling of agricultural products resulting from the implementation of environmentally friendly cultivation methods, perhaps because they are better aware of what this entails. In the indirect payment questions for the olive oil and the organization, total consumers and small producers are willing to give $184,67 €$ per year. Then, using the data of Tsioris' work, a comparison of the results was made. The demographic data show great similarities as in both Thessaloniki and Athens the women who participated in the questionnaire were much more than men, were in the majority in the age group of 2240 years, were higher educated and private employees. The only difference was in income as the majority of Athens participants had incomes of $10.000 €-15.000 €$. Regarding environmental policy questions, residents of the capital appear to be more aware of environmentally friendly products with certification than Thessaloniki residents. In the indirect payment questions, Athens participants are willing to contribute $23.06 €$ more than those in Thessaloniki. Finally, I investigated the protest after joining the Athens and Thessaloniki samples and concluded that while they refuse to answer the question of indirect payment, they do not evaluate the environment at zero value but treat it as a public good and therefore consider it not to be subject in trade-offs and that the State or the EU should subsidize farmers, in this particular case, the cost difference resulting from their production.

## 5.References

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## 6. Annex

6.1 Questionnaire for olive oil consumers


This questionnaire is part of the LIFE CLIMATREE project which aims to develop an innovative tool to quantify carbon dioxide capture in permanent tree crops. The main objective of the program is to study the possibilities of implementing climate change mitigation measures and actions in the agricultural sector and to assess the corresponding benefits that can be gained in society.

You have been selected at random along with a large number of residents of the country who also participated in this survey. The purpose of the research is to explore your consumer preferences regarding purchasing agricultural products with certification of good climate change mitigation practices. The answers are confidential and will be used exclusively for research purposes.

Introduction
Are you buying olive oil?
Are you buying olive oil? *
Please select only one of the following:YesNo
Questions related to the olive oil market
How often you consume olive oil? *
Select one of the answers below. Please select only one of the following:
ODaily

O3-4 times a week

- 1-2 times a week

ORarely

How many liters of olive oil do you estimate you consume per month?*

Only numbers can be entered in this field. Please write your answer here:

Where do you mainly get olive oil? *
Select everything that applies. Please select all that apply:
$\square$ Supermarket
$\square$ Mini market
$\square$ Cooperatives
$\square$ Producers / Farmer's markets
$\square$ Other:

Multiple choice
On a scale of 1 to 5 where $1=$ not at all and 5 = too much, how important are the following factors / characteristics when buying olive oil? *

Please select the appropriate answer for each item:

| Taste - Odor - Color | 1 | 2 | 3 | 4 | 5 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Appearance - Packaging 00000 | 0 | 0 | 0 | 0 | 0 |
| Price 00000 |  |  |  |  |  |
| Quality (e.g. extra virgin, |  |  |  |  |  |
| virgin, plain olive oil) 00000 |  |  |  |  |  |
| Production company reputation 00000 |  |  |  |  |  |
| Area of origin (e.g. protected |  |  |  |  |  |
| designation of origin)00000 |  |  |  |  |  |
| Organic crop product 00000 |  |  |  |  |  |

## Consumer spending

Household expenditure breakdown
Please write the answer (s) here:

What percentage of your income do you usually spend on basic consumer goods such as: food, clothing, rent, bread, water, etc.? $\qquad$ \%

What percentage of your income do you usually spend on luxury goods such as: expensive clothes, leisure trips, jewelry, private education, private health etc.? $\qquad$ \%

What percentage of your income do you usually spend on climate change actions / policies / measures? $\qquad$ \%

On a price range between 1-100 (where $1=$ too cheap and $100=$ too expensive)
What is the average price of basic consumer goods you buy? $\qquad$ \%

What is the average price of luxury goods you buy? $\qquad$ \%

## Environmental policy questions

On a scale of 1 to 5 where 1 = strongly disagree and 5 = strongly agree, how much do you agree or disagree with the following:

Please select the appropriate answer for each item:

Climate change and its possible implications concern me very much


I believe that immediate action must be taken to mitigate climate change
I think it is too late for mitigation measures and we should invest in measures to tackle the risks of climate change (floods, droughts, etc.)
I believe that at this point in time, policies and measures concerning the economy and society are at the forefront, and therefore any environmental issue is secondary
I would like to know the environmental burden or environmental benefit that comes
from every product I buy
00000
I would choose and buy a product that is environmentally friendly $\bigcirc \bigcirc \bigcirc \bigcirc$

On a scale of 1 to 5 where 1 = not at all and 5 = too much, how important do you consider the following:

Please select the appropriate answer for each item:
12345

The production of agriculture products must be based on agricultural practices of carbon capture (climate change mitigation)
Agricultural products resulting from the implementation of good agricultural practices must bear the relevant certification on their label
10. On a scale of 1 to 5 where $1=$ not at all and $5=$ very much, how important would such a certification be: (certification of agricultural products for climate change mitigation practices): *
Please select the appropriate answer for each item:

When choosing and buying your food and drinks
Especially when selecting and buying olive

Producing olive oil in accordance with good practice standards (to mitigate climate change) is very likely to increase production costs and thus the price of the liter. In that case would you be willing to pay more than you pay today to buy an olive oil with the same characteristics as the one you use (quality, taste, acidity, etc.) if it had the corresponding certification?

Select an answer

YES $\square$

MAYBE (depending on the price) $\square$
$\mathrm{NO} \square$

To cover the higher cost of buying olive oil you will need to save money on the costs you incur as a household on an annual basis. We give you two tabs with different types of costs to choose from which category (tab) you would prefer to save money to cover that expense.

## Answer this question only if the following conditions are true:

The answer was' YES 'or' MAYBE (depending on the price) 'to question '11 [ValA1]' (Olive oil production according to good agricultural practices (to mitigate climate change) is likely to increase production cost and thus the price of the liter, in which case you would be willing to pay more than you pay today to buy an olive oil with the same characteristics as the one you use (quality, taste, acidity, etc.) if you had the extra corresponding certification?)

Choose one of the answers below
Please select only one of the following:

[^0]Reducing costs from the second tab (luxury goods)

Reduce spending on basic consumer goods
From this category of goods you prefer, you can choose one or more goods for which you would be willing to reduce their consumption over a year in order to save money on purchasing the proposed product (olive oil with certification of good practices to mitigate it). climate change). For each product you choose, fill in the maximum amount you would be willing to save per year by reducing its consumption. Each product also has an indication price so that you can estimate how many units of this product you will be deprived of based on the cost savings you decide to make.

## *

Answer this question only if the following conditions are true:

The answer was NOT ' NO 'to question '11 [ValA1]' (Olive oil production in line with good agricultural practices (to mitigate climate change) is very likely to increase production costs and thus the price of liters) In that case you would be willing to pay more than you pay today to buy an olive oil with the same characteristics as the one you use (quality, taste, acidity, etc. if it also had the corresponding certification?) And the answer was' Reducing costs images from the first tab (daily / basic goods) 'to question '12 [ValA2]' (To cover the higher cost of the olive oil market should save money
of the expenses you incur as a household on an annual basis. We give you two tabs with different types of costs to choose from which category (tab) you would prefer to save money to cover that expense.)

Please write the answer (s) here:

| Good | Target price | Costreduction (€/year) |
| :--- | :--- | :--- |
| Flour | $0.95 € / \mathrm{kg}$ |  |
| Milk | $1.2 € / \mathrm{lt}$ |  |
|  |  |  |



| Good | Costreduction ( $€$ / year) |
| :--- | :--- |
| Expensive clothes |  |


|  <br> ${ }^{\text {arcal }}$ X $\oplus$ (ian <br>  <br>  <br>  |  |
| :---: | :---: |
| Leisure trips |  |
| Jewerly |  |
| Alcoholic beverage |  |
| Electronics |  |

According to your answers, you seem willing to reduce your total spending on basic consumer products by:


As a benchmark, we would like to inform you that based on the consumption of olive oil you stated you spend approximately:
$\square$ year in the olive oil market

If you agree go ahead to the next question, otherwise you can correct the above values.
[] Beyond the burden on your income you just chose (to purchase certified olive oil), would you be willing to spend more money on your income for similar climate change mitigation actions? If so what amount ( $€$ ) would you be willing (as a household) to spend maximally annually?

Only numbers can be entered in this field

Please write your answer here:
$\square$
(If the answer is no, just mark 0 )

## No desire to pay

## Why / why you are not interested in buying such a product?

## Multiple choice

I already consider the price of olive oil high compared to other oils
I cannot afford to increase my spending $\square$
I do not consider the issue of climate change particularly important $\square$
I do not consider the contribution of agricultural production to climate change mitigation particularly important
Should the EU / State to subsidize the difference in production costs incurred by farmers
Different reason $\square$ Please specify:

## Personal information

1.Gender of the respondent:

Man $\square$

Woman

## 2.Age of respondent (year of birth):

$\square$

## 3.Permanent Address:

Please write the answer (s) here:

## Municipality

## Zip Code

## 4.Educational level of the respondent:

a. Graduate of elementary school $\square$ b. Graduate of junior high school $\square$
c. Graduate of high school $\square$ d. Higher education $\square$
e. Postgraduate / Doctoral Title $\square$

## 5.Respondent's profession:

a. Private Employee $\square$
b. Civil Servant $\square$
c. Freelance $\square$
d. Retired $\square$
e. Unemployed $\square$
f. Housewives $\square$
g. Other $\square$ (Please specify): $\qquad$
6.Number of household members: $\qquad$
7.Number of members over 18 years: $\qquad$

## 8.Respondent'sannualfamilyincome:

a. To 5.000€
e. 20.000€-25.000€
b. $5.000 €-10.000 € \square$
f. $25.000 €-30.000 €$
c. $10.000 €-15.000 €$
g. 30.000€ $-40.000 €$
d. 15.000€-20.000€
h. More than $40.000 €$
[] Questionnaire comments (e.g. credibility of answers, interest in participating in climate change actions, strong response to a question, etc.)

Please write your answer here:
$\square$

End of investigation

Do not buy olive oil
[] Why don't you buy olive oil? *

Select everything that applies. Please select all that apply:
$\square$ do not like the taste of it
$\square$ find it quite expensive compared to the other oils
$\square$ l produce it myself or get it from a relative / friend
$\square$ Other: $\square$
Multiple choice
Thank you very much for your participation

Submit your inquiry
Thank you for completing this survey.
6.2 Questionnaire for olive oil small producers


This questionnaire is part of the LIFE CLIMATREE project which aims to develop an innovative tool to quantify carbon dioxide capture in permanent tree crops. The main objective of the program is to study the possibilities of implementing climate change mitigation measures and actions in the agricultural sector and to assess the respective benefits that can be gained in society.

You have been selected at random along with a large number of residents of the country who also participated in this survey. The purpose of the research is to explore your preferences for agricultural production by certifying good practices in mitigating climate change. The answers are confidential and will be used exclusively for research purposes.

## Area of Permanent Residence (Municipality / Region):

## Questions about buying olive oil

1. Do you buy olive oil?

YES $\square$ NO $\square$
(If NO the investigation is not ongoing). Clarifying question: WHY NOT?

## Multiple choice

i. I do not like the taste of it $\square$
ii. I find it quite expensive compared to the other oils
iii. I produce it myself or get it from a relative / friend
iv. Different reason $\square$ (Please specify): $\qquad$
2. How often do you consume olive oil?
i. Daily $\square$
ii. 3-4 times a week $\square$
iii. 1-2 times a week $\square$
iv. Rarely
3. How many liters of olive oil do you estimate you consume per month? $\qquad$
4. In which prefecture / region do you produce your oil? $\qquad$
5. How many acres of olives do you cultivate? $\qquad$
6. What is the total number of trees you grow? $\qquad$
7. How many liters do you produce in average (in a good year)? $\qquad$
8. Where you have it? Ability to choose multiple answers
i. Personal use
ii. To friends / relatives $\square$
iii. For sale $\square$
9. (If he answers yes to ii or iii to the question above). What percentage of your total production do you have available to others (either free or for sale); $\qquad$

## B. General questions on environmental policy and environmental protection

11. On a scale of $\mathbf{1}$ to $\mathbf{5}$ where $\mathbf{1}$ = strongly disagree and $\mathbf{5}$ = strongly agree, how much do you agree or disagree with the following:
i. Climate change and its possible implications concern me very much $\square$
ii. I find the estimates of the impact of climate change to be overwhelming
iii. I believe that immediate action must be taken to mitigate climate change $\square$
iv. think it is too late for mitigation measures and we should invest in measures to tackle climate change risks (floods, droughts, etc.)) $\square$
v. I believe that at this point in time, policies and measures concerning the economy and society are at the forefront, and therefore any environmental issue is secondary $\square$
vi. I would like to know the environmental burden or environmental benefit that comes from every product I buy $\square$
vii. I would choose and buy a product that is only environmentally friendly $\square$
12. In a scale of $\mathbf{1}$ to $\mathbf{5}$ where $\mathbf{1}=$ not at all and $\mathbf{5}=$ too much, how important do you consider the following:
i. The production of agricultural products must be based on agricultural practices of carbon capture (climate change mitigation) $\square$
ii. Agricultural products resulting from the implementation of good agricultural practices must bear the relevant certification on their label $\square$
C. Instant payment questions (via olive oil price) to mitigate climate change
13.The production of olive oil according to the standards of good agricultural practices (to mitigate climate change) entails the introduction of new cultivation practices such as: improving weed and pruning (to increase CO2 capture through photosynthesis), soil no cultivation (to limit CO2 release from the soil) and return of organic matter to the olive grove (recycling pruning material as soil cover and nutrient). Some of these practices are likely to affect the productivity of your olive grove.
In that case, would you be willing to sacrifice part of your production in order to follow climate change mitigation practices?

We inform you that the adoption of these practices can lead to an increase in storage in a 1-acre olive grove up to $0,2 \mathrm{t} \mathrm{CO2} \mathrm{/} \mathrm{year}$, corresponding pollutants emitted by an average passenger car for every 1,500 km covered.

It is also indicative that the adoption of these practices may result in the storage of up to 2.2 t CO2 / year in 10 acres of olive groves, an amount corresponding to the average CO2 emission of an average passenger car per year.


Select an answer

YES $\square \quad$ MAYBE (depending on how much production will decrease) $\square$

NO $\square$
13. IF NO: Why would you not be interested?

Multiple choice
i. I already consider my production to be marginal to my needs
ii. I do not want to lose any income from selling my olive oil as it is very important for my household's needs $\square$
iii. I do not consider the issue of climate change particularly important $\square$
iv. I do not consider the contribution of agricultural production to climate change mitigation particularly important $\square$
v. The state/E. U should cover the difference of production costs $\square$
vi. Different reason $\square$ Please specify: $\qquad$
14. If YES or MAYBE: You would be willing to accept a X\% reduction in your production for this purpose:
YES $\square \quad$ NO $\square$

Where $X=5 \%, 10 \%, 15 \%, 20 \%$ (we divide the questionnaires by an equal number to these percentages and use the questionnaires alternatively with different values)
15. What percentage of your income would you be willing to spend on climate change actions? $\qquad$ \%
D.Personal information

1. Gender of the respondent: Man $\square$ Woman $\square$
2.Age of respondent (year of birth): $\qquad$

## 3.Permanent Address:

Municipality: $\qquad$
Zip Code: $\qquad$
4.Educational level of the respondent:
a. Graduate of elementary school $\square$ b. Graduate of junior high school $\square$
C. Graduate of high school $\square$ d. Higher education $\square$
e. Postgraduate / Doctoral Title $\square$

## 5.Respondent's profession:

a. Private Employee $\square$
b. Civil Servant
c. Freelance
d. Retired
e. Unemployed
f. Housewives $\square$
g. Farmer
h. Other $\square$ ( Please specify): $\qquad$
6.Number of household members: $\qquad$
7. Number of members over 18 years: $\qquad$

## 8.Respondent'sannualfamilyincome:

a. To $5.000 €$
e. $20.000 €-25.000 €$
b. $5.000 €-10.000 € \square$
f. $25.000 €-30.000 € \square$
c. $10.000 €-15.000 € \square$
g. $30.000 €-40.000 € \square$
d. $15.000 €-20.000 €$
h. More than $40.000 €$
9.Questionnaire comments (e.g. credibility of answers, interest in participating in climate change actions, strong response to a question, etc.)

Please write your answer here:
$\square$


[^0]:    OReducing spending from the first tab (daily /basicgoods)

