A choice modelling experiment to explore the opportunities to invest in biodiversity conservation in the Amazon

Pedro Flores Tenorio
PhD Candidate – La Trobe University

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Pedro Flores Tenorio

PhD Candidate in Economics – La Trobe University

Abstract

We focus our study in the opportunities that exist in investment for conservation of biodiversity in tropical countries. It allows a natural and multiple benefits of mitigation of climate change as well as addressing the global environment problem of biodiversity loss.

We observe that the short implementation in Australia of the “carbon tax” during 2012 and 2013 that was dismantle in the Federal Elections of 2013 was inadequately informed to the general public. And, it was seen and criticised by them as being a one party unilateral initiative and the mitigation tools such as reduction of energy consumption using non-natural means, such as more products were rejected by the majority of the population. It was a contradictory relation of less climate change with more material production.

We hypothesise that the support and understanding of the Australians will provide a support to develop policy design that include this component in a long term strategy for Australia, including the development of investment in biodiversity conservation in tropical forest countries as a better alternative than man-made carbon sequestration or strategies.

A choice modelling experiment was designed with a sample of 100 University students from Melbourne and Sydney. It present a hypothetical scenario about a hypothetical investment program to maintain the resilience of the Amazon forest ecosystem.

The results presented show the trade-offs of the attributes assigned to a public program of investment in biodiversity conservation in Peru. It will provide results that contribute to build sound policies in the framework of current consensus in the Paris 2015 agreement.

Keywords

Choice modelling, ecosystem resilience, carbon sequestration, biodiversity loss

1. Introduction

The international community arrived at a consensus on Paris 2015 regarding a global deal to limit the average annual temperature increase of 1.5°C (34.7°F) compared to the temperature in pre-industrial times, in order to prevent climate change from reaching dangerous levels (European Union, 2015). This effort to reach consensus and sign an agreement to replace the Kyoto Protocol, requires that each signatory country commit to the reduction of emissions and manage their strategies in a transition to a zero carbon economy, in accordance with their individual circumstances.

Several mechanisms exist to mitigate and adapt to climate change for Australia. Choosing among them, requires the recognition that as one of the main global emitters of GHGs (per capita), it generates an obligation to tackle the global environment problem, with strong support from the population. In order to obtain these commitments and to think more about the long term solutions, the politicians should clearly present the costs and benefits to their citizens, to facilitate an adequate understanding of the new investments and adjustments, needed for the economy to move away from a fossil fuel era.

Australian politicians would need to present taxpayers with clear results and accountability indicators when they approve policies involving long term, horizon results. It is worth noting that climate change issues face increasing competing cost from different interest groups. Australian society recognises the need for improvement of the publicly funded welfare support system. However, most of the national problems look small in scale compared to climate change (UN-IPCC, 2014), such as comparing tertiary education accrued debt to climate change influenced ecological disaster. Environmental problems need to compete with the scarce funds for international development aid and with many other urgent and short-term problems. Would the decision making improve, if there was an adequate understanding of what to fund? What types of biodiversity conservation is preferred by the tax-payers of the developed countries?

Australia is one of the first countries to prepare long-term pathways studies to decarbonize its economy (ClimateWorks Australia, 2014). It is critically important to adequately present to the general public, how the benefits of the mechanisms and policies to transit to a zero carbon economy, are adequately measured and accountable to the tax-payers (Denis et.al, 2014).

The future mechanisms for transiting to a zero carbon economy would require in the future mechanisms equivalents to the “carbon tax”, but it would need to be better explained to the population, along with the investment policies. Also, adjustments would be required to better redesign the effective provision of carbon sequestration and the benefits for the economy

(Edenhofer et al., 2014, Walker, 2010). In this context, our study focus on the opportunities that exist in investment for conservation of biodiversity in tropical countries. It allows a natural and multiple benefits of mitigation of climate change, as well as addressing the global environment problem of biodiversity loss.

We observe that the short implementation in Australia of the "carbon tax" during 2012 and 2013 that was abolished in the Federal Elections of 2013, was inadequately communicated to the general public. Carbon tax was seen and criticised as being a one party unilateral initiative. The mitigation tools such as reduction of energy consumption using non-natural means, such as the distribution of devices to reduce energy consumption and the increase of the electricity bills were rejected by the majority of the population. This was due to the counterintuitive concept of achieving less climate change with more material production.

Young Australians account for a minority of voters in the Federal elections (Martin, 2012). This age group is especially important in choosing parties with specific policies regarding climate change and investment in biodiversity conservation due to the idealism and interest in a sustainable future[1]. Long-term horizon decisions can be more understandable for them, than for politicians or businesses looking for maintaining the status quo profits and trends. It is so important, that this year, the opposition leader proposed to reduce the age of voting from 18 to 16 years old (The Conversation, 2014a). Economic valuation of investment in biodiversity conservation by young Australians would balance traditional visions that the only relevant space of decision making in international aid is in the surrounding countries. For example, after the agreement of Paris 2015, the first reaction of the current Australian government was to announce that they will transfer money from the international aid budget for the Pacific Islands strategy to tackle climate change (The Conversation, 2015).

We hypothesise that the understanding of the young Australians will provide a support to develop policy design that includes this component in a long term strategy for Australia, including the development of investment in biodiversity conservation in tropical forest countries.

In this study, we will explore the beliefs, attitudes and understanding young Australians have of the economic value assigned to investment in biodiversity conservation in tropical countries, which will provide results that contribute to building sound policies in the framework of current initiatives such as Reducing Emissions from Deforestation and Forest Degradation (REDD+). In the context of Peru and indigenous people in particular, it seems

[1] During year 2017 in Parlamentary Debate, the current Prime Minister of Australia tried to discret the opposition party, Labor party, as a party that counts only with the support of university students and union members.

that this is more important than only signing non-binding agreements of payment for ecosystem services (Hall, 2012; Valqui et al., 2014).

According to the environmental economics theory, the total economic valuation (TEV) of the biodiversity from rich tropical forest was calculated with use and non-use values. In the first research papers, the main components of this TEV were the non-use values (Pearce et al. 1989, Pearce, 1993). One of the indirect use values was the capture of carbon dioxide by forests. In those first studies, it was found that it was easier to measure and place a market value on carbon, than biodiversity, for example (Pearce, 2003).

For its economic analysis, biodiversity in tropical forests is classified as a global public good. According to the environmental economics theory, its conservation will be under provided for unless specific public policies are designed to address the non-exclusion and non-rivalry of the benefits provided from the diversity of ecosystems, species and genes (Bartkowski et. al., 2015, Myers et. al, 2002; CBD, 2014).

Among the stated preference methods that look to estimate the non-use values of goods and services, choice modelling (CM) experiments have been successful in its applications to transport and marketing models (Hensher et al., 2015, Carson, 2011). In environmental economics, its applications are mainly in travel cost models and increasingly replacing contingent valuation methodology (CV) in more aspects (Adamowickz, V. et al., 1998, DeShazo, J. et al., 2002, Louviere, J. et al, 2015).

Interestingly, it is important to mention that some research areas in Experimental Economics neglect the existence of non-use value estimates (Kaviv et al, 2014). Therefore, the need to apply stated preferences methodologies to elicit non-use values is not an area of consensus in economics. The development of the experiment in this paper aims to support the usefulness of including this methodology in the policy making process. This is especially important today, in the current international context, where influential politicians are ignoring the scientific advice from climate change science (The Conversation, 2016).

One of the more complex attributes to incorporate in choice modelling is ecosystem services and resilience in particular (Scheufele et al., 2012). In this study we focus on the wild species harvest of Brazil nuts in an effort to try to clarify this concept from a simple model for this case study and include this attribute in the design of a choice modelling survey to be undertaken with young Australians.

Before we start, we will state some Basic definitions, for clarity. (Kalliola, et al. 2014).

Biodiversity: Diversity within species, between species and of ecosystems.

Ecosystem service: A strictly anthropocentric concept. When humans assign a value to something provided by nature.

Resilience: The ability of the ecosystem to maintain its integrity or to rapidly recover when subject to disturbance.

Species: It is a group of organisms that are similar to each other and can interbreed to produce fertile offspring.

Wild species harvest: Extraction of wild organisms or parts thereof from the ecosystem, with the main motivation for this being the perceived value of the extracted matter, in addition to the cultural value of the practice itself.

These definitions are of particular interest for our analysis due to the link between ecosystem service and resilience. It is important to understand that the resilience is the basis for provision of ecosystem services, such as carbon sequestration, habitat for flora and fauna, or pollination. Nevertheless, some authors in the biological sciences (Lindenmayer et. al, 2002) use alternative definitions for biodiversity and forest ecosystem resilience, highlighting that this concept can be understand better if we use the concept of forest ecosystem restoration. The inclusion of this extensive definition of restoration can go beyond the understanding of the typical young Australian[2]. Therefore, we did not use it for the purpose of this CE.

CV has been extensively studied (Carson RT, 2011). Although, less research has been made of economic valuation by developed countries citizens for biodiversity conservation in developing countries. In addition, these studies have been made mainly by developed country academics. Among them, three influential papers with stated preference methods, have addressed the economic valuation from developed countries to fund ecosystem service provision by developing countries in tropical areas. The first paper, with a CV study in UK and Italy (Horton et al, 2003) was held to analyse the willingness-to-pay (WTP) for the biodiversity conservation in a protected area of 5% of the Brazilian Amazon with 19.000.000 hectares. Additionally, a second scenario was presented in the Biodiversity richest area of 76.000.000 hectares. The results, through tax payments mechanism showed that the British and Italian sample have a WTP of 31.2 US$ and 96 US$/year respectively for each scenario built (Horton et al., 2002).

A previous CV study (Kramer et al, 1997) was made in USA with 542 face to face interviews to preserve 44.515.420 hectares of tropical rainforest in 57 countries, with two tools in the questionnaires: 1) Payment card and 2) Referendum format question with a payment

[2] Andrew Bennett, personal communication 2016.

mechanism of a one time donation to UN Fund. The estimates obtained by the study were: 42.6 US$ and 62.8 US$ respectively. This study was made after the First Earth Summit in Rio, in a time where the American citizens were fiercely opposed to any increase of taxes.

Finally, the third study, a Delphi stated-preference technique with 48 European environmental valuation experts was held in 2013 to estimate the annual per-household willingness to pay to avoid further losses up to 2050 in the Amazon rainforest for two scenarios: 1) 15% loss: no further, and 2) 25% loss of pristine state. The estimates of annual per-household WTP were: 32 €/year and 24 €/year (Navrud et al., 2013).

These three studies show a WTP positive for a remote asset. However, the limitation of CV is that it did not identify which attributes of the hypothetical program were more important neither the links between use values and non-use values of ecosystem services provided. This study looks to overcome those gaps with a CME. Following on from these kind of models, we found two papers, researching Australian consumers, about rainforest protection and ecosystem resilience in the tropics. The first paper (Rolfe et. al. 2000 and 2002) defined locations available to choose in the CM experiment. Included in the analysis were: Vanuatu, Far North Queensland, New South Wales, South America, South East Queensland and Indonesia. It included established areas of 10, 100, 1000 hectares, and payment mechanism of donations with (AUS$): $5, $10 and $50 per year. The results showed that Brisbane residents surveyed were parochial in apportioning their support for rainforest protection. The three Australian locations are preferred to overseas locations. Finally, there were no significant difference in values between the three overseas locations.

The second CM study aim was an attempt to explore the valuation of ecosystem resilience in Queensland (Scheufele et al, 2012). The attribute of resilience was approached, including levels of likelihood probability of an ecosystem remaining in its current stable state. The ecosystem resilience of the Queensland Border Ranges rainforests was understood in percentage levels: 5%, 25%, 50%, 75%, and 95%. One-off household payment mechanism were set in $AU: $0 S $50, $100, $200, $300. The results showed evidence that implicit prices from the respondents were positive and statistically significantly different from 0.

Finally, in the context of the state of Victoria, an interesting CV study about the conservation of a state emblematic fauna species was developed (Jakobsson, 1994). Different hypothesis were analysed such as the embedding of one species with all species, differences between willingness to pay and willingness to accept, different types of payment mechanism and different amount of information given to the respondents. The structure of this work help to develop the CM experiment of this study. We focus especially on this last component.

The inclusion of ecosystem resilience is considered a critical attribute in the design of a stated preference survey for a choice experiment. The context is one of a global public good: biodiversity conservation that is far away, from where the survey respondents live. The design of Information Choice Sets (ICS) was critical for providing enough quality information to the participants in the choice experiment. The ecosystem resilience has not previously been included in choice experiment as an attribute due to the complexity of its measurement (Scheufele et al., 2012).

Following the suggestion of Bennet et al. (2001), we structured the presentation of the choice experiment in the next section, addressing the specific Characterization of the decision problem, Definition and justification of the inclusion of attributes and levels, Questionnaire development, Experimental design, Sample size and data collection, Estimation and the econometric model, analysis of the results and discussion.

In the section of the Questionnaire development, we also analyse in detail: Introduction, Framing, Statement of the issue, Statement of the potential solution, Choice sets, Follow-up questions and Socioeconomic and attitudinal data collection. Finally, this paper draws some Conclusions and Recommendations, and includes Appendixes with the results.

2. The experimental design process

2.1. Characterization of the decision problem

This study focuses on the case of Brazil nut old-growth forest in the Peruvian Amazon and the means by which ecosystem resilience can be an attribute in the design of a survey. This survey is undertaken in Australia, among young citizens to gauge an insight into their preferences for ecosystem resilience of an old-growth forest in the Peruvian Amazon. Initially, we discuss three different areas: (1) ecosystem resilience modelling, (2) inclusion of ecosystem resilience as an attribute, (3) inclusion of warm-up questions in the survey design, before the resilience questions, learning from prior behavioural economics modelling (Crastes et al., 2015).

Brazil nut trees are one of the world's largest and oldest trees, which can provide structural elements of hollows/woody debris that many species depend on for survival, and important levels of carbon sequestration. A Single large or Small tree debate (SLOSS) has been developed in biological conservation to address the design of strategies in different landscapes where biodiversity of large trees that form part of a patch can offset benefits provided by other forest management uses (Lindenmayer et al., 2015). In this study, we focus on the funding of the large Brazil nut tree-level biodiversity conservation.

The biology of the Brazil nuts trees include the fruit that are non-timber forest products and have the characteristic of being renewable (Comite Tecnico Multisectorial de la Castaña, 2006). Every year, from January to March, these fruits fall to the ground of these gigantic trees (more than 50 meters), that can produce fruits during 500 years and live more than 1000 years, are collected to obtain its edible seeds that are dried and shelled to be exported (Clay, J.W. 1997). On the other hand, the renewal characteristic of fruits production is the result of numerous interrelations in the fragile ecosystem where Brazil nuts trees stand. Among those interrelations, we give special attention to the disperser role of the agoutis (*Dasyprocta spp.*) and the success of the cross pollination of the Brazil nut tree flower by the hymenopterans bees of the Bombus, Centris, and Xylocopa genders (Corvera-Gomringer, R., et al., 2010).Every year, the agoutis hide and store 3 to 8 seeds per each seed they consume; this allows the agoutis' descendants to find food in the same ecosystems, while some of the seeds dispersed turn into productive trees (Cornejo, 2001).

The productivity of Brazil nut trees depends critically on the successful cross pollination of its flowers by bees in the previous year. To fulfil their ecosystem functions, these bees need a forest cover they can use as habitat. It is critically affected by an increase of forest fire smoke which can happen naturally or with land clearing. (Corvera-Gomringer, R., op.cit.). It is expected that natural fires will increase with climate change in the Amazon (Stern, 2009). In a previous paper (Flores, 2014), we have simplified the complex interrelation between biodiversity and the production of Brazil nuts.

From the ecological perspective, an indicator of the sustainability of the production of this non-timber forest product is that the successful cross pollination of the previous year is associated with a non-degraded forest where the Brazil nuts will be extracted in this year; ceteris paribus abiotic factors (Cornejo, 2001, Kalliola et al, 2011). For the sustainability of the biological production of Brazil nuts, the resilience of the ecosystem is more important than the number of Brazil nut trees (Flores, 2014) as it was clearly identified by the International Union for Conservation of Nature (IUCN) putting this species in its Red list in Brazil. (Flores et al., 2011). Then, the natural production is an indicator of the resilience of the ecosystem. Therefore, the ecosystem functions of pollination and habitat are working.

Our model to link biodiversity conservation with ecosystem resilience of Brazil nuts old-growth forest is simple, plausible, intuitive, tractable and with a minimum number of parameters. It says in the Introduction, that if the production of Brazil nuts follows a regular cycle of supply, or maintains its integrity as the definition of resilience, then the ecosystem services associated, such as pollination and habitat for flora and fauna, have been well functioning and the ecosystem will continuously maintain its resiliency.

Next, we will define experimental design of this choice experiment, following the stages suggested by Hensher et al (2015).

Stage 1: Problem refinement

This research focuses on the increasing threat of forest degradation in the Amazon and furthermore, on its consequences in the maintenance of critical ecosystem services. We consider that solutions to this problem have not adequately been included in the decision making process of Peru or by the international community, specifically, in the case of the Peruvian Amazon, where all the production contributes only 1% of the GDP, but represents around 70% of the territory with 70 million hectares (Amat y Leon, CA, 2006). This economic indicator is overwhelmingly seen as the most important by Peruvian policy makers (Garcia, 2007, De Soto, 2010). Therefore, the economic valuation of ecosystem services arises from a huge heterogeneity. Although the Amazon seems like a homogenous green carpet, there are huge differences between the flora species that exist there. For example, two trees stand in front of each other but pertain to different species. The Brazil nuts case provides an interesting case of a non-timber forest product that provides multiple benefits globally and locally with a commodity with a well established international market.

Stage 2: Refining the list of alternatives

The decision to invest more in mega diverse countries that can maintain the resilience of old-growth forest offering critical ecosystem services such as biodiversity conservation and carbon sequestration from the Amazon, involves allocating scarce resources in different alternatives. At this stage of the experiment, different species in Peru, such as coffee (*Coffea sp.*) or “aguaje” (*Mauritia flexuosa*) were considered in addition to Brazil nuts as species to be studied in detail in the choice model experiment. Finally, after the results of the pilot study, the alternatives below in color green, were selected.

- In public land with native Brazil nuts
- In indigenous land with native Brazil nuts
- In non-native coffee plantation
- In indigenous land with native “Aguaje”
- In pubic land with native “Aguaje”
- Status quo (not investing in maintenance of resilience in the Amazon).

Stage 2: Refining the list of attributes and attribute levels

After having decided to work with the specific case of Brazil nuts old-growth forest, we had to focus and choose the list of attributes to include in the CM experiment. The initial list of attributes is shown below.

- Wilderness areas with resilience for habitat of flora and fauna.
- Carbon sequestration capacity.
- Indigenous “employment”
- Accountability and monitoring of the program
- Taxes paid per household
- Whether native species or not
- Time Horizon of the biodiversity conservation program

After the pilot survey and analyzing the pros and cons of including each attribute, we finished with those listed in green. It is interesting to note that the indigenous “employment” attribute was included from the pilot survey, due to the presence of these populations in this activity and our focus of understanding the improvement of inclusive projects, plans and policy process in those territories. We consider as very important the indigenous presence and participation in the harvest in the wild. Then, the attribute levels set were ready to complete, using as reference magnitudes gathered in previous studies. We finished with the ones highlighted in green in the following list:

- Wilderness areas of Brazil nut trees with ecosystem resilience – 50,000 hectares, 200,000 hectares or 300,000 hectares
- Cost /household/year – AU$ 5, 10, 30, 40 and 50
- Richness of fauna diversity – Bees, Small mammals and Birds
- Indigenous people families benefited with the program – 0, 100
- Average above ground Carbon sequestration capacity or storage with the program – 10 Mg/ha , 70 Mg/ha or 110 Mg/ha.
- Accountability and Monitoring of the investment – High, with option to visit and many indicators to evaluate changes, Medium, only with some indicators to evaluate change, Low, with few indicators to evaluate change.

Stage 3: Experimental Design Considerations

The next stage considered the use of a fractional factorial orthogonal design, since there is an interest the trade-offs assigned by individual consumers to the attributes selected and also due to the importance of establishing WTP for specific attributes. Then, an unlabeled experiment was designed with a minimum number of treatment combinations for main effects on fractional factorial design: assuming that the marginal utilities for each attribute are non-lineal. Therefore, this minimum number of treatment combinations (choice sets for individual) was calculated in Eq. 5.1, following the updated experiment recommendation (Hensher et al, 2015):

$$(L-1)*A+1= (3-1)*3 + (2-1)*1 +1= 8 \text{ treatments} \qquad \text{(Eq. 5.1)}$$

Using 2 blocks

Stage 4: Generate Experimental Design

The generation of the experimental design after the previous three stages were taken was to decide to use an optimal design with the lowest error or D_b- Bayesian error design. This was because we have found in the literature review that some related studies in other regions have been held before and provide information with uncertainty. We can assume that the estimated parameters β distribute randomly following some given probability distribution to express the uncertainty about the true value of β. In Table 1. we present each of the four attributes with the different levels selected, the design codes for fractional factorial design and finally, orthogonal codes for fractional factorial design.

Table 1. Levels, Design and Orthogonal Codes for fractional factorial design

Attributes	Levels		
wildarea	50	200	300
indigenous	0	100	
storage	10	70	110
cost	10	30	40

Attributes	Designl codes for fractional factorial design		
wildarea	0	1	1
indigenous	0	1	
storage	0	1	2
cost	0	1	2

Attributes	Orthogonal codes for fractional factorial design		
wildarea	-1	0	1
indigenous	-1	1	
storage	-1	0	1
cost	-1	0	1

Stage 5: Randomize Choice Sets

In this framework, we can let X be the domain of the model, that can be in the case of use values, the set of Brazil nuts consumption streams, and in the case of non-use values, the set of options (menus) for biodiversity conservation in the tropical forests where the Brazil nut forest stand.

For the use value decision problem, we can let $S \subset X$ be the set of available consumption streams. A consumer in Australia can buy 1 kilo of Brazil nuts, Macadamia or Walnuts with $20. Which ones will she choose? We can ask before giving information about the non-use values (Adamowickz et al., 1998). Then, the new Information Choice Set (ICS) protocol (Crastes et al., 2015) will provide us something interesting about the revealed preference for nuts and the inclusion of information that is not normally known by consumers in the Australian market. Internationally, Brazil nuts represent only 2.5% of total nuts consumption in the world (Clay, 1997).

The analysis of choices taken by consumers, with respect to nuts and ecosystem resilience will provide us with the data needed for identification of uncovering unobservable elements (e.g. preferences, beliefs, attention) and characterizations (or representation). Connecting the model to behavioural postulates, provides us a better understanding for its evaluation and testing. Finally, when the survey is finished, there can be comparative statics questions, such as how do intuitive changes in the behaviour correspond to changes in the parameters.

In this study, the new ICS is designed to apply to the specific case of Brazil nuts from the Peruvian Amazon. Respondents will be asked about the use value as a nut of Brazil nut tree and non-use value of the biodiversity conservation of the old-growth forest where Brazil nut trees stand. We follow the suggestions of a recent work (Crastes, R. et al. 2015) about the design of warm up questions in a choice modelling experiment.

The decision unit in our study is a single individual: a young adult Australian university student. She can live by herself or in a household where the main decision-making is taken by her father or mother. The purpose of our model is to explain a certain observable phenomenon to the decisions taken by today adults (parents and grandparents) and the likelihood of whether or not these decisions continuing to be taken by the young adults, the new decision makers in the future as they age. One of our main questions to answer becomes: Is there a status quo bias with respect to the preferences for biodiversity conservation in tropical forests? Learning from the development of analytical tools of behavioural economics, the new ICS survey protocol provides an opportunity to successfully include the complex variable of ecosystem resilience during the choice experiment where the respondent has been warmed up with other dimensions of the good with which she is familiar. Therefore, she recognises that she is revealing her preferences for market goods.

An example of a decision problem in the case of non-use value, (S, x) where x is a default/status-quo non-use value option ($x \in S$), is related to choices of their parents. In the assumptions on X for both goods and services, we include these which are finite and

countable. Moreover, the design includes linearity in the case of nuts and order structure in the case of ecosystem resilience and monotonicity.

For the respondent to evaluate how the information provided for the choice experiment about the non-use value for the ecosystem service the questions of Sections A and B are taken first. After these three very basic choice tasks, the respondents will be asked to carry out the CE survey in section C.

An objective of this CE experiment will be to observe if there are some changes between the first questions and final questions about attitudes to Brazil nuts, after all the information of ecosystem resilience of Brazil nuts was provided. In the next section, we design the discrete choice experiment for the ecosystem resilience of the Brazil nuts.

2.2. - Definition and justification of the inclusion of attributes and levels.

There are three attributes in this study which are “people benefited” in the program of wild harvest from old-growth forest; differentiating between “indigenous” and non-indigenous, between “carbon sequestration ecosystem service provision because of ecosystem resilience from old-growth forest in hectares” and the level of “accountability” of each proposal, associated with the financial impost. In summary, 4 attributes levels are included in 8 choice experiment sets (Scenarios), as it is shown in the Section C of the Questionnaire of the Appendix 4.3.

The attributes were defined from previous pilot studies (Flores, 2002). Informing a number of design choices is essential for achieving relevancy by (Rolfe et al., 2004). At the beginning of this research work, we thought to do a contingent valuation study for this Chapter, but after the literature review update and the pilot study, we decided to apply a choice modelling experiment. Interviews and Focus group meetings were conducted in two central locations of Melbourne, in Preston on 12 September 2014 with five people attending and in La Trobe University on 1 October 2014, where six people attended. The pilot study interviews pursued the objective to narrow the framing of the choice experiments and improve contextual presentation and relevancy of biodiversity conservation to Australians.

Key messages from the pilot study interviews included: firstly, with regard to the payment, many indicated that Australia is too small to pay for broad-scale biodiversity conservation. Secondly, there were few consumers aware of Brazil nuts and less that know the origin of these nuts. Thirdly, relevant for the understanding of the payment were the number of hectares with conservation activities in the forest. This appeared meaningful to express on a dollar-per-hectare basis. Fourthly, to make the conservation alternatives relevant for young university students individuals, they would need to be expressed in terms of their taxes paid

and even as a percentage of carbon tax that was repelled in elections by the older generation. The pilot survey interviews recommended that the inclusion of pictures in areas designated for biodiversity conservation was helpful for understanding the information presented to the respondents regarding management requirements of wild harvest associated with use of old-growth forest.

The interest to study the valuation of ecosystem services from the Amazon within developed countries citizens came from several years ago, Flores (2002) when the author interviewed ten tourists visiting the Tambopata Natural Protected Area in Madre de Dios before Christmas 2001, 70% were male and 30% female, 30 years old on average and 6 were from the UK, 2 from Australia and 2 from Canada. They said they consumed very few Brazil nuts, except for the Christmas holiday season. 90% of them knew the Brazil nuts, however only 40% said they knew about their wild harvest. Also, we found that 30% said they would be willing to increase their decision purchase about Brazil nuts in a large amount and 30% in a small amount.

The survey pilot of 2002 was useful for the survey pilot of 2014. The positive aspect of this new survey is that being held in Australia, the respondents were more related to the payment mechanisms through taxes. Other studies have found limitations in biodiversity conservation programs due to difficulties between private and public responsibilities (Bateman et al., 2015). All the tourists interviewed in 2002 were coming from Cusco and was their first time visiting the Amazon basin, drawn by a desire to understand this biodiversity rich rainforest. The share of total tourism spending in the Amazon corresponded to 10% of total expenditure in the Amazon. They stayed an average of 2.5 days in the region.

2.3. – Questionnaire development including the valuation of ecosystem resilience for Brazil nuts

2.3.1. Introduction

The participants in this survey were introduced to this research and the people who are involved with a Participation Information Statement that appears in the Appendix 4.1. The letters that were designed to recruit the participants in platforms online and from La Trobe University of Melbourne and the University of Sydney campuses, respectively prior to the questionnaire, appear in Appendix 4.2 The ethical approval of my research project E16-054 was sent to approval by 19 August 2016.

2.3.2. Framing

The Survey questionnaire design presented in the Appendix 4.3 is divided into 4 sections. Section A asks 8 questions about perceptions and attitudes towards habitats in tropical

rainforests and protection of biodiversity. These were designed to motivate young Australian citizens that study in Melbourne to respond in thinking about tropical rainforests, their trade-offs and their preferences about ecosystem services provided from the Amazon.

In section B information is presented to respondents which specified: the ecosystem services identification and processes involved and details of the area's typical landscape, flora and fauna (photo provided). Furthermore, this part focuses on the estimation of use values of the Brazil nuts as a warm up for estimating use values and trade-offs. A total of 7 questions are asked in this section.

Section C presents the six choice set scenarios and two extra questions about the non- use values of the Brazil nuts included in the program with 50,000, 200,000 or 500,000 hectares and the proportion of all the world's remaining tropical rainforest covered with Brazil nuts; The present extent and condition of the rainforest in Peruvian Amazon; The degree of protection to be given; Likely future impacts of forest degradation if the program is not implemented. In addition, it identified who would be responsible for the implementation and maintenance of the areas and who would be required to pay for the proposals if implemented.

Finally, Section D examine socio-demographic characteristics with nine questions.

The survey was pre-tested and piloted allowing questions to be improved and reducing the average completion time to 15 minutes.

The dependent variable for the use value is: choice for the use value data of Section B and choice for the non-use value of Section C with 50,000 has. 200,000 has. or 500,000 has. alternatives. In Appendix 4.4 is the explanation about the STATA application with the model developed in this chapter.

Below is a brief explanation of the explanatory variables that are divided in three categories, each one related with one section of the questionnaire: a) Environmental awareness, b) Opinions on the use-value attributes of Brazil nuts and c) Socio-economic characteristics.

a) Environmental awareness

environ = rank given to environmental concerns compared to other 8 social/economic problems in Australia (See Q2 in the Appendix 4.3), Maximum rank: 8, minimum rank:0. Each point is given for having strongly or mildly agreed that the problem is important.

amazon = 1 if Strongly or Mildly agree to use money to pay for Amazon conservation (See Q3 in Appendix 4.3), 0 otherwise.

large = 1 if Strongly or Mildly agree that conservation of large trees is more important than small trees (See Q3 in Appendix 4.3), 0 otherwise.

natural = 1 if Strongly or Mildly agree that “natural” carbon sequestration is more important than “artificial” carbon sequestration (See Q3 in Appendix 4.3), 0 otherwise.

Imports = 1 if Strongly or Mildly agree that imports of Brazil nuts from the Amazon should be encouraged (See Q3 in Appendix 4.3), 0 otherwise.

climate = 1 if agrees that the maintenance of the climate temperature is an extremely or very important ecosystem service (See Q4 in Appendix 4.3), 0 otherwise.

pollination = 1 if agrees that pollination is an extremely or very important ecosystem service (See Q4 in Appendix 4.3), 0 otherwise.

fuel = 1 if agrees that fuel and energy is an extremely or very important ecosystem services (See Q4 in Appendix 4.3), 0 otherwise.

gathering= 1 if agrees that gathering, hunting and fishing are extremely or very important ecosystem services (See Q4 in Appendix 4.3), 0 otherwise.

indigenous2= 1 if agrees that use of nature by indigenous people is an extremely or very important ecosystem service (See Q4 in Appendix 4.3), 0 otherwise.

landscape = 1 if agrees that enjoyment of landscape is an extremely or very important ecosystem service (See Q4 in Appendix 4.3), 0 otherwise.

Research = 1 if agrees that use of nature to research is an extremely or very important ecosystem service (See Q4 in Appendix 4.3), 0 otherwise.

Other =1 if agrees as extremely or very important other ecosystem services additional to this list (See Q4 in Appendix 4.3), 0 otherwise.

b) Opinions on the use-value attributes of Brazil nuts

visited= 1, if have visited one of the Amazon countries, 0 otherwise

wild =1, if knows that Brazil nuts are harvested from the wild, 0 otherwise

option= 1, if have thought to visit one of the Amazon countries, 0 otherwise

buy= 1, if interested in buying more Brazil nuts after knowing its wild harvest, 0 otherwise

pay_ind= 1, if interested in paying more for Brazil nuts harvested by indigenous people, 0 otherwise.

pay_more20= 1, if willing to pay at least 20% more for Brazil nuts that cost AUS$20 per kilo in the retail market, 0 otherwise.

c) Socio-economic characteristics

age = rank given to age groups where 1 is the youngest and 7, the oldest

gender = 1 if male, 0 if female

happiness = grade of self-assessed level of being happy, where 1 is the least happy and 10 the most happy

income = household income group, where 1 is the lowest income level and 12 is the highest.

city = 1 if Melbourne, 0 if Sydney

In this study, we used scaling techniques to improve our ability to measure attitudes and beliefs. Simultaneously, we looked for patterns in how people answered questions in the series of questions and used statistical techniques to combine answers into a single numerical estimate,for example, answers to a series of questions to get opinions on a single topic: importance of biodiversity loss, after answers about Capture of CO2, Habitat for vulnerable flora species and protect livelihood of indigenous people.

Furthermore, with abstract questions, we apply scaling to help us to avoid measurement error, one of the 4 types of error that affect accuracy. All of this was with the objective of ensuring genuine answers to how people really think about these issues. The other three kinds of errors in the surveys are: coverage, sampling and nonresponse error (Salant et al., 1994). We address the first two, using a sample that does not pretend to be representative of all young Australians. The non-response error was addressed in the analysis with STATA, eliminating the respondents that chose 0 in all their choice answers and compared with the model considered with the best fit.

2.3.3. Statement of the issue

The dilemma that is being presented is that Australia has signed an agreement in Paris 2015, therefore commitments for climate change reduction exist. In this context, young people would be leading the change of “business as usual” to a low-carbon emissions economy. Then, it is expected choices between economy and environment would provide another dilemma There are scarce invest funds to fight against climate change and loss of biodiversity. In this CM experiment, we explore trade-offs such as if the young Australians prefer investing in “natural” carbon sequestration and biodiversity conservation, rather than “artificial” carbon sequestration with more man-made engineering solutions.

The Brazil nut forest management that is presented to simultaneously provide carbon sequestration and biodiversity conservation, highlights the resilience concept associated with the relation between pollination, fire management and its natural production. The issue of making a decision and choosing is framed with the ecosystem services provided having the

capacity to be accountable. The public investment that is designed to be built with increase of taxes (e.g. “carbon” tax) can be monitored with different levels of detail, which are correlated with the level of payment chosen by the respondent.

2.3.4. Statement of the potential solution.

The payment vehicle is the increase in the tax paid by household. It is a potential strategy to be considered in the future, because to fulfil the commitments of Paris 2015, some “carbon” or “pollution” tax is needed. This tax would be paid for by the young generations during a long term horizon of time. That is why they have been chosen. Their horizon of time would allow them the space to consider supporting a “carbon tax” as an investment in biodiversity conservation, in which they have a vested interest. The quality of their future depends on such actions, a viewpoint which the older generation seems not to share (The Conversation, 2014c). Interestingly, the “carbon tax” that operated in Australia during years 2012 to 2013 represented a cost for an average household of AU$150 per year (The Conversation, 2014b). It is worthy to compare this with those cited previously in the literature review.

2.3.5. Choice sets

In the questionnaire, before the presentation of eight choice scenarios with three unlabelled alternatives (including one status quo), it is stated that there are many variants to the solution just outlined and that young people’s opinions about which variant is preferredis an important tool for Australia and Peru to build their strategies and policies about investment in biodiversity conservation in the framework of Paris 2015 implementation.

Since ecosystem resilience is a complex issue, this choice model experiment tries not to put cognitive burden on the respondents. For this reason, we decided to include only two alternatives additional to the status quo. In addition, the alternatives are unlabelled, to avoid a bias in the respondent, using names which could mislead her (See Appendix 4.3, section “C”).

2.3.6. Follow-up questions and Meta-data

After making the choice, we will analyse some of the question patterns, to extract from the sample, those respondents who made payment vehicle protests, or who show lexicographic preferences and perfect embedding. The Qualtrics online platform, which was chosen to follow this study, allows us to work with the metadata. In the results section, will be seen that

we removed from the results section all the respondents who took less than five minutes to answer the survey or those who did not express their age or gender.

2.3.7. Socioeconomic and attitudinal data collection

The sample characteristics will allow us to identify the variation of choices according to traditional variables in stated preference studies, such as: gender, education level, age, income, work situation, volunteer participation and the level of happiness. We include this last variable because we consider that the level of individual wellbeing is not related mainly to income. This variable wouldhelp us to more accurately characterize the individuals answering the questionnaire.

2.4. Experimental design

The respondents are asked to make a sequence of eight choice sets, which is only a segment of the full factorial array of possible combination of the attributes.

The financial burden has been selected to vary between the levels of AU $10, $20, $30 and $50. The six choice sets that have been included focus on this attribute to explore the consideration of the respondent to the part-whole areas. In addition, it will allow us to explore what was identified in the follow up questions.

The “hectares with ecosystem resilience” attribute has a direct relation to the amount of payment chosen, since more payment can fund conservation in more hectares. The other two attributes do not have that direct positive relation. For example, more payment would not necessarily imply that more benefits for indigenous people or more carbon sequestration is received. The maximum WTP would be more important to explore, analysing the answers of the participants on the trade-offs in the alternative they prefer within each choice set.

2.5. Sample size and Survey administration

The choice experiment forms the key part of a survey of young Australians, as it explores their preferences about non-use values, ecosystem resilience, risk attitudes, environmental attitudes and management, and personal and family circumstances. To maximise opportunities for young adult university students to participate in the research the survey is administered (i) online with access to the survey anonymously with a link through Qualtrics, answering the email of interest to participate in the study from the permanent residents and citizens of La Trobe University and Sydney University, and (ii) offers an incentive by inviting participants to enter into a draw for a possible reward of one of 6 vouchers of AU$50 at a local supermarket if located in Melbourne or for one of 30 lunch vouchers for AU$10 in the case of respondents from The University of Sydney.

The survey administration faced the difficulty that at the beginning, the fliers did not get the attention of many participants. Then, in Melbourne, we had to personally invite participants to different events, where gathered students provided their emails so that we were able to invite them to participate. As my University is based in Melbourne, it was expected that we could get more participants from Sydney. The final decision of the mode of participation – online through an email answering the flyer or from an online platform such as REDDIT- depended on the preference of the research respondents. The young adults were asked to identify whether they lived alone, as individuals or as a part of a household and if they still live with their parents during the completion of the survey, as in this case, the key decision maker in the household would be the father or mother.

As we are looking at the sustainability of the research method approach, the view of the young Australians will be taken into account in the future given the horizon of the question time. Research questionnaire took approximately 15-18 minutes and respondents who answered in less than 5 minutes were taken out from the sample, because it was considered that they have not thought thoroughly about the questions.

The sample survey size was expected to be a total of 198 students, considering the size of student popoulations of both Universities, to allow a +/- 5% sampling error (Champ, 2002). However, due to the time poor characteristic of the University students in Australia, we found that when we reached a sample size of 110, it was an equivalent number to that of previous studies in UK and Italy (Horton et al, 2003), and on this basis, we decided that the CM experiment can proceed. We acknowledge that the study is not representative of all young University Australian students.

The surveys were expected to be conducted in Australia during June 2016 from Melbourne. However, due to difficulty in recruiting participants, the survey in Melbourne began in September 2016 and finished in November 2016, while in Sydney it finished in February 2017. For this last region, we had to use the REDDIT webpage and attend the Open day on campus to arrive at the final number. Finally, the number of genuine answers that are analysed in the Results section was 95. We realize that this study is not representative of all the young Australians, although the insight gained with this research can contribute to designing a further experiment with more participants at the national scale, with adequate funding if it is required.

2.6. Estimation and the econometric model with Non-use value of ecosystem resilience included as an attribute in the survey for CE

In a choice experiment, it is assumed that the respondent will choose as a rational agent who looks to maximize her utility. She has the capacity to understand and order all the

alternatives in a choice task and choose the alternative which gives the greatest relative utility. This is different to the behavioural economics models where the revealed preferences are the main criteria to support the economic decision (Carlsson, F., 2010).

The design of the discrete choice experiment is built on the basis of a Random Utility Maximization (RUM) model, meaning a stochastic error term ε is included in the utility function to reflect the unobservable factors in the respondent's utility function (Mc. Fadden, 2000). DCE can be applied to estimate non-use values (Adamowickz et al., 1998) and expressed like this:

$$U_i = v(X_i, p_i; \beta) + \epsilon_i \qquad \text{(Eq. 5.2)}$$

U_i represents the true indirect utility associated with profile "i". This indirect utility function described here is unobservable for the researcher and an additionally separable sub-utility function that is specific to the particular non-market service under analysis: the ecosystem resilience of Amazon forest.

For example, a young Australian will choose alternative profile "i" over 'j", if $U_i (X_i, Z) > U_j (X_j, Z)$, where X_i is a vector of the attributes of the biodiversity conservation program (e.g. ecosystem resilience, carbon sequestration, benefit to indigenous people) to maintain ecosystem resilience in the forest. Similarly, X_j represents the attributes of alternative profile "j". And, Z represents the personal (e.g. socio-demographic and attitudinal) that influences the young adult's utility.

Choice behaviour is assumed to be deterministic from the perspective of the individual, but stochastic for the researcher (Holmes et al., 2003). In Eq. 5.2, pi is the cost of alternative profile "i" and in Eq. 5.3, $-\beta_p$ is the parameter on profile cost interpreted as the marginal cost of money. β is a vector of preference parameters –influenced by Z- and β_k is the preference parameter associated with attribute k. ϵ_i is an error term with zero mean. This term reflects the researcher's uncertainty about the choice. In Eq. 5.3, we assume that utility is linear in parameters for a profile "i" with K attributes:

$$U_i = \sum k=1K \ \beta_k X_{ik} + \beta_p p_i + \epsilon_i \qquad \text{(Eq. 5.3)}$$

By differentiating equation Eq. 5.3, it can be seen that βks represent marginal utilities δU/δXk and an increase in pi, profile cost (price for the individual) decreases their disposable income. The implicit price of attribute K is estimated as the ratio βk/βp = (δU/δXk) / (δU/δpi)

In this experimental design we do not include interactions between attributes of a profile alternative, because we are addressing the complexity of ecosystem resilience with simple measurement units and reduced the K attributes to 3. (De Shenzo, 2002)

Following is the example of the young Australian; the probability that she will choose alternative “i” from a choice set (domain: S) containing competing alternatives can be expressed as in equation Eq. 5.4:

$$P(i \mid S) = P(U_i > U_j) = P(v_i + \epsilon_i > v_j + \epsilon_j), \forall\, i \in S \qquad \text{(Eq. 5.4)}$$

$$P(i \mid S) = P(v_i - v_j > \epsilon_j - \epsilon_i), \forall\, i \in S \qquad \text{(Eq. 5.5)}$$

$$P(i \mid S) = \exp(u\, v_i) / \sum i \epsilon S \ \exp(u\, v_i) \qquad \text{(Eq. 5.6)}$$

$$P(i \mid S) = \sum k=1K \exp(\beta_k X_{ik} + \beta_p p_i) / \sum i \epsilon S \ \exp(\beta_k X_{ik} + \beta_p p_i) \qquad \text{(Eq. 5.7)}$$

If we let N represent the sample size and define

Yin = 1 if respondent n choose profile “i”

0 otherwise

Then, the likelihood function for the Multinomial Logit (MNL) model (McFadden, 1974) will be:

$$L = \Pi n=1N \Pi\, i \epsilon S \ Pn(i) Yin\ k \qquad \text{(Eq. 5.8)}$$

Substituting Eq. 5.7 into Eq. 5.8 and taking the natural logarithm, the MNL model is estimated with maximum likelihood function by finding the values of the βs that maximize the log-likelihood function,

$$\ln L = \sum \Pi_n=1N \Pi_i \epsilon S \ Yin \left(\sum k=1K \ \beta_k X_{ik} + \beta_p p_i - \ln \sum i \epsilon S \left(\sum k=1K \ \beta_k X_{ikn} + \beta_p p_{in}\right)\right) \qquad \text{(Eq. 5.9)}$$

Maximum likelihood estimation yields only the response probabilities at a number of discrete points, and a rule is needed for interpolating between these points in order to calculate mean and median WTP.

Estimations and Hypothesis to test

The above DCE description includes the suggestion of Sen (1993) that the options in the utility function should be able to be chosen. Initially, two hypotheses were going to be tested about socioeconomic characteristics related to the choices to change the status quo of investment in biodiversity conservation. It is interesting to differentiate between the respondents, those whose families have the lowest income according to Centrelink and evaluate if they are fulfilling their basic ? and comparing them with those who have a higher income. We will analyse the relationship of the group of individuals of the household, whether the student lives alone or still with her parents to define whether they are able to choose for biodiversity conservation in a remote location in the Amazon or not.

In addition, a third hypothesis is investigated; whether the introduction of the NICS has an effect of WTP estimates in comparison to the use of a classic ICS or not. The novelty of this CM experiment is that we link the non-use valuation of resilience of the old-growth forest with the knowledge and understanding of the use value of the same old-growth forest. The explanation of this relationship could be made by different ways. We chose the textual way, although new ICS that involve virtual reality could also have been used (Louviere et al., 2015). Nevertheless, we believe that there is a significant difference in the choice of alternatives regarding the ecosystem resilience or biodiversity conservation for those who have experienced a visit to the Amazon. We are sure that nothing substitutes the experience of being personally in the Amazon, to get more preference for the non-use values provided from there. This hypothesis can be tested for other studies that can incorporate video, digital data or virtual reality. It is commonly used in everyday life by the cohort of students from which our sample is drawn.

When analysing young Australian individuals' decision making in relation to their preferences about biodiversity conservation programs, two attribute segments are relevant: (i) the conservation programme characteristics associated with different levels of ecosystem resilience which are captured as attributes in the choices and (ii) respondent-specific factors, including personal characteristics such as individual or household accommodation, part-time job, income or knowledge about the tropical forest (Horton et al., 2003). Respondent-specific attributes are not reflected in the choice experiment but captured directly or indirectly in the remainder of the survey. Personal characteristics of respondents that are expected to be relevant to explaining young Australians' propensity to engage in biodiversity conservation include, e.g., income of respondent, knowledge about tropical conservation, participation in environmental or indigenous organisations, having visited the tropical forest area, political party with which she sympathises, risk perceptions, motivations and attitudes.

Respondent-specific parameters will be included in the CE model specification so that their influence on likely participation in contractual biodiversity conservation can be quantified. This will allow us to test the hypothesis that maximum WTP for public investment in biodiversity conservation overseas is positively correlated with the capacity of the ecosystem services provision outcomes to be monitored by the investor countries.

2.7. The results.

We finished the survey collection on February 4th of 2017. We obtained 111 completed surveys. Then, we applied three filters (one of metadata and two qualitative filters about socioeconomic characteristics) in order to be left only the genuine answers. We did not consider the surveys that were filled in less than 5 minutes and we also omitted the surveys

that did not answer their gender or their age. After that, we reduced our number of answers to 95, 60 surveys answered in Melbourne and 35 in Sydney.

2.7.1. Socioeconomic characteristics of the respondents.

- **95 young students** from La Trobe University (60) and Sydney University (35). With 8 choice sets presented with 3 alternatives, then **2280 observations obtained.**
- It does not pretend to be representative of all young Australians.
- 60 of the respondents were female and 35 male.
- Questionnaire completed online with Qualtrics. Information about the biology of Brazil nuts provided. Incentive to participate: draw for a grocery voucher and lunch voucher.
- Average length of questionnaire per student: 15 minutes
- 49% have participated as volunteers in NGOs, political parties or religious groups. Especially, with respect to support biodiversity conservation,it is clear that there has been a **self-selection bias** amongst the ones who decided to answer and complete the survey online.

The socioeconomic characteristics of the resulting sample are summarized in Tables 2 to 11. Table 2 shows that almost one third of the respondents were born overseas, one third in Victoria and the other third in the other Australian states (20% in NSW).

Table 3 shows that 63% of the total respondents were female. Table 4 shows that approximately one third of the respondents were under 23 years old of age, other third were between 23 and 30 years old and other third, older than 30 years.

Table 5 shows the active participation of young people as volunteers including NGOs, political parties and religious groups and clearly shows a self-selection bias among respondents It is very difficult to get an answer from somebody not interested in climate change, biodiversity conservation or indigenous people to answer a survey of this kind. In addition, in our experience in the face to face pilot study, we found that all the people that were not interested in the topic did not stop even a minute to try to begin to answer the survey.

Table 6 shows that 25% of the respondents were unemployed, which was expected of full time students. However, as is also common in Australia, the majority of students participate in the labour force as part-time (40%) or casual (22%) workers.

Table 7 shows that among the ones who receive a weekly payment during last year, the mode range is AUS$200 to AU$299, with approximately 80% receiving less than AU$ 799 per week and 90% receiving less than AU$ 1249 per week.

Tables 8 and 9 show that more than 80% of the students interviewed in both cities live with 2 or more adults. This is the common case in Australia of sharing accommodation with other students. In addition, it is interesting to see that more than 50% do not live with teenagers, children or babies in their households. Tables 10 and 11 shows the highest level of the respondents. In both cities, more than 60% of the respondents are in the undergraduate level. Being in Melbourne, a significative number of answers were from first year students. In addition to the tables with socioeconomic characteristics summarized here, all the other tables and graphs with the Sydney and Melbourne answers, ordered by category of questions results are presented in the Appendixes 4.5 and 4.6, respectively.

Table 2. Birth place origin of all respondents. Total and relative frequency (%)

Birth place	Melbourne	Sydney	Total	r.f.(%)
Australian Capital Territory	2	1	3	3.15
New South Wales	2	17	19	20.00
Northern Territory	0	0	0	0.00
Queensland	1	2	3	3.15
South Australia	1	1	2	2.10
Tasmania	0	0	0	0.00
Victoria	31	0	31	32.63
Western Australia	1	1	2	2.10
Overseas	22	13	34	35.78
Total	60	35	95	

Table 3. Gender of all respondents. Total and relative frequency (%)

Gender	Melbourne	Sydney	Total	r.f.(%)
Male	23	13	36	37.89
Female	37	22	59	62.10
Total	60	36	95	

Table 4. Age of all respondents. Total and relative and accumulated frequencies (%)

Age	Melbourne	Sydney	Total	r.f.(%)	a.r.f.(%)
18 years old	1	0	1	1.05	1.05
19 years old	4	4	8	8.42	9.47
20 years old	6	3	9	9.47	18.94
21 years old	3	4	7	7.36	26.31
22 years old	4	5	9	9.47	35.78
23 to 30 years old	17	12	29	30.52	66.31
31 to 50 years old	25	7	32	33.68	100.00
Total	60	35	95		

Table 5. Participation as volunteers. Total and relative frequencies (%)

Answer	Melbourne	Sydney	Total	r.f.(%)
Political party	3	3	6	6.31
NGO that protects indigenous people rights	0	1	10	10.52
NGO that protects biodiversity conservation	6	8	14	14.73
NGO that stands for action in climate change	6	5	11	11.57
Religious group	13	2	15	15.78
Other:	39	21	60	63.15
Total	60	35	95	

Table 6. Participation in the work force. Total and relative frequencies (%)

Answer	Melbourne	Sydney	Total	r.f. (%)
Employed part-time (1-8 hours per week)	8	3	11	11.57
Employed part-time (9-16 hours per week)	5	2	7	7.36
Employed part-time (17-24 hours per week)	3	6	9	9.47
Employed part-time (25-30 hours per week)	7	3	10	10.52
Employed full time	8	3	11	11.57
Employed casual	14	7	21	22.10
Unemployed	14	10	24	25.26

Unable to work due to sickness or disability	1	1	2	2.10
Total	60	35	95	

Table 7. Salary level per week of respondents. Total and relative frequencies (%)

Answer	Melbourne	Sydney	Total	r.f. (%)	a.r.f.(%)
Nil income	10	6	16	16.84	16.84
AU$ 1 to AU$199	6	5	11	11.57	28.42
AU$200 to AU$299	5	11	16	16.84	45.26
AU$300 to AU$399	6	3	9	9.47	54.73
AU$400 to AU$599	9	5	14	14.73	69.47
AU$600 to AU$799	8	2	10	10.52	80.00
AU$800 to AU$999	4	0	4	4.21	84.21
AU$1000 to AU$1249	6	1	7	7.36	91.57
AU$1250 to AU$1499	0	1	1	1.05	92.62
AU$1500 to AU$1999	3	0	3	3.15	95.77
AU$2000 to AU$2499	1	0	1	1.05	96.82
AU$2500 or more	2	1	3	3.15	100.0
Total	60	35	95		

Table 8. Number of people living in the household of Sydney respondents. Total and relative frequencies (%)

Sydney (Total=35)	Below 5 years old	r.f. (%)	Between 5 and 16 years old	r.f. (%)	Over 16 years old	r.f. (%)
0	19	66.51	21	77.77	1	2.94
1	6	20.68	5	18.51	3	8.82
2	1	3.44	0	0.00	13	38.23
3	1	3.44	1	3.70	7	20.58
4 or more	2	6.89	0	0.00	10	29.41
Total	29	100.00	27	100.00	34	100.00

Table 9. Number of people living in the household of Melbourne respondents. Total and relative frequencies (%)

Melbourne (Total= 60)	Below 5 years old	r.f. (%)	Between 5 and 16 years old	r.f. (%)	Over 16 years old	r.f. (%)
0	33	86.84	31	70.45	2	3.12
1	3	7.89	5	11.36	9	14.06
2	1	2.63	3	6.81	24	37.50
3	1	2.63	2	4.54	10	15.62
4 or more	0	0.00	3	6.81	19	29.68
Total	38	100.00	44	100.00	64	100.00

Table 10. Highest level of education of Sydney respondents. Total and relative frequencies (%)

Sydney (Total=35)	Undergraduate	r.f.(%)	Honors or Masters	r.f.(%)	PhD	r.f.(%)
First year	1	4.16	3	30.00	1	16.66
Second year	7	29.16	3	30.00	1	16.66
Third year	7	29.16	1	10.00	4	66.66
Fourth or more years	9	37.50	3	30.00	0	0.00
Total	24	100.00	10	100.00	6	100.00

Table 11. Highest level of education of Melbourne respondents. Total and relative frequencies (%)

Melbourne (Total =60)	Undergraduate	r.f.(%)	Honors or Masters	r.f.(%)	PhD	r.f.(%)
First year	13	3.51	6	33.33	3	12.50
Second year	9	24.32	7	38.88	8	33.33
Third year	7	18.91	0	0.00	4	16.66
Fourth or more years	8	21.62	5	27.77	9	37.50
Total	37	100.00	18	100.00	24	100.00

2.7.2. Environmental Awareness of the respondents.

Table 12 shows survey respondent index for environmental awareness, built over the sum of dummy variables (1 if the respondent mildly or strongly agrees that biodiversity loss and environmental concerns are more important than other social problems, 0 otherwise). According to this index, the lowest values is 0, if the respondent has not agreed mildly or strongly about this level of importance, 8 if the respondent has agreed that all the problems are of such importance. As can be seen, 53% is the accumulated relative frequency of all the respondents that have 3 or less as an environmental awareness index.

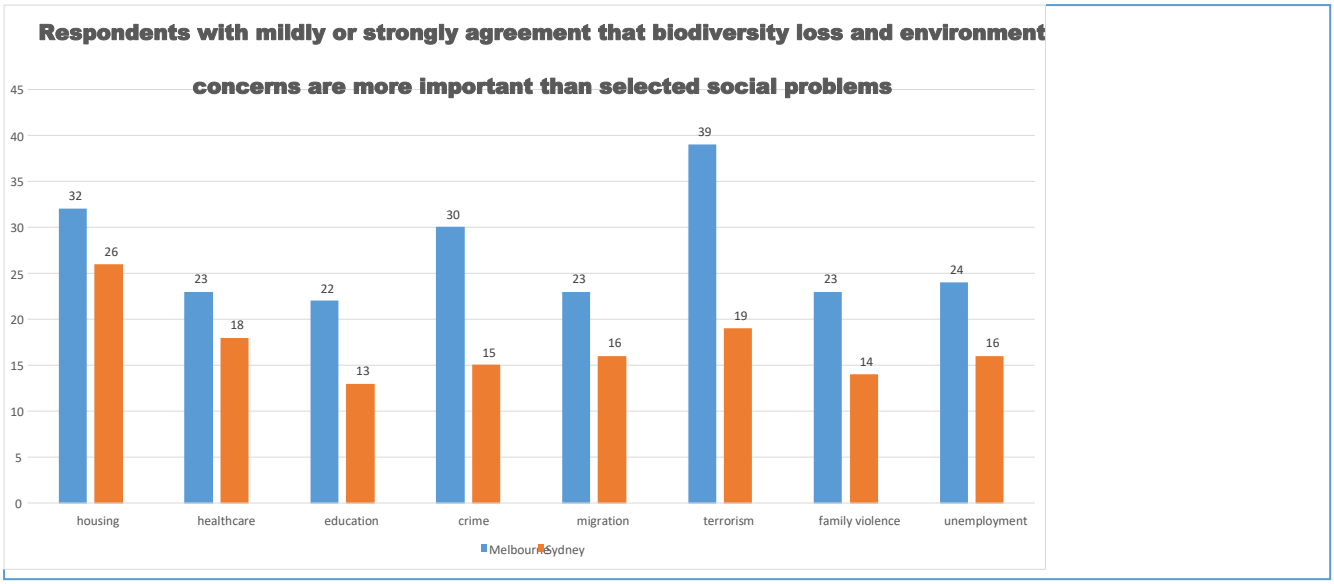
This result was less than we would have expected, since we were aware that the people who decided to take the time to answer a questionnaire like this, would be biased towards great environmental awareness. However, the results presented in this table shows us that the answers are genuine and such overemphasis of the respondents of the survey does not exist. The mean of this index is 3.71, with a 95% confidence interval that the true population mean is between 3.19 and 4.24.

Table 12. Environmental index for total of respondents. Relative and Accumulated relative frequencies (%)

Environ	r.f.(%)	a.r.f.(%)
0	11.58	11.58
1	9.47	21.05
2	17.89	38.95
3	14.74	53.68
4	10.53	64.21
5	7.37	71.58
6	8.42	80
7	7.37	87.37
8	12.63	100

It is worthwhile to note that this environmental awareness index was increased when social problems of terrorism and housing were listed and was not increased when education or family violence were asked. The graph in Figure 1, where is extended each of the eight components of the index for each of the cities is shown next.

Figure 1

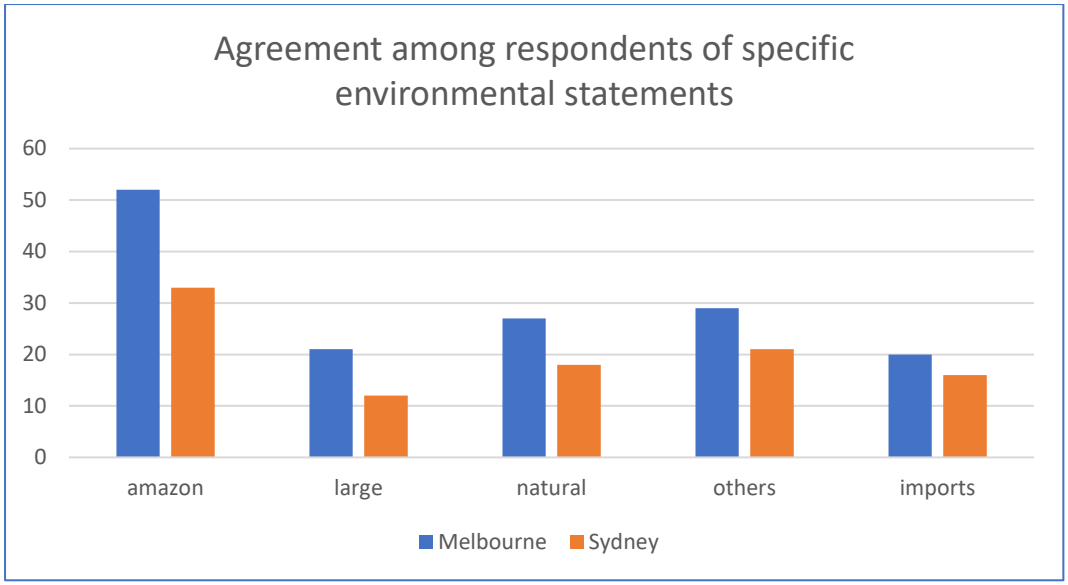


Own elaboration

Figure 2 provides data on the two cities where the survey was completed regarding debated topics about investment in biodiversity conservation and opinion on supporting policies that aim to include ecosystem services in the accounting of the production of the country. The strongest agreement in both cities is in response to the need to use money now to protect the Amazon for the future. However, in second place appears that response that Australia should pay to invest those funds after other developed countries do the same.

The argument that Australia was not economically competitive if they are the first to accept the “carbon tax” was the reason for the current Federal government to eliminate it. Alternatively, the topic that generated less agreement is the one about large trees and small trees. Scientifically, it has been demonstrated that large trees provide multiply larger ecological benefits than small trees (Lindenberg, 2015), especially the millennial tree of Brazil nuts. However, at the beginning of the survey the majority of the respondents were not aware of this fact.

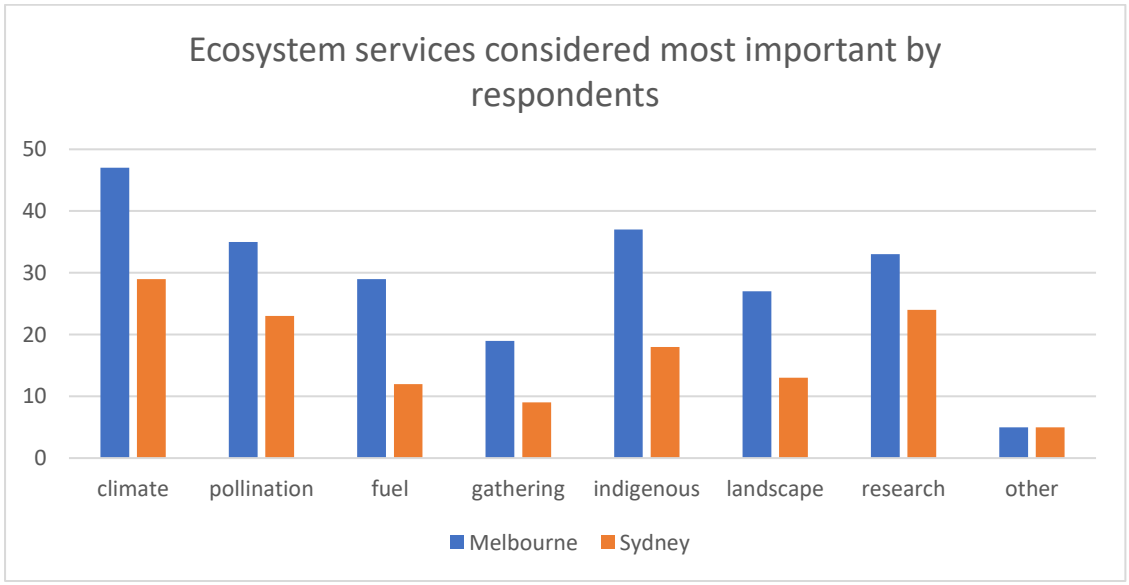
Figure 2



Own elaboration

The graph in Figure 3 extends the investigation into the environmental awareness of the respondents, asking them which of the seven ecosystem services presented in the list, they considered to be most important. The global service of maintaining the climate adequately for human beings appear as the most important. Then, appears ecosystem services that provide indirect benefits to human being through pollination and use of nature to research. Interestingly, it appears that use of nature by indigenous people was given high importance. In contrast, least importance was given to the gathering of nuts, fish and fruits (Kalliola et al., 2011). Interestingly, these activities are the ones that provide the food security for the indigenous people that live in the Amazon.

Figure 3



Own elaboration

Table 13 shows respondents' preferences about distributing the Australian public budget of investment in biodiversity conservation, if they could decide. Interestingly, the Amazon appears in the first place in both cities, followed by the traditional main recipients of international aid from Australia (Department of Foreign Affairs, 2015). Although, the differences between biodiversity conservation outcomes achievable can be substantial between one region and the other, the responsibility for the neighbour appears as a cause of preference.

Table 13. Relative frequency (%) of distribution of public budget on investment in biodiversity conservation overseas, by city of the University.

Regions	**Sydney**	**Melbourne**
Amazon	24.71	23.84
Papua New Guinea, Solomon Islands, Vanuatu and Fiji	19.44	19.37
North Africa and Middle East	12.57	11.92
Indonesia	10.09	13.52
Other South East Asia	12.34	10.55
Other Pacific Islands	11.10	10.55
Other areas outside the Amazon in the Latin American and Caribbean countries	10.30	11.45
Total	100.00	100.00

2.7.3. Knowledge of the respondents about the use values of Brazil nuts

The graph in figure 4 shows that only a quarter of the respondents know about the harvest quality of the Brazil nuts. This is very important because when they go to the nut retail store, they are not aware of the benefits to the environment that they are generating if they buy Brazil nuts harvested in Peru. There is a very high percentage who would support the initiative that providing more information to the market is needed. This provision of information should be effective about the important environmental attributes in the food the people eat. In the answer of Q11 in Appendixes 5 and 6, it is shown that the majority, especially in Melbourne has extracted their knowledge and understanding from TV and reading newspaper articles.

Figure 4. Do you know that Brazil nuts are harvested from wild Peruvian tropical rainforests?

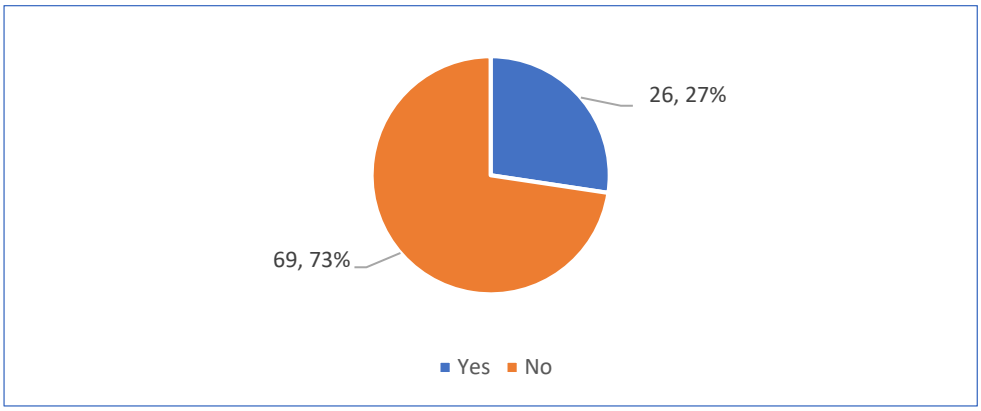
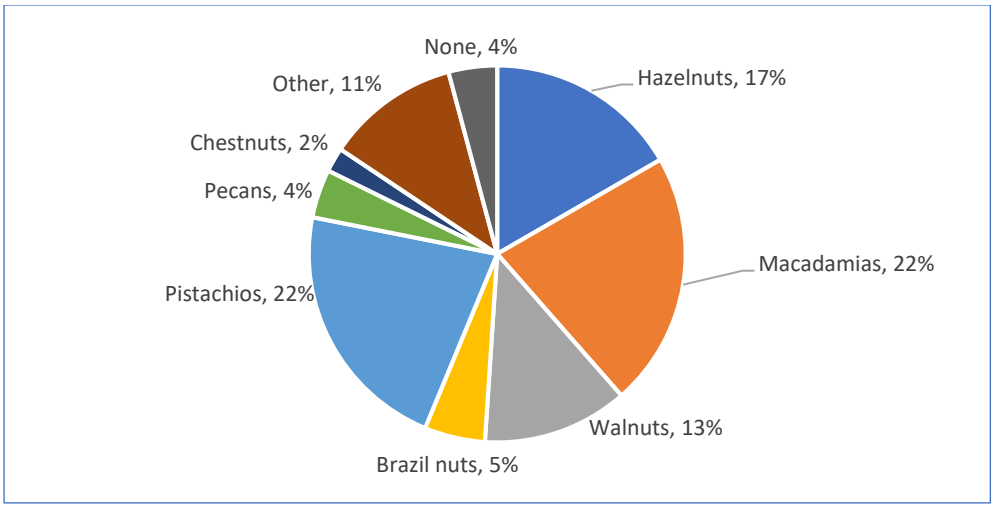


Figure 5. Which is your most preferred nut?



Furthermore, the graph in Figure 5 shows that there are many substitutes for the use value of Brazil nut as food in Australia. Macadamias, Pistachios, Hazelnuts and Walnuts are clearly preferred over Brazil nuts as the first option for the respondents. Other notable results is the less than 1 kilo per year of nuts consumption in both cities presented in the Q8 of Appendix 5.5 and 5.6. Finally, the importance of the knowledge of the origin of the nuts in the Appendix for Brazil nuts Q9, for Sydney and Melbourne becomes evident. Respondents know the origin of Macadamia, since it is a native species from Australia. There is little knowledge about the other nuts; that they grow in orchards and live only 30 years productive process, which is insignificant compared with the 1000 years that the Brazil nuts can live. The decision making process about nuts, with the inclusion of non-use values would be very different if the knowledge about the origin of the product was clearer.

Finally, after establishing the knowledge about the use value of Brazil nuts as food and its substitution characteristics, we applied questions Q12 and Q13 (See Appendixes 5 and 6) to

assess the option non-use value of the respondents. Interestingly, 80% in Sydney and 91% in Melbourne have never been to the Amazon. This means the understanding of the non-use values can be understood only by their knowledge of biology, environment and climate change or by the awareness that they could obtain from the TV and newspapers. This brings us to the issue or reliability of information, as in the scientific debate, the agreement of climate change is greater than 90%, but in the media, it is only 50%. It was addressed by other studies (CSIRO, 2014).

When we explore the potential appeal to the respondents of travelling to the Amazon, the respondents identified an interest in visiting Brazil, followed by Peru and Colombia Therefore, we can say that this option value is a component of the non-use value choices that will be elicited in the next section. Before that, in Table 14, 15 and 16, we have applied the typical questions of WTP, considering the general definition of benefits for the respondents after knowing that the Brazil nuts are harvested in the wild. The human nature of unwillingness to pay more for goods is contrasted with the interest in contributing to a significant global cause. Although, Brazil nuts have many substitutes for their use values, almost 70% would think to buy more next time, now that they know that this local action contributes to saving the Amazon and providing multiple ecosystem services. This contribution, which is different to the decision taken in the choice experiment in the next section, shows the capacity for trading off goods with use values for goods with many substitutes due to the existence of non-use values with no substitutes. This is a research area that needs further development in the future; how to build a sustainable food chain architecture in goods that can internalize the market failure to acknowledge the existence of public goods (Flores, 2017).

Table 15 shows more detail about the WTP where knowing that the harvest in the wild is gathered by indigenous people, would result in 91% of the respondents being willing to pay more. This result will be extended in the next section. Finally, Table 16 shows the magnitude of that WTP. Considering a retail price of AUS$ 20 per kilo of Brazil nuts, 36.6% of all respondents would be motivated to pay an increase of AUS$ 4.1 or more per extra kilo. This represents more than 20% of the retail price. In addition, 54.9% of all respondents would pay 5% to 20% extra per kilo.

Table 14. Accumulated and Relative frequency (%) of the willingness to buy more Brazil nuts after knowing that it is harvested in the wild in the Amazon

Total	a.f	r.f.(%)
Yes	27	28.4%

Maybe	39	41.0%
No	29	30.5%
Total	95	100%

Table 15. Would you pay more for the Brazil nuts if you know they were harvested by Amazon indigenous people?

Total	a.f	r.f.(%)
Yes	40	61%
Maybe	20	30%
No	6	9%
Total	66	100%

Table 16. How much more would you pay for the nuts if you know that the current retail price per kilo is AUS$ 20?

Maximum WTP addition to the price per-kilo	a.f.	r.f.(%)
Less than AU$ 1	6	10.0.%
Between AU$1 until AU$2	12	20.0%
Between AU$ 2.1 until AU$3	13	21.6%
Between AUS3.1 until AU$4	8	13.3%
Between AUS$4.1 and AU$5	13	21.6%
More than AU$ 5	9	15.0%
Unsure	12	20.0%
Total	60	100%

The results presented in the last section shown that the respondents are motivated to contribute to the maintenance of resilience of old-growth forest in the Peruvian where Brazil nuts are harvested. Their WTP is expressed in a private manner. After having received the information about the most important ecosystem services provided by the Brazil nut harvest in the wild, they were willing to to contribute by both buying higher quantities and/or paying a higher price.

If this study is replicated for all Australia and other developed countries, especially USA, the main importer of Brazil nuts would support the need to provide extra information to the market. Unlike the issue of GMO in food that producers insist does not have negative implications, the Brazil nuts provide multiple benefits of global importance. It could be an interesting research area that the products that impose a risk in the environment should fund the provision of information to the market of these environmentally friendly commodities.

Next, we are going to present the results of the choice modelling section of the study. This section focuses on the non-use values and the preference for young tax payers to fund a public investment in biodiversity conservation.

2.7.4. Preferences of the respondents about the non-use values of Brazil nuts

From Tables 17 to 20 we show the first results related to the choices of the respondents with respect to the four attributes selected for a hypothetical biodiversity conservation program. In Table 17, among the alternatives chosen, 60.1% of the respondents chose 50,000 hectares as the area preferred to maintain the resilience in the old-growth forest. In Table 18, with respect to the cost, 49.3% chose as maximum WTP, AU$ 10 per year collected as carbon tax. When the option to benefit 100 indigenous families was presented 52.9% elected that alternative. Finally, with respect to the carbon sequestration, 53.08% chose the highest alternative of carbon sequestration of 110 Mg per hectare.

These results show an interest in obtaining the highest level of carbon sequestration at the lowest cost. The indigenous variable increases the desire to fund the expected benefit of the program and the number of hectares of resilient forest mainly chooses the lowest land space. This mean a major interest is their own benefit in negating impacts of climate change. Then, in second place the benefits to other human beings, the indigenous people and finally, the benefits as habitat for flora and fauna.

If we could extend these results to be representative of young Australians, Peru as a provider of ecosystem services could focus its marketing campaign as provider of ecosystem services from the Amazon in the long term in the case of Australia, marketing of the campaign would focus on the benefits on carbon sequestration in first place, secondly, the benefits to indigenous people and then the number of species benefited. Since the public funds are scarce, priorization should be applied to this campaign, improving the monitoring of carbon sequestration in the first place, empowering the participation and income of indigenous people and finally, surveillance of the threats that are affecting the habitat of flora and fauna of different species.

In the case of Australia, the importance of accounting for the investment and highlighting the benefits in the order preferred by the young people, can generate a better reception of mechanisms such as “carbon tax”. Interestingly, if the results of this study could be extended to all Australian young students, it will be a measure that this young generation, educated and in the future assuming the leadership positions will be more interested in adopting the funding of investment in biodiversity conservation than is the current generation, that could not support the implementation of a carbon tax. Although, it is because the the monetary cost of carbon tax using carbon sequestration with artificial methods was not “sellable” among tax-payers, natural carbon sequestration shows possibilities among the young Australians. The change will be sooner if they can achieve an increase in their participation in elections with a lowering of voting age

Table 17. Total results of attribute “resilience” by choice

```
. tabulate choice resilience, chi2 col
```

Key
frequency *column percentage*

choice	resilience				Total
	0	50	200	300	
0	687	189	345	297	1,518
	90.51	39.87	60.63	62.53	66.67
1	72	285	224	178	759
	9.49	60.13	39.37	37.47	33.33
Total	759	474	569	475	2,277
	100.00	100.00	100.00	100.00	100.00

Pearson chi2(3) = 360.3453 Pr = 0.000

Table 18. Total results of attribute “cost” by choice

```
. tabulate choice cost, chi2 col
```

Key
frequency *column percentage*

choice	cost			Total
	0	10	30	40	
0	687	180	365	286	1,518
	90.51	50.70	52.98	60.34	66.67
1	72	175	324	188	759
	9.49	49.30	47.02	39.66	33.33
Total	759	355	689	474	2,277
	100.00	100.00	100.00	100.00	100.00

Pearson chi2(3) = 301.6034 Pr = 0.000

Table 19. Total results of attribute “indigenous” by choice

```
. tabulate choice indigenous, chi2 col
```

Key
frequency *column percentage*

choice	indigenous 0	100	Total
0	1,117	401	1,518
	78.44	47.01	66.67
1	307	452	759
	21.56	52.99	33.33
Total	1,424	853	2,277
	100.00	100.00	100.00

Pearson chi2(1) = 237.1428 Pr = 0.000

Table 20. Total results of attribute “carbon” by choice

```
. tabulate choice carbon, chi2 col
```

Key
frequency *column percentage*

choice	carbon 0	10	70	110	Total
0	687	263	362	206	1,518
	90.51	69.21	51.79	46.92	66.67
1	72	117	337	233	759
	9.49	30.79	48.21	53.08	33.33
Total	759	380	699	439	2,277
	100.00	100.00	100.00	100.00	100.00

Pearson chi2(3) = 341.9658 Pr = 0.000

After this initial assessment, we will analyse different models built with the answers obtained. Frist, we will begin with a basic model with alternative specific regressors. Then, we will be adding more regressors per each of the three groups of case specific regressors. Table 21 presents the results of the basic Multinomial Logit Model. This Model 1 has as a dependent variable, the choice of the program selected from 3 options, each one of those has four specific attributes variables. It shows that the regressors are jointly significant at 0.05 level.

The model fit is not poor with pseudo-R^2 equal to 0.1159. In addition, Table 21 shows how the marginal utility of choosing the attribute of carbon sequestration is more significant than resilience of habitat of flora and fauna or benefits for indigenous people. The three variables appear significant for the level 1 of choices of funded program in the unlabelled experiment. In the Appendix 4 we show the output of the linearized standard errors. That change does not affect the level of significance of each of the coefficients. Interestingly, the higher the forseen cost, the less that choice is preferred.

Table 21. Model 1 of Choice with 4 specific-attributes for an hypothetical program

```
. mlogit choice resilience indigenous carbon cost, vce(cluster id)

Iteration 0:   log pseudolikelihood = -1449.3428
Iteration 1:   log pseudolikelihood =  -1284.879
Iteration 2:   log pseudolikelihood = -1281.3789
Iteration 3:   log pseudolikelihood = -1281.3674
Iteration 4:   log pseudolikelihood = -1281.3674

Multinomial logistic regression                 Number of obs     =      2,277
                                                Wald chi2(4)      =      79.16
                                                Prob > chi2       =     0.0000
Log pseudolikelihood = -1281.3674               Pseudo R2         =     0.1159

                                  (Std. Err. adjusted for 95 clusters in id)
------------------------------------------------------------------------------
             |               Robust
      choice |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
0            |  (base outcome)
-------------+----------------------------------------------------------------
1            |
  resilience |   .0022048   .0008565     2.57   0.010     .0005261    .0038836
  indigenous |   .0083793    .002114     3.96   0.000      .004236    .0125226
      carbon |   .0113959   .0018776     6.07   0.000     .0077158    .0150759
        cost |   -.004745    .005894    -0.81   0.421    -.0162971    .0068071
       _cons |  -1.813068   .1623745   -11.17   0.000    -2.131317    -1.49482
------------------------------------------------------------------------------
```

Table 22 shows the model 2, which extends the four alternative specific regressors with case specific regressors of the group of socioeconomic variables. These new variables do not contribute to a greater level of significance of the model. However, when the standard errors are linearized, then the variable “city” appears as significant (See Model 2 with robust standard errors in Appendix 4). The sign negative of 1.80 with a level of significance of 0.076 reflects that the Melbourne respondents are less prone to choose one alternative different to the status quo. Therefore, where the Sydney students of the sample show a willingness to contribute to a change of the status quo, it could be anticipated when we review the answers in section 2.7.3 that Sydney respondents have travelled to the Amazon in a bigger proportion than have the Melbourne ones. There is nothing that compares to the benefit of being ‘on the ground’ for raising awareness of the environment problem.

Table 5.22. Model 2 of Choice with case (socio-economic characteristics) and alternative specific regressors

```
. svy linearized : mlogit choice resilience indigenous carbon cost age gender city birth income happiness
(running mlogit on estimation sample)

Survey: Multinomial logistic regression

Number of strata   =         1                 Number of obs     =      2,277
Number of PSUs     =        95                 Population size   =      2,277
                                               Design df         =         94
                                               F(  10,     85)   =     157.07
                                               Prob > F          =     0.0000
```

choice	Linearized Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
0	(base outcome)					
1						
resilience	.0021884	.0008615	2.54	0.013	.000478	.0038989
indigenous	.0083503	.0021185	3.94	0.000	.0041441	.0125566
carbon	.0114036	.0018775	6.07	0.000	.0076757	.0151315
cost	-.004575	.0059815	-0.76	0.446	-.0164513	.0073013
age	-.0007602	.0007418	-1.02	0.308	-.002233	.0007127
gender	.0010494	.0010553	0.99	0.323	-.0010459	.0031448
city	-.0268881	.0149728	-1.80	0.076	-.0566169	.0028407
birth	.0001425	.0001504	0.95	0.346	-.000156	.0004411
income	.0003381	.0003307	1.02	0.309	-.0003185	.0009948
happiness	-.0000952	.0001339	-0.71	0.479	-.000361	.0001705
_cons	-1.794901	.1591138	-11.28	0.000	-2.110825	-1.478977

With respect to the variables about their environmental knowledge and preferences about biodiversity conservation, it is shown in Table 23, the Model 3 with city and all the others collected variables shown in the Appendix 5.4, only the linearized standard error version shows the variable “climate” as the more significative, but with a level of significance of more than 20%. Interestingly, the recognition that the maintenance of appropriate levels of weather temperature is considered the most critical ecosystem service provided from the Amazon in general. Those who have this understanding, are more motivated to choose an option different to the status quo.

Table 23. Model 3 of Choice with case (environmental awareness), “city” and alternative specific regressors

```
. svy linearized : mlogit choice resilience indigenous carbon cost city environ amazon large natural import others climate pollination fuel gathering indigenous2 landscape resear
> ch other
(running mlogit on estimation sample)

Survey: Multinomial logistic regression

Number of strata   =         1                  Number of obs     =      2,277
Number of PSUs     =        95                  Population size   =      2,277
                                                Design df         =         94
                                                F(  19,     76)   =      42.53
                                                Prob > F          =     0.0000
```

choice	Linearized Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
0	(base outcome)					
1						
resilience	.0021884	.0008615	2.54	0.013	.0004779	.0038989
indigenous	.0083504	.0021185	3.94	0.000	.0041441	.0125567
carbon	.0114036	.0018775	6.07	0.000	.0076757	.0151315
cost	-.0045748	.0059814	-0.76	0.446	-.0164511	.0073015
city	-.0264811	.0150541	-1.76	0.082	-.0563714	.0034092
environ	.0001179	.0001384	0.85	0.396	-.0001569	.0003927
amazon	.0017748	.0016472	1.08	0.284	-.0014958	.0050454
large	.0004972	.0006562	0.76	0.451	-.0008057	.0018001
natural	.0010617	.0010055	1.06	0.294	-.0009348	.0030582
imports	.0002164	.0004312	0.50	0.617	-.0006397	.0010725
others	.0013834	.0012707	1.09	0.279	-.0011396	.0039064
climate	-.0033452	.002996	-1.12	0.267	-.0092937	.0026034
pollination	.0015464	.0014353	1.08	0.284	-.0013035	.0043963
fuel	.0006754	.0007839	0.86	0.391	-.0008812	.0022319
gathering	.0008665	.0009611	0.90	0.370	-.0010419	.0027748
indigenous2	.000399	.0005413	0.74	0.463	-.0006757	.0014737
landscape	.0009922	.0009466	1.05	0.297	-.0008873	.0028718
research	-.0016886	.0015438	-1.09	0.277	-.0047537	.0013766
other	-.000657	.0008132	-0.81	0.421	-.0022716	.0009576
_cons	-1.798883	.1596632	-11.27	0.000	-2.115898	-1.481868

Table 24. Model 4 of Choice with case (“use value” knowledge), “city”, “climate” and alternative specific regressors

```
. svy linearized : mlogit choice resilience indigenous carbon cost city climate wild visited option buy pay_ind pay_more20
(running mlogit on estimation sample)

Survey: Multinomial logistic regression

Number of strata   =         1                  Number of obs     =      2,277
Number of PSUs     =        95                  Population size   =      2,277
                                                Design df         =         94
                                                F(  12,     83)   =      93.81
                                                Prob > F          =     0.0000
```

choice	Linearized Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
0	(base outcome)					
1						
resilience	.0021884	.0008615	2.54	0.013	.0004779	.0038989
indigenous	.0083503	.0021185	3.94	0.000	.0041441	.0125566
carbon	.0114036	.0018775	6.07	0.000	.0076757	.0151315
cost	-.0045749	.0059815	-0.76	0.446	-.0164512	.0073014
city	-.0270847	.0150658	-1.80	0.075	-.0569982	.0028287
climate	-.0028196	.0026502	-1.06	0.290	-.0080816	.0024425
wild	.0020684	.0019787	1.05	0.299	-.0018603	.0059971
visited	-.0028709	.0028101	-1.02	0.310	-.0084504	.0027086
option	-.0001938	.0006214	-0.31	0.756	-.0014276	.00104
buy	.0018226	.0017315	1.05	0.295	-.0016153	.0052604
pay_ind	.0013156	.0012659	1.04	0.301	-.0011978	.003829
pay_more20	-.0008545	.0009183	-0.93	0.354	-.0026778	.0009687
_cons	-1.795437	.1591493	-11.28	0.000	-2.111431	-1.479442

Table 24 shows Model 4, which includes the variables about “use value knowledge”, case specific to each respondent. In this case, the variable that appears more significative is “buy”, although with only 29.5% level of significance. This result is logic, since the respondents who are willing to pay more for Brazil nuts in their private purchase of Brazil nuts, agree also that the investment of tax-payers funds can be used for non-use values.

Table 25. Model 5 of Choice with case (“use value” knowledge), “city”, “climate” and “buy” alternative specific regressors

```
. svy linearized : mlogit choice resilience indigenous carbon cost city climate buy
(running mlogit on estimation sample)

Survey: Multinomial logistic regression

Number of strata   =         1                  Number of obs     =      2,277
Number of PSUs     =        95                  Population size   =      2,277
                                                Design df         =         94
                                                F(   7,     88)   =     245.21
                                                Prob > F          =     0.0000
```

choice	Linearized Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
0	(base outcome)					
1						
resilience	.0021884	.0008615	2.54	0.013	.000478	.0038989
indigenous	.0083503	.0021185	3.94	0.000	.0041441	.0125566
carbon	.0114036	.0018775	6.07	0.000	.0076757	.0151315
cost	-.004575	.0059815	-0.76	0.446	-.0164513	.0073013
city	-.0266063	.01503	-1.77	0.080	-.0564487	.0032361
climate	-.0026033	.0025609	-1.02	0.312	-.0076881	.0024815
buy	.0019262	.0018772	1.03	0.307	-.0018011	.0056535
_cons	-1.7955	.1591947	-11.28	0.000	-2.111585	-1.479415

We arrived at the final model, after selecting one case specific variable with coefficient more significative of each of the three categories of variables included in the survey. This is presented in Table 25. Overall, the sample, which does not pretend to be representative of all young Australians, has been a useful exercise for improving our understanding of which variables could be considered when there is a positive relation between use value of a commodity and the production of non-use value.

It provides rich information for different decision makers about how to allocate scarce resources with the objective of increasing the probability that the old-growth forest will be resilient under the uncertain negative impact of climate change.

First, for the international community at the donor level, it should call for action to protect the ecosystem services of importance global provided by this old-growth forest. It has been seen that just providing information to the consumers, can increase their motivation to buy more Brazil nuts or pay more for them. Mechanisms such as declaring the Brazil nuts landscape humankind patrimony could provide necessary assistance.

The characteristics of the survey respondents applied in this study are young and have the highest education level among the young Australians. They will be the leaders of the future in Australia. The results show that they are aware of the importance of providing funds to

maintain the ecosystem services, especially when they are well-informed about the benefits to the fight against climate change.

The Peruvian government has made an effort inventorying the capacity of carbon sequestration aboveground in the Brazil nuts old-growth forest. In the questionnaire We have used three of the different levels found in a recent mapping. However, this information needs to be monitored and updated, including also the carbon sequestration that can be done below ground. It is useful to build clear indicators of provision of a critical ecosystem service such as carbon sequestration, that is more easily understood and valued by respondents than others of biodiversity conservation, such as hectares of flora and fauna.

This should be taken into account by the Peruvian Government and offered to countries such as Australia that need to reduce their carbon emissions. This supply has multiple more benefits and co-benefits than “artificial” carbon sequestration that is proposed by some in Australia. In addition, this exercise shows the need to include ecosystem services accounting for a better decision making process with sustainable development.

The indigenous employment attribute also has shown some preference by young Australians. We can say that is easier to understand for them than hectares with flora and fauna. This can induce the government to act to support the indigenous initiatives of non-timber forest production, encouraging the identification of the harvest from some specific area with the origin attribute. Unfortunately, until recently, some governments look to the indigenous attribute as something that was to go backwards. This study shows that it is not the case. Some firms that work with indigenous, work with the USA importers of Brazil nuts in obtaining prime prices when they inform that the benefits go to indigenous people from remote areas of the Amazon. This should be incentivized and supported by the government and indigenous people.

Finally, with respect to the application of the multinomial logit to this sample, we found that three of the 95 respondents chose the status quo option predominantly. We exclude them in one regression, but the results of the quality of the model were not significatively different (See last Model of Appendix 4.4). Therefore, we can reject the occurrence of protest vote bias.

3. CONCLUSIONS AND RECOMMENDATIONS

Maintenance of resilience of old-growth forests in the Amazon should be preserved by their use and their non-use values. The non-use values are found in the multiple ecosystem services of global importance being provided from lands such as the Peruvian Amazon where Brazil nuts are harvested in the wild. Those lands can be protected against the threats

of increasing weather extremes by climate change if developd counties could invest more in "natural" carbon sequestration and biodiversity conservation. One of these countries is Australia, one of the highest CO_2 per-capita polluter countries in the world.

Choice modelling is a technique that has been expanded during the last twenty years for the assessment of non-use values in environmental assets. This paper applies this technique to assess the values that young Australians might hold for maintenance of resilience in old-growth forest of the Peruvian Amazon. We have found four important conclusions:

First, the CM technique can be applied to model a complex environmental asset such as the resilience of an old-growth forest where three variables of carbon sequestration capacity, number of hectares to provide habitat for flora and fauna and number of indigenous families benefited, show an important influence on preference formation.

Second, the CM technique can be used to model the non-use values of individuals from a country with a variety of simultaneous trade-offs, which include environmental awareness, knowledge of the use value of the environmental asset and socio-economic characteristics.

Third, the increase of the participation of young Australians in the Australian Federal elections may contribute to build sounder environmental policies by public decision makers.

Fourth, Peruvian policy makers can prioritise the attributes considered most important in this study in the marketing of ecosystem services, as a mechanism to promote the supply side and promote the investment in biodiversity conservation from developed countries.

The results confirm that, depending on the circumstances of the conservation proposal, young Australians can hold substantial non-use values of maintenance of resilience of old-growth forests in the Amazon, especially when informed about the benefits in the fight against climate change. The young Australians are the tax-payers who will provide the revenue for the Australian government in the long term. Therefore, there is the potential that mechanisms such as "carbon tax", "green accounting" and increasing investment in biodiversity conservation overseas can be consider in the future.

The results provide a tool for decision makers to use in prioritising the marketing of ecosystem services provided from their territories to offer in programs such as REDD+. From the conservation program options, the sample considered in this study has shown a preference for the capacity of carbon sequestration in first place, then, in the numbers of indigenous people benefited and finally, in the number of hectares for habitat of flora and fauna. These results motivate action and policy decisions to allocate scarce funds.

One of the most interesting trade-offs found in this study shows that the young Australians that participate in this study are willing to privately pay more for Brazil nuts after learning the multiple benefits provided by the ecosystem services are of global importance. This shows that Peru needs to provide more information on the market about this positive relation between the use-values and the non-use values of the Brazil nuts.

The recommendations that follow this study are three:

This study can be replicated to include all young Australians, using a bigger sample and a bigger budget. It will be especially useful if it is used to extend the National Strategy of Ecosystem Services to include ecosystem services from overseas and when mechanisms such as REDD+ can be better funded by developed countries, especially, Australia which is one of the main per-capita emitters of CO_2 in the world.

“Millenials” (young Australians) rely more on online platforms to answer surveys and questionnaires than previous generations. These online platforms can present the information with pictures and videos, even with virtual reality. However, the willingness to dedicate fifteen minutes to answer a questionnaire on biodiversity conservation requires an adequate knowledge of which webpages they read and trust the most and understanding that the smell, silence and views that can be found in the Amazon can not be simulated by any PC.

Not all ecosystem services provided offer the range of attributes that Brazil nuts old-growth forests and not all the young people in developed countries shows such generosity as the Australian people. Therefore, it should be wise to use an exercise like this to promote the development of “green accounting” of supply of more biodiversity conservation in Peru and the demand of more biodiversity conservation in Australia, as mechanisms to include in the decision making process, solutions to the biggest market failures of all: climate change and biodiversity loss.

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4.- Appendixes

Appendix 4.1. Participant Information Statement

ECONOMIC VALUATION OF BIODIVERSITY CONSERVATION IN THE AMAZON

Investigator Principal Supervisor: Associate Professor Suzanne O'Keefe.
Phone: 03 9479 9831 Email: S.Okeefe@latrobe.edu.au
Investigator Co-Supervisor: Associate Lecturer David Walker.
Phone: 03 3 9479 2674 Email: d.walker@latrobe.edu.au
Student Researcher: Mr Pedro Flores Tenorio.
Phone: 03 9479 5451 Email: p.florestenorio@latrobe.edu.au
La Trobe Business School, La Trobe University, Victoria 3086.

This survey is intended to collect information on the economic valuation of ecosystem services in the Amazon, and is part of the PhD research of Mr. Pedro Flores on "Economic valuation of critical ecosystems provided from the Peruvian Amazon. The case of Brazil nuts". The research is being conducted at La Trobe University under the supervision of Dr. David Walker and Dr. Suzanne O'Keefe, funded by an Australian Awards Scholarship. Any information provided is strictly confidential and no respondent will be identified. The questions you will be asked are intended to obtain your personal opinion and as such, there are no 'right' or 'wrong' answers. This research project intends to make a contribution to the knowledge around biodiversity conservation in a tropical Amazon forest through the use of taxes by analysing the choices made by young adults studying in Australian Universities.

This survey focuses on the conservation of biodiversity in the Peruvian tropical rainforest and the ecosystem resilience of old-growth forests. This resilience is understood as the capability to keep natural cycle of non-timber forest production due the success in the cross pollination of the tree every year. The Peruvian Amazon is the 2nd largest remaining tropical rainforest in the world. Wild Brazil nuts are harvested each year in an area of approximately 2.5 million hectares of the Peruvian Amazon. The Brazil nuts trees (*Bertholletia excelsa*) are productive at an age of 15 years and can live for more than 1,000 years.

To participate in this study, you must be: an Australian citizen or permanent resident for tax purposes; and be able to read English. This survey will take no longer than eighteen minutes to complete and will be completed online at a time and location convenient to you using Qualtrics. Your participation is voluntary and completion of the survey is taken to imply your consent to participate in the research.

The anonymous raw data collected will be stored electronically on a secure hard drive at La Trobe University. The results will be maintained and used to undertake research for a PhD thesis, presentation at conferences and publication in academic journals, books, papers or reports. You may request the final results of this research by contacting the Student Researcher: Mr. Pedro Flores, via the details provided; the results will be emailed to you via your nominated email address.

Any questions regarding this project may be directed to the Student Researcher. If you have any complaints or concerns about your participation in the study that the researcher has not been able to answer to your satisfaction, you may contact the Senior Human Ethics Officer, Ethics and Integrity, Research Office, La Trobe University, Victoria, 3086 (P: 03 9479 1443, humanethics@latrobe.edu.au). Please quote the application reference number E16-054. Please read this sheet and if you want keep a print copy for your future reference

Thank you for your participation

Appendix 4.2. Participants Recruitment flyers in Melbourne and Sydney

La Trobe Business School

RESEARCH PARTICIPANTS NEEDED

STUDY ABOUT BIODIVERSITY CONSERVATION IN THE AMAZON

Photo: M. Salo. In:Salo, M., Siren, A. and Kalliola, R. Diagnosing Wild Species Harvest(2014)

To participate in this study, you must be: Australian or international student with at least 1 tax declaration lodged.

Benefit of participate, include that you can enter in the draw for 6 $50 dollar gift cards of COLES

To receive a link to the survey, the participant information statement or if you have any inquiry about this research, you can write

p.florestenorio@latrobe.edu.au

La Trobe Business School

RESEARCH PARTICIPANTS NEEDED

STUDY ABOUT BIODIVERSITY CONSERVATION IN THE AMAZON

Photo: M. Salo. In:Salo, M., Siren, A. and Kalliola, R. Diagnosing Wild Species Harvest(2014

To participate in this study, you must be: Australian or international student with at least 1 tax declaration lodged.

Benefit of participate, include that you can enter in the draw for 10 AU$30 vouchers to use in THE ROYAL HOTEL

To receive a link to the survey, the participant information statement or if you have any inquiry about this research, you can write p.florestenorio@latrobe.edu.au

p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au	p.florestenorio@latrobe.edu.au

<u>Appendix 4.3.</u> Online Survey presented to Sydney students about "Opinions on Biodiversity Conservation in the Amazon by University Students in Australia"

Q1 Thank you for your interest in our survey. You will be asked first about your opinions on biodiversity loss in tropical forests. Then, about the specific case of the Brazil nuts in Peruvian Amazon. Finally, some questions about a hypothetical program and finally, some socioeconomic questions. There is no right or wrong answers. All your answers are anonymous.

Q2 Do you consider the issue of biodiversity loss and environmental concerns to be more important than the social issues outlined below?

	Strongly disagree (1)	Midly Disagree (2)	Undecided, Neutral or Unsure (3)	Midly Agree (4)	Strongly agree (5)	I don't know (6)
Improving housing affordability (1)	❍	❍	❍	❍	❍	❍
Improving health care provision (2)	❍	❍	❍	❍	❍	❍
Improving education opportunities (3)	❍	❍	❍	❍	❍	❍
Reducing crime rates (4)	❍	❍	❍	❍	❍	❍
Improving asylum seeker migration conditions (5)	❍	❍	❍	❍	❍	❍
Addressing international terrorism threats (6)	❍	❍	❍	❍	❍	❍
Reducing family violence levels (7)	❍	❍	❍	❍	❍	❍
Reducing unemployment level (8)	❍	❍	❍	❍	❍	❍

Q3 Please read the following statements related to biodiversity conservation in the Amazon and choose in what extent do you agree or disagree.

	Strongly disagree (1)	Midly Disagree (2)	Undecided, Neutral or Unsure (3)	Midly Agree (4)	Strongly agree (5)	I don't know (6)
Amazon forests should be protected for future generations even if that costs me money now. (1)	❍	❍	❍	❍	❍	❍
Conservation of large trees in the Amazon is more important than conservation of small trees. (2)	❍	❍	❍	❍	❍	❍
Carbon sequestration from the Amazon rainforest is more important than "artificial" carbon sequestration with engineering. (3)	❍	❍	❍	❍	❍	❍
Australia should use tax funds to invest in biodiversity conservation in the Amazon, only if other developed countries do the same. (4)	❍	❍	❍	❍	❍	❍
The imports of nuts for consumption in Australia from wild species harvested in the Amazon should be encouraged. (5)	❍	❍	❍	❍	❍	❍

Q4 An ecosystem is a dynamic system of plant, animal and microorganism communities and the surrounding nonliving environment. Ecosystem services are the benefits people obtain from ecosystems. Below you will find a list of ecosystem services from the Amazon basin. Please rate how important each of these ecosystem services are to you.

	Extremely important (1)	Very important (2)	Moderately important (3)	Slightly important (4)	Not at all important (5)	I don't know (6)
Influence on the global climate and maintenance of favourable climate (e.g. temperature, precipitation). (1)	❍	❍	❍	❍	❍	❍
Pollination of wild plant species. (2)	❍	❍	❍	❍	❍	❍
Fuel and energy (e.g. fuel wood, organic matter). (3)	❍	❍	❍	❍	❍	❍
Hunting, gathering of fish, fruits and nuts. (4)	❍	❍	❍	❍	❍	❍
Use of nature by indigenous people. (5)	❍	❍	❍	❍	❍	❍
Enjoyment of landscape and scenery. (6)	❍	❍	❍	❍	❍	❍
Use of nature for future scientific research. (7)	❍	❍	❍	❍	❍	❍
Other (8)	❍	❍	❍	❍	❍	❍

Q5 If you could decide how to distribute Australia's investment in biodiversity conservation . Where would you choose? Please, include a percentage for each option (total percentage = 100).

_____ Papua New Guinea, Solomon Islands, Vanuatu and Fiji (1)
_____ Other Pacific Island (2)
_____ Indonesia (3)
_____ Other South East Asia (4)
_____ North Africa and Middle East (5)
_____ Amazon (6)
_____ Other areas outside Amazon in the Latin American and Caribbean countries (7)

Q6 In which ecosystem services overseas would you prefer that Australian biodiversity conservation budget be invested in? Please, include a percentage for each option (total percentage = 100).

_____ Adaptation to the climate change and maintenance of global climate favourable for human life. (1)
_____ Maintenance of pollination of wild plant species. (2)
_____ Maintenance of capacity to provide fuel and energy. (3)
_____ Maintenance of hunting, gathering of fish, game fruits and nuts. (4)
_____ Allowing indigenous people to maintaining using nature in their traditional ways. (5)
_____ Maintaining the option for me and my family to enjoy the landscapes and nature sceneries. (6)
_____ Keeping the option to use the nature for future scientific research. (7)
_____ Other (8)

Q7 Before addressing more Amazon tropical forest questions, we would like to ask you some questions about your preferences in nuts consumption.Which is your most preferred nut of the following list?

- ❍ Hazelnuts (1)
- ❍ Macadamias (2)
- ❍ Walnuts (3)
- ❍ Brazil nuts (4)
- ❍ Pistachios (5)
- ❍ Pecans (6)
- ❍ Chestnuts (7)
- ❍ Other (9)
- ❍ None (8)

Q8 In the last year, in what quantities did you purchased your first choice of nuts?

- ❍ Less than 1 kilo (1)
- ❍ 1 to 2 kilos (2)
- ❍ 3 to 5 kilos (3)
- ❍ 6 to 10 kilos (4)
- ❍ More than 10 kilos (5)
- ❍ I don't know (6)

Q9 Which of the following nuts do you know about the native origin of the nut species?

- ❑ Hazelnuts (1)
- ❑ Macadamias (2)
- ❑ Walnuts (3)
- ❑ Brazil nuts (4)
- ❑ Pistachios (5)
- ❑ Pecans (6)
- ❑ Chestnuts (7)

Q10 Do you know that Brazil nuts (Bertholletia excelsa) are harvested from wild Peruvian tropical rainforests?

- ❑ Yes (1)
- ❑ No (2)

Display This Question:
If Do you know that Brazil nuts (Bertholletia excelsa) are harvested from wild Peruvian tropical rainforests? Please, place a TICK (✓) Yes Is Selected

Q11 If you were aware of Brazil nuts wild harvest. How did you know it?

- ❑ I have visited the tropical rainforest (1)
- ❑ I have seen in a TV program or a video (2)
- ❑ I have read an article in a newspaper or magazine (3)
- ❑ I have heard about it from a teacher or a friend (4)
- ❑ Other (5) _____

Q12 Have you ever visited the Amazon basin in one of the following countries? Please, TICK (✓) all of the countries where you have visited the Amazon basin.

- ❑ Bolivia (1)
- ❑ Brazil (2)
- ❑ Colombia (3)
- ❑ Peru (4)
- ❑ Other (5) _____
- ❑ None (6)

Display This Question:
If Have you ever visited the Amazon basin in one of the following countries before this time? Please, TICK (✓) all of the countries where you have visited the Amazon basin. None Is Selected

Q13 If you have not visited any Amazon basin country yet, have you had planned to visit it in the future? Please, TICK (✓) on the Amazon basin countries you would like to visit.

- ❑ Bolivia (1)
- ❑ Brazil (2)
- ❑ Colombia (3)
- ❑ Peru (4)
- ❑ Other (5) _____

Q14 If you know that Brazil nuts are the only native wild harvest nut sold in the market. Would you buy more Brazil nuts?

- ❍ Yes (1)
- ❍ Maybe (2)
- ❍ No (3)

Display This Question:
If If you know that Brazil nuts are the only native wild harvest nut sold in the market. Would you buy more Brazil nuts? Please, place a TICK (✓) Yes Is Selected
Or If you know that Brazil nuts are the only native wild harvest nut sold in the market. Would you buy more Brazil nuts? Please, place a TICK (✓) Maybe Is Selected

Q15 Would you pay more for the Brazil nuts if you know they were harvested by Amazon indigenous people?

- ❍ Yes (1)
- ❍ Maybe (2)
- ❍ No (3)

Display This Question:
If Would you you pay more for the Brazil nuts if you know they were harvested by Amazon indigenous people? Please, place a TICK (✓) Yes Is Selected
Or Would you you pay more for the Brazil nuts if you know they were harvested by Amazon indigenous people? Please, place a TICK (✓) Maybe Is Selected

Q16 How much more would you pay for the nuts if you know that the current retail price per kilo is AUS$ 20? Please, place a TICK (✓) in how much more would you pay for kilo?

- ❑ Less than AU$ 1 (1)
- ❑ Between AU$1 until AU$2 (2)
- ❑ Between AU$ 2.1 until AU$3 (3)
- ❑ Between AUS3.1 until AU$4 (4)
- ❑ Between AUS$4.1 and AU$5 (5)
- ❑ More than AU$ 5 (6)
- ❑ Unsure (7)

Q17 Suppose that after the international community arrived at consensus in Paris 2015 regarding a global deal to limit the average annual temperature increase, the Australian government decides to invest in a program that will maintain the resilience of the Amazon forest ecosystem. It will allow the natural production of Brazil nuts continues every year (see photo) providing ecosystem services, carbon sequestration and habitat for flora and fauna. If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support? Please, consider each of the following 3 alternatives options: A, B, and C in the 8 scenarios given below.

Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (thousand of has)	0	200	50
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	70	10
Annual cost to my household to achieve this outcome AU$)	0	10	30

	A (1)	B (2)	C (3)
Which alternative would you choose? (1)	❍	❍	❍

Q19 If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (thousand of has.)	0	200	50
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	110	70
Annual cost to my household to achieve this outcome (AU$)	0	40	10

	A (1)	B (2)	C (3)
Which alternative would you choose? (1)	❍	❍	❍

Q20 If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (thousand of has.)	0	300	200
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	10	110
Annual cost to my household to achieve this outcome (AU$)	0	40	30

	A (1)	B (2)	C (3)
Which alternative would you choose? (1)	❍	❍	❍

Q21 If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (thousand of has.)	0	300	50
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	10	70
Annual cost to my household to achieve this outcome (AU$)	0	30	10

	A (1)	B (2)	C (3)
Which alternative would you choose? (1)	❍	❍	❍

Q22 If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (thousand of has.)	0	300	50
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	70	110
Annual cost to my household to achieve this outcome (AU$)	0	10	30

	A (1)	B (2)	C (3)
Which alternative would you choose? (1)	❍	❍	❍

Q23 If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (thousand of has.)	0	50	200
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	10	70
Annual cost to my household to achieve this outcome (AU$)	0	10	40

	A (1)	B (2)	C (3)
Which alternative would you choose? (1)	❍	❍	❍

Q24 If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (thousand of has.)	0	300	200
Indigenous families benefited with the Program	0	100	0
Average capacity of carbon storage above ground (Mg./hectares)	0	10	70
Annual cost to my household to achieve this outcome (AU$)	0	40	30

	A (1)	B (2)	C (3)
Which alternative would you choose? (1)	❍	❍	❍

Q25 If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (thousand of hectares)	0	300	50
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	70	110
Annual cost to my household to achieve this outcome (AU$)	0	30	10

	A (1)	B (2)	C (3)
Which alternative would you choose? (1)	❍	❍	❍

Q26 If you are an Australian citizen, in which state were you born?

- ❍ Australian Capital Territory (1)
- ❍ New South Wales (2)
- ❍ Northern Territory (3)
- ❍ Queensland (4)
- ❍ South Australia (5)
- ❍ Tasmania (6)
- ❍ Victoria (7)
- ❍ Western Australia (8)
- ❍ Overseas (9)

Q27 What is your gender?

- ❍ Male (1)
- ❍ Female (2)

Q28 Including yourself, how many people live in your household?

	0 (1)	1 (2)	2 (3)	3 (4)	4 or more (5)
Below 5 years old (1)	❑	❑	❑	❑	❑
Between 5 and 16 years old (2)	❑	❑	❑	❑	❑
Over 16 years old (3)	❑	❑	❑	❑	❑

Q29 Please, indicate how many years have you been studying and the highest level you have obtained up until now?

	First year (1)	Second year (2)	Third year (3)	Fourth or more years (4)
Undergraduate (1)	❑	❑	❑	❑
Honours or Masters (2)	❑	❑	❑	❑
PhD (3)	❑	❑	❑	❑

Q30 Which of these age groups do you belong to?

- ❍ 18 years old (1)
- ❍ 19 years old (2)
- ❍ 20 years old (3)
- ❍ 21 years old (4)
- ❍ 22 years old (5)
- ❍ 23 to 30 years old (6)
- ❍ 31 to 50 years old (7)

Q31 Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?

- ❍ 0 (0)
- ❍ 1 (1)
- ❍ 2 (2)
- ❍ 3 (3)
- ❍ 4 (4)
- ❍ 5 (5)
- ❍ 6 (6)
- ❍ 7 (7)
- ❍ 8 (8)
- ❍ 9 (9)
- ❍ 10 (10)

Q32 Are you a volunteer or donor to any of the following organizations? Please, TICK (✓) in the first column for each case you participate

- ❑ Political party (1)
- ❑ NGO that protects indigenous people rights (2)
- ❑ NGO that protects biodiversity conservation (3)
- ❑ NGO that stands for action in climate change (4)
- ❑ Religious group (5)
- ❑ Other: (6) _____

Q33 What is your current work status, in addition to studying? Please, choose one of the following options:

- ❍ Employed part-time (1-8 hours per week) (1)
- ❍ Employed part-time (9-16 hours per week) (2)
- ❍ Employed part-time (17-24 hours per week) (3)
- ❍ Employed part-time (25-30 hours per week) (4)
- ❍ Employed full time (5)
- ❍ Employed casual (6)
- ❍ Unemployed (7)
- ❍ Unable to work due to sickness or disability (8)

Q34 Could you tell me which category best describes your average income before taxes per week over the last year?

- ❍ Nil income (1)
- ❍ AU$ 1 to AU$199 (2)
- ❍ AU$200 to AU$299 (3)
- ❍ AU$300 to AU$399 (4)
- ❍ AU$400 to AU$599 (5)
- ❍ AU$600 to AU$799 (6)
- ❍ AU$800 to AU$999 (7)
- ❍ AU$1000 to AU$1249 (8)
- ❍ AU$1250 to AU$1499 (9)
- ❍ AU$1500 to AU$1999 (10)
- ❍ AU$2000 to AU$2499 (11)
- ❍ AU$2500 or more (12)

Q35 Please add any further comments you would like to contribute to the study.Thanks.

Appendix 4.4. Econometric model and additional models developed in STATA

The commands in STATA for the three choices presented to the interviewed students are based in the Multinomial logit model.

Choice Experiment 1: Using a multinomial logit model

The assumption following McFadden is that:

(1) $U_i = v(X_i, p_i; \beta) + \epsilon i$

Where Ui represents the true indirect utility associated with profile "i". This indirect utility function described here is unobservable for the researcher and an additively separable sub-utility function that is specific to the particular non-market service under analysis: the ecosystem resilience of Amazon forest.

In the case of this basic multinomial model, we can separate the attribute variables as X and the individual variables that affect the utility as Z. And, assuming, for simplicity, an additive linear function we will have (2):

(2) $U_i = v(X_i,\beta; Z_i,A) + \epsilon_i$

Z_i will be the same as Z_j we can say Z, because this alternative does not change with the alternative chosen. For example, a young Australian will choose alternative profile "i" over 'j", if $U_i (X_i, Z) > U_j (X_j, Z)$, where X_i is a vector of the attributes of the biodiversity conservation program (e.g. ecosystem resilience, carbon sequestration, benefit to indigenous people) to maintain ecosystem resilience in the forest. Similarly, X_j represents the attributes of alternative profile "j". And, Z represents the personal characteristics (e.g. socio-demographic and attitudinal) such as income, education or gender that influence the young adult's utility.

From that theoretical framework, STATA estimates the models presented in the results. Here we present the Model 1 with linearized standard errors and Models 2 to 5 with robust standard errors. Model 6 is the results, taking out the five respondents of the sample that chose mainly the "status quo" option in the eight choice sets.

Model 1 with linearized standard errors

```
. svy linearized : mlogit choice resilience indigenous carbon cost
(running mlogit on estimation sample)

Survey: Multinomial logistic regression

Number of strata   =         1                  Number of obs     =      2,277
Number of PSUs     =        95                  Population size   =      2,277
                                                Design df         =         94
                                                F(   4,     91)   =      19.16
                                                Prob > F          =     0.0000
```

choice	Linearized Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
0	(base outcome)					
1						
resilience	.0022048	.0008565	2.57	0.012	.0005042	.0039055
indigenous	.0083793	.002114	3.96	0.000	.004182	.0125766
carbon	.0113959	.0018776	6.07	0.000	.0076678	.0151239
cost	-.004745	.005894	-0.81	0.423	-.0164477	.0069578
_cons	-1.813068	.1623745	-11.17	0.000	-2.135467	-1.49067

Model 2 with robust standard errors

```
. mlogit choice resilience indigenous carbon cost age gender city birth income happiness

Iteration 0:   log likelihood = -1449.3428
Iteration 1:   log likelihood = -1284.8648
Iteration 2:   log likelihood = -1281.3437
Iteration 3:   log likelihood = -1281.3318
Iteration 4:   log likelihood = -1281.3318

Multinomial logistic regression                 Number of obs     =      2,277
                                                LR chi2(10)       =     336.02
                                                Prob > chi2       =     0.0000
Log likelihood = -1281.3318                     Pseudo R2         =     0.1159
```

choice	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
0	(base outcome)					
1						
resilience	.0021884	.0006287	3.48	0.000	.0009562	.0034207
indigenous	.0083503	.001538	5.43	0.000	.005336	.0113647
carbon	.0114036	.0016411	6.95	0.000	.0081871	.01462
cost	-.004575	.0054353	-0.84	0.400	-.0152279	.0060779
age	-.0007602	.0330617	-0.02	0.982	-.0655599	.0640396
gender	.0010494	.1036782	0.01	0.992	-.202156	.2042549
city	-.0268881	.1127381	-0.24	0.811	-.2478508	.1940746
birth	.0001425	.0201887	0.01	0.994	-.0394266	.0397117
income	.0003381	.0199796	0.02	0.986	-.0388213	.0394975
happiness	-.0000952	.0330422	-0.00	0.998	-.0648567	.0646662
_cons	-1.794901	.314804	-5.70	0.000	-2.411905	-1.177896

Model 3 with robust standard errors

```
. mlogit choice resilience indigenous carbon cost environ amazon large natural import others climate pollination fuel gathering indigenous2 landscape research other

Iteration 0:   log likelihood = -1449.3428
Iteration 1:   log likelihood = -1284.8764
Iteration 2:   log likelihood = -1281.3737
Iteration 3:   log likelihood = -1281.3621
Iteration 4:   log likelihood = -1281.3621

Multinomial logistic regression                 Number of obs     =      2,277
                                                LR chi2(18)       =     335.96
                                                Prob > chi2       =     0.0000
Log likelihood = -1281.3621                     Pseudo R2         =     0.1159
```

choice	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
0	(base outcome)					
1						
resilience	.0022027	.0006259	3.52	0.000	.000976	.0034294
indigenous	.0083758	.0015353	5.46	0.000	.0053666	.0113849
carbon	.0113968	.0016421	6.94	0.000	.0081785	.0146152
cost	-.0047234	.0054021	-0.87	0.382	-.0153112	.0058644
environ	.0001909	.0197486	0.01	0.992	-.0385157	.0388975
amazon	.0074792	.169936	0.04	0.965	-.3255893	.3405477
large	-.0007933	.1111226	-0.01	0.994	-.2185897	.217003
natural	.0035162	.107999	0.03	0.974	-.208158	.2151903
imports	-.000431	.1021126	-0.00	0.997	-.2005681	.1997061
others	.0066682	.106374	0.06	0.950	-.2018211	.2151575
climate	-.0042005	.1437905	-0.03	0.977	-.2860247	.2776238
pollination	.0032779	.1202735	0.03	0.978	-.2324538	.2390096
fuel	-.0016225	.1253924	-0.01	0.990	-.247387	.2441421
gathering	.0000547	.134006	0.00	1.000	-.2625922	.2627016
indigenous2	-.0021646	.1072939	-0.02	0.984	-.2124568	.2081275
landscape	-.0016917	.1082713	-0.02	0.988	-.2138996	.2105162
research	.0006942	.1089805	0.01	0.995	-.2129036	.2142921
other	.0029802	.1616797	0.02	0.985	-.3139061	.3198665
_cons	-1.821245	.2181589	-8.35	0.000	-2.248828	-1.393661

Model 4 with robust standard errors

```
. mlogit choice resilience indigenous carbon cost city climate wild visited option buy pay_ind pay_more20

Iteration 0:   log likelihood = -1449.3428
Iteration 1:   log likelihood = -1284.8646
Iteration 2:   log likelihood = -1281.3434
Iteration 3:   log likelihood = -1281.3316
Iteration 4:   log likelihood = -1281.3316

Multinomial logistic regression                 Number of obs     =      2,277
                                                LR chi2(12)       =     336.02
                                                Prob > chi2       =     0.0000
Log likelihood = -1281.3316                     Pseudo R2         =     0.1159
```

choice	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
0	(base outcome)					
1						
resilience	.0021884	.0006287	3.48	0.000	.0009562	.0034207
indigenous	.0083503	.001538	5.43	0.000	.005336	.0113647
carbon	.0114036	.0016411	6.95	0.000	.0081871	.01462
cost	-.0045749	.0054353	-0.84	0.400	-.0152278	.006078
city	-.0270847	.103845	-0.26	0.794	-.2306172	.1764477
climate	-.0028196	.1278941	-0.02	0.982	-.2534874	.2478483
wild	.0020684	.116624	0.02	0.986	-.2265105	.2306473
visited	-.0028709	.2001819	-0.01	0.989	-.3952203	.3894785
option	-.0001938	.1398856	-0.00	0.999	-.2743646	.2739769
buy	.0018226	.1184944	0.02	0.988	-.2304222	.2340673
pay_ind	.0013156	.1132419	0.01	0.991	-.2206345	.2232657
pay_more20	-.0008545	.1310219	-0.01	0.995	-.2576527	.2559436
_cons	-1.795437	.193553	-9.28	0.000	-2.174794	-1.41608

```
.
```

Model 5 with robust standard errors

```
. mlogit choice resilience indigenous carbon cost city climate buy

Iteration 0:   log likelihood = -1449.3428
Iteration 1:   log likelihood = -1284.8648
Iteration 2:   log likelihood = -1281.3437
Iteration 3:   log likelihood = -1281.3319
Iteration 4:   log likelihood = -1281.3319

Multinomial logistic regression                 Number of obs     =      2,277
                                                LR chi2(7)        =     336.02
                                                Prob > chi2       =     0.0000
Log likelihood = -1281.3319                     Pseudo R2         =     0.1159
```

choice	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
0	(base outcome)					
1						
resilience	.0021884	.0006287	3.48	0.000	.0009562	.0034207
indigenous	.0083503	.001538	5.43	0.000	.005336	.0113647
carbon	.0114036	.0016411	6.95	0.000	.0081871	.01462
cost	-.004575	.0054353	-0.84	0.400	-.0152279	.0060779
city	-.0266063	.1000395	-0.27	0.790	-.2226802	.1694676
climate	-.0026033	.1210309	-0.02	0.983	-.2398195	.2346129
buy	.0019262	.1070073	0.02	0.986	-.2078042	.2116566
_cons	-1.7955	.1521145	-11.80	0.000	-2.093639	-1.497361

Model 6: Model 1 Without three respondents that predominantly choose “status quo”

```
. mlogit choice resilience cost indigenous carbon, vce(cluster id)

Iteration 0:   log pseudolikelihood = -1403.5137
Iteration 1:   log pseudolikelihood = -1212.0663
Iteration 2:   log pseudolikelihood = -1206.6262
Iteration 3:   log pseudolikelihood = -1206.6136
Iteration 4:   log pseudolikelihood = -1206.6136

Multinomial logistic regression                 Number of obs     =      2,205
                                                Wald chi2(4)      =     118.02
                                                Prob > chi2       =     0.0000
Log pseudolikelihood = -1206.6136               Pseudo R2         =     0.1403

                                  (Std. Err. adjusted for 92 clusters in id)
```

choice	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
0	(base outcome)					
1						
resilience	.0026504	.0008696	3.05	0.002	.000946	.0043547
cost	-.0033004	.0060446	-0.55	0.585	-.0151477	.0085468
indigenous	.0089741	.0021368	4.20	0.000	.0047862	.0131621
carbon	.0124954	.0018499	6.75	0.000	.0088696	.0161212
_cons	-1.999521	.1486218	-13.45	0.000	-2.290815	-1.708228

```
. mlogit choice resilience cost indigenous carbon, vce(cluster id)

Iteration 0:   log pseudolikelihood = -1403.5137
Iteration 1:   log pseudolikelihood = -1212.0663
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Iteration 3:   log pseudolikelihood = -1206.6136
Iteration 4:   log pseudolikelihood = -1206.6136

Multinomial logistic regression                 Number of obs     =      2,205
                                                Wald chi2(4)      =     118.02
                                                Prob > chi2       =     0.0000
Log pseudolikelihood = -1206.6136               Pseudo R2         =     0.1403

                                  (Std. Err. adjusted for 92 clusters in id)
```
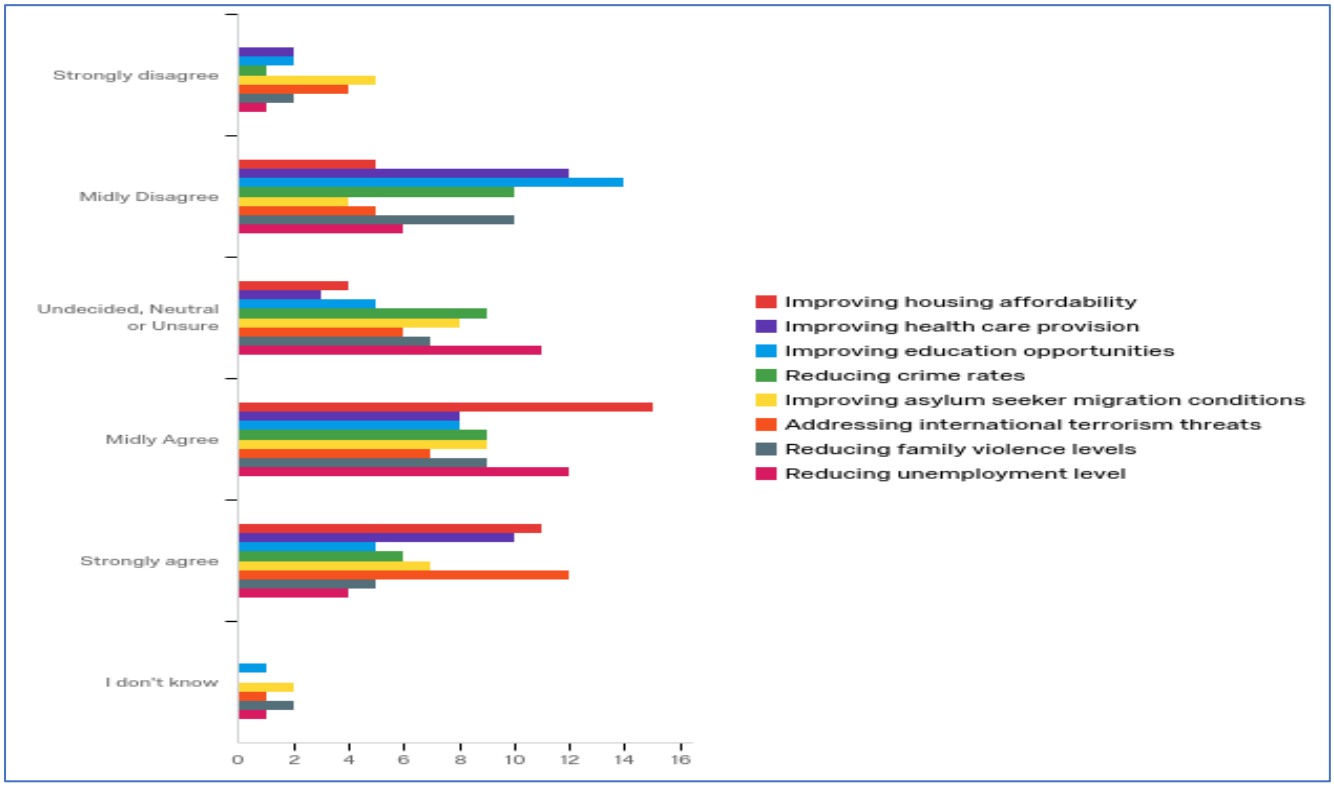

choice	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
0	(base outcome)					
1						
resilience	.0026504	.0008696	3.05	0.002	.000946	.0043547
cost	-.0033004	.0060446	-0.55	0.585	-.0151477	.0085468
indigenous	.0089741	.0021368	4.20	0.000	.0047862	.0131621
carbon	.0124954	.0018499	6.75	0.000	.0088696	.0161212
_cons	-1.999521	.1486218	-13.45	0.000	-2.290815	-1.708228

Appendix 4.5. Answers of Sydney respondents.

5.1. Environment Awareness Block

Q2 - Do you consider the issue of biodiversity loss and environmental concerns to be more important than:



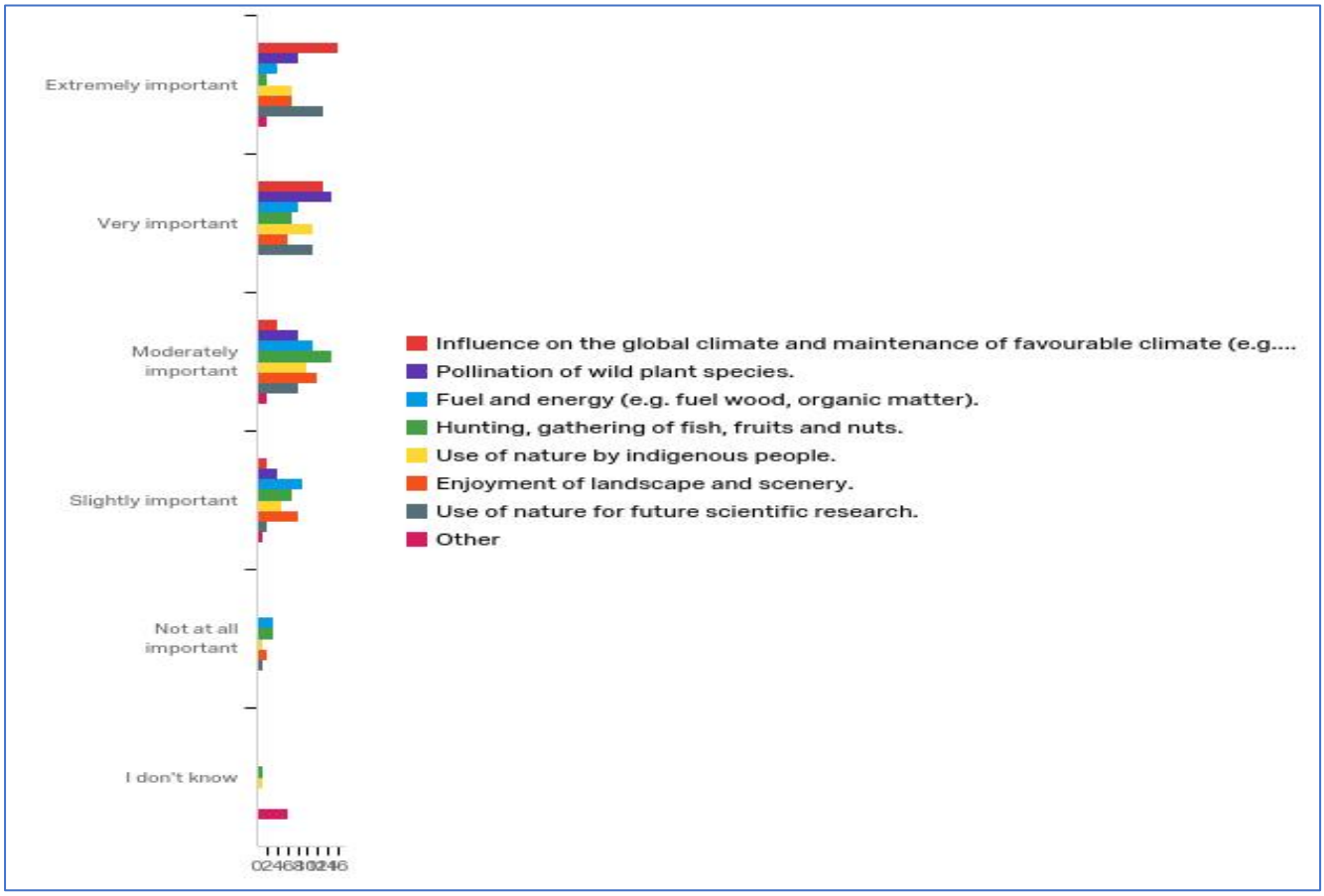
#	Question	Strongly disagree		Midly Disagree		Undecided, Neutral or Unsure		Midly Agree		Strongly agree		I don't know		Total
1	Improving housing affordability	0.00%	0	14.29%	5	11.43%	4	42.86%	15	31.43%	11	0.00%	0	35
2	Improving health care provision	5.71%	2	34.29%	12	8.57%	3	22.86%	8	28.57%	10	0.00%	0	35
3	Improving education opportunities	5.71%	2	40.00%	14	14.29%	5	22.86%	8	14.29%	5	2.86%	1	35
4	Reducing crime rates	2.86%	1	28.57%	10	25.71%	9	25.71%	9	17.14%	6	0.00%	0	35
5	Improving asylum seeker migration conditions	14.29%	5	11.43%	4	22.86%	8	25.71%	9	20.00%	7	5.71%	2	35
6	Addressing international terrorism threats	11.43%	4	14.29%	5	17.14%	6	20.00%	7	34.29%	12	2.86%	1	35
7	Reducing family violence levels	5.71%	2	28.57%	10	20.00%	7	25.71%	9	14.29%	5	5.71%	2	35
8	Reducing unemployment level	2.86%	1	17.14%	6	31.43%	11	34.29%	12	11.43%	4	2.86%	1	35

Q3 - Please read the following statements related to biodiversity conservation in the Amazon and choose in what extent do you agree or disagree.

#	Question	Strongly disagree		Midly Disagree		Undecided, Neutral or Unsure		Midly Agree		Strongly agree		I don't know		Total
1	Amazon forests should be protected for future generations even if that costs me money now.	0.00%	0	0.00%	0	5.71%	2	17.14%	6	77.14%	27	0.00%	0	35
2	Conservation of large trees in the Amazon is more important than conservation of small trees.	2.86%	1	14.29%	5	37.14%	13	28.57%	10	5.71%	2	11.43%	4	35
3	Carbon sequestration from the Amazon rainforest is more important than "artificial"	0.00%	0	5.71%	2	25.71%	9	28.57%	10	31.43%	11	8.57%	3	35

	carbon sequestration with engineering.													
4	Australia should use tax funds to invest in biodiversity conservation in the Amazon, only if other developed countries do the same.	20.00%	7	20.00%	7	8.57%	3	37.14%	13	14.29%	5	0.00%	0	35
5	The imports of nuts for consumption in Australia from wild species harvested in the Amazon should be encouraged.	2.86%	1	17.14%	6	11.43%	4	17.14%	6	28.57%	10	22.86%	8	35

Q4 - An ecosystem is a dynamic system of plant, animal and microorganism communities and the surrounding nonliving environment. Ecosystem services are the benefits people obtain from ecosystems. Below you will find a list of ecosystem services from the Amazon basin. Please rate how important each of these ecosystem services are to you.



#	Question	Extremely important		Very important		Moderately important		Slightly important		Not at all important		I don't know		Total
1	Influence on the global climate and maintenance of favourable climate (e.g. temperature, precipitation).	45.71%	16	37.14%	13	11.43%	4	5.71%	2	0.00%	0	0.00%	0	35
2	Pollination of wild plant species.	22.86%	8	42.86%	15	22.86%	8	11.43%	4	0.00%	0	0.00%	0	35
3	Fuel and energy (e.g. fuel wood, organic matter).	11.43%	4	22.86%	8	31.43%	11	25.71%	9	8.57%	3	0.00%	0	35
4	Hunting, gathering of fish, fruits and nuts.	5.71%	2	20.00%	7	42.86%	15	20.00%	7	8.57%	3	2.86%	1	35

5	Use of nature by indigenous people.	20.00%	7	31.43%	11	28.57%	10	14.29%	5	2.86%	1	2.86%	1	35
6	Enjoyment of landscape and scenery.	20.00%	7	17.14%	6	34.29%	12	22.86%	8	5.71%	2	0.00%	0	35
7	Use of nature for future scientific research.	37.14%	13	31.43%	11	22.86%	8	5.71%	2	2.86%	1	0.00%	0	35
8	Other	18.18%	2	0.00%	0	18.18%	2	9.09%	1	0.00%	0	54.55%	6	11

Other

Other
Education and understanding of bio-diversity for future generations.
Animal habitat

Q5 - If you could decide how to distribute Australia's investment in biodiversity conservation . Where would you choose? Please, include a percentage for each option (total percentage = 100).

Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Papua New Guinea, Solomon Islands, Vanuatu and Fiji	0.00	70.00	19.44	14.50	210.31	34
Other Pacific Island	0.00	50.00	11.10	9.52	90.54	35
Indonesia	0.00	35.00	10.09	7.93	62.82	35
Other South East Asia	0.00	30.00	12.34	7.82	61.20	35
North Africa and Middle East	0.00	50.00	12.57	10.45	109.10	35
Amazon	0.00	50.00	24.71	13.36	178.49	35
Other areas outside Amazon in the Latin American and Caribbean countries	0.00	50.00	10.30	9.69	93.92	35

Q6 - In which ecosystem services overseas would you prefer that Australian biodiversity conservation budget be invested in? Please, include a percentage for each option (total percentage = 100).

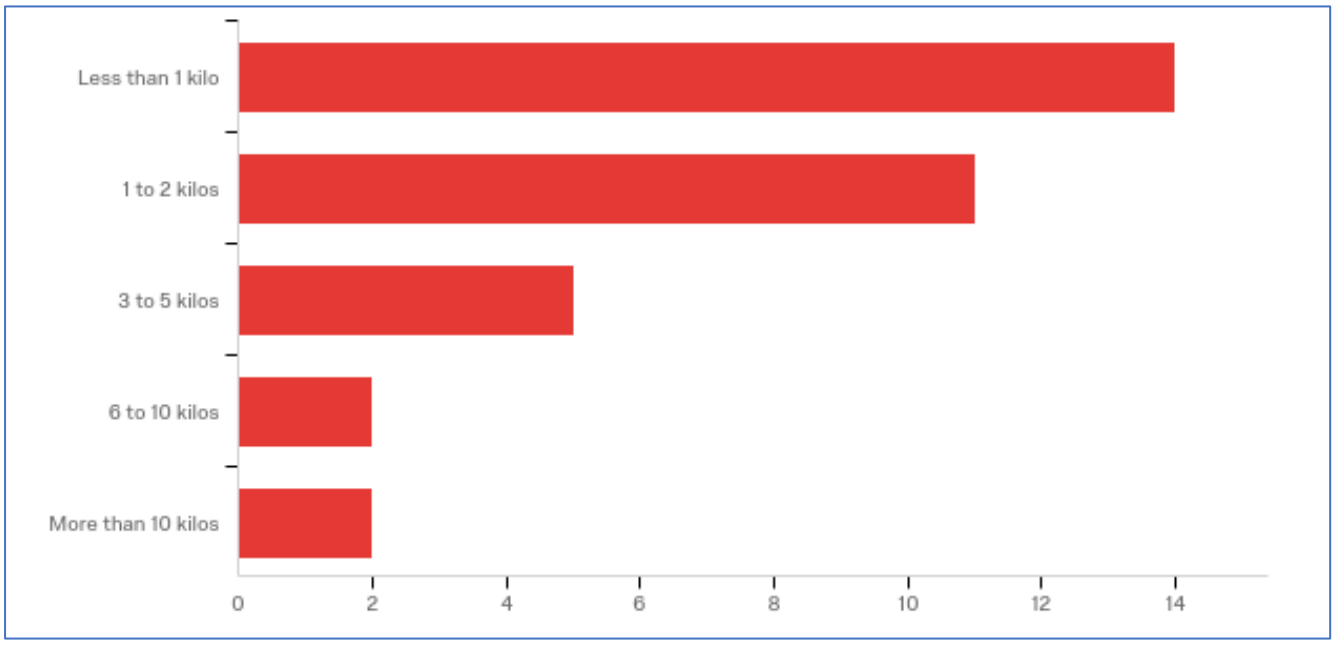
Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Adaptation to the climate change and maintenance of global climate favourable for human life.	0.00	70.00	25.34	17.58	309.14	35
Maintenance of pollination of wild plant species.	0.00	40.00	14.14	9.60	92.12	35
Maintenance of capacity to provide fuel and energy.	0.00	40.00	10.96	10.22	104.41	35
Maintenance of hunting, gathering of fish, game fruits and nuts.	0.00	20.00	7.01	6.33	40.04	34
Allowing indigenous people to maintaining using nature in their traditional ways.	0.00	50.00	12.14	9.51	90.41	35
Maintaining the option for me and my family to enjoy the landscapes and nature sceneries.	0.00	40.00	10.11	7.80	60.84	35
Keeping the option to use the nature for future scientific research.	0.00	50.00	19.34	12.48	155.83	35
Other	0.00	20.00	1.14	4.64	21.55	35

Other

Other

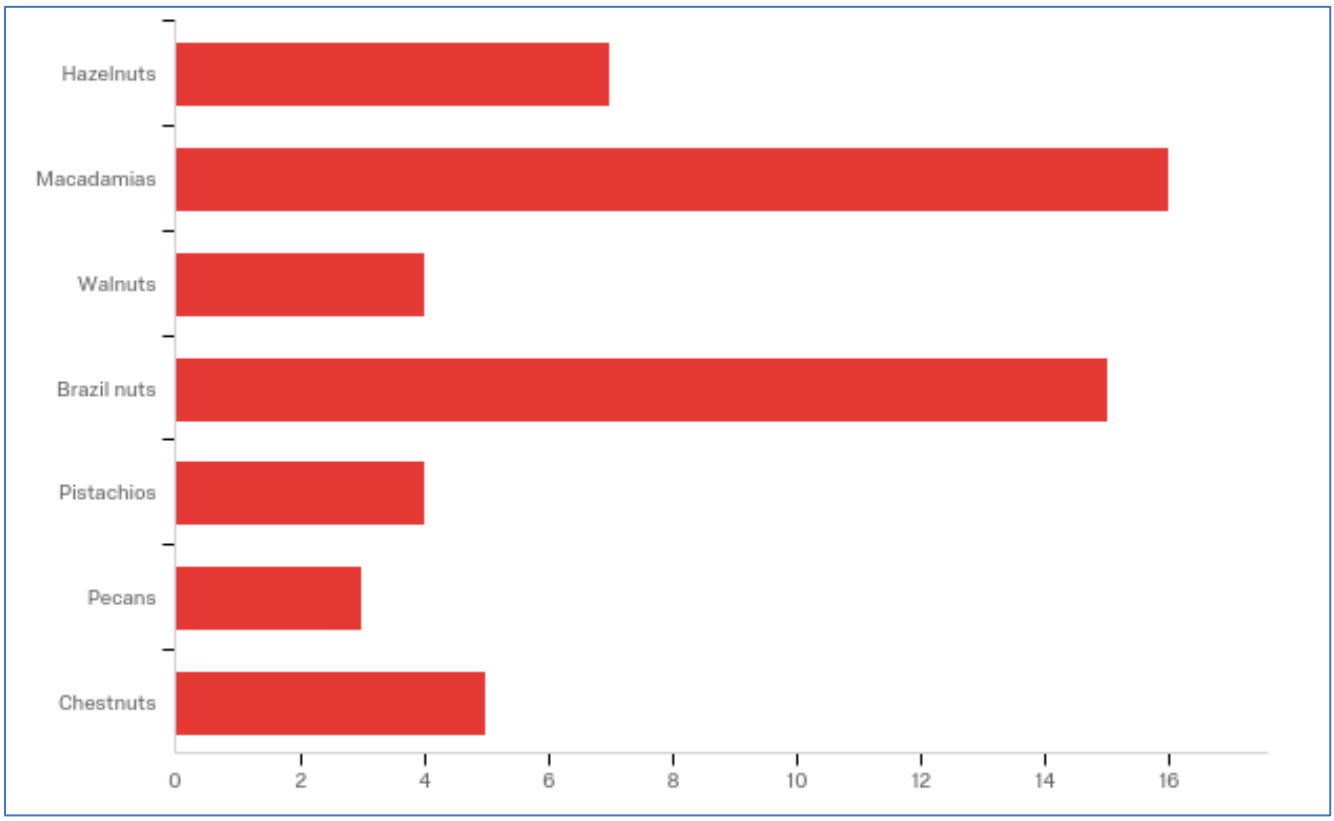
Medicine

Q8 - In the last year, in what quantities did you purchased your first choice of nuts?



#	Answer	%	Count
1	Less than 1 kilo	41.18%	14
2	1 to 2 kilos	32.35%	11
3	3 to 5 kilos	14.71%	5
4	6 to 10 kilos	5.88%	2
5	More than 10 kilos	5.88%	2
	Total	100%	34

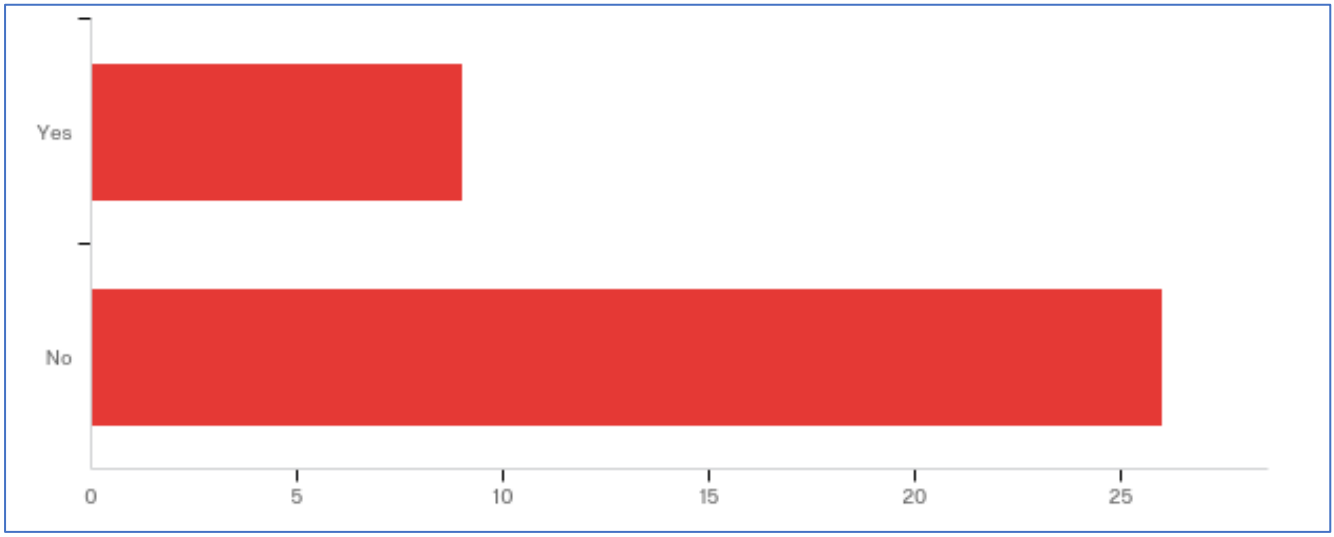
Q9 - Which of the following nuts do you know about the native origin of the nut species?



#	Answer	%	Count
1	Hazelnuts	20.00%	7
2	Macadamias	45.71%	16
3	Walnuts	11.43%	4
4	Brazil nuts	42.86%	15

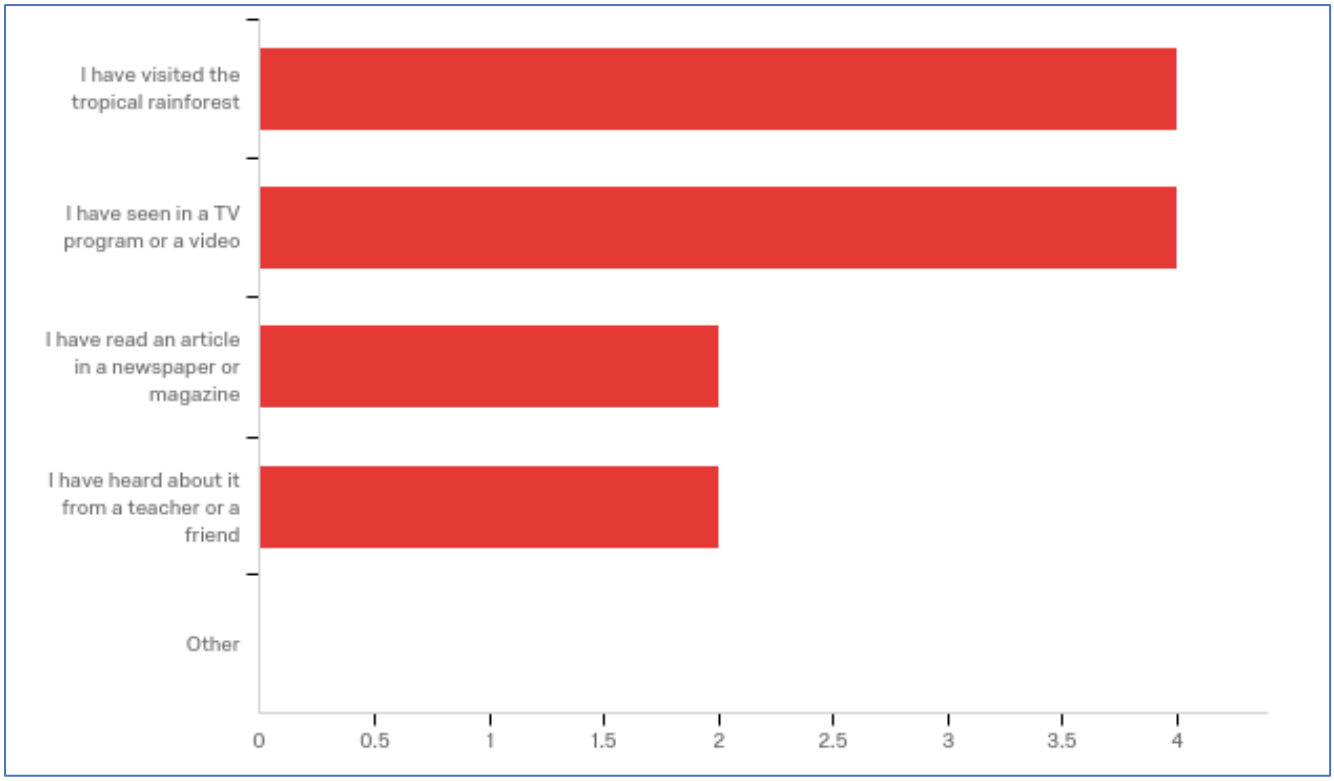
5	Pistachios	11.43%	4
6	Pecans	8.57%	3
7	Chestnuts	14.29%	5
	Total	100%	35

Q10 - Do you know that Brazil nuts (Bertholletia excelsa) are harvested from wild Peruvian tropical rainforests?



#	Answer	%	Count
1	Yes	25.71%	9
2	No	74.29%	26
	Total	100%	35

Q11 - If you were aware of Brazil nuts wild harvest. How did you know it?

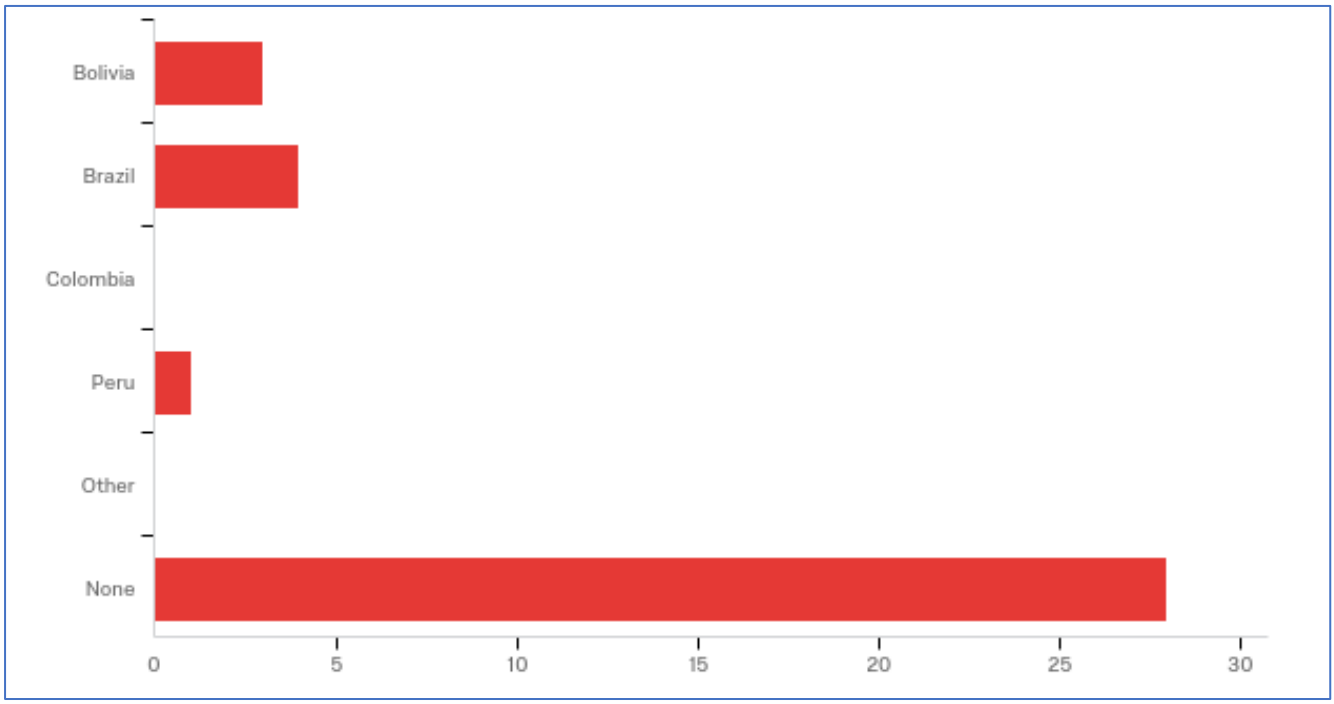


#	Answer	%	Count
1	I have visited the tropical rainforest	44.44%	4
2	I have seen in a TV program or a video	44.44%	4
3	I have read an article in a newspaper or magazine	22.22%	2
4	I have heard about it from a teacher or a friend	22.22%	2
5	Other	0.00%	0
	Total	100%	9

Other

Other

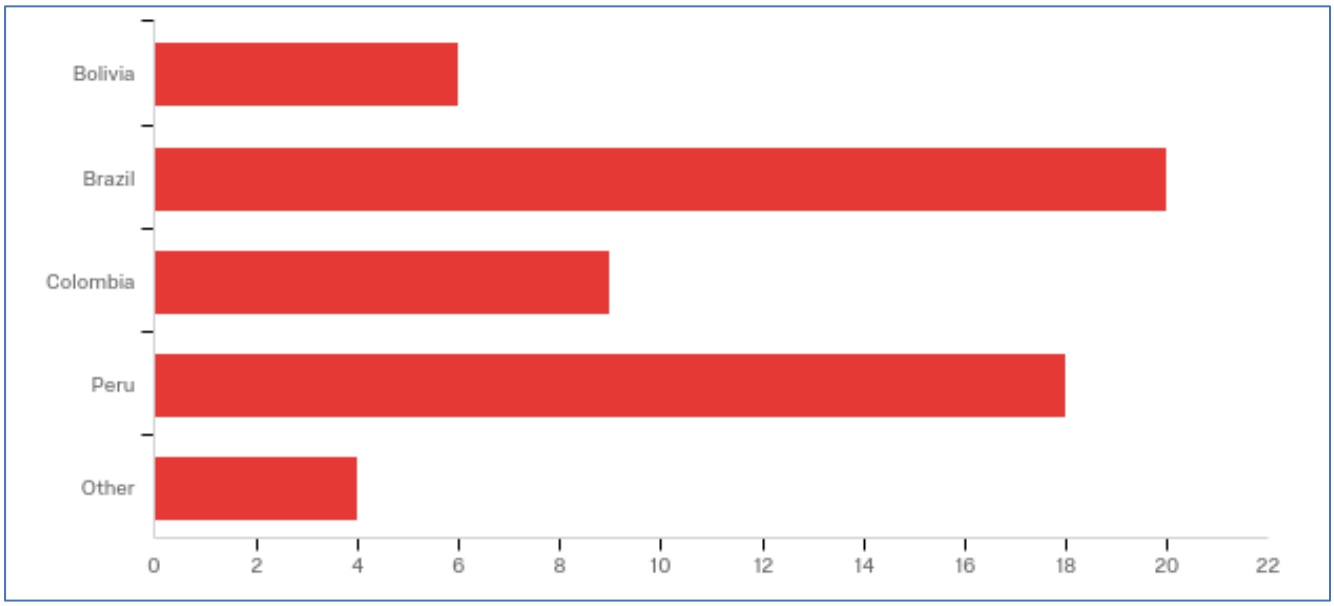
Q12 - Have you ever visited the Amazon basin in one of the following countries? Please, TICK (✓) all of the countries where you have visited the Amazon basin.



#	Answer	%	Count
1	Bolivia	8.57%	3
2	Brazil	11.43%	4
3	Colombia	0.00%	0
4	Peru	2.86%	1
5	Other	0.00%	0
6	None	80.00%	28
	Total	100%	35

Other
Other

Q13 - If you have not visited any Amazon basin country yet, have you had planned to visit it in the future? Please, TICK (✓) on the Amazon basin countries you would like to visit.

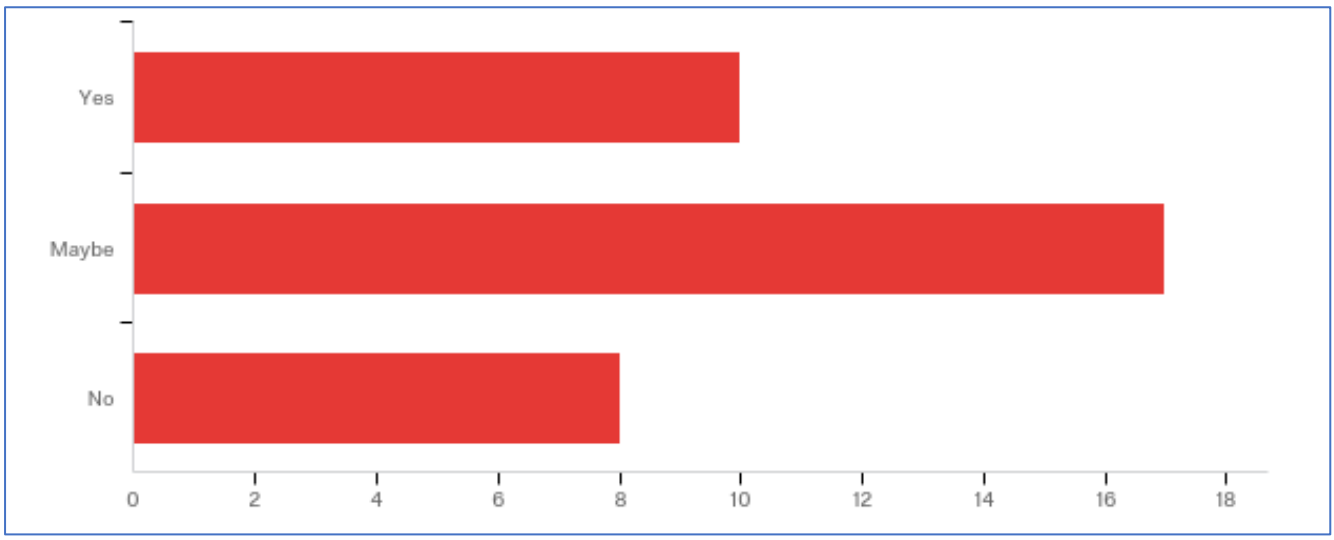


#	Answer	%	Count
1	Bolivia	21.43%	6
2	Brazil	71.43%	20
3	Colombia	32.14%	9
4	Peru	64.29%	18
5	Other	14.29%	4
	Total	100%	28

Other

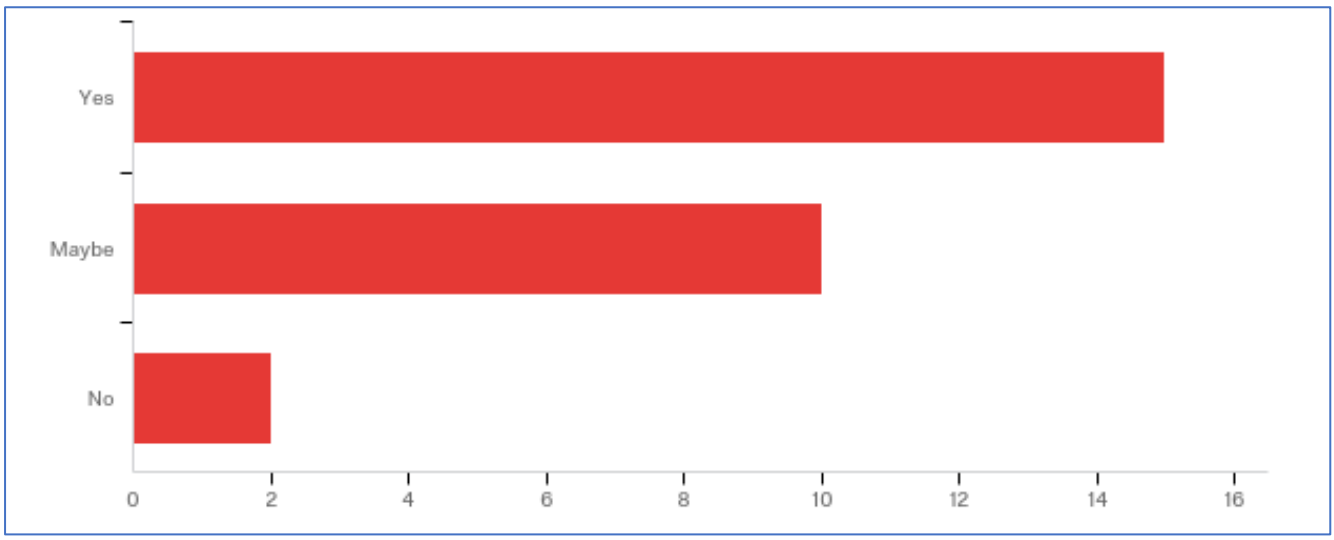
Other
None
No current plans
Prefer not to fly

Q14 - If you know that Brazil nuts are the only native wild harvest nut sold in the market. Would you buy more Brazil nuts?



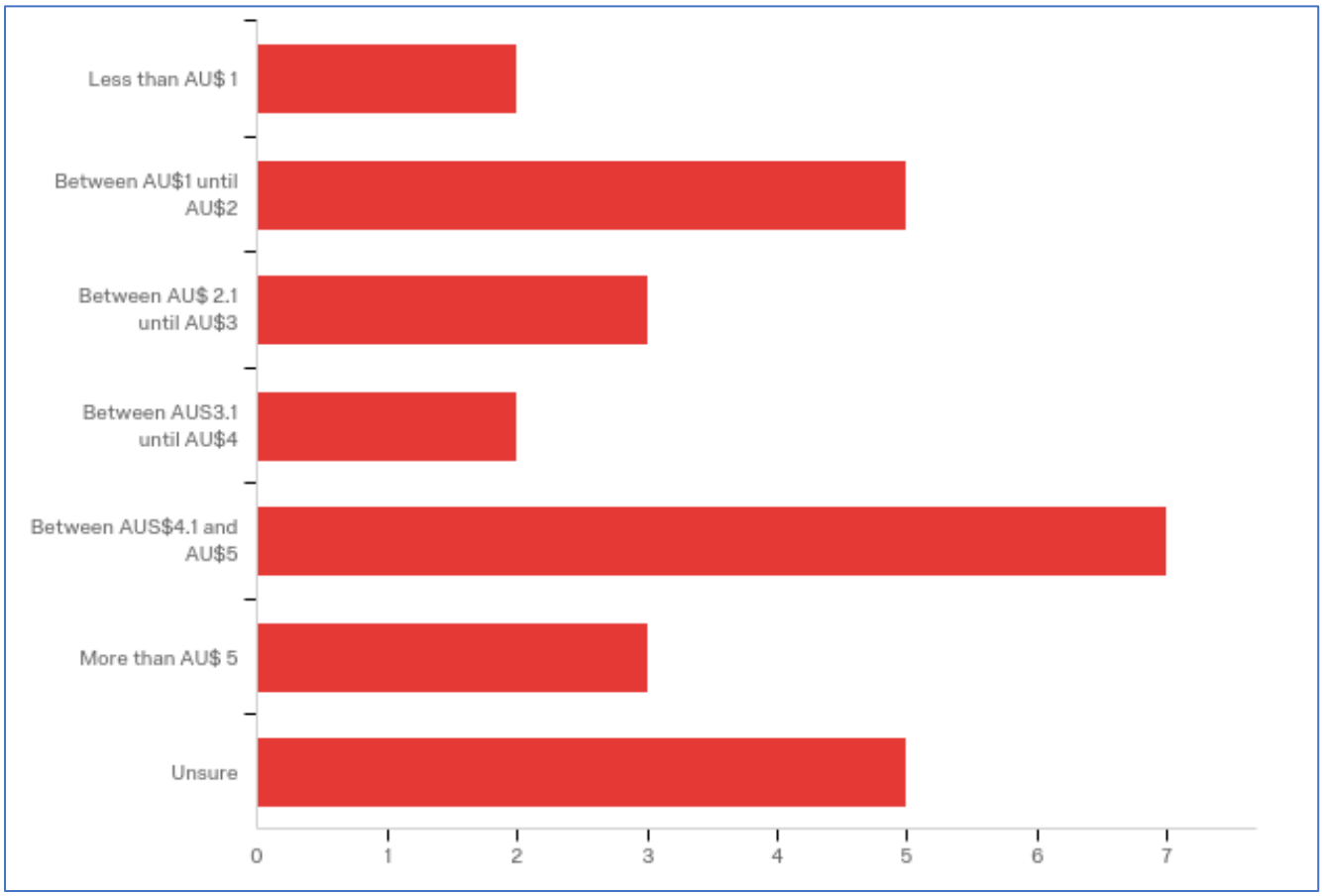
#	Answer	%	Count
1	Yes	28.57%	10
2	Maybe	48.57%	17
3	No	22.86%	8
	Total	100%	35

Q15 - Would you pay more for the Brazil nuts if you know they were harvested by Amazon indigenous people?



#	Answer	%	Count
1	Yes	55.56%	15
2	Maybe	37.04%	10
3	No	7.41%	2
	Total	100%	27

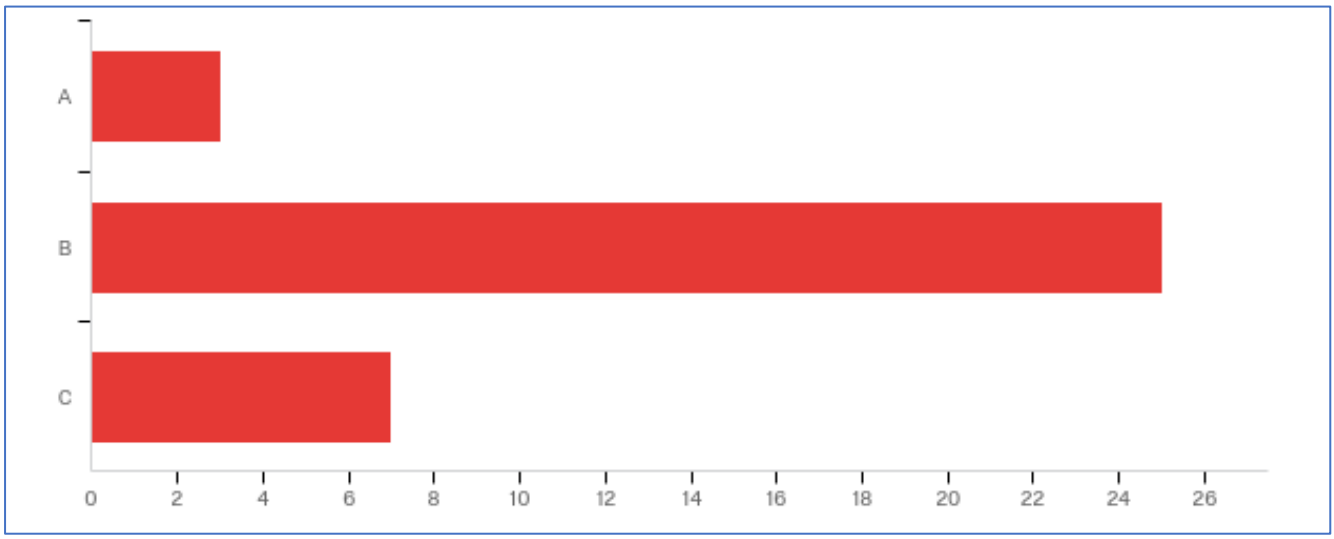
Q16 - How much more would you pay for the nuts if you know that the current retail price per kilo is AUS$ 20? Please, place a TICK (✓) in how much more would you pay for kilo?



#	Answer	%	Count
1	Less than AU$ 1	8.00%	2
2	Between AU$1 until AU$2	20.00%	5
3	Between AU$ 2.1 until AU$3	12.00%	3
4	Between AUS3.1 until AU$4	8.00%	2
5	Between AUS$4.1 and AU$5	28.00%	7
6	More than AU$ 5	12.00%	3
7	Unsure	20.00%	5
	Total	100%	25

Q17 - Suppose that after the international community arrived at consensus in Paris 2015 regarding a global deal to limit the average annual temperature increase, the Australian government decides to invest in a program that will maintain the resilience of the Amazon forest ecosystem. It will allow the natural production of Brazil nuts continues every year (see photo) providing ecosystem services, carbon sequestration and habitat for flora and fauna. If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support? Please, consider each of the following 3 alternatives options: A, B, and C in the 8 scenarios given below.

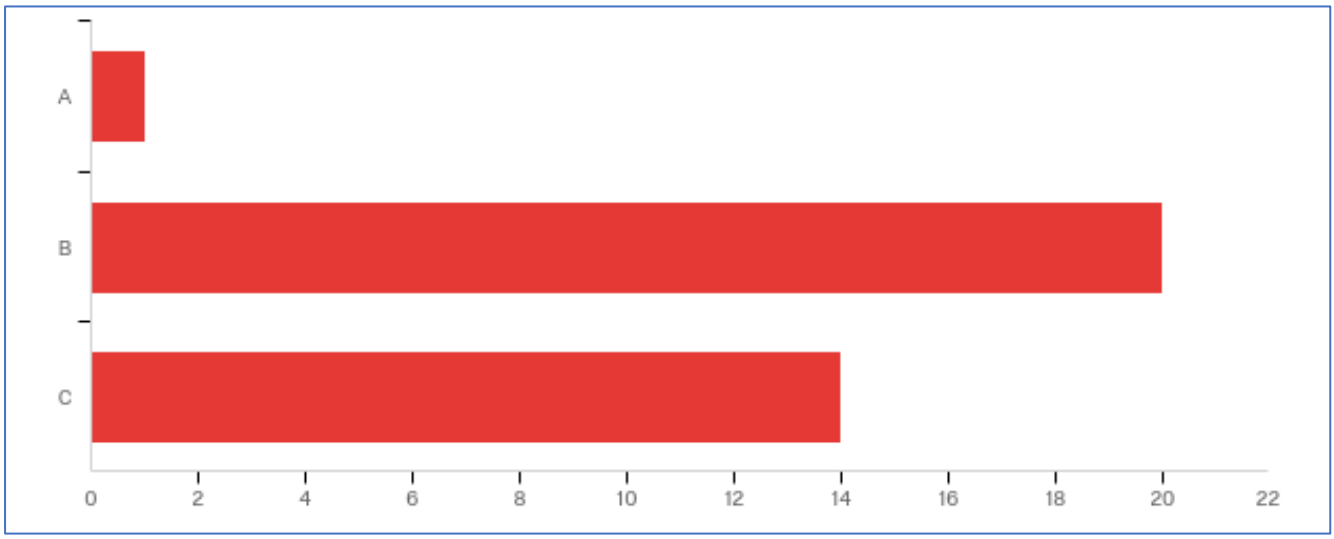
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of hectares)	0	200	50
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	70	10
Annual cost to my household to achieve this outcome (AU$)	0	10	30



#	Answer	%	Count
1	A	8.57%	3
2	B	71.43%	25
3	C	20.00%	7
	Total	100%	35

Q19 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

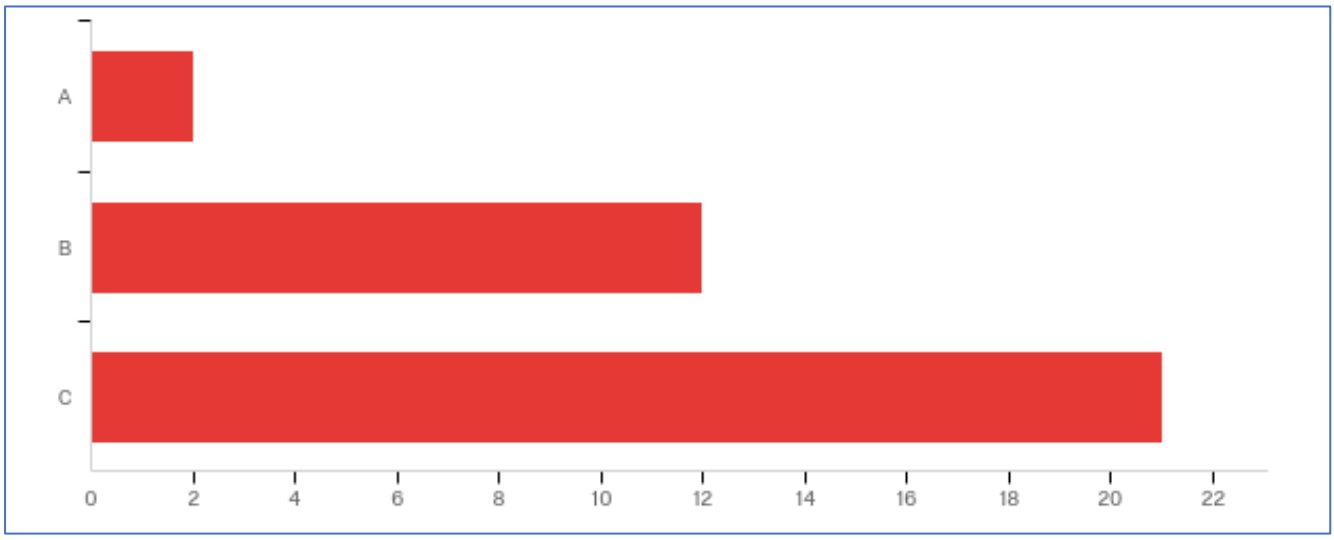
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	200	50
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	110	70
Annual cost to my household to achieve this outcome (AU$)	0	40	10



#	Answer	%	Count
1	A	2.86%	1
2	B	57.14%	20
3	C	40.00%	14
	Total	100%	35

Q20 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

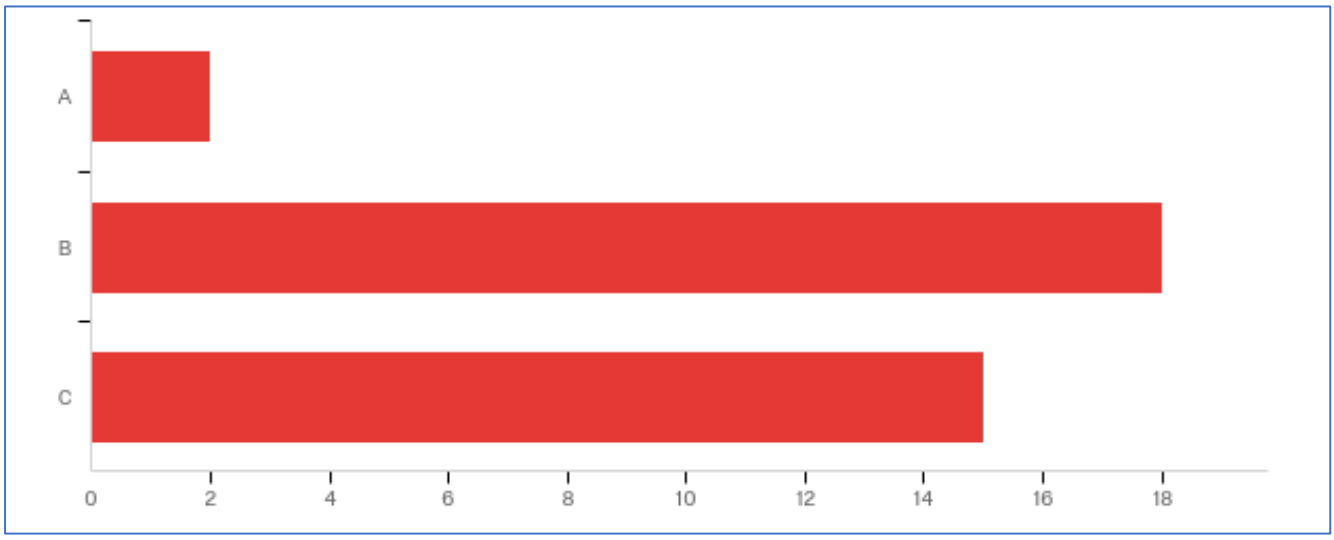
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	300	200
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	10	110
Annual cost to my household to achieve this outcome (AU$)	0	40	30



#	Answer	%	Count
1	A	5.71%	2
2	B	34.29%	12
3	C	60.00%	21
	Total	100%	35

Q21 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

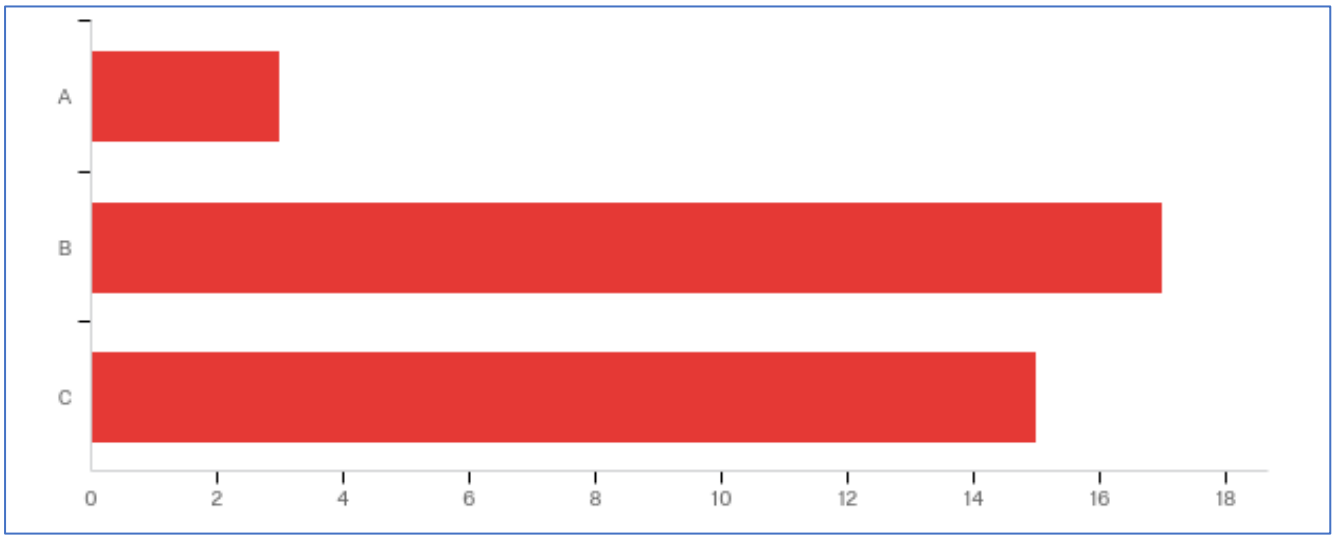
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	300	50
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	10	70
Annual cost to my household to achieve this outcome (AU$)	0	30	10



#	Answer	%	Count
1	A	5.71%	2
2	B	51.43%	18
3	C	42.86%	15
	Total	100%	35

Q22 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

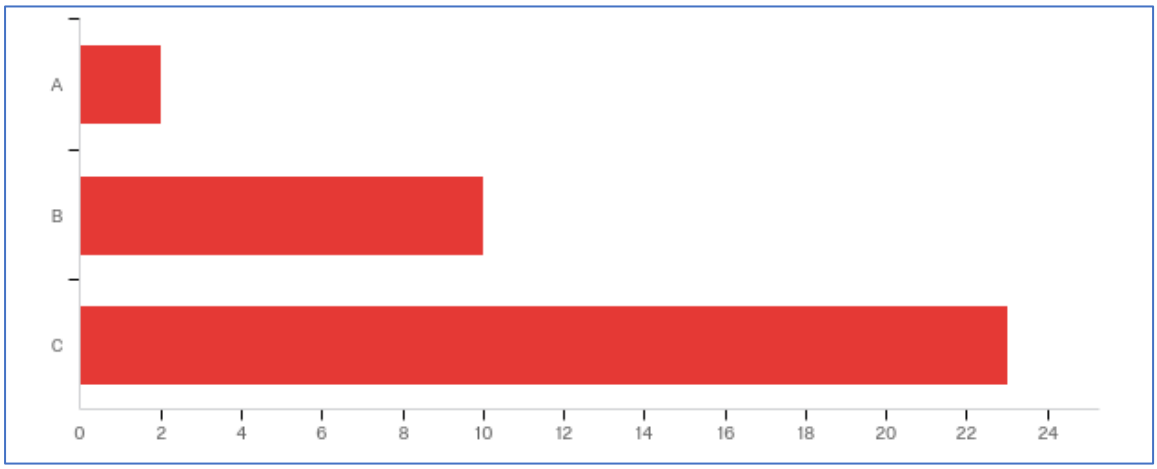
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	300	50
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	70	110
Annual cost to my household to achieve this outcome (AU$)	0	10	30



#	Answer	%	Count
1	A	8.57%	3
2	B	48.57%	17
3	C	42.86%	15
	Total	100%	35

Q23 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

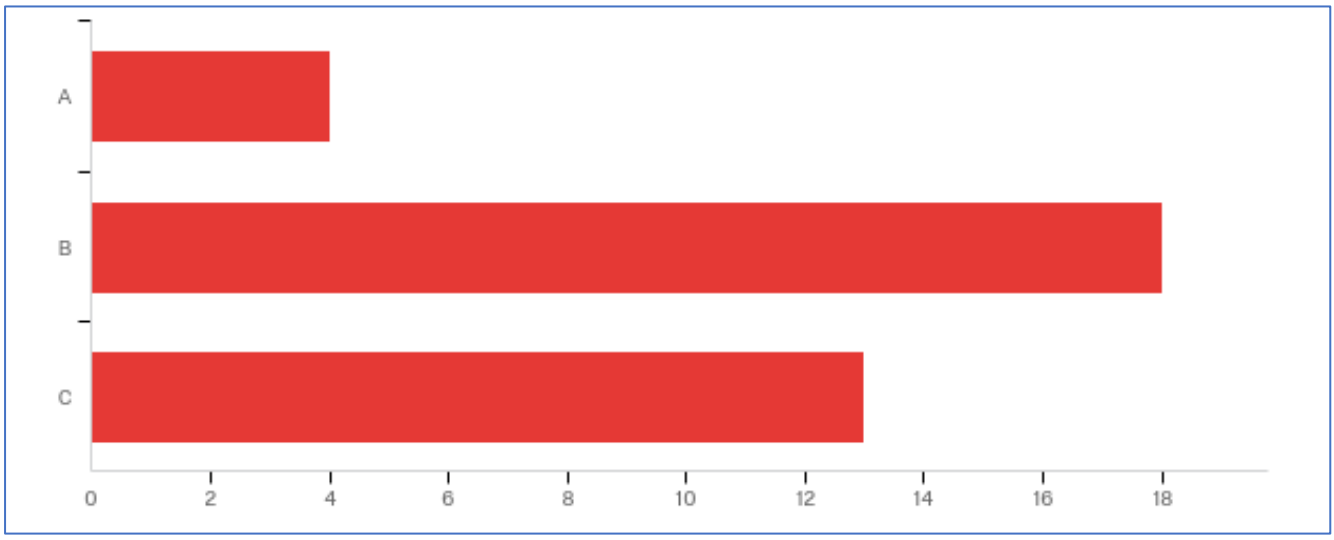
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	50	200
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	10	70
Annual cost to my household to achieve this outcome (AU$)	0	10	40



#	Answer	%	Count
1	A	5.71%	2
2	B	28.57%	10
3	C	65.71%	23
	Total	100%	35

Q24 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

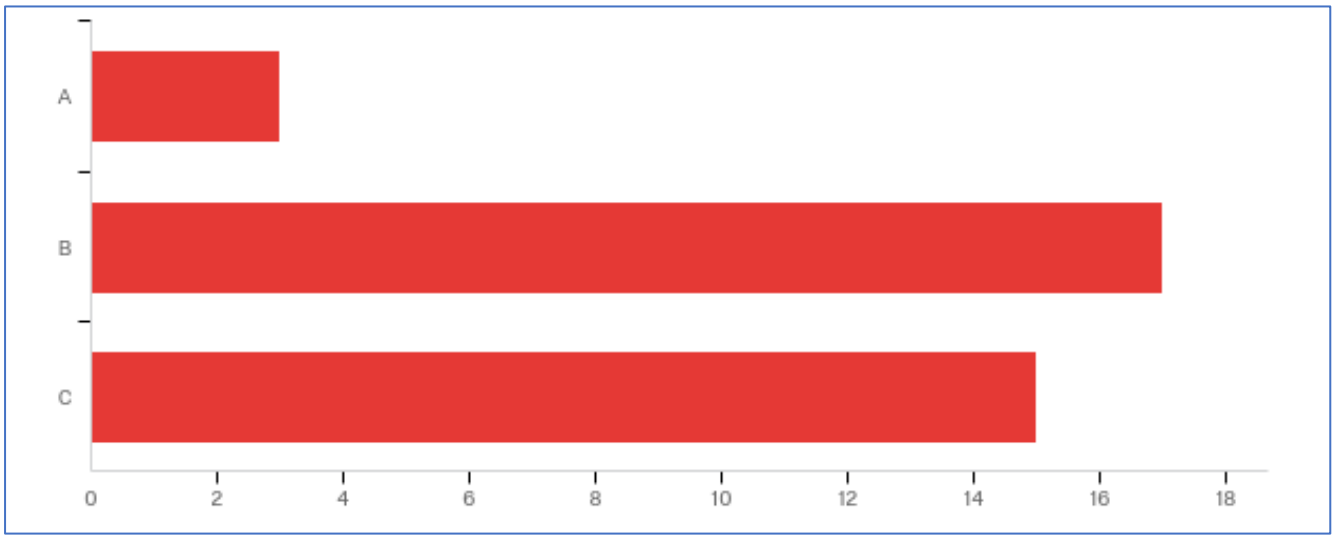
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	300	200
Indigenous families benefited with the Program	0	100	0
Average capacity of carbon storage above ground (Mg./hectares)	0	10	70
Annual cost to my household to achieve this outcome (AU$)	0	40	30



#	Answer	%	Count
1	A	11.43%	4
2	B	51.43%	18
3	C	37.14%	13
	Total	100%	35

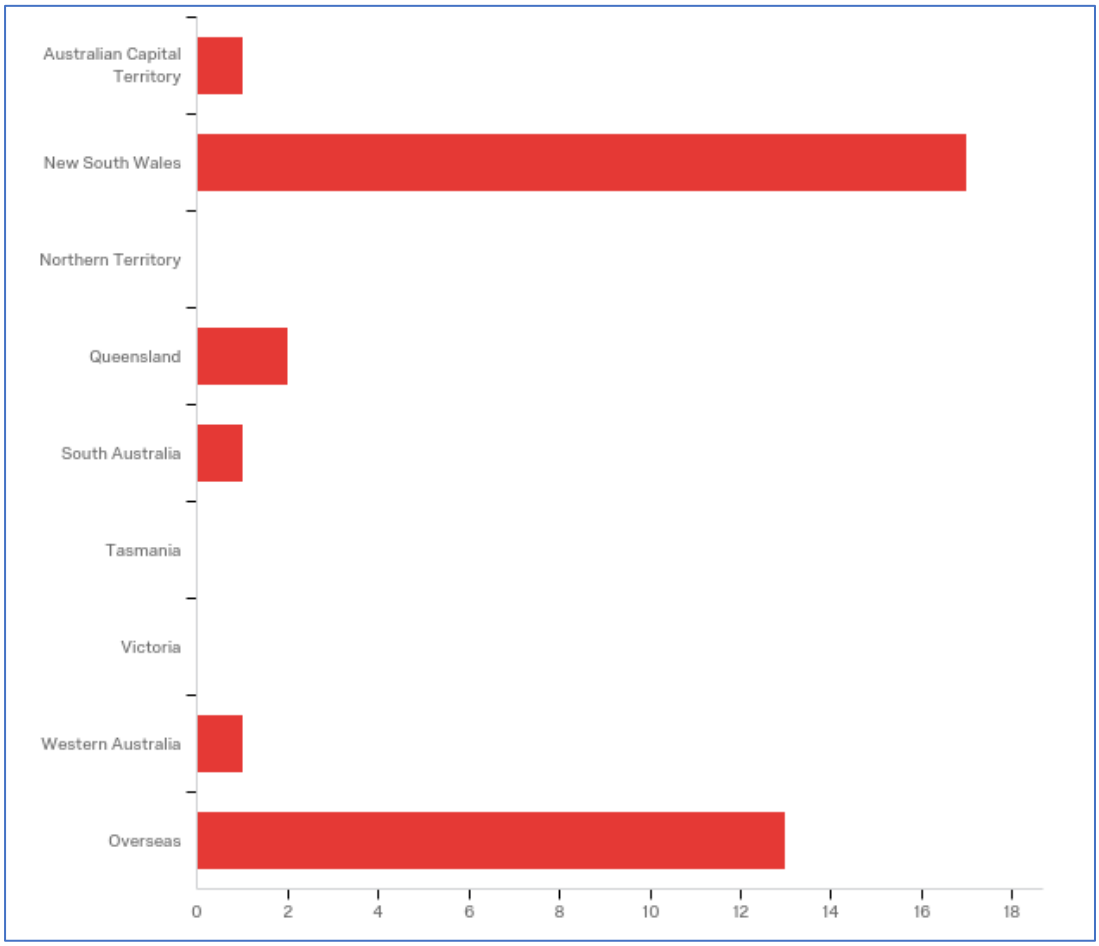
Q25 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	300	50
Indigenous families benefited with the Program	0	0	100
Average capacity of carbon storage above ground (Mg./hectares)	0	70	110
Annual cost to my household to achieve this outcome (AU$)	0	30	10



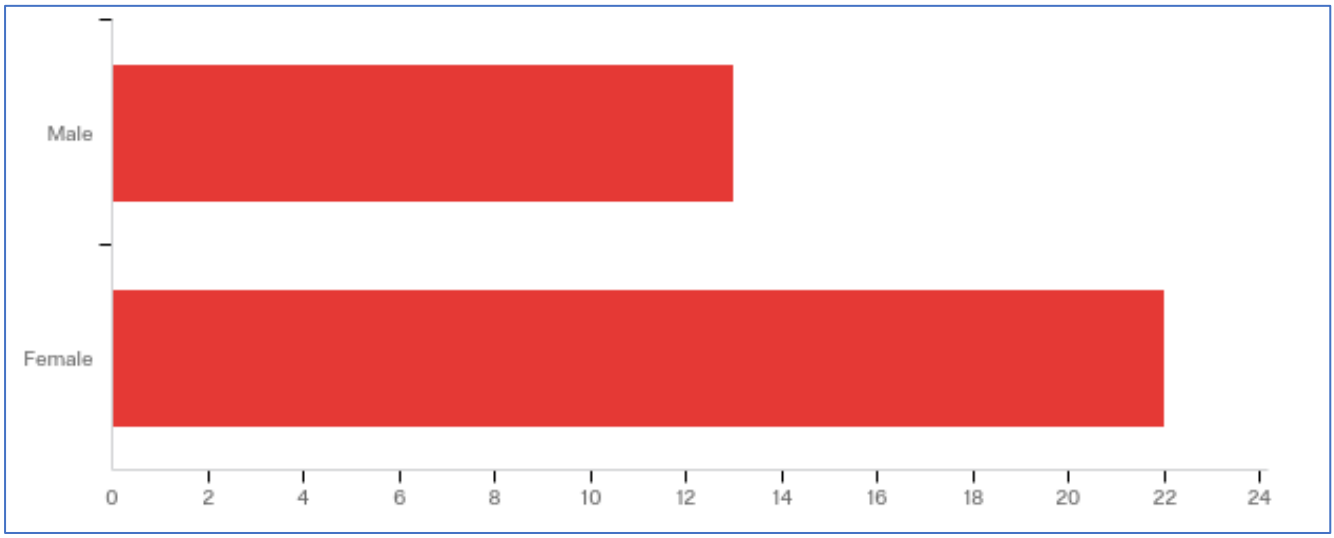
#	Answer	%	Count
1	A	8.57%	3
2	B	48.57%	17
3	C	42.86%	15
	Total	100%	35

Q26 - If you are an Australian citizen, in which state were you born?



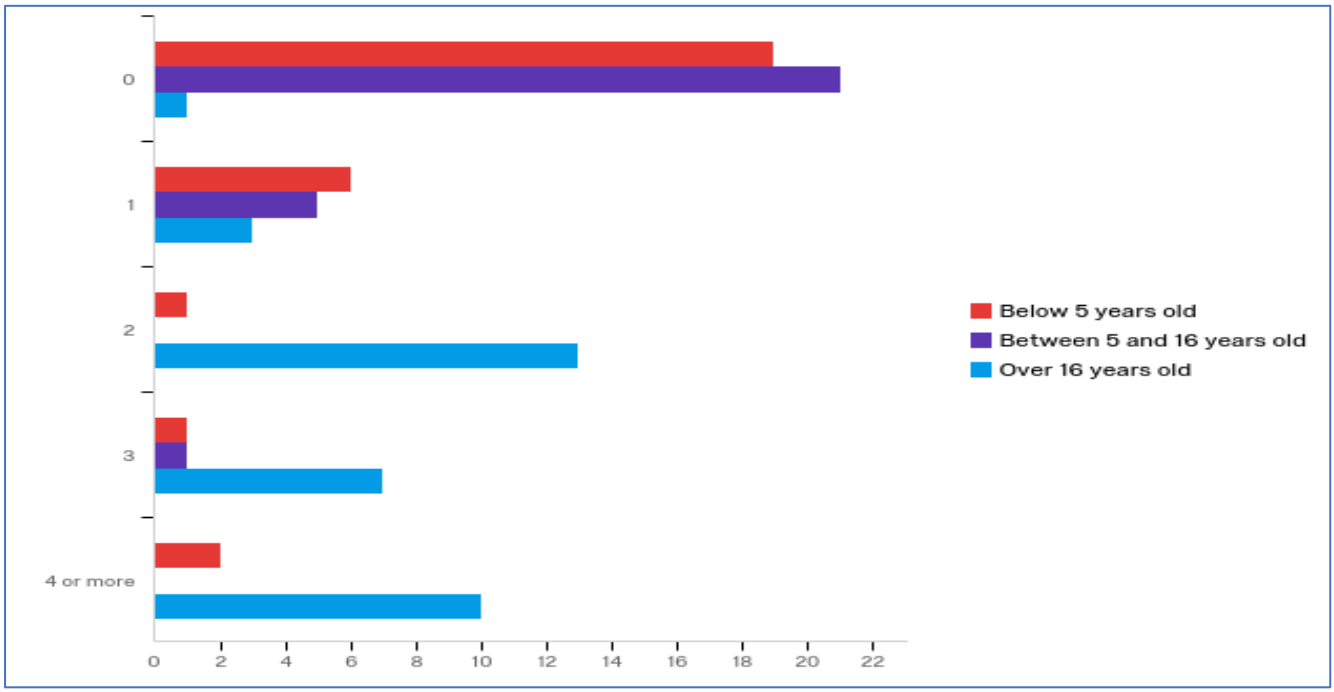
#	Answer	%	Count
1	Australian Capital Territory	2.86%	1
2	New South Wales	48.57%	17
3	Northern Territory	0.00%	0
4	Queensland	5.71%	2
5	South Australia	2.86%	1
6	Tasmania	0.00%	0
7	Victoria	0.00%	0
8	Western Australia	2.86%	1
9	Overseas	37.14%	13
	Total	100%	35

Q27 - What is your gender?



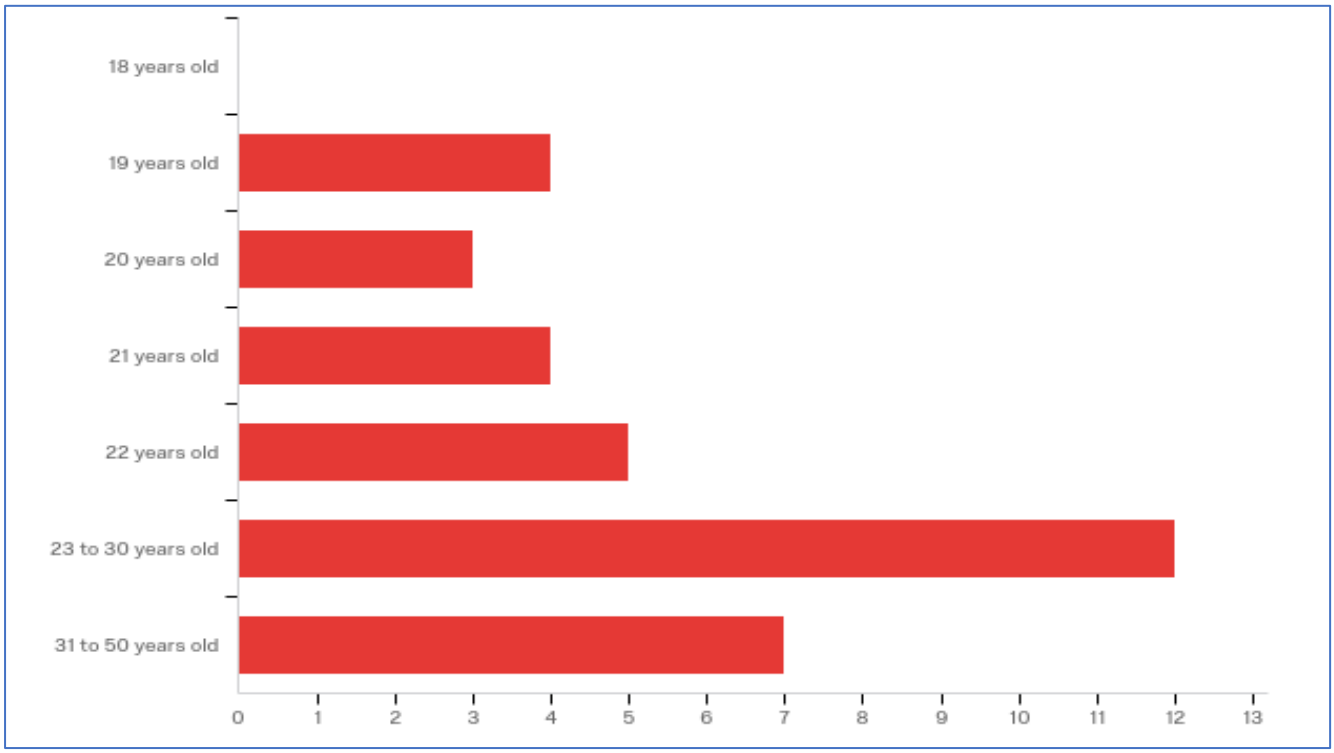
#	Answer	%	Count
1	Male	37.14%	13
2	Female	62.86%	22
	Total	100%	35

Q28 - Including yourself, how many people live in your household?



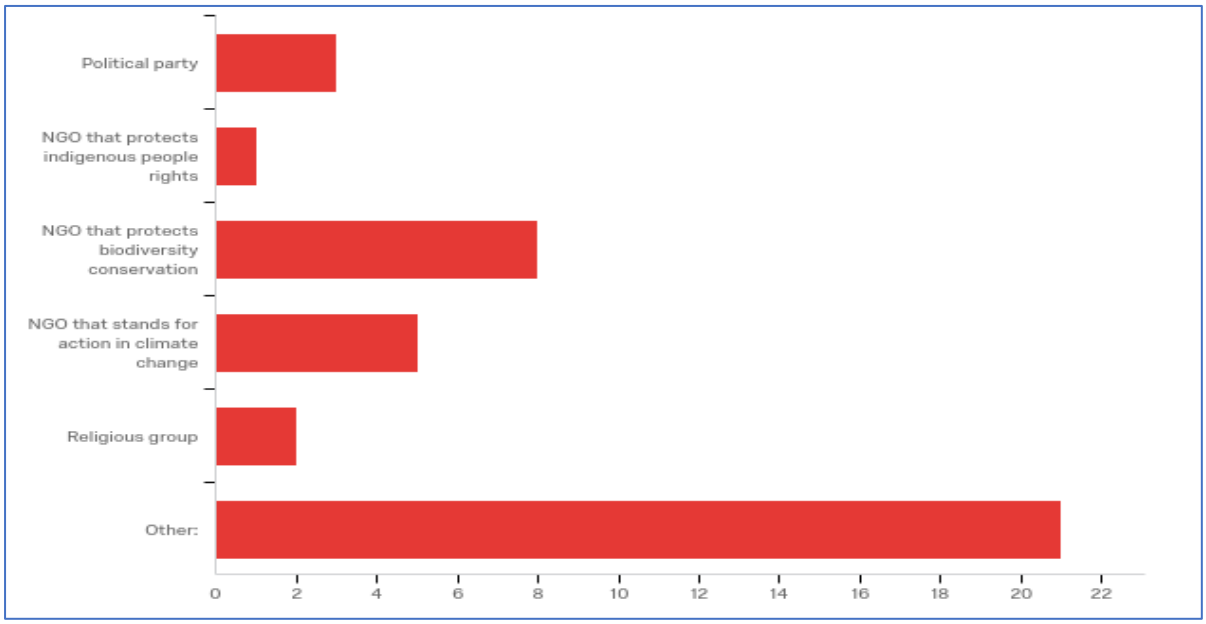
#	Question	0		1		2		3		4 or more		Total
1	Below 5 years old	65.52%	19	20.69%	6	3.45%	1	3.45%	1	6.90%	2	29
2	Between 5 and 16 years old	77.78%	21	18.52%	5	0.00%	0	3.70%	1	0.00%	0	27
3	Over 16 years old	2.94%	1	8.82%	3	38.24%	13	20.59%	7	29.41%	10	34

Q30 - Which of these age groups do you belong to?



#	Answer	%	Count
1	18 years old	0.00%	0
2	19 years old	11.43%	4
3	20 years old	8.57%	3
4	21 years old	11.43%	4
5	22 years old	14.29%	5
6	23 to 30 years old	34.29%	12
7	31 to 50 years old	20.00%	7
	Total	100%	35

Q32 - Are you a volunteer or donor to any of the following organizations? Please, TICK (✓) in the first column for each case you participate



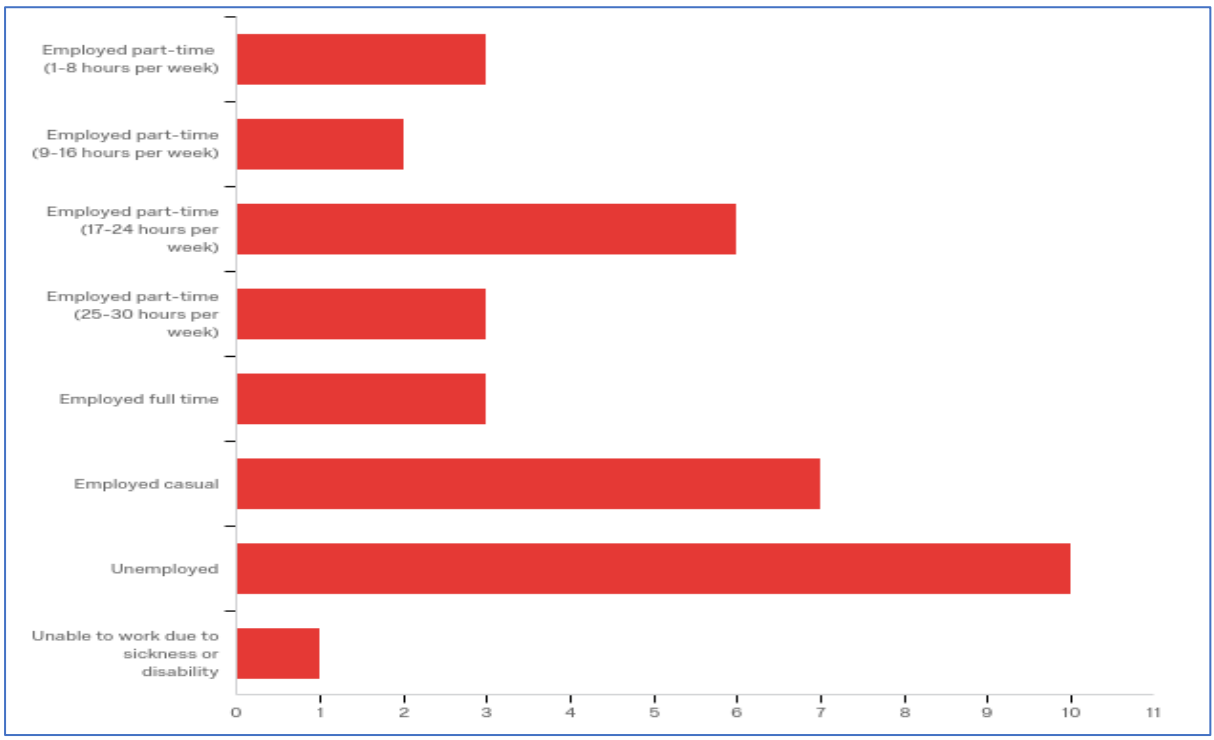
#	Answer	%	Count
1	Political party	8.57%	3
2	NGO that protects indigenous people rights	2.86%	1
3	NGO that protects biodiversity conservation	22.86%	8
4	NGO that stands for action in climate change	14.29%	5
5	Religious group	5.71%	2
6	Other:	60.00%	21
	Total	100%	35

Other:

Other:
None.
red cross
Mone
none
Doctors without borders
none
None

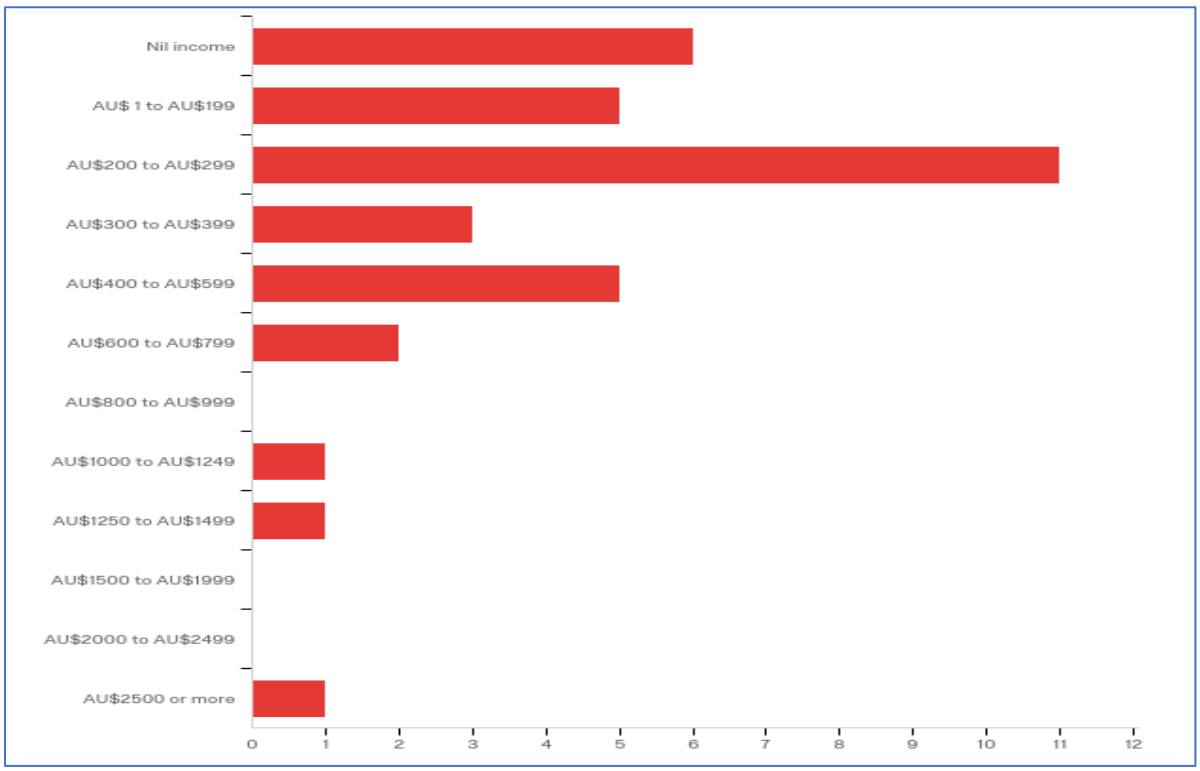
None
MSF, Refugee supporting organisations
None
none
None
charity
Occasional volunteer - political and environmental
none
None
none

Q33 - What is your current work status, in addition to studying? Please, choose one of the following options:



#	Answer	%	Count
1	Employed part-time (1-8 hours per week)	8.57%	3
2	Employed part-time (9-16 hours per week)	5.71%	2
3	Employed part-time (17-24 hours per week)	17.14%	6
4	Employed part-time (25-30 hours per week)	8.57%	3
5	Employed full time	8.57%	3
6	Employed casual	20.00%	7
7	Unemployed	28.57%	10
8	Unable to work due to sickness or disability	2.86%	1
	Total	100%	35

Q34 - Could you tell me which category best describes your average income before taxes per week over the last year?



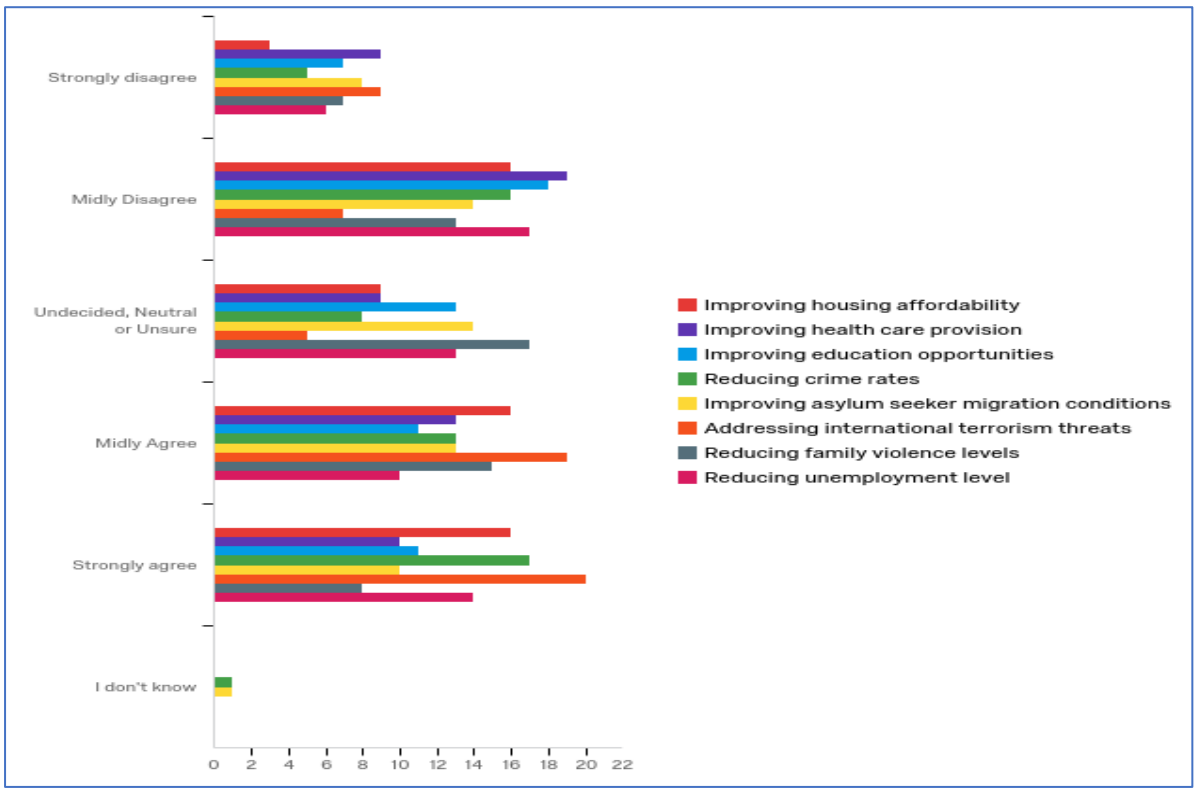
#	Answer	%	Count
1	Nil income	17.14%	6
2	AU$ 1 to AU$199	14.29%	5
3	AU$200 to AU$299	31.43%	11
4	AU$300 to AU$399	8.57%	3
5	AU$400 to AU$599	14.29%	5
6	AU$600 to AU$799	5.71%	2
7	AU$800 to AU$999	0.00%	0
8	AU$1000 to AU$1249	2.86%	1
9	AU$1250 to AU$1499	2.86%	1
10	AU$1500 to AU$1999	0.00%	0
11	AU$2000 to AU$2499	0.00%	0
12	AU$2500 or more	2.86%	1
	Total	100%	35

Q35 - Please add any further comments you would like to contribute to the study.Thanks.

Please add any further comments you would like to contribute to the study.T...
Brazil nuts are a good source of selenium. It's great for optimizing mens' health in regards to low testosterone. And they taste great!
Great research
Please have someone proofread your survey. There are some small grammatical mistakes which affect the meaning... and subsequently the responses to quiestions. Also the questions guaging level of importance of activities in Brazil, were way to similar and repetitive.
Nice.keep up the good work.
Interesting!
I would support/buy Brazil nuts more if I knew they were being harvested sustainably, also with fair pay for workers. Organic (no chemical treatment) is also important to me

Appendix 4.6. Answers of Melbourne respondents.

Q2 - Do you consider the issue of biodiversity loss and environmental concernsto be more important than



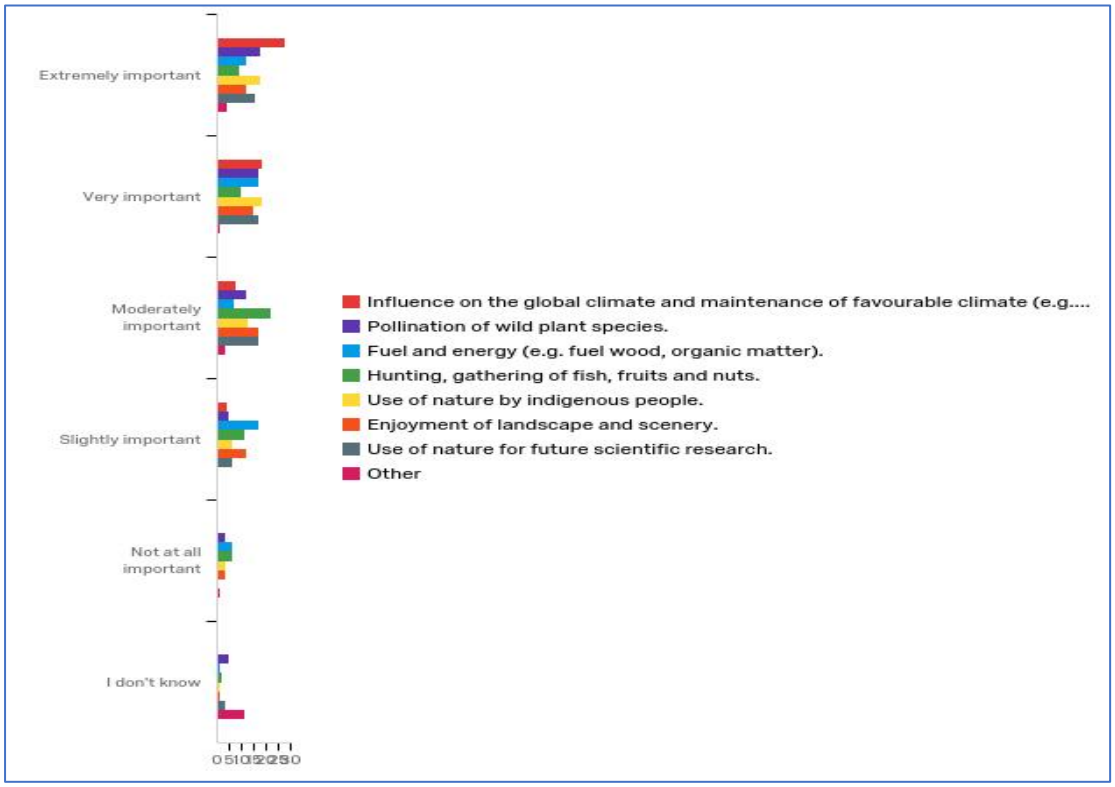
#	Question	Strongly disagree		Midly Disagree		Undecided, Neutral or Unsure		Midly Agree		Strongly agree		I don't know		Total
1	Improving housing affordability	5.00%	3	26.67%	16	15.00%	9	26.67%	16	26.67%	16	0.00%	0	60
2	Improving health care provision	15.00%	9	31.67%	19	15.00%	9	21.67%	13	16.67%	10	0.00%	0	60
3	Improving education opportunities	11.67%	7	30.00%	18	21.67%	13	18.33%	11	18.33%	11	0.00%	0	60
4	Reducing crime rates	8.33%	5	26.67%	16	13.33%	8	21.67%	13	28.33%	17	1.67%	1	60
5	Improving asylum seeker migration conditions	13.33%	8	23.33%	14	23.33%	14	21.67%	13	16.67%	10	1.67%	1	60
6	Addressing international terrorism threats	15.00%	9	11.67%	7	8.33%	5	31.67%	19	33.33%	20	0.00%	0	60
7	Reducing family violence levels	11.67%	7	21.67%	13	28.33%	17	25.00%	15	13.33%	8	0.00%	0	60
8	Reducing unemployment level	10.00%	6	28.33%	17	21.67%	13	16.67%	10	23.33%	14	0.00%	0	60

Q3 - Please read the following statements related to biodiversity conservation in the Amazon and choose in what extent do you agree or disagree.

#	Question	Strongly disagree		Midly Disagree		Undecided, Neutral or Unsure		Midly Agree		Strongly agree		I don't know		Total
1	Amazon forests should be protected for future generations even if that costs me money now.	3.33%	2	6.67%	4	3.33%	2	23.33%	14	63.33%	38	0.00%	0	60
2	Conservation of large trees in the Amazon is more important than conservation of small trees.	5.00%	3	13.33%	8	35.00%	21	25.00%	15	10.00%	6	11.67%	7	60
3	Carbon sequestration from the Amazon rainforest is more important than "artificial" carbon sequestration with engineering.	1.67%	1	5.00%	3	35.00%	21	13.33%	8	31.67%	19	13.33%	8	60
4	Australia should use tax funds to invest in biodiversity conservation in the Amazon, only if other developed countries do the same.	15.00%	9	23.33%	14	11.67%	7	33.33%	20	15.00%	9	1.67%	1	60

5	The imports of nuts for consumption in Australia from wild species harvested in the Amazon should be encouraged.	10.00%	6	15.00%	9	35.00%	21	15.00%	9	18.33%	11	6.67%	4	60

Q4 - An ecosystem is a dynamic system of plant, animal and microorganism communities and the surrounding nonliving environment. Ecosystem services are the benefits people obtain from ecosystems. Below you will find a list of ecosystem services from the Amazon basin. Please rate how important each of these ecosystem services are to you.



#	Question	Extremely important		Very important		Moderately important		Slightly important		Not at all important		I don't know		Total
1	Influence on the global climate and maintenance of favourable climate (e.g. temperature, precipitation).	47.46%	28	32.20%	19	13.56%	8	6.78%	4	0.00%	0	0.00%	0	59
2	Pollination of wild plant species.	30.00%	18	28.33%	17	20.00%	12	8.33%	5	5.00%	3	8.33%	5	60
3	Fuel and energy (e.g. fuel wood, organic matter).	20.00%	12	28.33%	17	11.67%	7	28.33%	17	10.00%	6	1.67%	1	60
4	Hunting, gathering of fish, fruits and nuts.	15.00%	9	16.67%	10	36.67%	22	18.33%	11	10.00%	6	3.33%	2	60
5	Use of nature by indigenous people.	30.00%	18	31.67%	19	21.67%	13	10.00%	6	5.00%	3	1.67%	1	60

6	Enjoyment of landscape and scenery.	20.00%	12	25.00%	15	28.33%	17	20.00%	12	5.00%	3	1.67%	1	60
7	Use of nature for future scientific research.	27.12%	16	28.81%	17	28.81%	17	10.17%	6	0.00%	0	5.08%	3	59
8	Other	20.00%	4	5.00%	1	15.00%	3	0.00%	0	5.00%	1	55.00 %	11	20

Other

Other
None
Retaining huge numbers of biodiversity
Non

Q5 - If you could decide how to distribute Australia's investment in biodiversity conservation . Where would you choose? Please, include a percentage for each option (total percentage = 100).

Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Papua New Guinea, Solomon Islands, Vanuatu and Fiji	0.00	80.00	19.37	14.10	198.71	60
Other Pacific Island	0.00	30.00	10.55	7.10	50.42	59
Indonesia	0.00	50.00	13.52	9.91	98.26	60
Other South East Asia	0.00	40.00	10.55	7.35	54.01	60
North Africa and Middle East	0.00	70.00	11.29	11.57	133.80	60
Amazon	0.00	70.00	23.84	14.48	209.81	59
Other areas outside Amazon in the Latin American and Caribbean countries	0.00	100.00	11.45	14.32	205.01	60

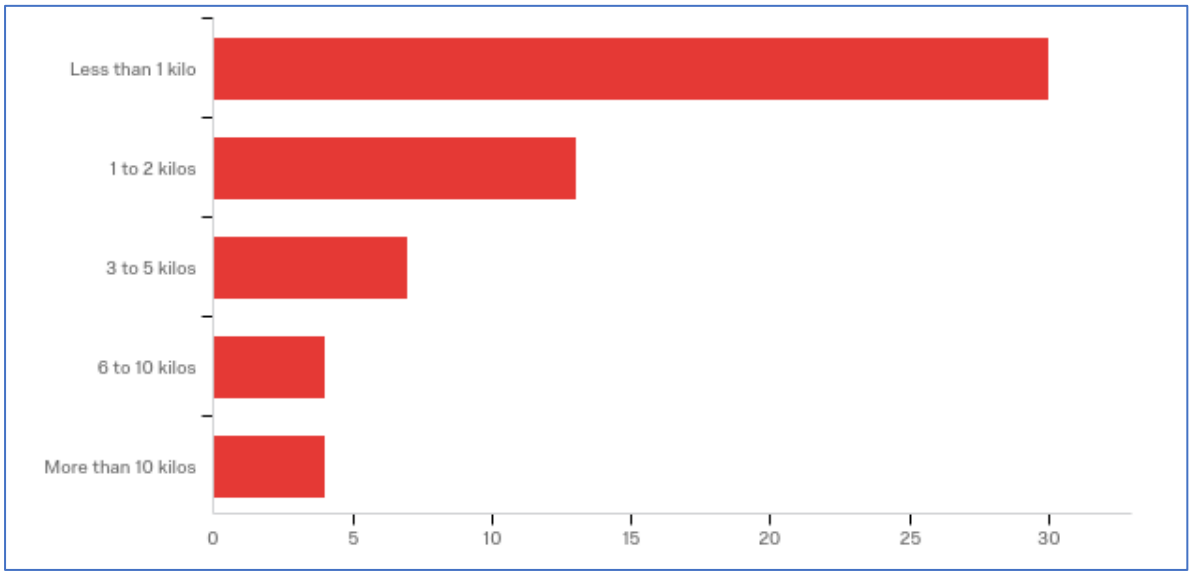
Q6 - In which ecosystem services overseas would you prefer that Australian biodiversity conservation budget be invested in? Please, include a percentage for each option (total percentage = 100).

Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Adaptation to the climate change and maintenance of global climate favourable for human life.	0.00	100.00	32.52	22.52	507.08	60
Maintenance of pollination of wild plant species.	0.00	30.00	12.73	8.95	80.13	60
Maintenance of capacity to provide fuel and energy.	0.00	50.00	11.18	11.01	121.22	60
Maintenance of hunting, gathering of fish, game fruits and nuts.	0.00	25.00	8.62	7.48	56.00	60
Allowing indigenous people to maintaining using nature in their traditional ways.	0.00	50.00	14.42	12.49	155.91	60
Maintaining the option for me and my family to enjoy the landscapes and nature sceneries.	0.00	50.00	8.87	9.05	81.88	60
Keeping the option to use the nature for future scientific research.	0.00	30.00	9.73	6.64	44.06	59
Other	0.00	62.00	2.14	8.40	70.49	59

Other

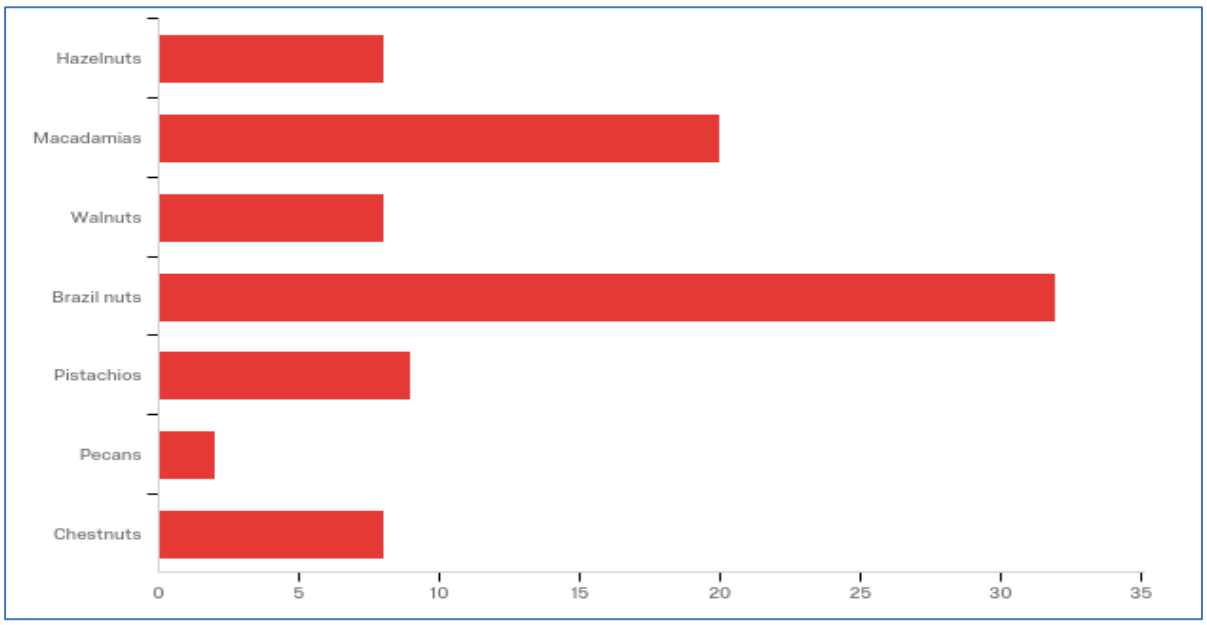
Other
clean air & water
Educating people

Q8 - In the last year, in what quantities did you purchased your first choice of nuts?



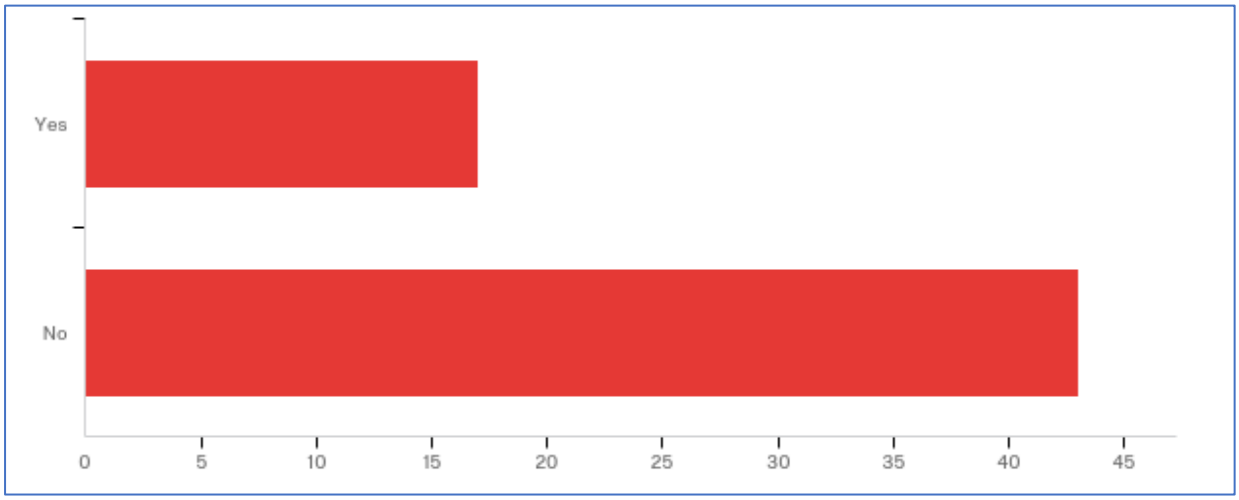
#	Answer	%	Count
1	Less than 1 kilo	51.72%	30
2	1 to 2 kilos	22.41%	13
3	3 to 5 kilos	12.07%	7
4	6 to 10 kilos	6.90%	4
5	More than 10 kilos	6.90%	4
	Total	100%	58

Q9 - Which of the following nuts do you know about the native origin of the nut species?



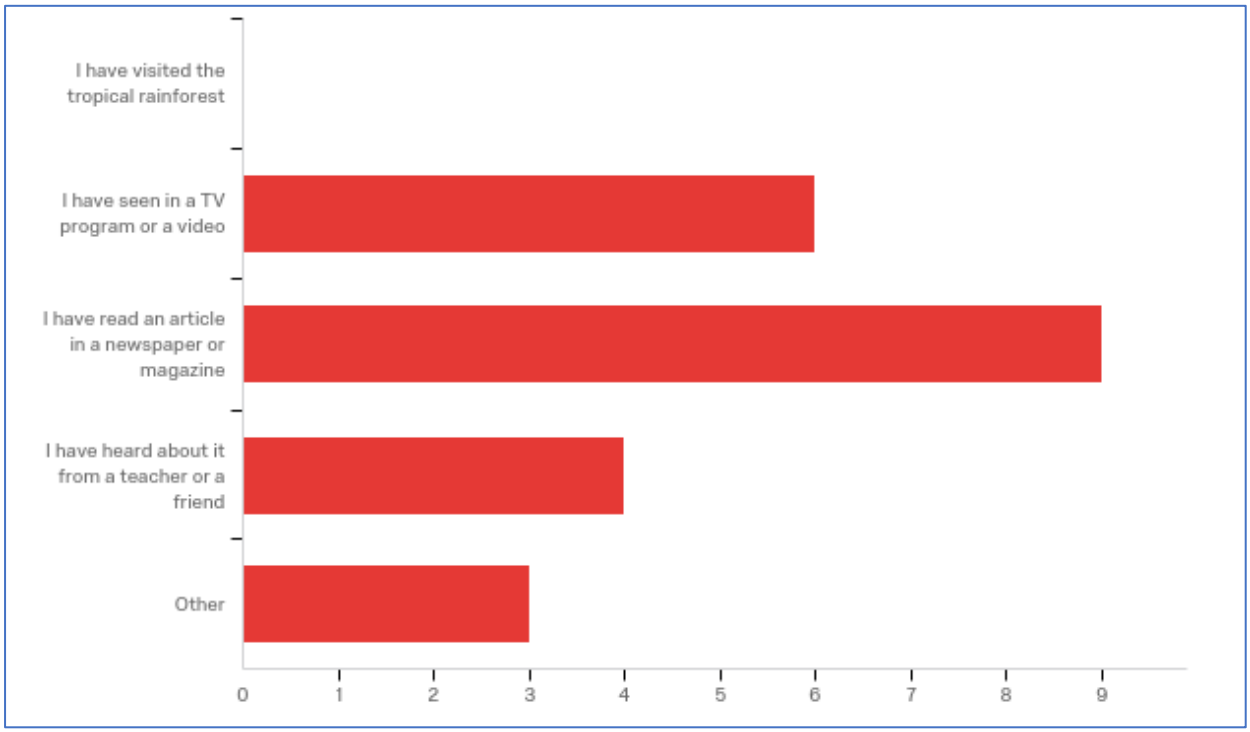
#	Answer	%	Count
1	Hazelnuts	13.33%	8
2	Macadamias	33.33%	20
3	Walnuts	13.33%	8
4	Brazil nuts	53.33%	32
5	Pistachios	15.00%	9
6	Pecans	3.33%	2
7	Chestnuts	13.33%	8
	Total	100%	60

Q10 - Do you know that Brazil nuts (Bertholletia excelsa) are harvested from wild Peruvian tropical rainforests?



#	Answer	%	Count
1	Yes	28.33%	17
2	No	71.67%	43
	Total	100%	60

Q11 - If you were aware of Brazil nuts wild harvest. How did you know it?

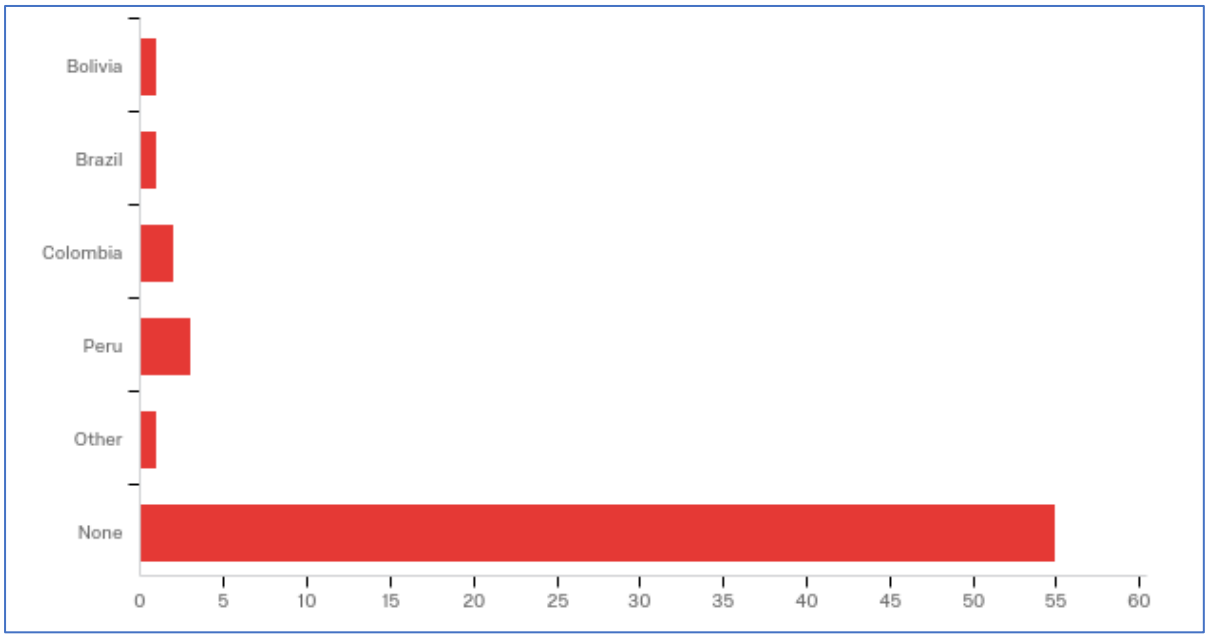


#	Answer	%	Count
1	I have visited the tropical rainforest	0.00%	0
2	I have seen in a TV program or a video	35.29%	6
3	I have read an article in a newspaper or magazine	52.94%	9
4	I have heard about it from a teacher or a friend	23.53%	4
5	Other	17.65%	3
	Total	100%	17

Other

Other
Reading your poster
Product information from packaging (Country of origin)
just assumed

Q12 - Have you ever visited the Amazon basin in one of the following countries? Please, TICK (✓) all of the countries where you have visited the Amazon basin.



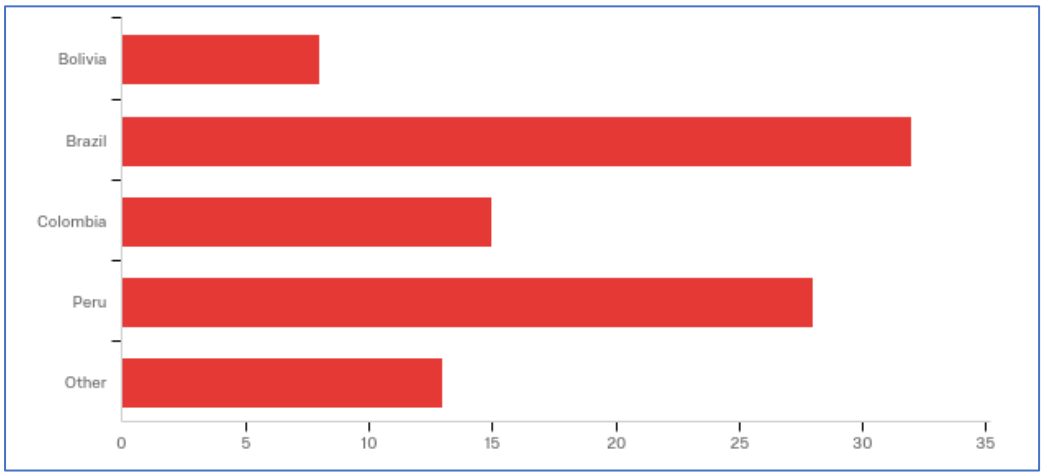
#	Answer	%	Count
1	Bolivia	1.67%	1
2	Brazil	1.67%	1
3	Colombia	3.33%	2
4	Peru	5.00%	3
5	Other	1.67%	1
6	None	91.67%	55
	Total	100%	60

Other

Other

ecuador

Q13 - If you have not visited any Amazon basin country yet, have you had planned to visit it in the future? Please, TICK (✓) on the Amazon basin countries you would like to visit.

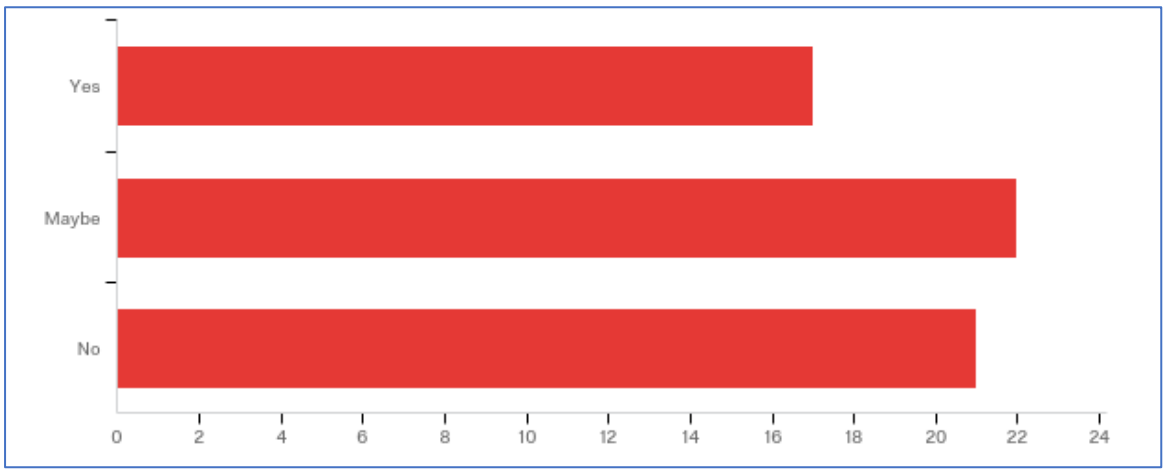


#	Answer	%	Count
1	Bolivia	14.55%	8
2	Brazil	58.18%	32
3	Colombia	27.27%	15
4	Peru	50.91%	28
5	Other	23.64%	13
	Total	100%	55

Other

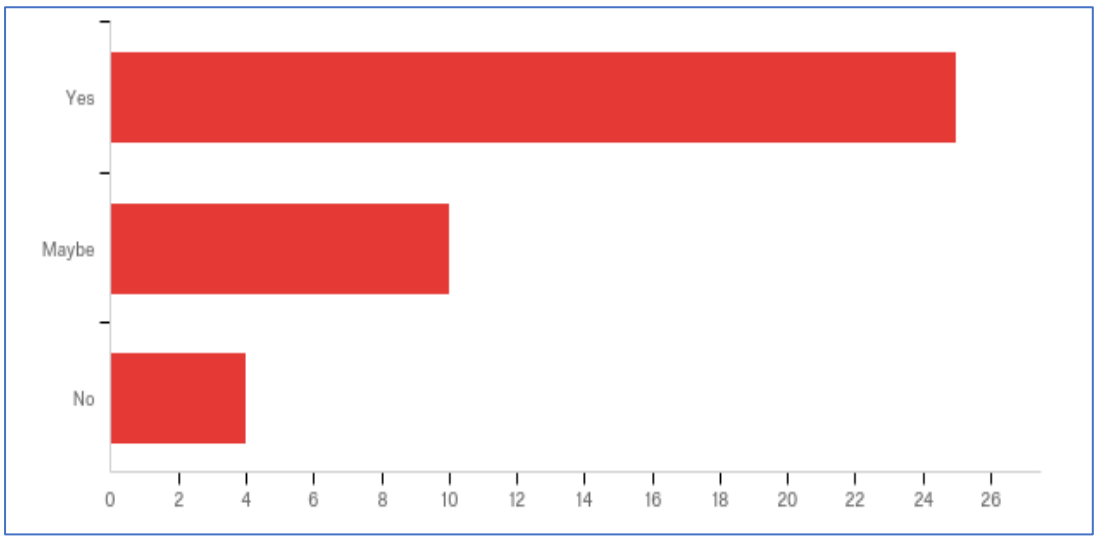
Other
Have not planned to visit
none
Suriname
None
none
None
no visits planned
All

Q14 - If you know that Brazil nuts are the only native wild harvest nut sold in the market. Would you buy more Brazil nuts?



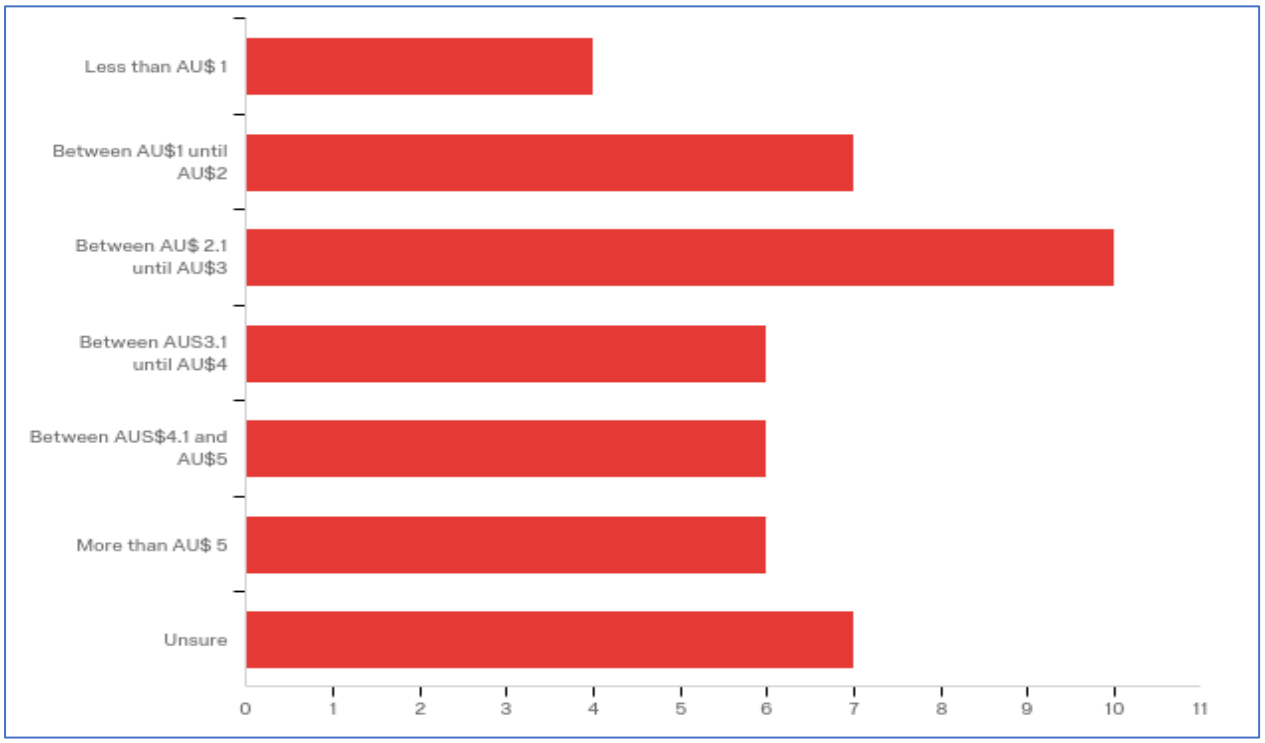
#	Answer	%	Count
1	Yes	28.33%	17
2	Maybe	36.67%	22
3	No	35.00%	21
	Total	100%	60

Q15 - Would you pay more for the Brazil nuts if you know they were harvested by Amazon indigenous people?



#	Answer	%	Count
1	Yes	64.10%	25
2	Maybe	25.64%	10
3	No	10.26%	4
	Total	100%	39

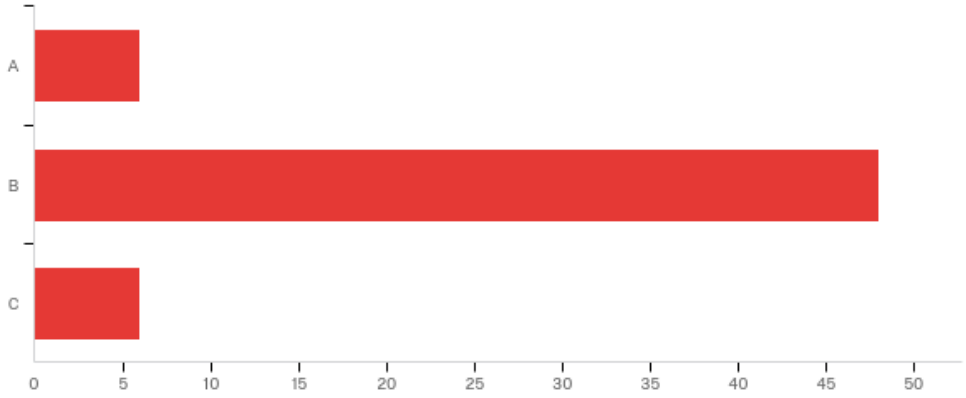
Q16 - How much more would you pay for the nuts if you know that the current retail price per kilo is AUS$ 20? Please, place a TICK (✓) in how much more would you pay for kilo?



#	Answer	%	Count
1	Less than AU$ 1	11.43%	4
2	Between AU$1 until AU$2	20.00%	7
3	Between AU$ 2.1 until AU$3	28.57%	10
4	Between AUS3.1 until AU$4	17.14%	6
5	Between AUS$4.1 and AU$5	17.14%	6
6	More than AU$ 5	17.14%	6
7	Unsure	20.00%	7
	Total	100%	35

Q17 - Suppose that after the international community arrived at consensus in Paris 2015 regarding a global deal to limit the average annual temperature increase, the Australian government decides to invest in a program that will maintain the resilience of the Amazon forest ecosystem. It will allow the natural production of Brazil nuts continues every year (see photo) providing ecosystem services, carbon sequestration and habitat for flora and fauna. If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support? Please, consider each of the following 3 alternatives options: A, B, and C in the 8 scenarios given below.

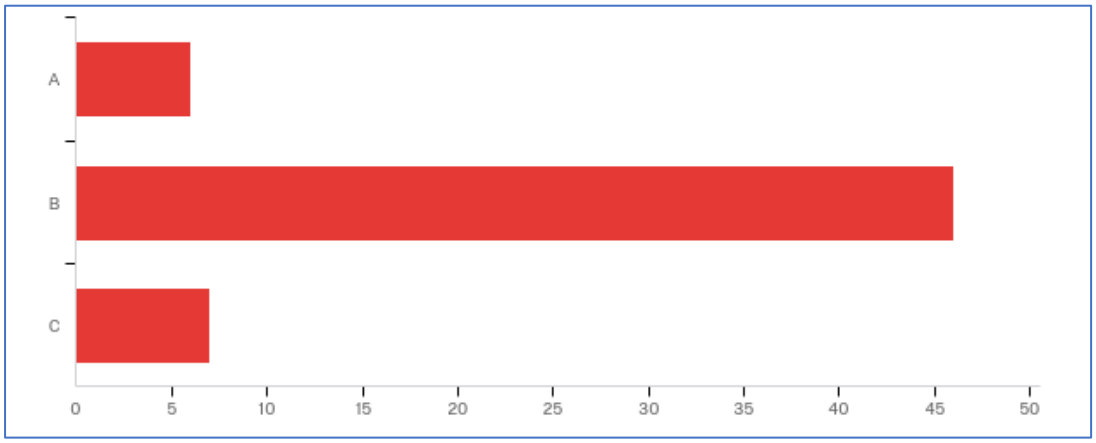
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	50	200
Indigenous families benefited with the Program	0	100	0
Average capacity of carbon storage above ground (Mg./hectares)	0	110	70
Annual cost to my household to achieve this outcome (AU$)	0	10	30



#	Answer	%	Count
1	A	10.00%	6
2	B	80.00%	48
3	C	10.00%	6
	Total	100%	60

Q19 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

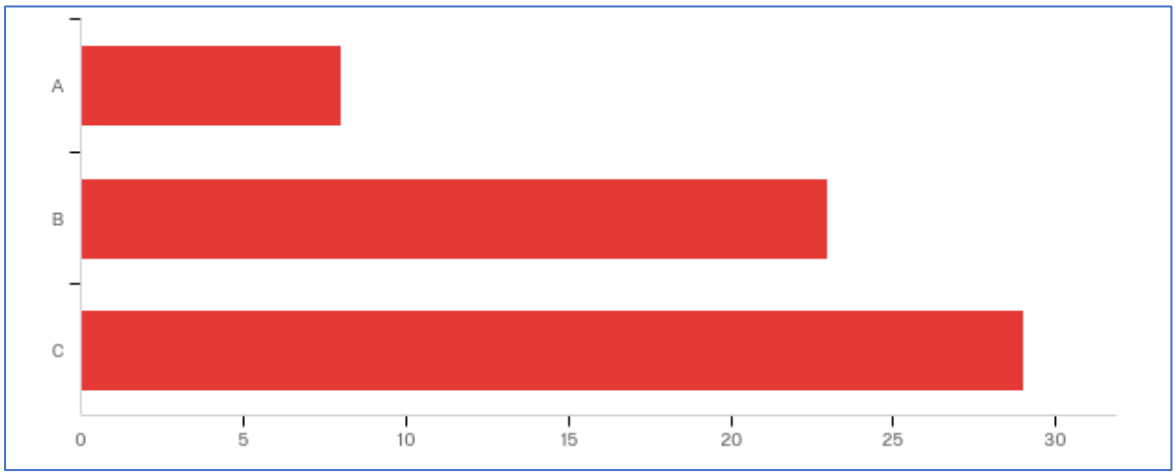
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	50	200
Indigenous families benefited with the Program	0	100	0
Average capacity of carbon storage above ground (Mg./hectares)	0	70	110
Annual cost to my household to achieve this outcome (AU$)	0	30	40



#	Answer	%	Count
1	A	10.17%	6
2	B	77.97%	46
3	C	11.86%	7
	Total	100%	59

Q20 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

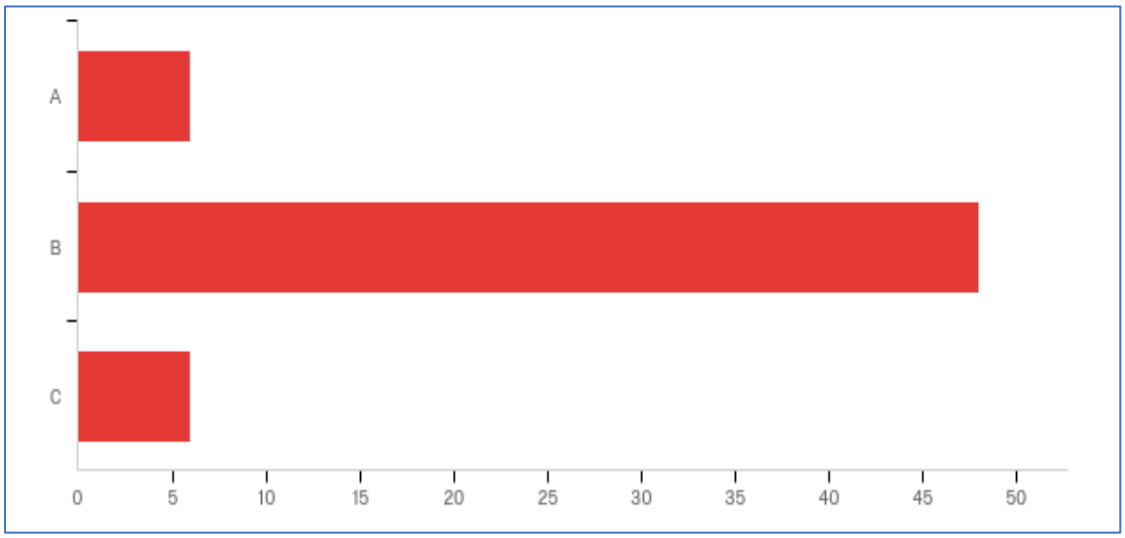
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	200	300
Indigenous families benefited with the Program	0	0	0
Average capacity of carbon storage above ground (Mg./hectares)	0	10	70
Annual cost to my household to achieve this outcome (AU$)	0	10	30



#	Answer	%	Count
1	A	13.33%	8
2	B	38.33%	23
3	C	48.33%	29
	Total	100%	60

Q21 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

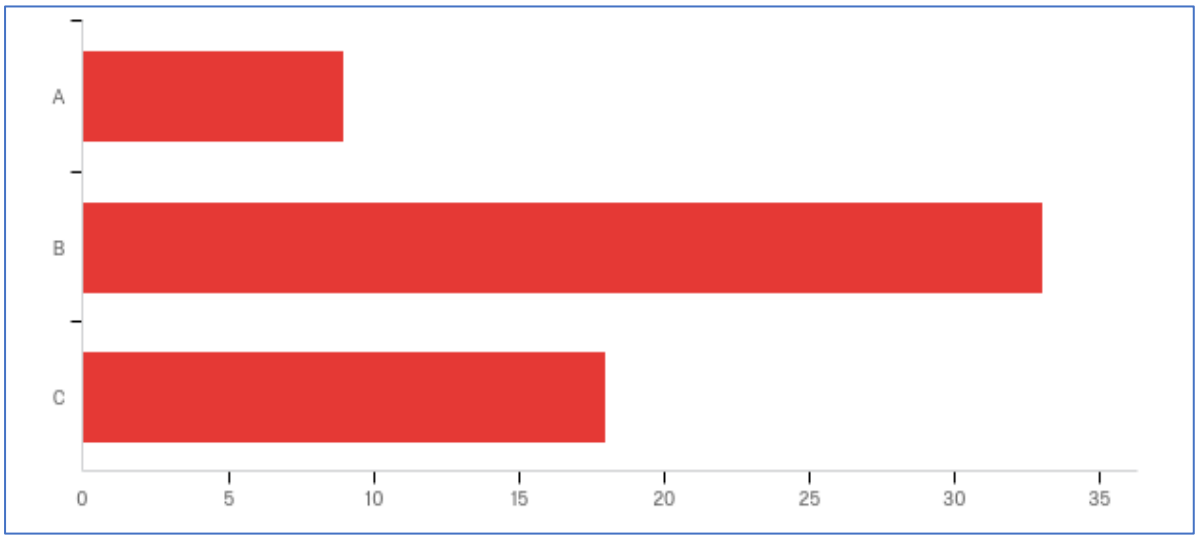
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	50	200
Indigenous families benefited with the Program	0	100	0
Average capacity of carbon storage above ground (Mg./hectares)	0	70	10
Annual cost to my household to achieve this outcome (AU$)	0	30	40



#	Answer	%	Count
1	A	10.00%	6
2	B	80.00%	48
3	C	10.00%	6
	Total	100%	60

Q22 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

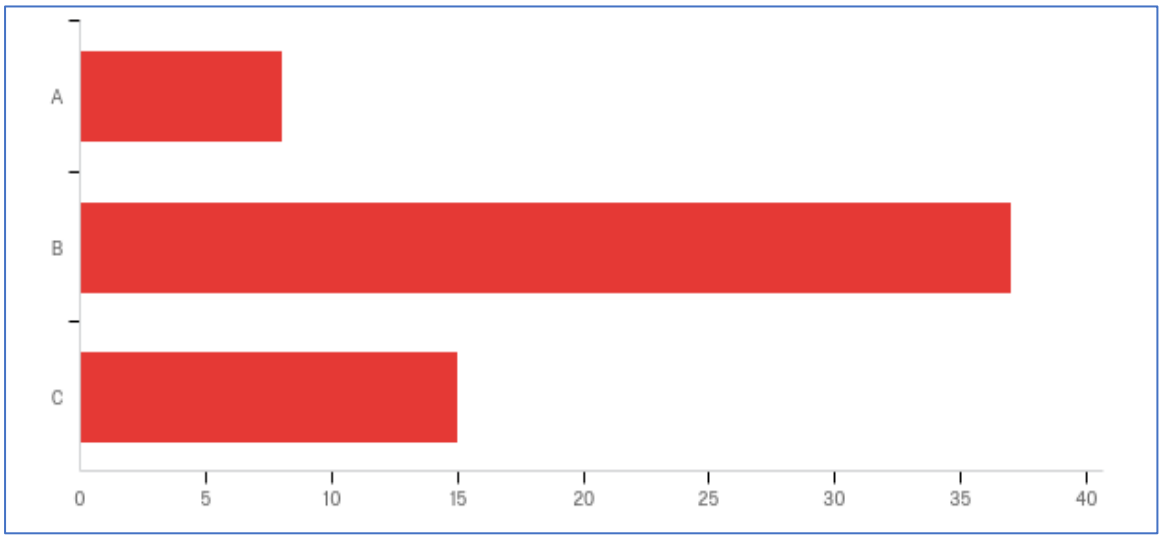
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	200	300
Indigenous families benefited with the Program	0	100	100
Average capacity of carbon storage above ground (Mg./hectares)	0	110	70
Annual cost to my household to achieve this outcome (AU$)	0	30	40



#	Answer	%	Count
1	A	15.00%	9
2	B	55.00%	33
3	C	30.00%	18
	Total	100%	60

Q23 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

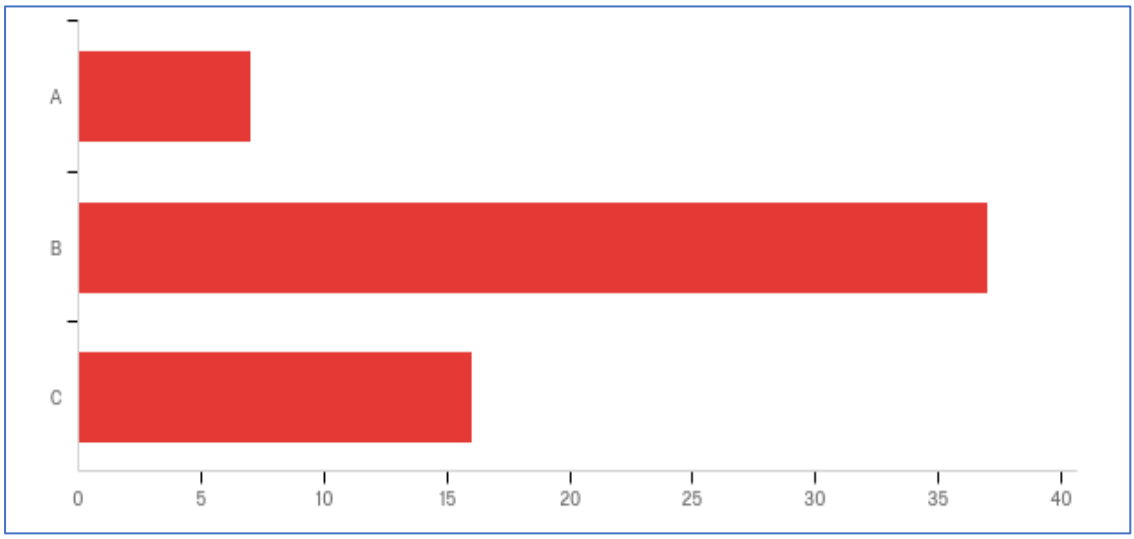
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	50	300
Indigenous families benefited with the Program	0	100	0
Average capacity of carbon storage above ground (Mg./hectares)	0	110	10
Annual cost to my household to achieve this outcome (AU$)	0	40	30



#	Answer	%	Count
1	A	13.33%	8
2	B	61.67%	37
3	C	25.00%	15
	Total	100%	60

Q24 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

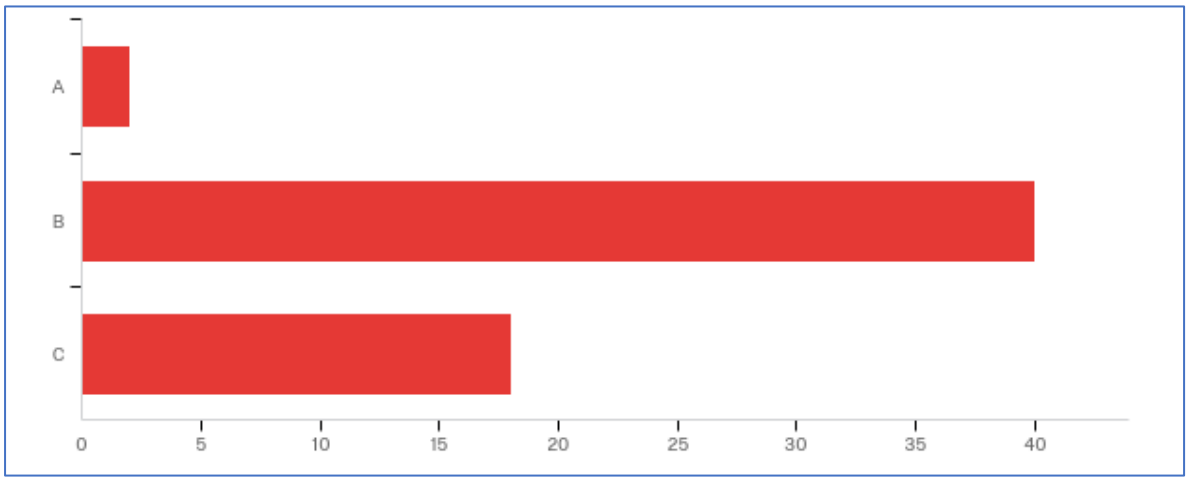
Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has.)	0	200	300
Indigenous families benefited with the Program	0	100	0
Average capacity of carbon storage above ground (Mg./hectares)	0	110	70
Annual cost to my household to achieve this outcome (AU$)	0	40	30



#	Answer	%	Count
1	A	11.67%	7
2	B	61.67%	37
3	C	26.67%	16
	Total	100%	60

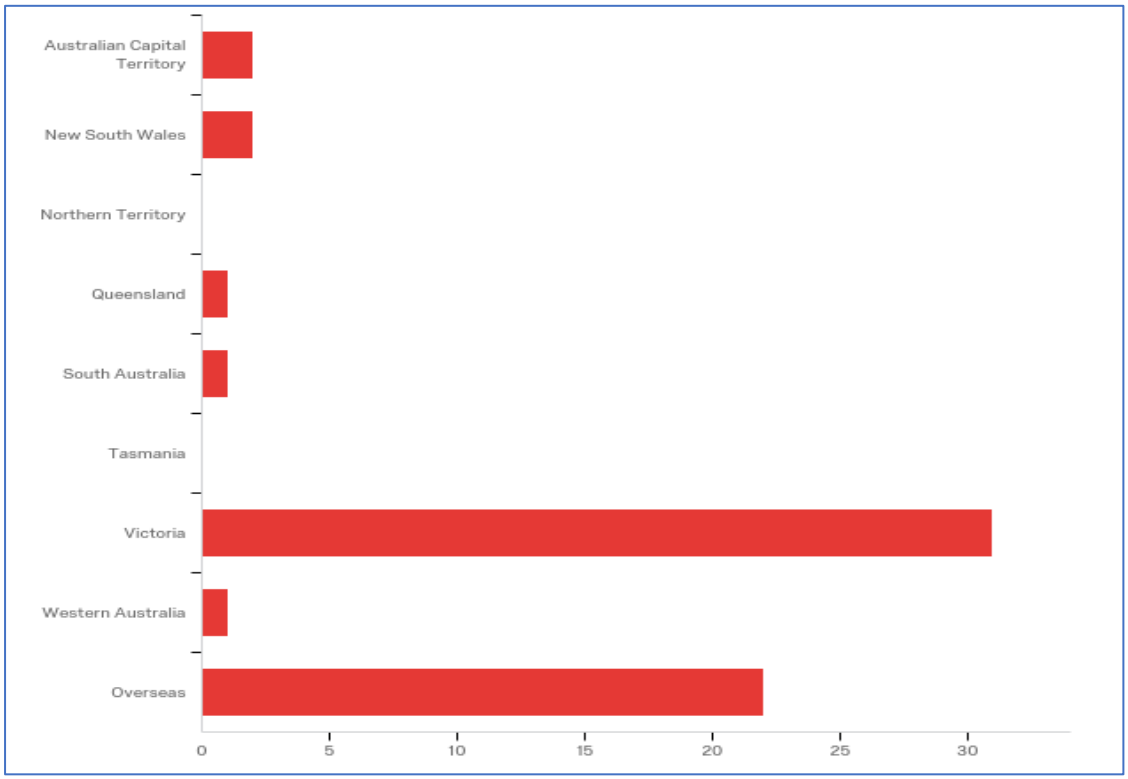
Q25 - If the Federal Government decide to use taxes to fund the hypothetical conservation program in the Brazil nuts forest, Which type of program would you support?

Attributes/options	A	B	C
Area of old-growth forest with resilience guaranteed (t. of has)	0	50	300
Indigenous families benefited with the Program	0	100	0
Average capacity of carbon storage above ground (Mg./hectares)	0	70	10
Annual cost to my household to achieve this outcome (AU$)	0	30	10



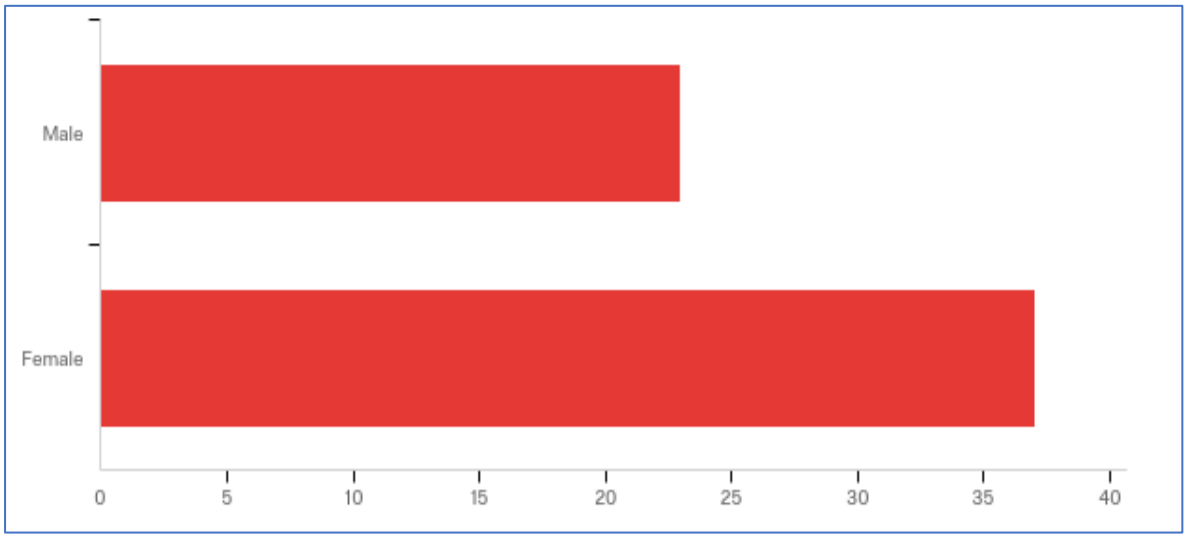
#	Answer	%	Count
1	A	3.33%	2
2	B	66.67%	40
3	C	30.00%	18
	Total	100%	60

Q26 - If you are an Australian citizen, in which state were you born?



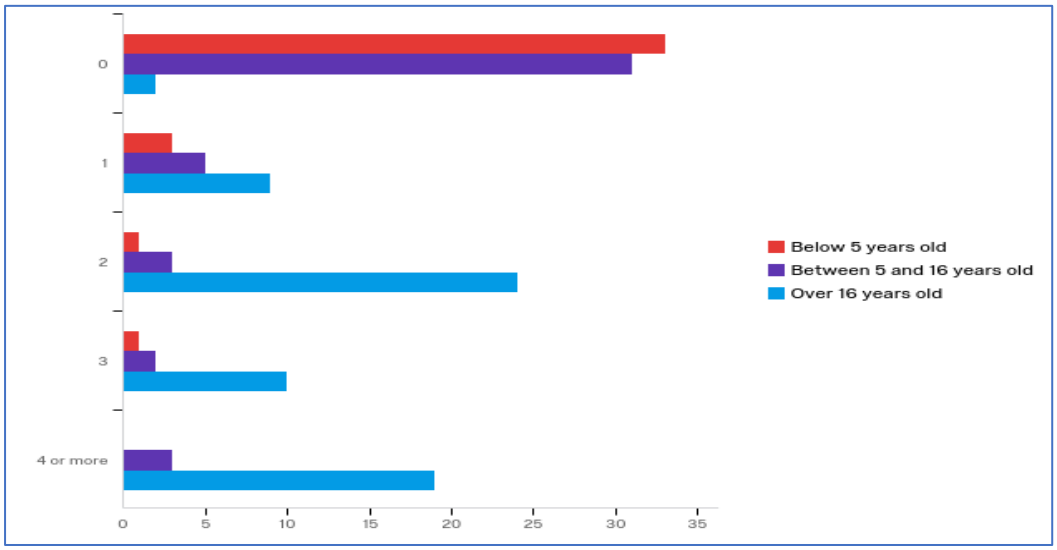
#	Answer	%	Count
1	Australian Capital Territory	3.33%	2
2	New South Wales	3.33%	2
3	Northern Territory	0.00%	0
4	Queensland	1.67%	1
5	South Australia	1.67%	1
6	Tasmania	0.00%	0
7	Victoria	51.67%	31
8	Western Australia	1.67%	1
9	Overseas	36.67%	22
	Total	100%	60

Q27 - What is your gender?



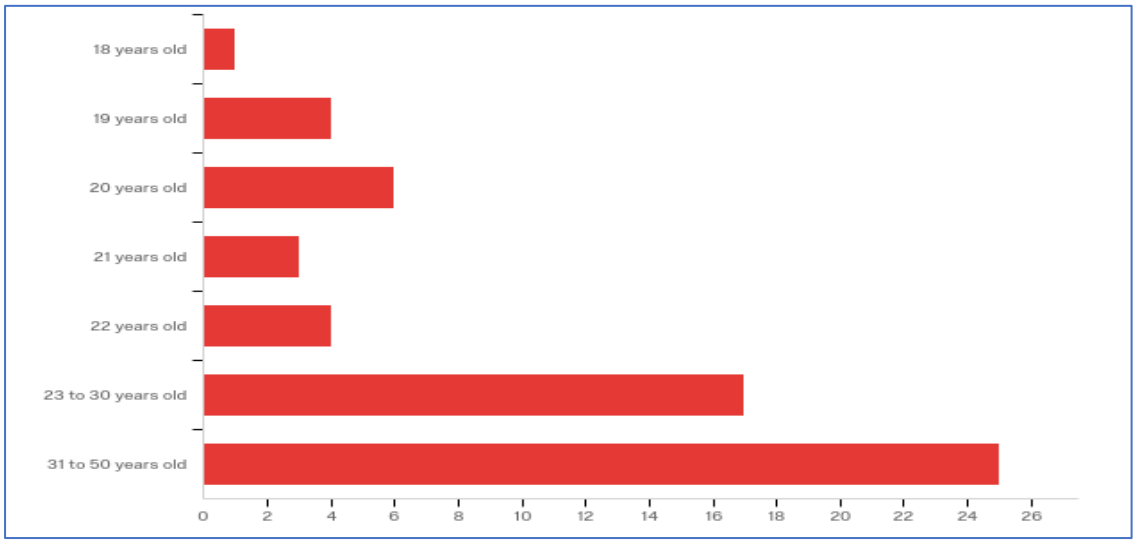
#	Answer	%	Count
1	Male	38.33%	23
2	Female	61.67%	37
	Total	100%	60

Q28 - Including yourself, how many people live in your household?



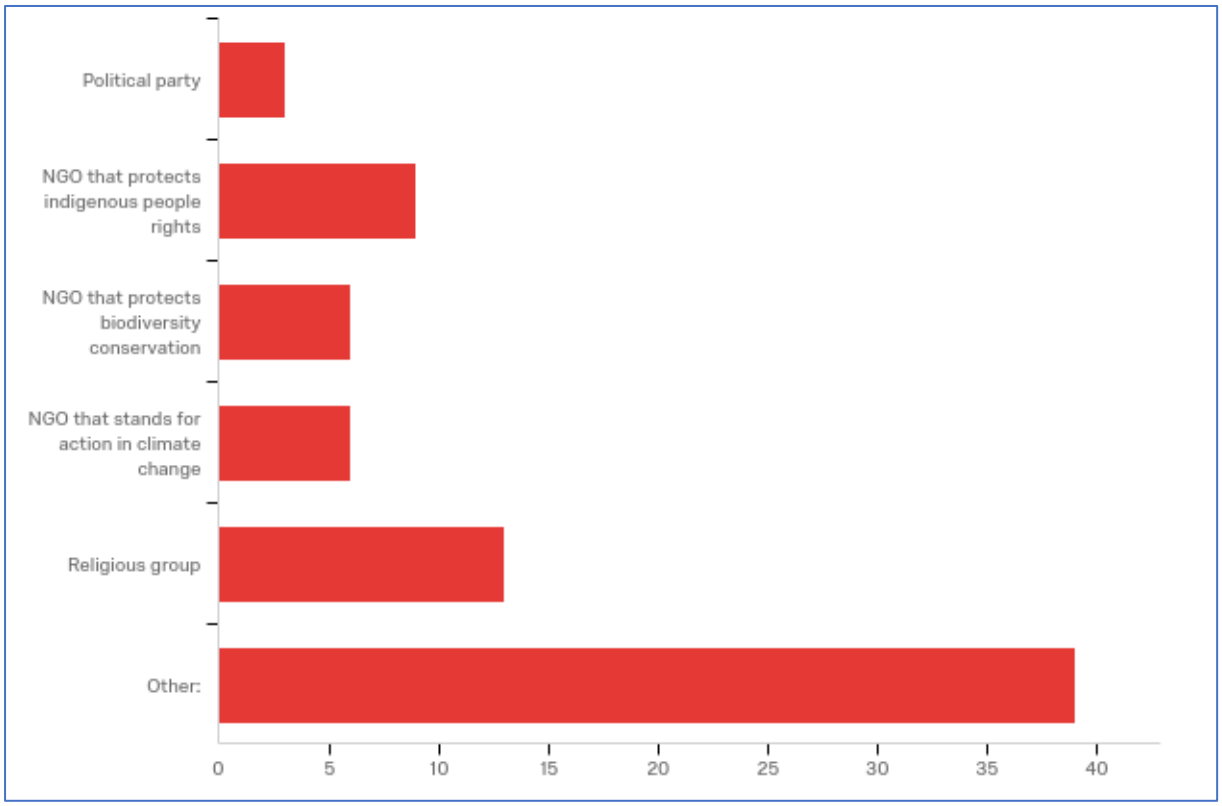
#	Question	0		1		2		3		4 or more		Total
1	Below 5 years old	86.84%	33	7.89%	3	2.63%	1	2.63%	1	0.00%	0	38
2	Between 5 and 16 years old	70.45%	31	11.36%	5	6.82%	3	4.55%	2	6.82%	3	44
3	Over 16 years old	3.13%	2	14.06%	9	37.50%	24	15.63%	10	29.69%	19	64

Q30 - Which of these age groups do you belong to?



#	Answer	%	Count
1	18 years old	1.67%	1
2	19 years old	6.67%	4
3	20 years old	10.00%	6
4	21 years old	5.00%	3
5	22 years old	6.67%	4
6	23 to 30 years old	28.33%	17
7	31 to 50 years old	41.67%	25
	Total	100%	60

Q32 - Are you a volunteer or donor to any of the following organizations? Please, TICK (✓) in the first column for each case you participate



#	Answer	%	Count
1	Political party	5.00%	3
2	NGO that protects indigenous people rights	15.00%	9
3	NGO that protects biodiversity conservation	10.00%	6
4	NGO that stands for action in climate change	10.00%	6
5	Religious group	21.67%	13
6	Other:	65.00%	39
	Total	100%	60

Other:

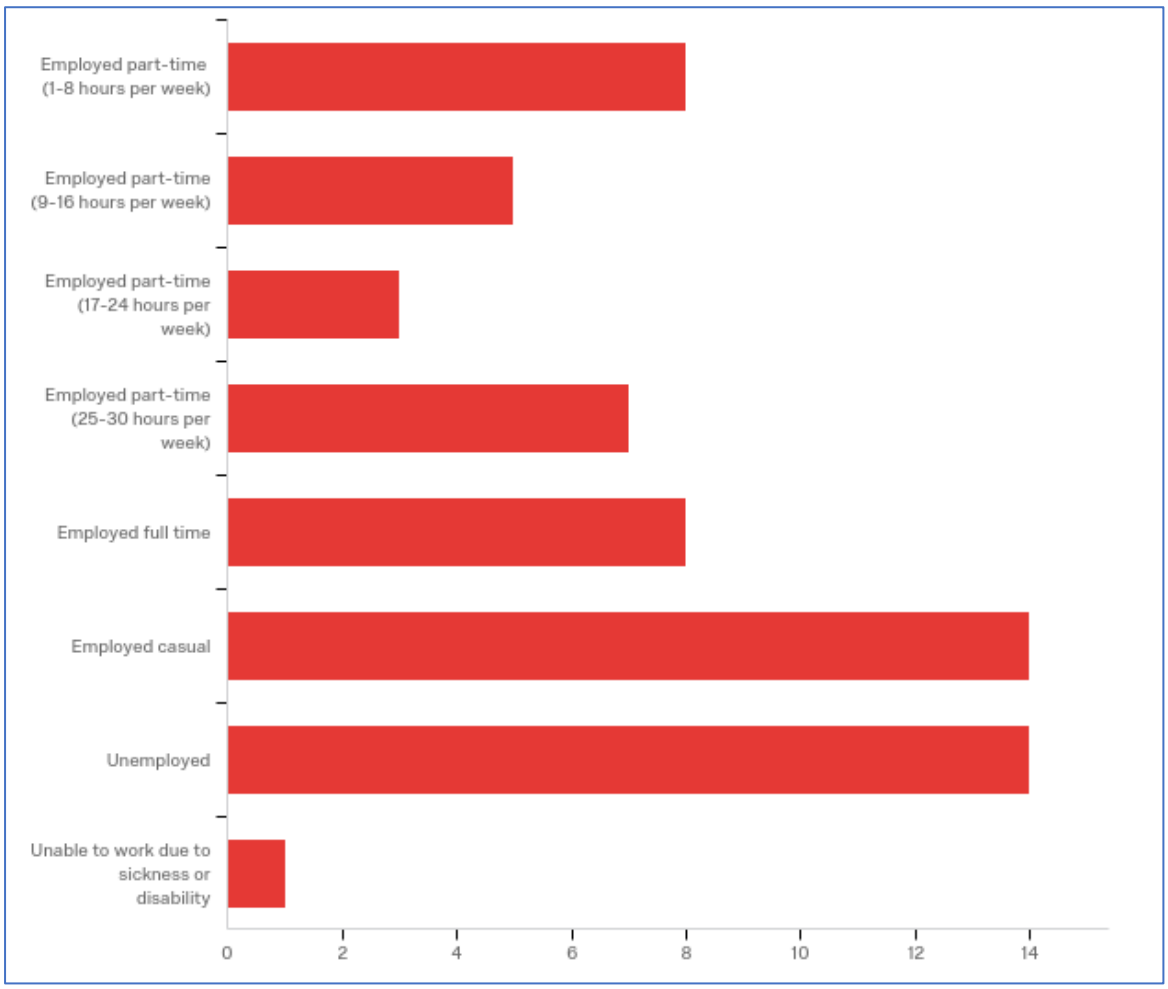
Other:

None

no

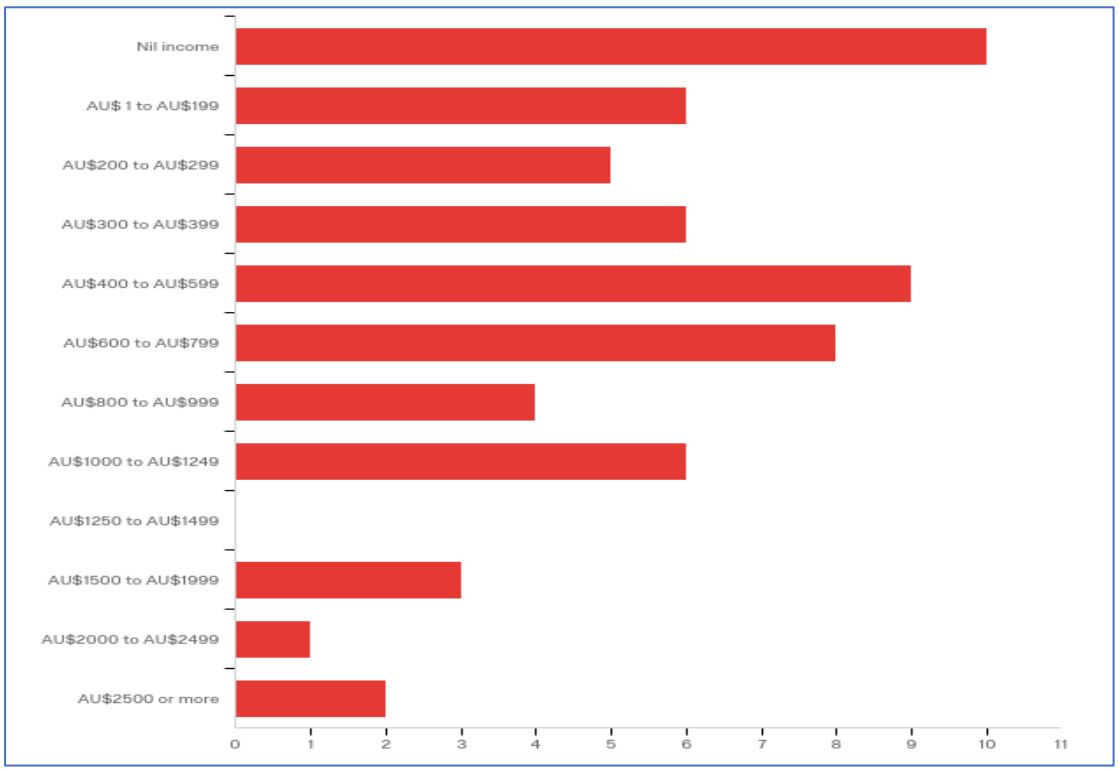
none
none
None
Na
nil
none
NA
No
volunteer and donor to animal rights groups
None
Volunteer for a hospital and a NGO that stands for social inclusion of children with disability
Medicine san francier
none
No
Red Cross Blood Service
UNICEF
none
Red Cross
not a volunteer
none
None
NGO education
NGO that protects human rights
Education/school
Just BU
World Vision
none
Arts organisations

Q33 - What is your current work status, in addition to studying? Please, choose one of the following options:



#	Answer	%	Count
1	Employed part-time (1-8 hours per week)	13.33%	8
2	Employed part-time (9-16 hours per week)	8.33%	5
3	Employed part-time (17-24 hours per week)	5.00%	3
4	Employed part-time (25-30 hours per week)	11.67%	7
5	Employed full time	13.33%	8
6	Employed casual	23.33%	14
7	Unemployed	23.33%	14
8	Unable to work due to sickness or disability	1.67%	1
	Total	100%	60

Q34 - Could you tell me which category best describes your average income before taxes per week over the last year?



#	Answer	%	Count
1	Nil income	16.67%	10
2	AU$ 1 to AU$199	10.00%	6
3	AU$200 to AU$299	8.33%	5
4	AU$300 to AU$399	10.00%	6
5	AU$400 to AU$599	15.00%	9
6	AU$600 to AU$799	13.33%	8
7	AU$800 to AU$999	6.67%	4
8	AU$1000 to AU$1249	10.00%	6
9	AU$1250 to AU$1499	0.00%	0
10	AU$1500 to AU$1999	5.00%	3
11	AU$2000 to AU$2499	1.67%	1
12	AU$2500 or more	3.33%	2
	Total	100%	60

Q35 - Please add any further comments you would like to contribute to the study.Thanks.

Please add any further comments you would like to contribute to the study.T...
Excellent study
I have very little knowledge of this area of study.
I volunteered for two months in a wildlife park in the bolivian amazon and it was an amazing experience. protecting the amazon is of very high importance to me
All the rain-forests are in danger right now due to CO2 emissions and poor maintenance. Steps should be taken to minimize these and to educate people on the value of the same.
Appreciate your work. Keep it up.
Just some feedback regarding the questionnaire, I found the section about the hypothetical government funding very confusing, if you could please make this clearer so we can give adequate responses. Thank you :)
Good luck with your research!
Climate change and/or other eco problems are important indeed but we have more real life problems (crime, unemployment, family violence) that we need to address before we take care of the global issues
It was incredibly difficult to understand some questions. They seemed overly complex. Eg. The ladder about life could just have been on a scale from 1-10. The ABC scenario was really difficult to understand as well. I had no idea what you were trying to get out for a long time
None
I hope the poor governance in developing countries is considered. Often projects look good but ability to implement is weak due to corruption and poor regulation.
No thank you
questions are too long, some questions are repeated. The 1st question is confusing. Questions regarding nut should have an option "I don't know"
Interesting topic Pedro
I was unable to put my age in as not enough categories! Rather ageist!