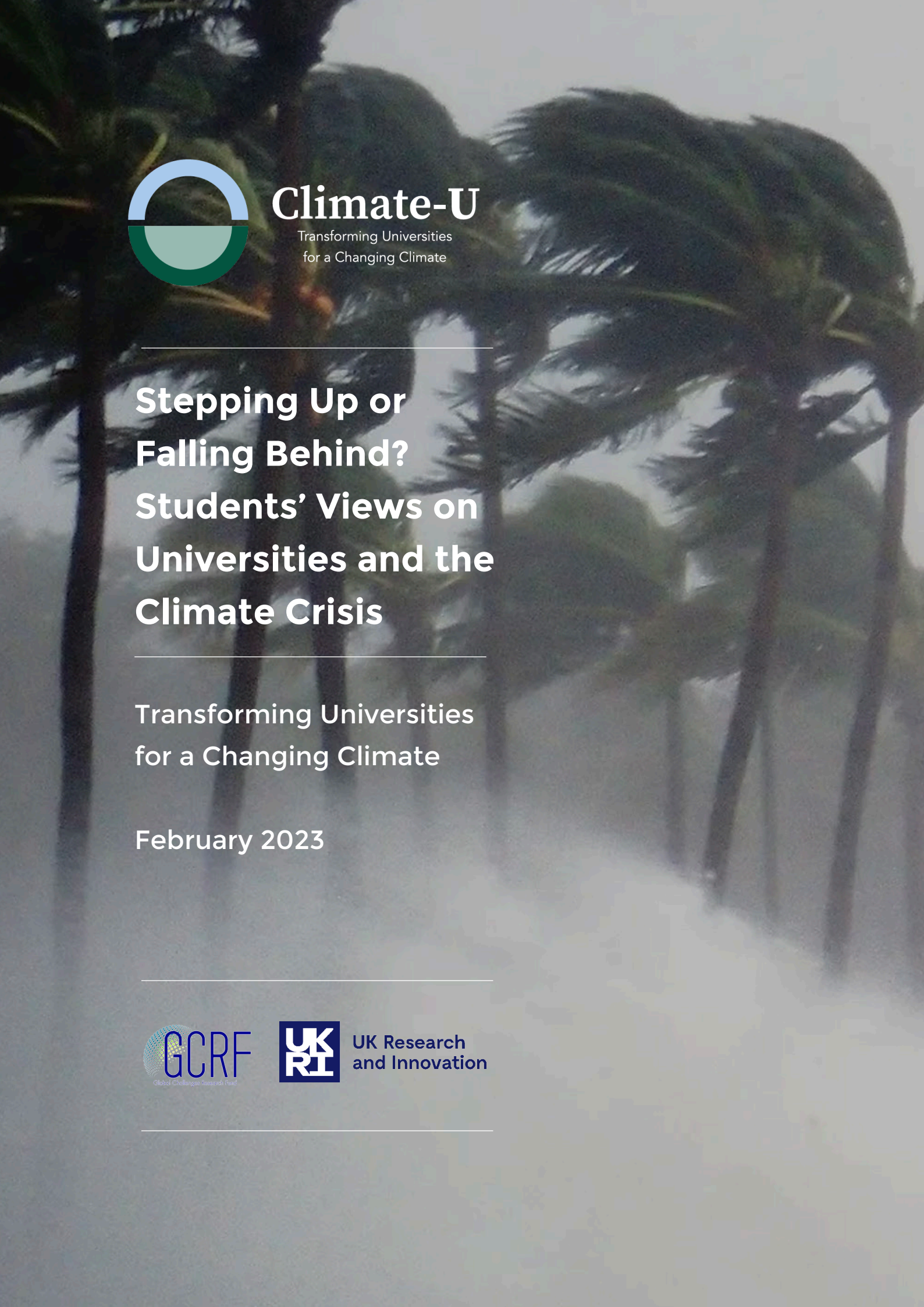

Climate-U
Transforming Universities
for a Changing Climate

Stepping Up or Falling Behind? Students' Views on Universities and the Climate Crisis

Transforming Universities
for a Changing Climate

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GCRF
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Climate-U
Transforming Universities
for a Changing Climate

Stepping Up or Falling Behind? Students' Views on Universities and the Climate Crisis

Transforming Universities for a Changing Climate
Student Survey Report

Abstract

This report presents the findings from a large-scale survey conducted among undergraduate students in twelve universities in Brazil, Fiji, Mozambique and Kenya. Carried out as part of the Transforming Universities for a Changing Climate (Climate-U) project, the survey centres on students' attitudes and experiences in relation to climate change and perceptions of climate action in their universities. It responds to the overall aim of the project, which is to generate insights into how to maximise the contribution of universities to the mitigation and adaptation challenges of climate change, and to understand how universities might contribute to climate justice.

The aim of this report is primarily descriptive; it serves to document the results of the survey comprehensively, providing basic analysis of the data including in comparative perspective across the four countries as well as serving as a reference for intended data users. To facilitate comparisons, a student home assets index is constructed using principal components analysis (PCA) and environmental attitudes are assessed using the Milfont and Duckitt (2010) reduced-form inventory and estimated using a latent-trait model based on Item Response Theory (IRT). Findings are reported mostly as descriptive statistics with a limited number of linear regression models being employed to estimate predictors of environmental attitudes.

Findings focus on, inter alia, students' backgrounds and areas of study, their experience, environmental attitudes, understandings and beliefs about climate change, feelings of personal responsibility and engagement with and willingness to participate in climate action as well as students' assessments of what universities are doing and what they should be doing with regard to climate change.

Overall, in all countries, students reported that they were most likely to learn about climate change from internet and social media sources. There is strong consensus that students should be learning more about climate change at their universities and that they are not satisfied with current learning. 'Environmental concern' was found to be higher among students studying science, agriculture, and health/welfare related subjects, by women, by more economically advantaged students, and among students in Brazil. While students in Brazil were most likely to believe human actions are the major cause of climate change and provided the most pessimistic estimations of the impact of climate change, they were also the least likely to be confident that government action could make an impact. Conversely, students in Kenya had the greatest confidence in government action, were the most willing to participate in climate-change activities and were most optimistic about the impacts of climate change. The report provides indicative evidence for participating universities and others who may be intending to improve their engagement with students on issues relating to climate change and climate justice.

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List of Abbreviations

USP Fiji	University of the South Pacific
UoF	University of Fiji
FNU	Fiji National University
KU	Kenyatta University
KMU	Kenyatta Methodist University
KSU	Kisii University
UEM	Universidade Eduardo Mondlane
UCM	Universidade Católica de Moçambique
UFPA	Universidade Federal do Pará
UPF	Universidade de Passo Fundo
USP Brazil	Universidade de São Paulo

1. Introduction

Climate change is a critical threat globally. The Sustainable Development Goals (SDGs) call for improved education and awareness on climate change. It is crucial that higher education institutions play a role in responding to the climate crisis through education, research, community engagement and public outreach. The Transforming Universities for a Changing Climate (Climate-U) project aims to strengthen the contribution of universities to addressing the causes and impacts of climate change in low and middle-income contexts. This report details the findings of the project's international survey 'Climate Change – Practices, experiences and attitudes.' The aim of the survey was to assess existing coverage of climate change in the curricula, research, and community engagement activities of universities in Brazil, Fiji, Kenya, and Mozambique. It sets out to help generate insights into how higher education institutions can contribute to the mitigation, adaptation and impact reduction of climate change and achieve the overall aim of climate justice. The survey investigates the actions being taken by universities in terms of research, teaching, community engagement and outreach activities as well as students' beliefs about climate change. It provides essential knowledge for universities on their initiatives and helps them reflect on changes which may be required.

The survey was conducted with undergraduate students at 12 universities in 4 countries: Brazil, Fiji, Kenya, and Mozambique during 2021-22. The students were drawn from all major disciplinary areas of study. The survey comprises of three parts: a student demographic questionnaire, a questionnaire on experience at university and an environmental attitudes questionnaire. The survey was administered in English in Fiji and Kenya and in Portuguese in Brazil and Mozambique. It was conducted remotely with support of the online platform SurveyMonkey. Full details of the survey design and methodology can be found in Salvia et al (2022). While the survey was conducted online, the COVID-19 pandemic formed part of the background to the study to a varying extent depending on the context. The survey does not address pandemic-related issues but as universities were certainly affected at this time, for example by making use of remote online teaching, responses from students should be understood in relation to this background. It is possible, for example, that public health concerns may have had the effect of reducing attention to climate change or that remote teaching and learning may have reduced students' connectedness to their universities, affecting their assessments of satisfaction with teaching and learning, while these are not issues that we are able to examine.

2. Sample and Design

The final sample included 5,258 complete responses from the students. This sample excluded incomplete responses, largely eliminating the need to address issues of missing data. The students in the final sample are distributed across countries as follows in Table 1:

Table 1: Student distribution by country

Country	Frequency	Percent
Fiji	1,421	27.0
Kenya	1,862	35.4
Mozambique	420	8.0
Brazil	1,555	29.6
Total	5,258	100.0

Table 2 shows the breakdown of the respondents by university

Table 2: Student distribution by university

Country	Univerisity	Frequency	Percent
Fiji	University of the South Pacific	741	14.09
	University of Fiji	484	9.2
	Fiji National University	196	3.7
Kenya	Kenyatta University	980	18.6
	Kenya Methodist University	375	7.1
	Kisii University	507	9.6
Mozambique	Universidade Eduardo Mondlane (UEM)	299	5.7
	Universidade Católica de Moçambique (UCM)	57	1.1
	Unilúrio	64	1.2
Brazil	Universidade Federal do Pará	445	8.5
	Universidade de Passo Fundo	428	8.1
	Universidade de São Paulo	682	13.0
Total		5,258	100.0

Analysis of the data focused on exploring the relationships between environmental attitudes and background factors such as gender, socio-economic background and region of origin, as well as links between disciplinary areas and experiences of the treatment of climate change in the curriculum. The disciplinary areas across which the students were divided have been derived from the ISCED classification established by UNESCO (2012), the ISCED 2011. These include 8 disciplinary groups which are as follows:

1	Education
2	Humanities and arts
3	Social sciences, business and law
4	Science
5	Engineering
6	Agriculture
7	Health and welfare
8	Services

2.1 Variables

To aid analysis, two key additional variables were computed from groups of questions in the survey. These are an asset index variable which was used as a proxy for the socio-economic status of each student; and an 'environmental concern' scale variable that captured each students' concern for the environment based on their responses to twenty-four questions. The details of the computation of these variables are provided below.

2.1.1 Asset Index

We created an asset index using data collected from the surveys regarding ownership of several household assets. These assets included fan, radio, mobile phone, smart phone, TV, flat TV, refrigerator, desk, personal books, computer, bicycle, motorcycle, car, air conditioner, and cable TV. We have followed the method developed by Filmer and Pritchett (2001) that summarises information on ownership of various household assets using principal components analysis (PCA). This method allows us to convert a series of binary ('yes' or 'no') ownership variables into a continuous scale of relative wealth. The asset index derived has a mean of 0 and standard deviation of 1.97.

2.1.2 Environmental Concern

Milfont and Duckitt's (2010) inventory for measuring environmental attitudes was administered as part of the Climate-U survey. While the full inventory contains 120 Likert-scale items, a reduced-form version of 24 items has been employed widely elsewhere and was employed in our survey with very minor adjustment (see Salvia et al. 2022). The 24-item battery consists of 12 item pairs focused on 12 dimensions of environmental attitudes as enumerated in Table 3 below. Responses to these items were used to estimate students' levels of 'environmental concern' using the method discussed in 2.1.2.2. Put briefly, the students' answers to the 24 items are combined to generate an estimate of a 'latent trait' or underlying factor which can explain students' response patterns, which is termed 'environmental concern'. Some individual items play a greater role in determining a student's level of environmental concern as discussed below. But, there are some differences in response patterns between contexts which may be important for the validity of the scale, also mentioned below.

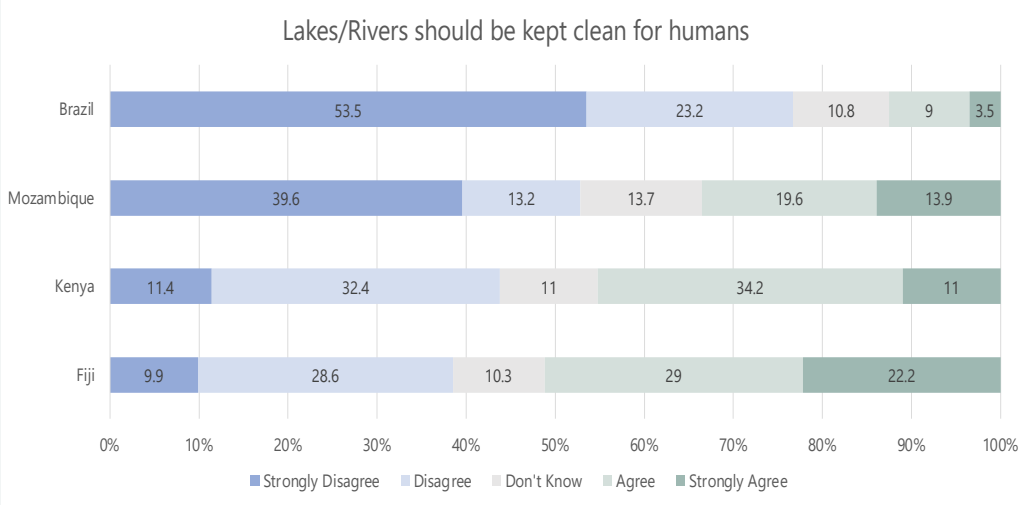
Table 3: Dimensions of Environmental Attitudes included in Measurement Scale

1	Enjoyment of Nature
2	Support for interventionist conservation policies
3	Environmental movement activism
4	Conservation motivated by anthropocentric concern
5	Confidence in science and technology
6	Environmental fragility
7	Altering nature
8	Personal conservation behaviour
9	Human dominance over nature
10	Human utilisation of nature
11	Eco-centric concern
12	Support for population growth policies

2.1.2.1 Drivers of Differences in Environmental Concern Scores Between Countries

Figure 1 below shows the response patterns to three examples of key questions where there are notable differences between countries. Overall, a higher level of average 'environmental concern' is found in Brazil and is the result of response patterns to questions like those presented in the first two graphs below. The final question is one in which students in Brazil show the opposite – less environmental concern than the other countries on average. In the first graph, students in Fiji and Kenya are somewhat ambivalent about whether the primary purpose of keeping lakes and rivers clean is for human benefit. In Brazil in particular, most students believe this is not the main reason, implying that lakes and rivers should be kept clean for less anthropocentric reasons. There are many possible considerations that may lie behind these patterns. For example, the extent to which people in a particular country are involved in agriculture, water-related leisure activities and so on are likely to be significant. Moreover, protecting lakes and rivers for the purposes of human benefit might still be expected to yield wider environmental benefits. These ++questions, among others, highlight some of the possible synergies and trade-offs between human activity and the environment, which play out differently in different contexts.

Figure 1. Response patterns to environmental attitudes questions across countries



The second example question (illustrated in Figure 2) asks students to consider whether the primary purpose of plants and animals is for human use. In this case, Brazil stands out more starkly in comparison with the other three countries which have relatively more ambivalent views. Students in Brazil disagreed with the statement, often strongly, implying that plants and animals should be considered to have a primary purpose aside from human use. We might expect answers to this question to be connected to livelihoods and cultural and religious beliefs, as well as to views about the environment specifically.

Moreover, these connections turn out to be very important since when respondents are presented with trade-offs or choices which may be considered informative in relation to environmental attitudes. For example, the final example question (illustrated in Figure 3) asks students whether they consider that protecting the environment is more important than protecting jobs. In this case, the results from Brazil show the least 'environmental concern' in that most students disagree with the assertion. By contrast, in Kenya more than three quarters of students agreed (or strongly agreed) with the statement. As earlier, there may be many possible explanations for this, but perhaps the fact that a much larger proportion of the labour-force in Brazil is employed in formal jobs than in Kenya or Mozambique (see Elgin et al 2021) is a key factor, i.e., this trade-off is a very serious concern for many. Nonetheless, the finding is significant and represents a strong prioritisation of environmental concerns.

Differences in response patterns linked to livelihoods, urban or rural backgrounds and so on suggest that interpretation of environmental concern should be cautious. Arguably, the sustainability of rural livelihoods is intertwined with environmental well-being, which may be somewhat different in urban areas. It is possible that the environmental concern scale is better suited to identifying such concern in wealthier and more urban contexts and it has certainly been applied much more frequently in high income countries. To the extent that this is true, results from the scale as discussed below such as the suggestion that less economically advantaged students are less concerned might reflect an under-estimation of environmental concern for these students. For example, the scale does not include items specifically designed to identify the concerns of families dependent on agriculture, while it does refer to leisure activities such as watersports.

Figure 2. Response patterns to environmental attitudes questions across countries

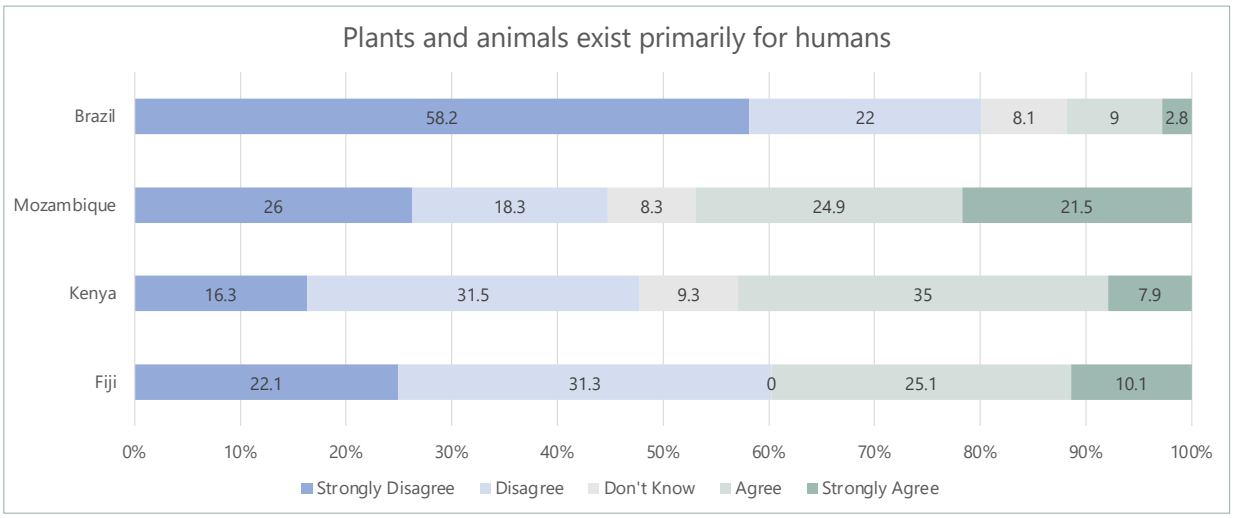
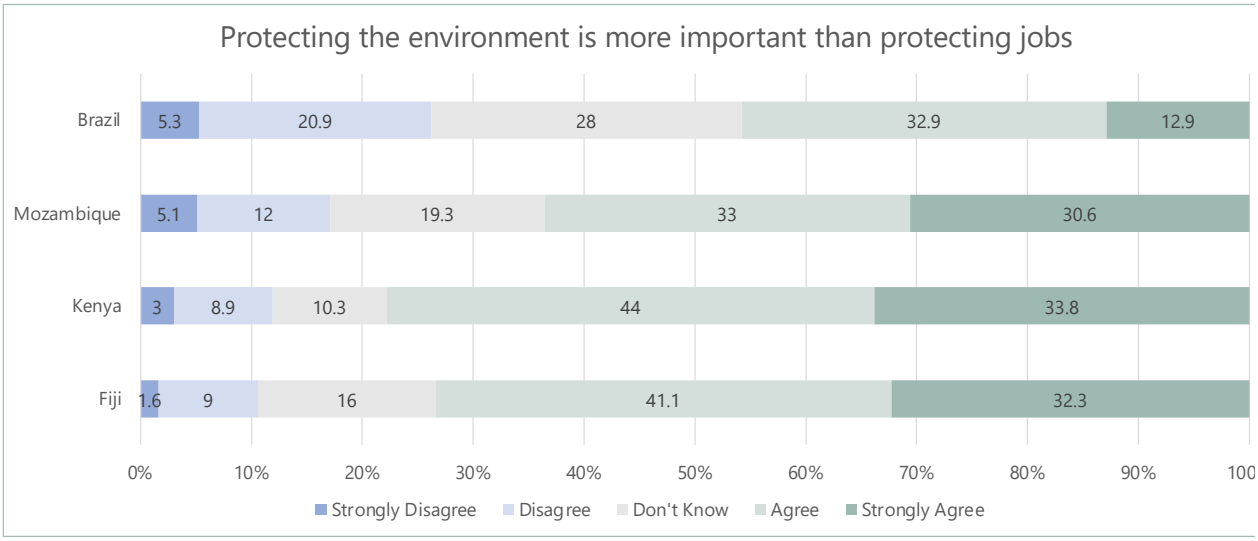


Figure 3. Response patterns to environmental attitudes questions across countries



2.1.2.2 Contribution of Individual Attitude Questions to an Environmental Concern Scale

Owing to differences in languages, occupations and cultures among other things, developing a common scale of environmental concern for four diverse countries presents a number of challenges. A case can be made for excluding particular question items which have functioned less well than others in one or more contexts but given that the issues are somewhat different across the countries, in the approach employed below we have not excluded items from the 24-item Milfont and Duckett scale. We have, however, collapsed the 'agree' and 'strongly agree' categories and the corresponding 'disagree' and 'strongly disagree' categories as well as recoding the 'don't know' category to missing. This is because differences in translation seem to have reduced direct equivalence between the more specific categories. As we have a binary coding for each item because of this recoding, we are able to employ a one-parameter item-response (latent-trait) model to calibrate a scale. The model estimates a value of the underlying trait (referred to as 'environmental concern') for each student. Figure 4 presents the distributions of the trait recovered from the model showing that, overall, measured environmental concern is highest in Brazil and lowest in Kenya, with the distributions of Fiji and Mozambique being very similar and in the centre of the total distribution. The distribution in Kenya is somewhat wider indicating greater diversity of attitudes.

Figure 4. Distributions of Environmental Concern trait in the Four Countries

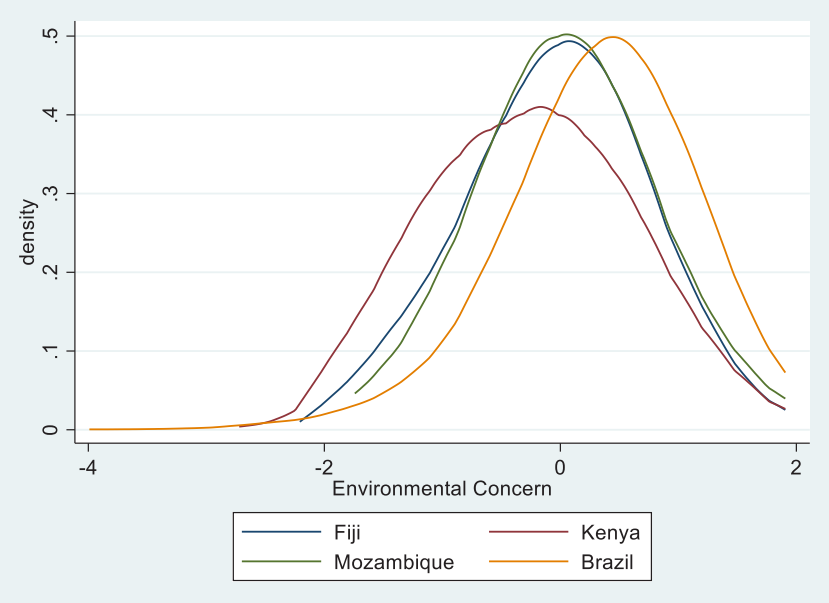
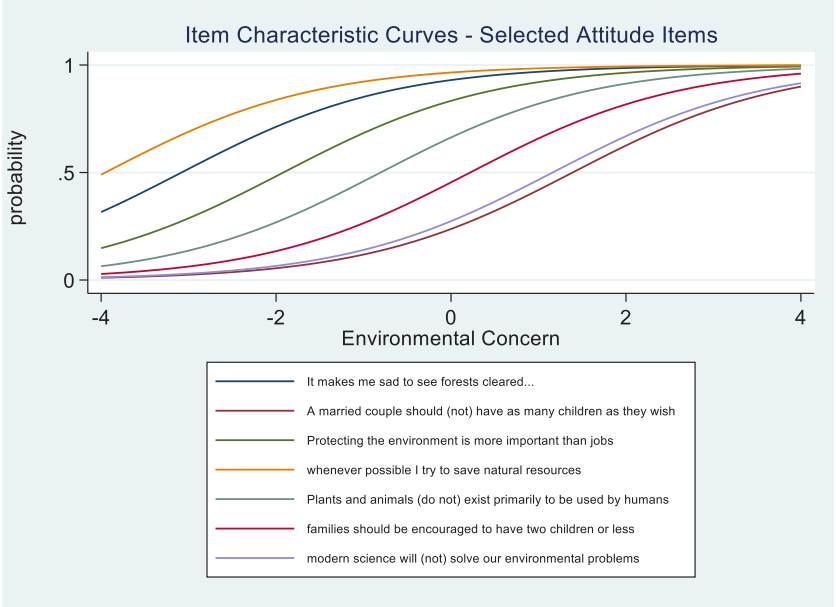


Figure 5 illustrates the role played by a number of example questions in the scale calibration for the whole (cross-country) sample. Answers to some questions are 'weighted' more by the model than others in terms of the evidence they provide about students' environmental concern. The examples below may be considered to make intuitive sense in terms of their ordering. The 'easiest' item to agree with is 'whenever possible I try to save natural resources', partly since this question does not indicate a specific trade-off and because this is something that is generally considered desirable prima facie. Even students at the extreme left of the distribution (those who are least concerned about the environment) have a 50% probability of agreeing with this item. At the other extreme, the most 'difficult' item to agree with is 'a married couple should not have as many children as they wish'. This item asks the student to consider what others should do (not only the student herself) and implies a trade-off between the environment and liberty to determine family decisions. The responses to items which lie between these extremes are of interest in similar ways. The second 'easiest' item to agree with asks only about how the student feels in relation to forest clearance while the second most difficult asks the student to judge that science will not solve our environmental problems in future. A student who makes this judgement may be expected to have very strong concerns about the environment. Students with an average level of concern (a value of zero) had a probability of agreeing with this item of around 25%.

Figure 5: Role played by example questions in scale calibration



2.2 Limitations of the Survey

Salvia et al. (2022) outline the sampling procedures employed in the survey and their implications. Initial attempts at proportionate sampling did not yield high response rates which resulted in sharing the survey through other methods with a larger set of students to improve response rates. As a result, certain students have a chance of being over-represented in the sample. This is particularly the case where student distribution across disciplines is concerned, and interpretation of survey results should bear this in mind. The samples of respondents for each discipline within a university should not be considered representative of the population of students in that group. It may be expected that students from certain disciplines are more likely to be more aware of climate change and its impacts, but the data is able to inform us in relation to this question. Response rates in Mozambique were poorer than in the other countries, resulting in a much smaller sample.

3. Student Profiles

3.1 Discipline

The overall student distribution by discipline is given in Figure 6 with the breakdown by country in Figure 7.

Figure 6. Student distribution by discipline

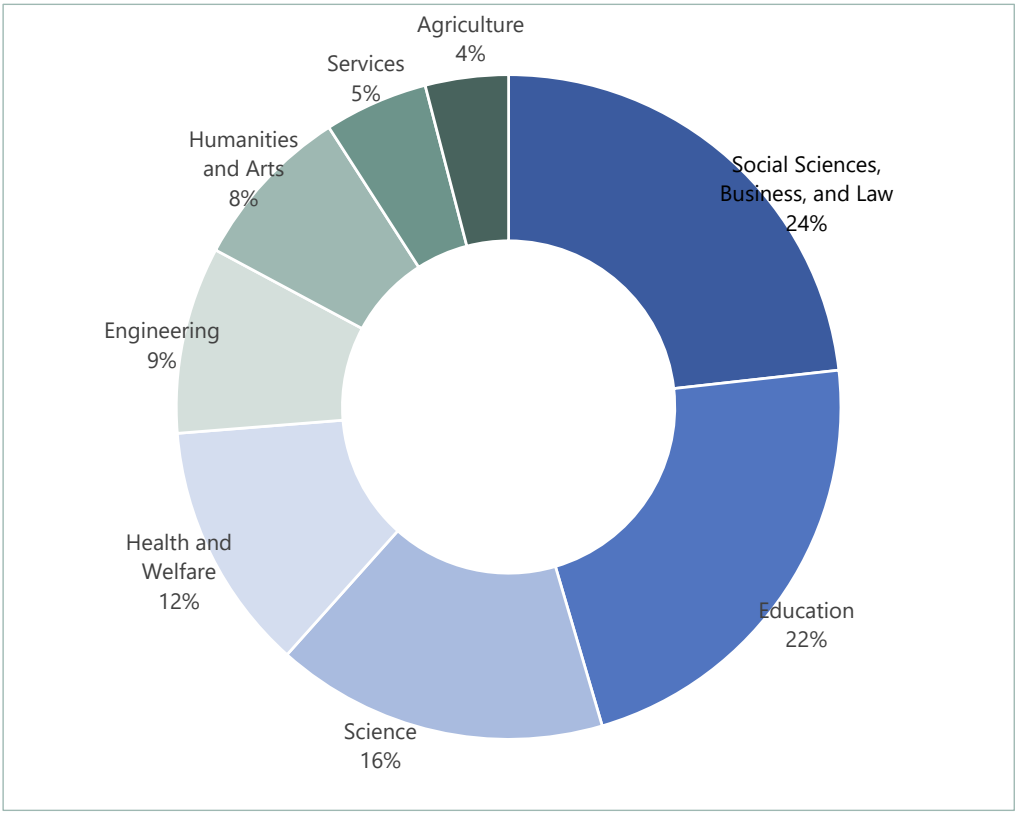
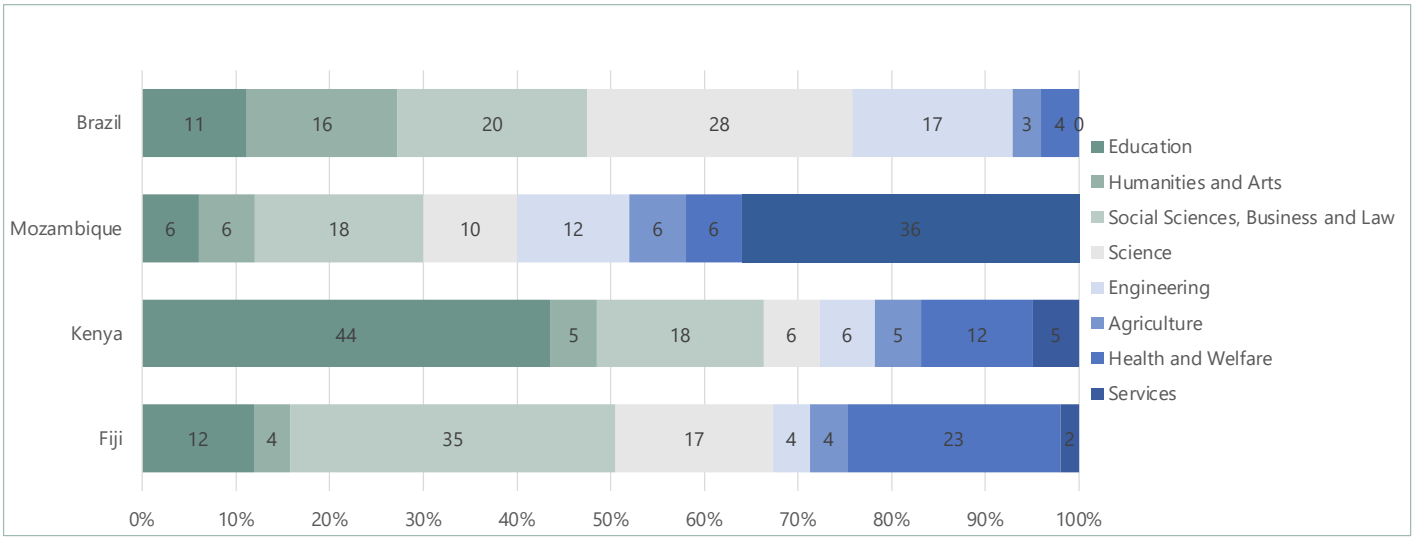


Figure 7: Student distribution by discipline across countries



Figures 8-11 show the results separately for the four countries by university and discipline, indicating the somewhat different compositions of the various universities in terms of the respondents' fields of study.

Figure 8: Student distribution by discipline across Fiji universities

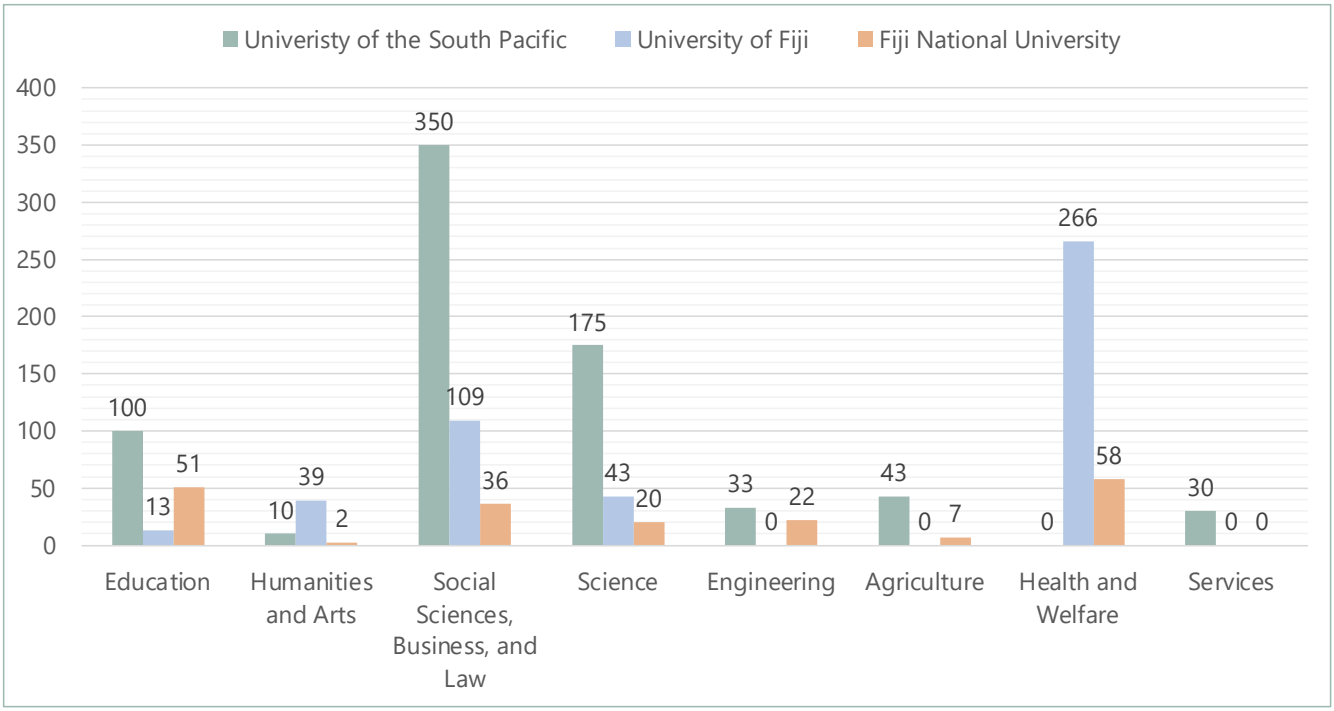


Figure 9: Student distribution by discipline across Kenyan universities

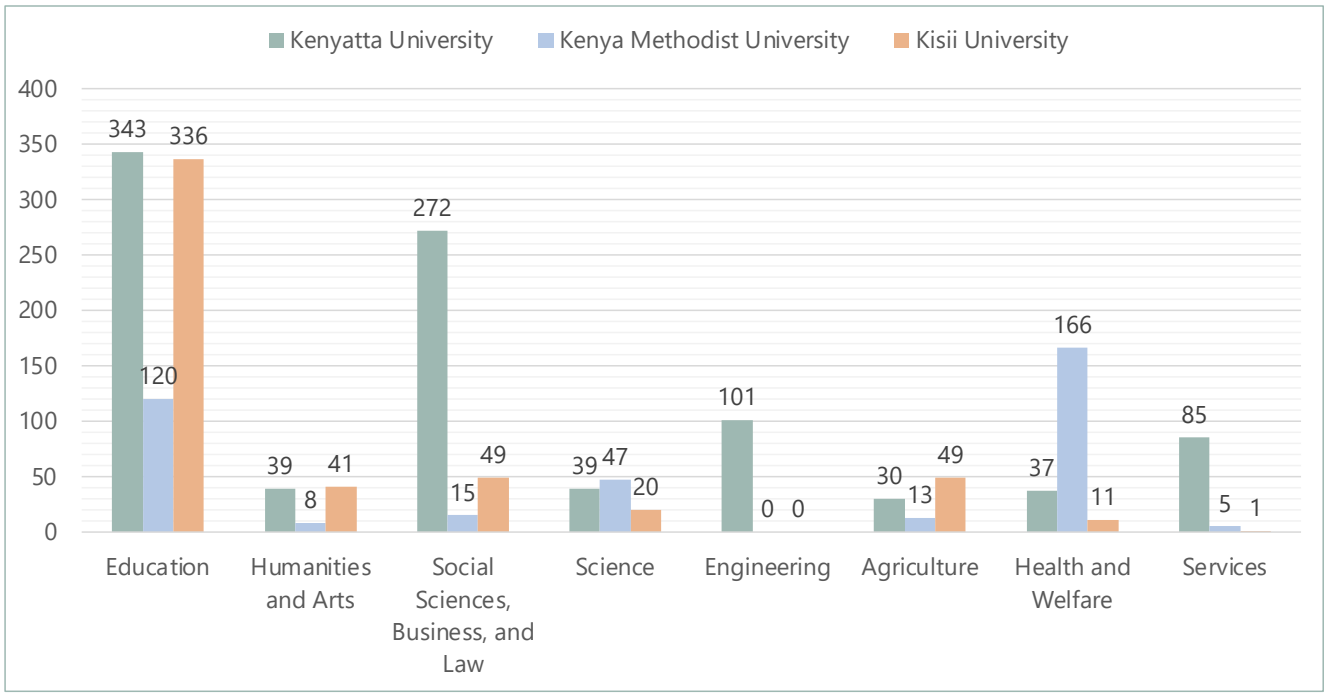


Figure 10: Student distribution by discipline across Mozambique universities

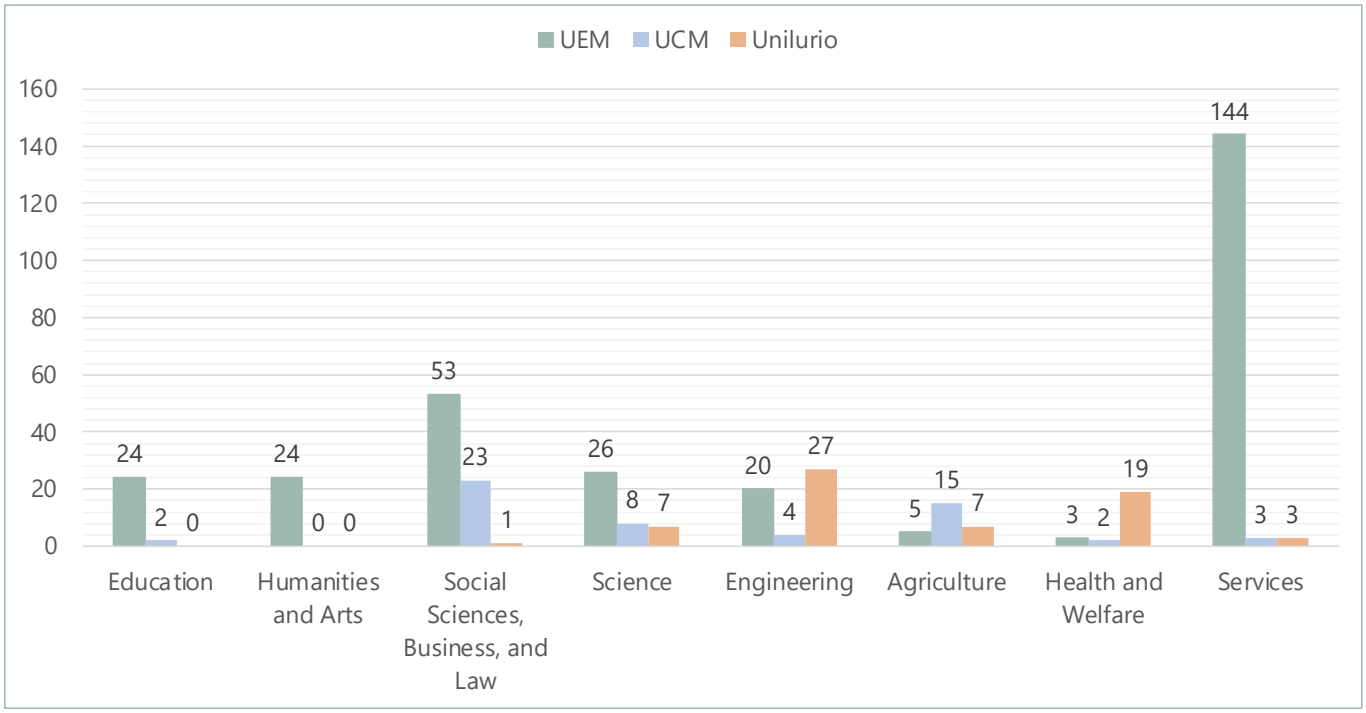
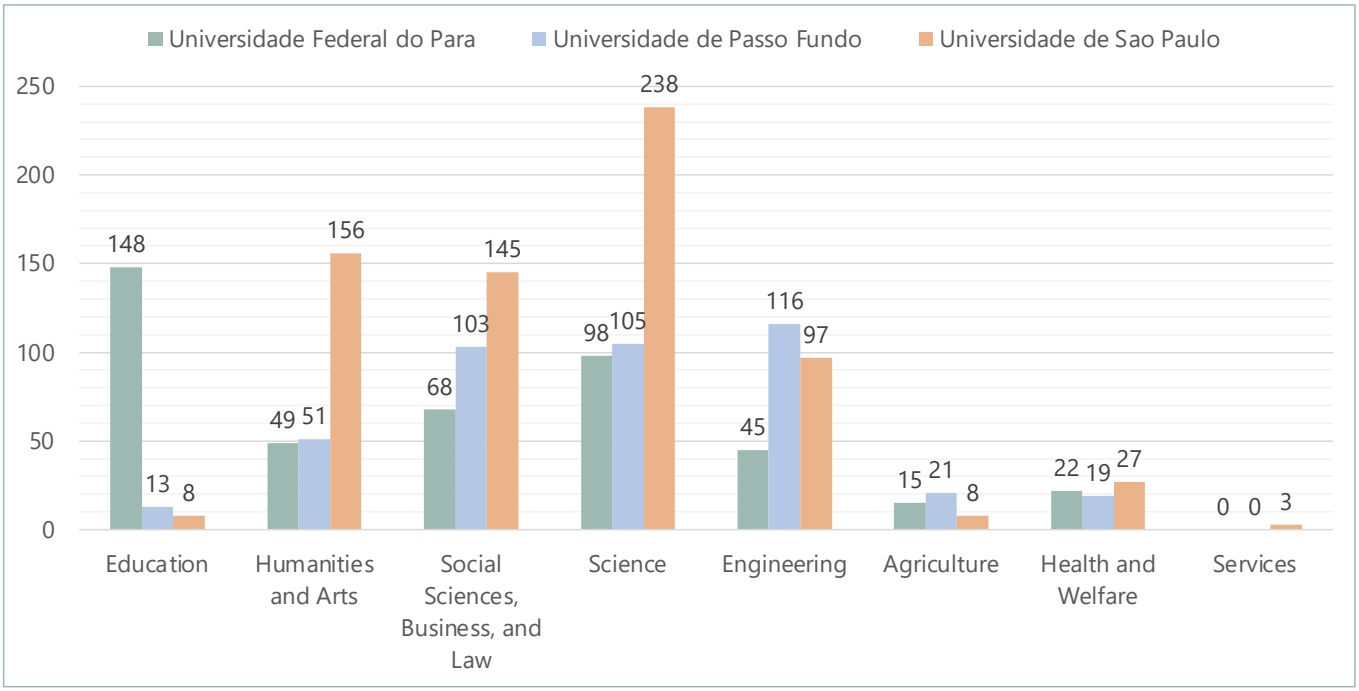


Figure 11: Student distribution by discipline across Brazilian universities



3.2 Gender

Figure 12 shows the distribution of students by gender across different countries. It shows that more responses have been received by women than men in Fiji, Brazil, and Mozambique, whereas more men have responded in Kenya.

Figure 12: Student gender distribution

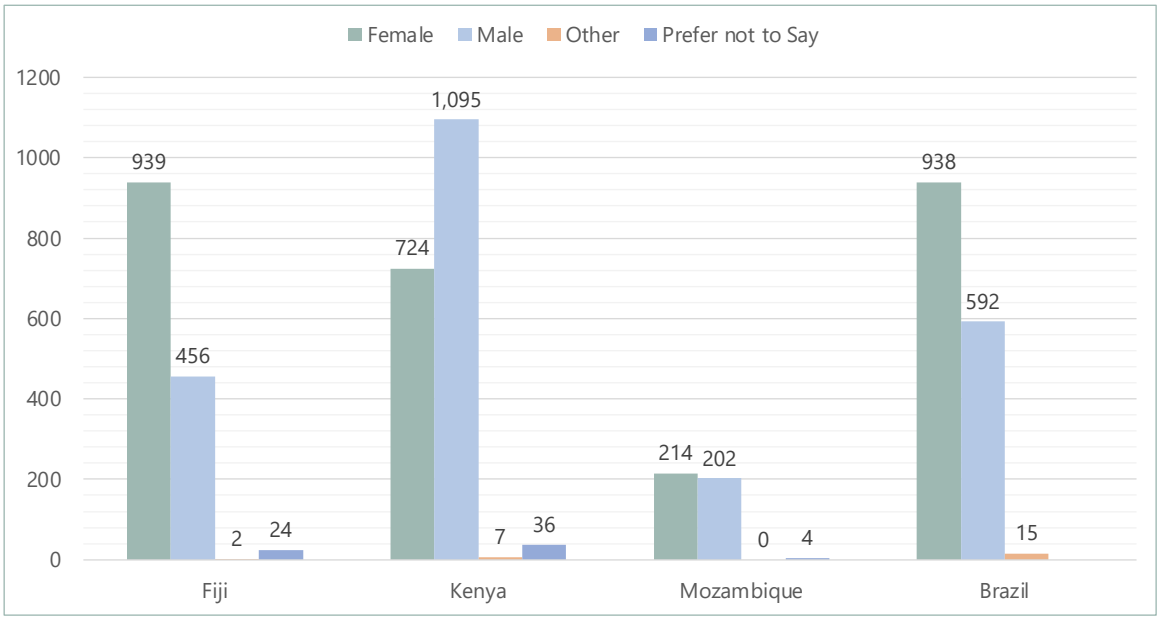
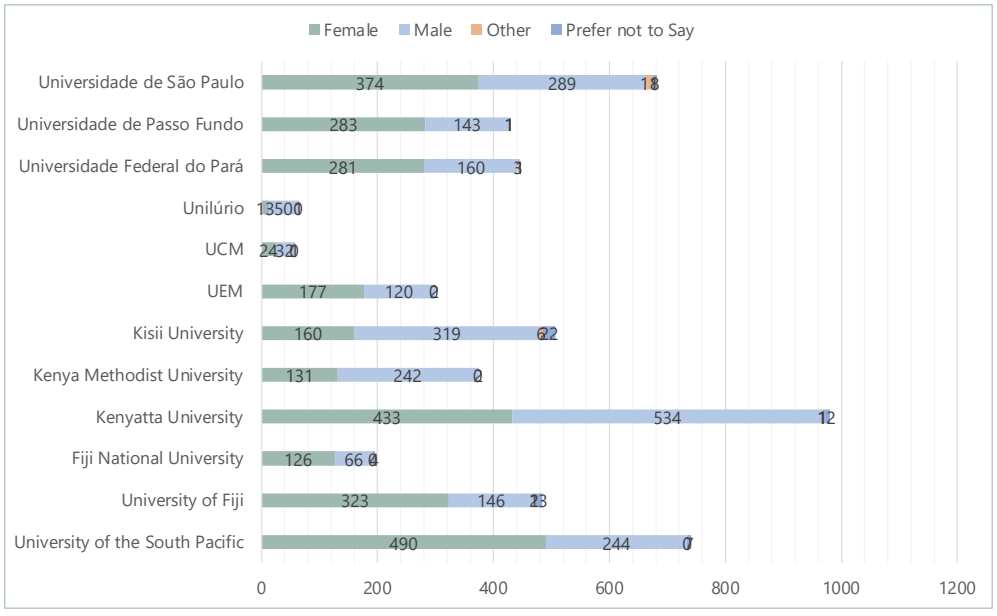


Figure 13 breaks down these figures further by universities. The data in this figure shows that the proportion of respondents who identify as male or female is similar to the overall population of students in the universities in Fiji, Brazil and Kenya. There is a male to female ratio of approximately 0.5:1 in universities in Fiji. In Kenya, universities tend to have a male to female ratio of 1.25:1. This ratio seems to have been achieved in Kenyatta University only, with male respondents outweighing female respondents in KSU and KeMU by a larger margin.

Figure 13: Student gender distribution across universities



3.3 Assets

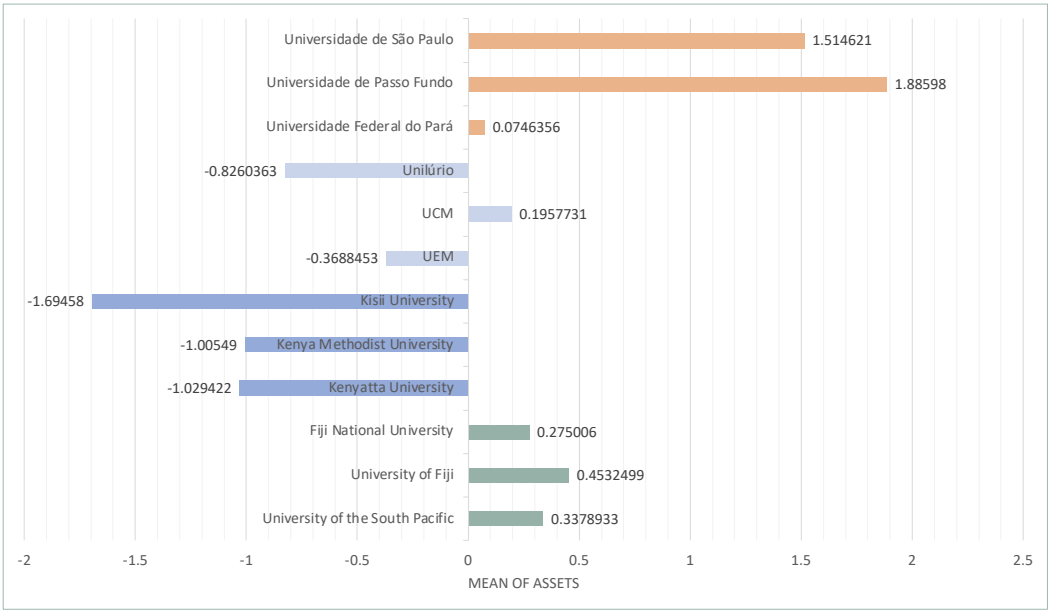
Figure 14 shows the variations in wealth (household assets) across the four countries. On average, the most advantaged students in terms of assets come from Brazil, followed by Fiji, and the poorest students on average are in Kenya.

Figure 14: Wealth distribution across countries

Figure 15 shows how the distribution of students according to wealth varies across the individual universities. Students in all Kenyan universities tend to be the poorest across all respondents, with students in Kisii University being the poorest within Kenya. In Mozambique, students in UniLúrio tend to be poorer than average, but students in UCM tend to be richer than average.

Students from University of Fiji are most well-off in Fiji, but the differences in wealth across Fiji universities are small. A starker contrast can be seen in Brazil, where students from UPF and USP tend to be the richest across all students across all countries. However, students in UFPA are much less well-off and average wealth in UFPA tends to be lower than universities in Fiji and UCM.

Figure 15: Wealth distribution across universities



We further investigate how wealth is distributed across students' study disciplines. Figure 16 shows that students studying education are the poorest, followed by those in services and agriculture. The wealthiest students are enrolled in engineering, science and social science, business, and law courses. Figure 17 shows the variation in wealth across disciplines by country. Within countries, the wealth distribution across disciplines seems to differ notably from the aggregate picture. Students studying humanities and arts in Fiji, Mozambique and Kenya tend to be among the poorest, alongside students in education. Social science, business, and law students in Fiji, Kenya and Mozambique are more likely to be richer. These results may be expected to reflect a number of factors relating to university admissions and student subject choices which differ significantly across countries.

Figure 16: Wealth distribution across disciplines

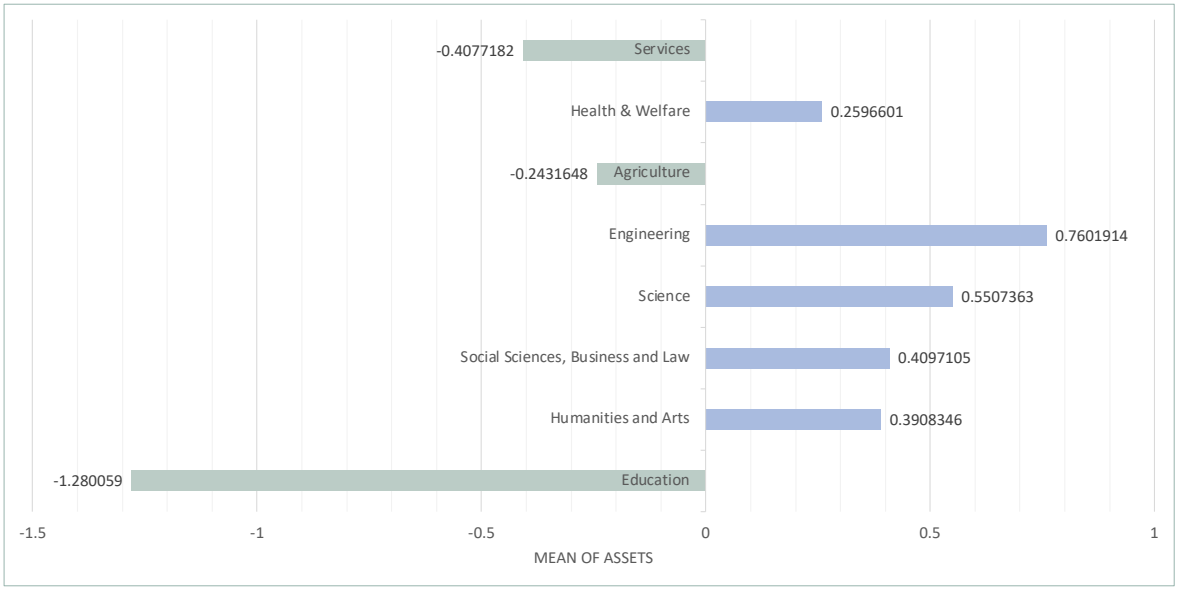
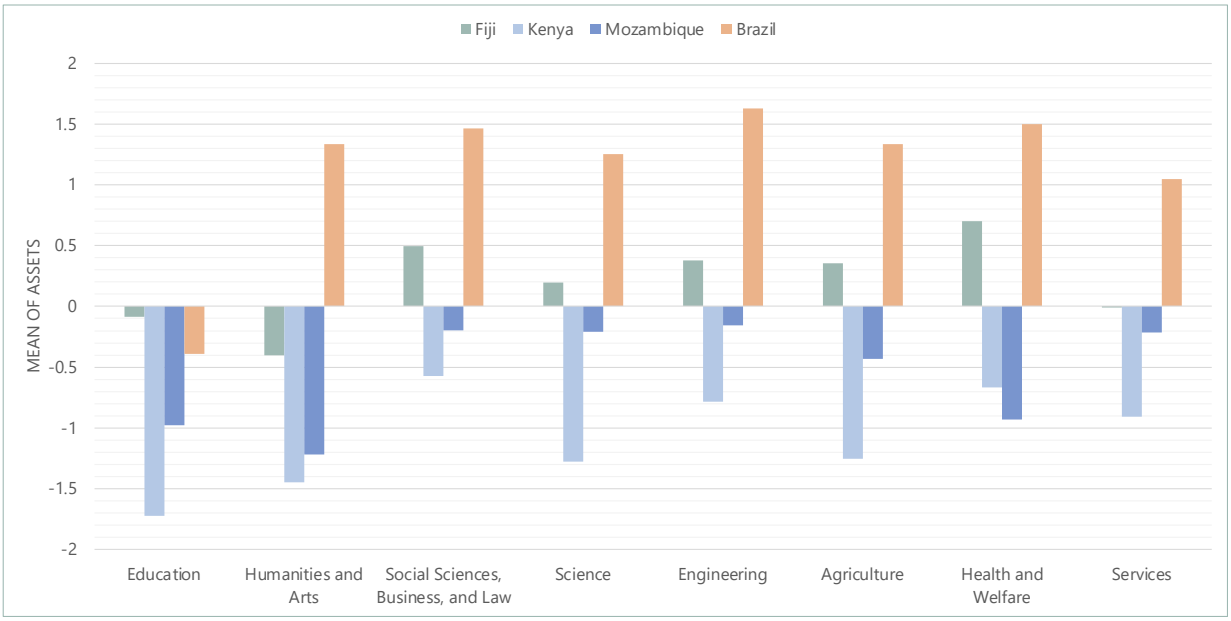


Figure 17: Wealth distribution across disciplines in different countries



3.4 Area and School Type

Two other variables indicate how wealth is distributed across the students surveyed. The first variable is the area where the student's family home is located. The responses are displayed in Figure 18. A higher proportion of respondents reside in urban areas in all countries except for Kenya, where the proportion of rural students is higher. This may explain in part why the students in Kenya have been found to be poorer compared to other countries. Similarly, the percentage of students from an urban area is significantly higher than those in rural areas in Brazil. These figures are what would be expected since Brazil is a predominantly urban country and Kenya mostly rural.

Figure 18: Student distribution by area across countries

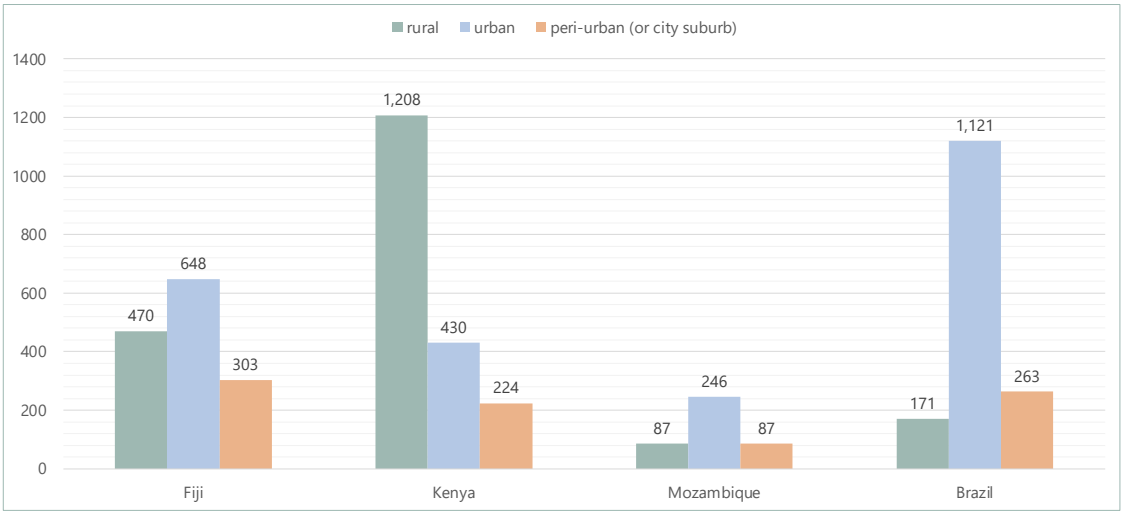


Figure 19 explores this distribution across universities. The distribution within countries across areas remains the same. The only outlier seems to be Fiji National University where students from rural areas are wealthier than their urban counterparts, unlike the overall distribution in Fiji. The highest percentage of urban dwellers are found at UFPA and USP in Brazil. This follows the trend of wealth across the two universities where the wealthiest students are. Figure 20 shows that the area where students' homes are is a fairly strong indicator of wealth with rural students being the poorest and urban students being the richest.

Figure 19: Student distribution by area across universities

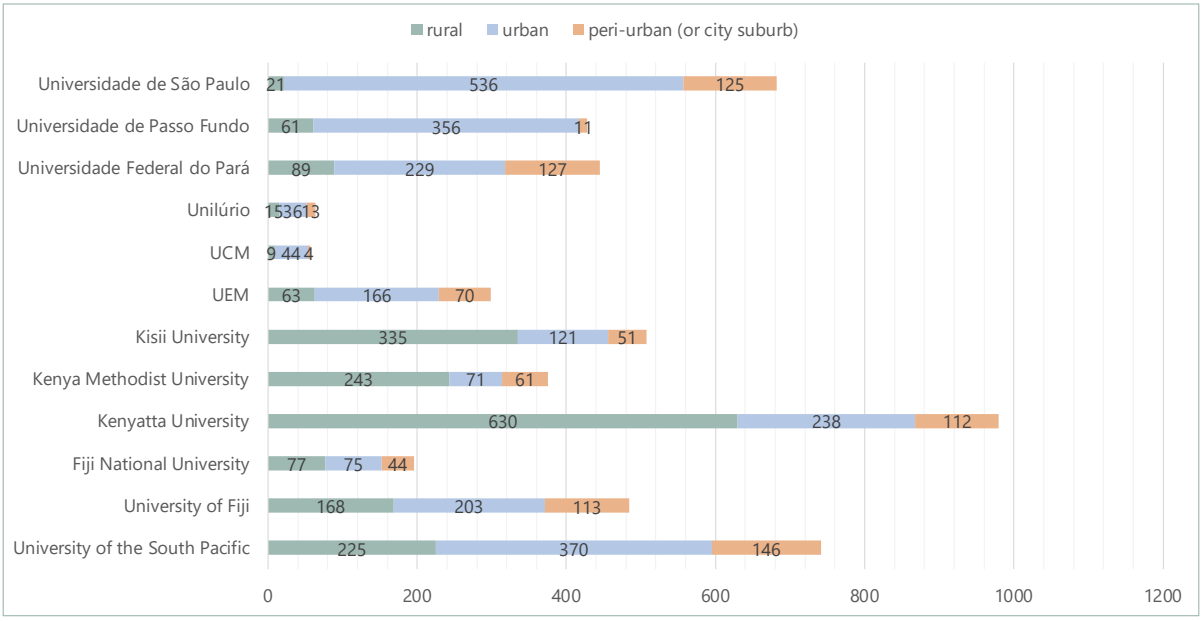


Figure 20: Asset index by area

Figure 21 reports the types of schools attended by respondents in terms of ownership. This variable also serves as an indicator of socio-economic status. The figure shows that a higher percentage of students in Brazil attended a fee-paying/private school compared to other countries. In Kenya, where respondents were on average least economically advantaged, over 90% of the students went to a government/state/public school and only 7% students attended a fee-paying/private school.

Figure 21: Student distribution by type of school across countries

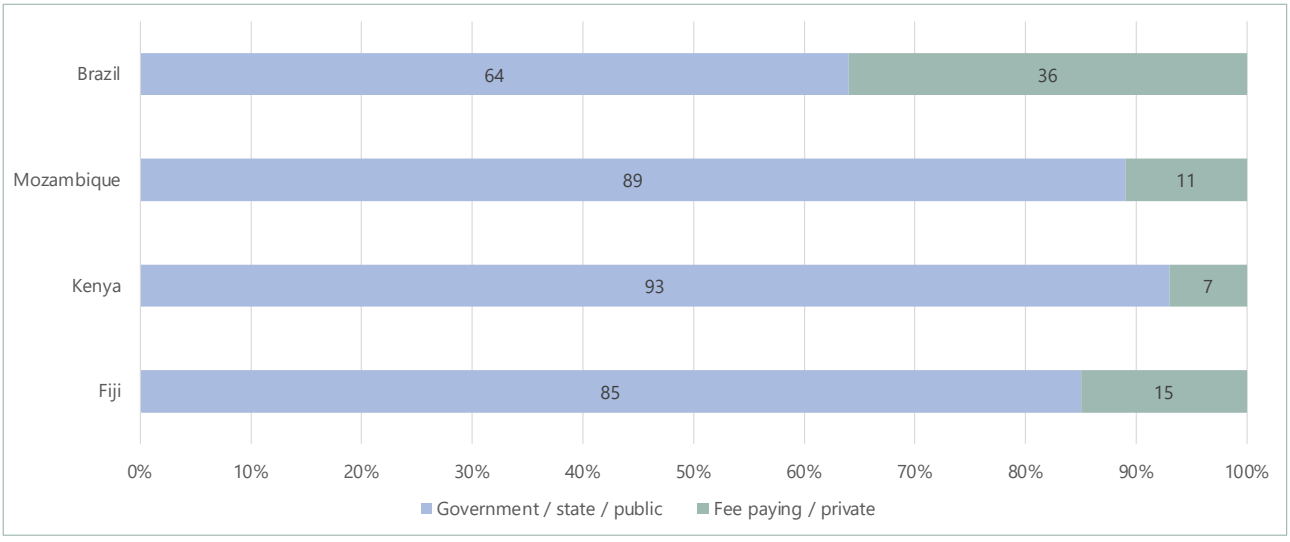
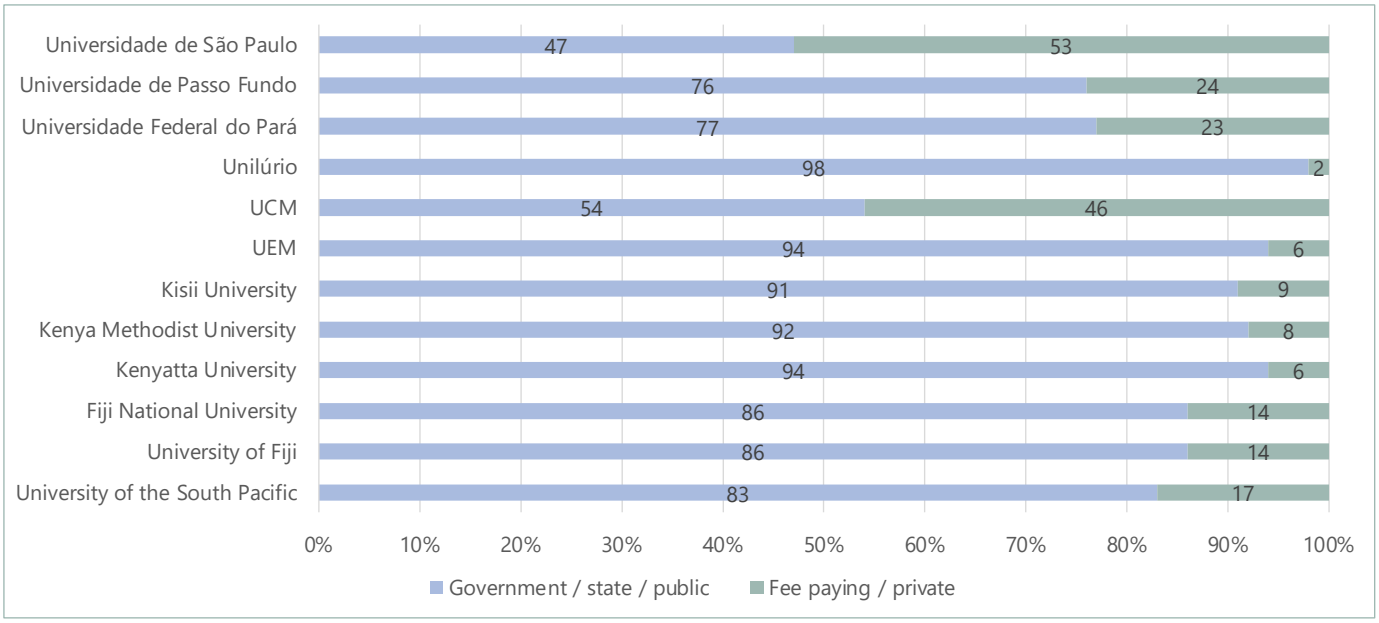


Figure 22 analyses these figures further by university. Notably, the student sample in USP in Brazil has a higher proportion of students from fee-paying, private schools than students from state schools. This is consistent with students in USP showing higher asset levels. Similarly, UniLúrio in Mozambique, which shows the lowest wealth in Mozambique has 98.4% students coming from a state school background. The percentage of students from a private school background is low in all universities in Kenya.

Figure 22: Student distribution by type of school across universities



3.5 Age

Figure 23 reports the ages of respondents and shows that the highest percentage of respondents were in the age group of 22-30 followed by the age group 17-21. This was to be expected as the sample included only undergraduate students. Responses to a question on when they first started studying at the university are given in Table 4. 'Mature students' include the more than 10% of students who are over 31. Figure 24 shows the age distribution across countries and a similar pattern is seen across each country as in the overall sample.

Figure 23: Student age distribution

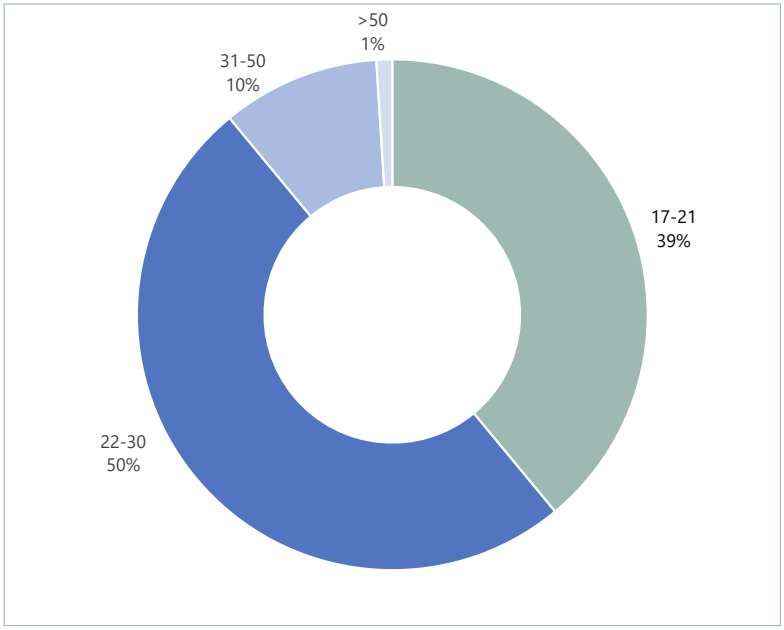


Table 4: Year of commencement of studies (whole sample)

Year started studying	Frequency	Percent
2022	373	7.09
2021	877	16.68
2020	839	15.96
2019	1,103	20.98
2018	1,046	19.89
2017	573	10.90
2016	202	3.84
2015	93	1.77
2014	39	0.74
2013	39	0.74
2012	15	0.29
2011	15	0.29
2010	44	0.84
Total	5,258	

Figure 24: Student age distribution across countries

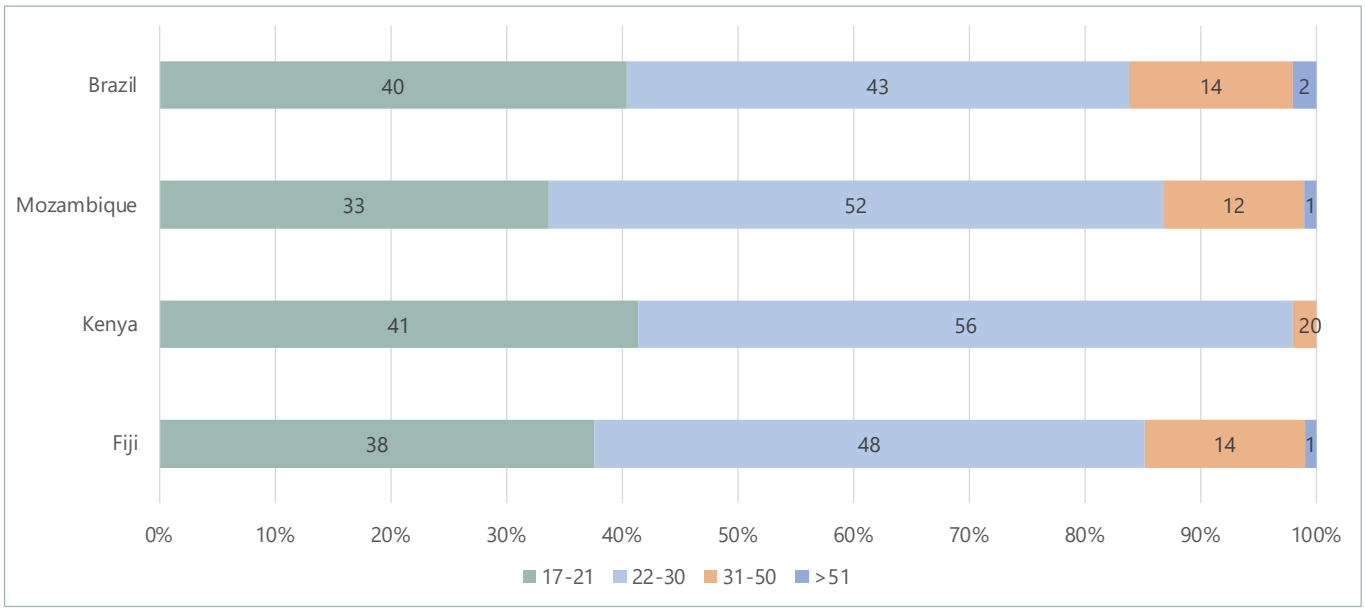
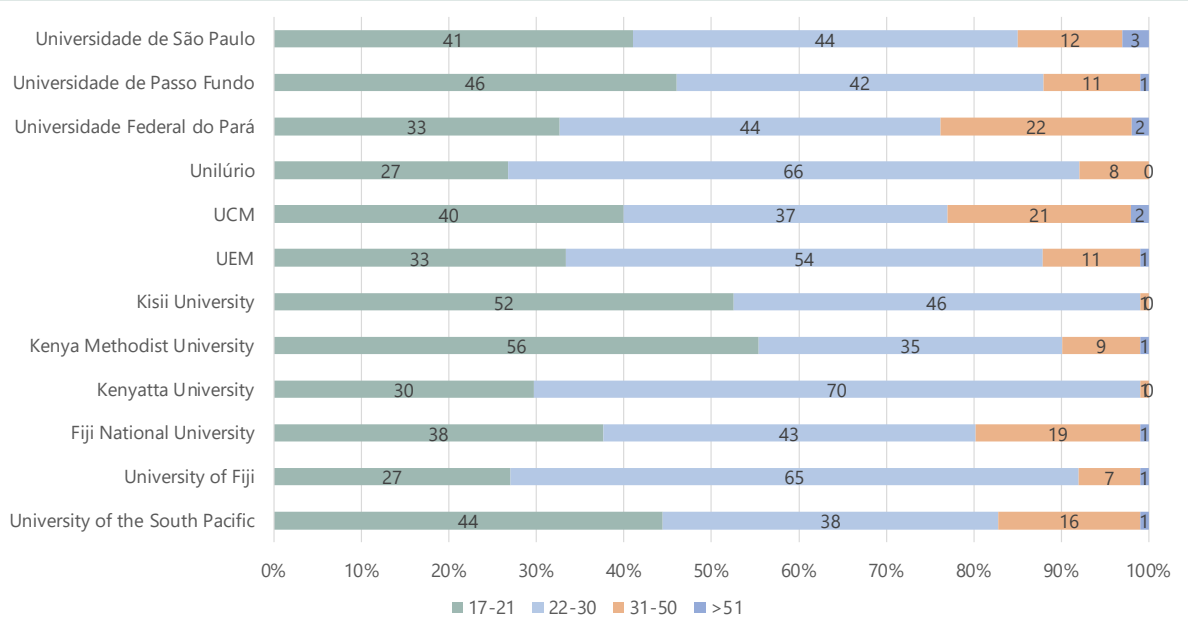


Figure 25 shows the age distribution of respondents across universities. In all universities except USPc in Fiji, KMU and KSU in Kenya, UCM in Mozambique and UFPA in Brazil, there is a higher percentage of respondents from the age group 22-30. In these universities, there is a higher proportion of students from the 17-21 age group. It is notable that nearly 20% of the respondents in FNU, UCM and UFPA are 'mature students'.

Figure 25: Student age distribution across universities

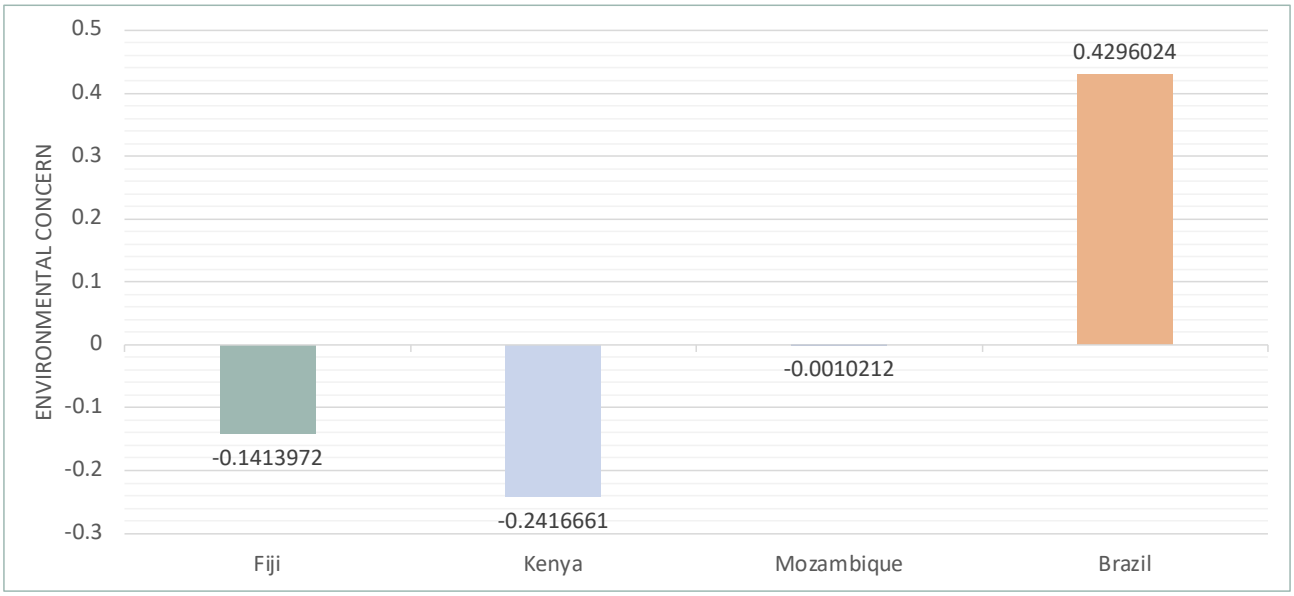


4. Environmental Attitudes

4.1 Environmental concern by country and university

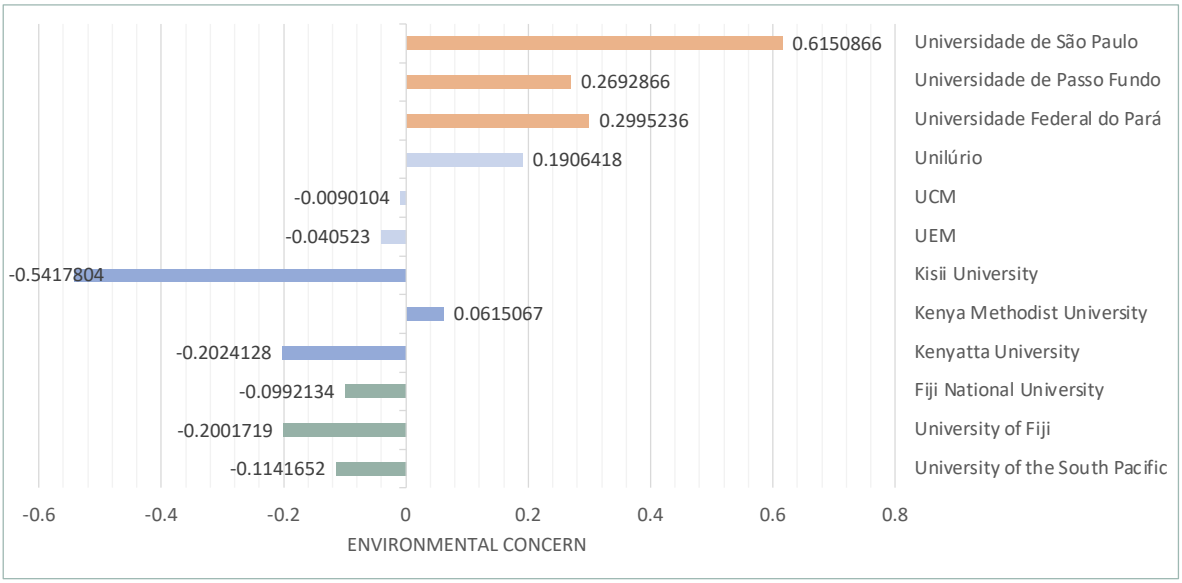
Figure 26 reports the mean values for the 'environmental concern' trait discussed in 2.1.2 by country. The mean value for the entire sample is zero so that negative values represent less than average levels of environmental concern. Patterns of response by country (and according to other variables) differ for many reasons, not only those that are related to environmental concern specifically. For example, in some cultural contexts and in some languages there may be a greater propensity to express agreement or to express strong or moderated views. Accordingly, direct comparison requires caution. As considered in 2.1.2., results suggest that in our samples, students were 'most concerned' in Brazil, followed by Mozambique, Fiji, and Kenya in that order.

Figure 26: Environmental concern by country



A closer look at the environmental concern scale across universities is provided in Figure 27. This shows that students in USP in Brazil have the highest level of environmental concern. In Mozambique, students from UniLúrio demonstrate the highest level of environmental concern. The lowest environmental concern in Mozambique was noted in UEM, where students from the environmental education course were specifically targeted and had accounted for nearly half of the sample. If it were expected that students enrolled in environmental education courses might be more aware of the impact of climate change and therefore will be more concerned, this finding could be considered surprising. The lowest level of environmental concern overall was witnessed in Kisii University in Kenya. It was noted earlier that Kisii University has the highest percentage of students originating from a rural areas and these students also tend to have the lowest socio-economic status. The lower level of concern, therefore, might be a function of lower level of awareness about climate change in rural, lower-income areas. We consider the predictors of environmental attitudes in a multivariate approach using linear regression in Section 4.1.

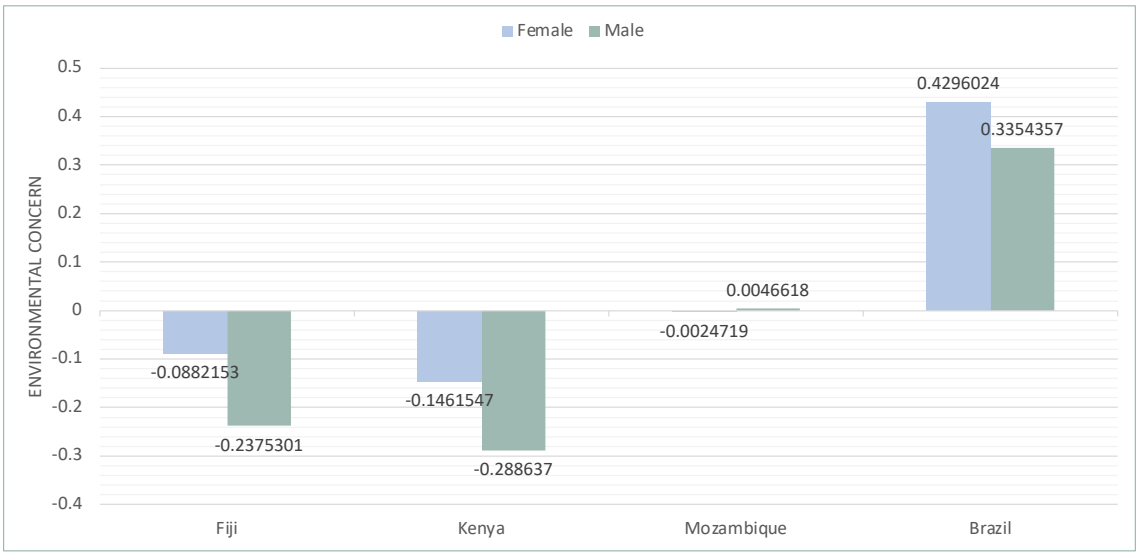
Figure 27: Environmental concern by university



4.2 Environmental concern by sex, discipline and home assets

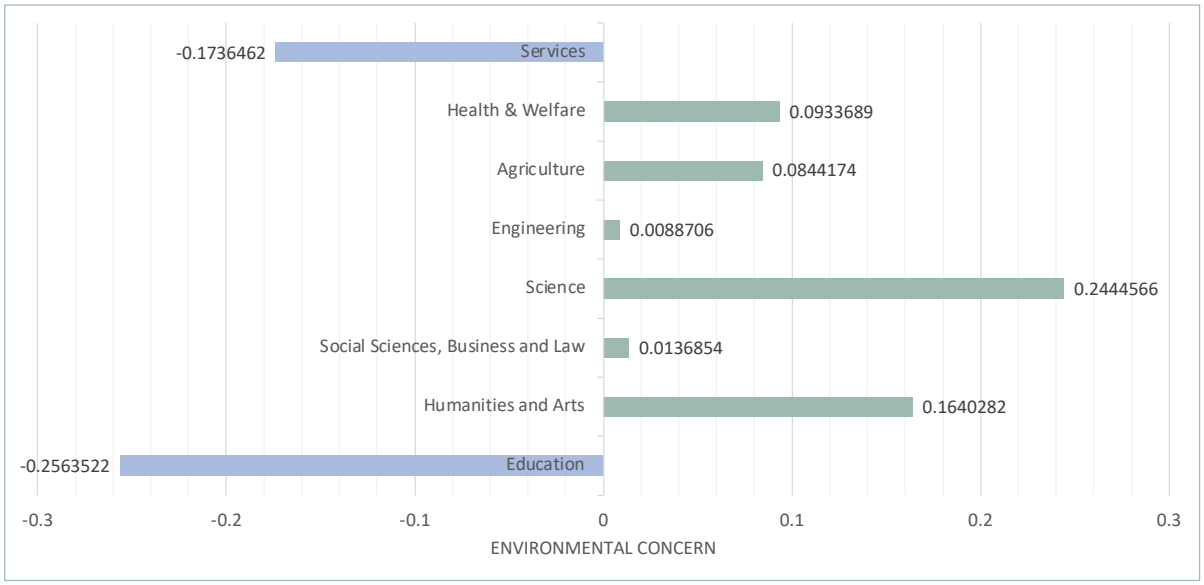
Figure 28 shows that across all countries except Mozambique, female students tend to demonstrate a higher level of concern than male students.

Figure 28: Environmental attitudes by country and gender



There is evidence of large variation in environmental concern by the discipline the student is studying (illustrated in Figure 29). Students in Engineering and Humanities and Arts tend to show the highest levels of environmental concern, whereas those in Education and Services show the lowest levels of concern. The graph shows relative levels of concern which means that students across all disciplines except for education and services show a higher-than-average level of environmental concern and students in education and services report a lower concern compared to students in other disciplines. These patterns are partly determined of course by the socio-economic backgrounds of students in the various disciplines as considered above.

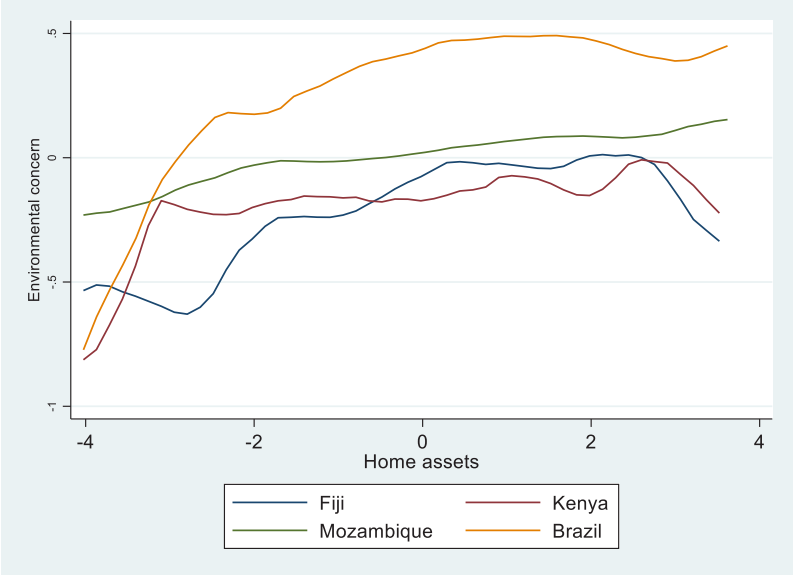
Figure 29: Environmental concern by discipline



Finally, we explore the relationship between socio-economic status and environmental concern more specifically (Figure 30). While the data show variation across the socio-economic in different countries, there is a general pattern that more economically advantaged respondents tend to report have higher levels of environmental concern. The poorest students in all countries report the lowest levels of environmental concern. In Mozambique and Brazil, there is a clear steady increase in concern as socio-economic status increases, as measured by home assets. However, in Fiji and Kenya, environmental concern increases steadily until it reaches a maximum point and decreases for the richest students.

It is potentially alarming that the poorest have the least concern, but there are many possible phenomena which may lie behind this and the relationship between wealth and environmental concern is not especially strong. While in some contexts poorer students may be expected to be impacted more by climate change, equally those living in rural or agricultural areas may answer questions about the environment differently by virtue of their potentially closer relationship with it – as in the case of the example questions considered in relation to the uses of plants, animals, lakes and rivers for example in 2.1.2. These issues are worthy of further exploration.

Figure 30: Environmental concern by home assets and country



4.3 Regression analysis: Cross Country

To understand the various predictors of environmental attitudes of students more fully, we employed regression models which allow us to identify the factors that may predict environmental attitudes including the discipline students are studying, their socio-economic status captured by the asset index, sex, country and their age. Table 5 shows the regression models using particular groups of variables (columns 1-5) and all the variables together (column 6).

The first model (column 1) treats students enrolled in education courses as the reference group so that all other disciplines are compared to education in terms of students' environmental attitudes. Students across all other disciplines demonstrate a higher level of environmental concern than students in the education discipline in the first model (column 1), bearing in mind this does not include controls for other differences between students. The highest concern is demonstrated by science students followed by humanities and arts and health and welfare students. While students in the services disciplines also demonstrate a higher envrionmental concern, this result is not statistically significant (comparing to those in education).

The second model (column 2) shows the relationship between socio-economic status (household assets) and environmental concern. The model shows that socio-economic status is a significant predictor of environmental concern i.e., as wealth increases, environmental concern also increases on average. An R-squared of 6.9% in this model shows that wealth explains a notable proportion of the variation in environmental concern. The third model (column 3) treats female gender as the reference category for comparison in a model estimating the relationship between gender and environmental attitudes. It shows that male students are on average less concerned about the environment than female students when no other factors are accounted for. The fourth model, reported in column 4, compares environmental concern across countries with Fiji as the reference country for comparison.

Results show that students in Kenya have lower concern for the environment than students in Fiji, while students in Mozambique and Brazil have a higher concern, with Brazilian students demonstrating the highest level of concern.The R-squared of 11.5% shows that the countries explain a notable amount of the variation in environmental concern. It is possible, however, as discussed earlier, that differences between response patterns in the two languages and differences in the local relevance of particular questions in part explain country-level differences in 'environmental concern' as estimated. Accordingly, caution is needed in interpreting country-level differences. However, in Model 6, which includes country variables alongside all other key predictors, we may consider that country-differences in response-patterns have been 'controlled for' to a large extent, allowing for more robust interpretation of the factors which predict environmental concern within countries. The model in column (5) examines the relationship between student age and environmental concern. Contrary to expectations perhaps, results shows that older students have a higher level of environmental concern by a small margin, significant at the 90% level.

Model 6 (column 6) includes all key predictor variables to examine the relationships between individual predictors and environmental concern while adjusting or controlling for other key predictive factors. Results show that, other things equal and compared to the discipline of education, students enrolled in health and welfare courses have the highest level of environmental concern, followed by those in agriculture and those studying science. Students studying services and engineering disciplines showed levels of enviromental concern not statistically significantly different from their counterparts in education. After controlling for other factors, the relationship between wealth and environmental concern is reduced as might be expected but it is still positive and significant. Similarly, the predictive power of gender is reduced while male students still show significantly lower levels of environmental concern, other things being equal.

In respect of age, this is no longer a significant predictive factor in the full model. Differences between countries are somewhat different in the full model, with students in Fiji showing the lowest concern followed by Kenya, Mozambique and Brazil when other factors are accounted for. The shift in part refects the model's inclusion of variables such as socio-economic status – for example students in Kenya are the least wealthy but not the least 'concerned' once this is accounted for. The notion of 'environmental concern' might be expected to reflect a number of underlying trait components. For example, concern might be negatively associated with confidence or optimism in relation to measures being taken to protect the environment or mitigate environmental degradation to the extent that concern reflects anxiety about the environment. While we were not able to investigate these factors separately, data from other parts of the survey show for example that students in Brazil have low levels of confidence in some of these areas and are less optimistic particularly in relation to political processes and climate change. Students in Fiji reported the highest levels of 'personal responsibility' and 'willingness to take action' in relation to climate change. It seems plausible that greater involvement may lead to a greater sense of progress and in turn to more informed concern, while this remains a suggestive interpretation.

The final model has an R-squared of 15.7% suggesting that the included variables only explain a moderate proportion of the varince in environmental attitudes and that there may be a number of important predictive factors which have not been captured, as might be anticipated in relation to a complex set of attitudes.

Table 5: Regression analysis - predictors of environmental concern

VARIABLES	(1) Discipline	(2) Assets	(3) Sex	(4) Country	(5) Age	(6) All variables
Humanities & art	0.420***					0.0737
	(0.0469)					(0.0464)
Social sciences, business & law	0.270***					0.124***
	(0.0337)					(0.0342)
Science	0.501***					0.209***
	(0.0375)					(0.0388)
Engineering	0.265***					-0.0609
	(0.0451)					(0.0459)
Agriculture	0.341***					0.241***
	(0.0612)					(0.0582)
Health & welfare	0.350***					0.300***
	(0.0407)					(0.0407)
Services	0.0827					-0.0229
	(0.0552)					(0.0571)
Assets		0.111***				0.0592***
		(0.00565)				(0.00649)
Male			-0.188***			-0.130***
			(0.0232)			(0.0226)
Other			0.0998			-0.0718
			(0.170)			(0.159)
Prefer not to say			-0.401***			-0.279***
			(0.0979)			(0.0918)
Kenya				-0.100***		0.0959***
				(0.0278)		(0.0316)
Mozambique				0.140***		0.292***
				(0.0438)		(0.0474)
Brazil				0.571***		0.575***
				(0.0289)		(0.0310)
Age					0.00327*	-0.00133
					(0.00186)	(0.00180)
Constant	-0.256***	0.00318	0.0923***	-0.141***	-0.0755	-0.238***
	(0.0242)	(0.0111)	(0.0157)	(0.0209)	(0.0462)	(0.0575)
Observations	5,210	5,258	5,258	5,258	5,258	5,210
R-squared	0.041	0.069	0.014	0.115	0.001	0.157

4.4 Regression analysis: Within Countries

Table 6 reports the result of a set of regression models which examine the predictive relationships specifically within countries, recognising that response patterns between countries may vary for a number of reasons. Sample sizes are of course smaller, reducing the likelihood of statistical significance in respect of the relationships being modelled. This is particularly an issue in Mozambique where the sample is much smaller and few significant results are found.

Environmental concern levels by discipline differ somewhat by country, with engineering students showing the highest concern in Fiji, agriculture students in Kenya and science students in Brazil. While there is limited consistency across the within country models, the disciplines of science, agriculture and health and welfare show generally higher levels of concern than the reference category (education students). These disciplines might arguably be considered likely to inform students more than average about climate change or to attract students with greater specific interest in environmental issues, at least in the more technical sense.

Within countries, sex and socio-economic status continue to be significant predictors of environmental concern, demonstrating that wealthier students and female students show a higher level of concern. The effect of age differs across countries with older students being more concerned in Fiji and younger students being more concerned in Brazil and Mozambique. The area in terms of rural, urban or peri-urban from which students originate has been added as a predictor variable in these models. Rural origin is the reference catogory. Results show that students from urban (except in Kenya) and peri-urban areas are more concerned about the environment, other things equal, than students in rural areas. The relationship is stronger typically when comparing peri-urban to rural areas.

Interpretation of the results of these regression exercises can only be tentative. Nonetheless, the results point to some interesting relationships which may warrant further investigation. For example, there is some suggestion that students studying scientific disciplines, broadly understood, may be more concerned about the environment. This is perhaps not a counter-intuitive finding. However, students who are wealthier and who originate from more urban areas show higher concern than less wealthy rural students who might be expected to be more likely to be directly affected by climate change, although this is clearly arguable.

Table 6: Regression analysis by country

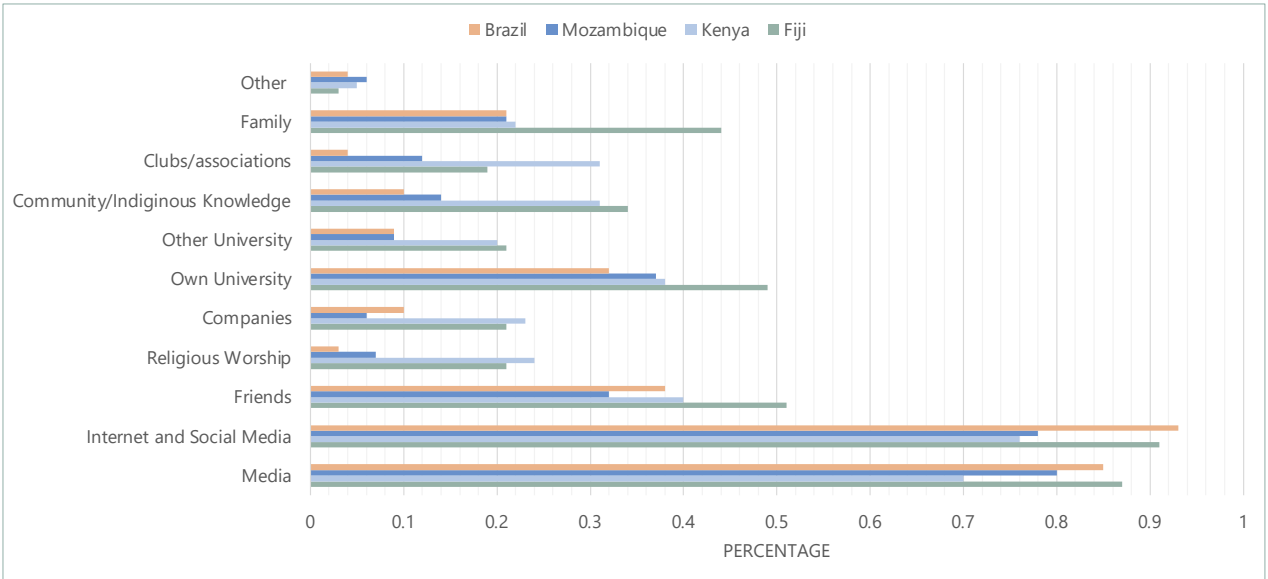
VARIABLES	Fiji	Kenya	Mozambique	Brazil
Humanities & art	-0.211*	-0.0502	0.248	0.198***
	(0.120)	(0.0980)	(0.195)	(0.0692)
Social sciences, business & law	0.0369	0.185***	0.0629	0.182***
	(0.0686)	(0.0584)	(0.157)	(0.0682)
Science	0.182**	0.271***	0.229	0.232***
	(0.0783)	(0.0906)	(0.174)	(0.0645)
Engineering	0.304**	-0.543***	0.148	0.0685
	(0.120)	(0.0929)	(0.169)	(0.0725)
Agriculture	0.256**	0.371***	0.166	0.00486
	(0.122)	(0.0963)	(0.192)	(0.113)
Health & welfare	0.257***	0.366***	0.382*	0.0420
	(0.0749)	(0.0685)	(0.197)	(0.0979)
Services	-0.0386	-0.229**	0.236	-0.0906
	(0.149)	(0.0968)	(0.147)	(0.379)
Assets	0.0547***	0.0744***	0.0486**	0.0278**
	(0.0116)	(0.0127)	(0.0188)	(0.0134)
Male	-0.168***	-0.155***	0.0351	-0.156***
	(0.0439)	(0.0425)	(0.0719)	(0.0349)
Other	-0.300	-0.807**		0.323*
	(0.526)	(0.333)		(0.169)
Prefer not to say	-0.322**	-0.380**	-0.279	0.242
	(0.157)	(0.150)	(0.350)	(0.206)
Age	0.00628**	0.00375	-0.0180***	-0.00508**
	(0.00316)	(0.00630)	(0.00575)	(0.00219)
Urban	0.0801*	-0.146***	0.0339	0.153***
	(0.0472)	(0.0554)	(0.0865)	(0.0563)
Peri-urban	0.196***	0.138**	0.193*	0.245***
	(0.0569)	(0.0672)	(0.106)	(0.0651)
Constant	-0.449***	-0.188	0.206	0.278***
	(0.108)	(0.152)	(0.200)	(0.0865)
Observations	1,407	1,828	420	1,555
R-squared	0.072	0.104	0.065	0.057

5. Student understandings and attitudes

5.1 Sources of information

In this section we examine where students receive their information about climate change from and the extent to which universities seem to play a part informing them, illustrated in Figure 31. Perhaps unsurprisingly, respondents across all universities most commonly obtain their information from the traditional print and broadcast media or the internet, with internet being the most common source of information in all universities except for those in Mozambique where the media is more commonly cited as a source of information. Nonetheless a sizeable proportion of respondents cited their own university as a source of information, particularly in USP Fiji (54%), UoF (45%), KU (43%) and KMU (42%). However, the figures for the other universities are low, ranging between 26% and 39% with the lowest percentages of students reporting their university as a source of information being in Brazil, followed by universities in Mozambique. Similar patterns are found in relation to students reporting other universities as a source of information. A greater proportion of students indicated this as a source in Fiji and Kenya than in Brazil or Mozambique. Higher proportions of students reported religious worship as a source of information in Kenya (24%) and Fiji (20%) compared to Brazil (3%) and Mozambique (10%). Overall, other than the media, internet and their friends, students in Brazil and Mozambique reported receiving information from other sources of information less often when compared to students in Kenya and Fiji.

Figure 31: Sources of information by country



5.2 Perception of personal awareness

Figure 32 reports students' perceptions of how well-informed they are about climate change. Respondents in all four countries believe that they are informed at average or better than average levels. Results for Brazil (and Mozambique) are somewhat lower in terms of those who considered themselves 'much better informed', with 23% of respondents reporting this, compared to 38% in Fiji and 32% in Kenya. Only a small percentage of respondents reported that they believe they are less informed than average across the countries, being highest in Mozambique. Clearly, what might be considered 'average' may differ significantly across countries so that direct cross-country comparisons should be considered contingent.

Figure 32: Perception of personal awareness

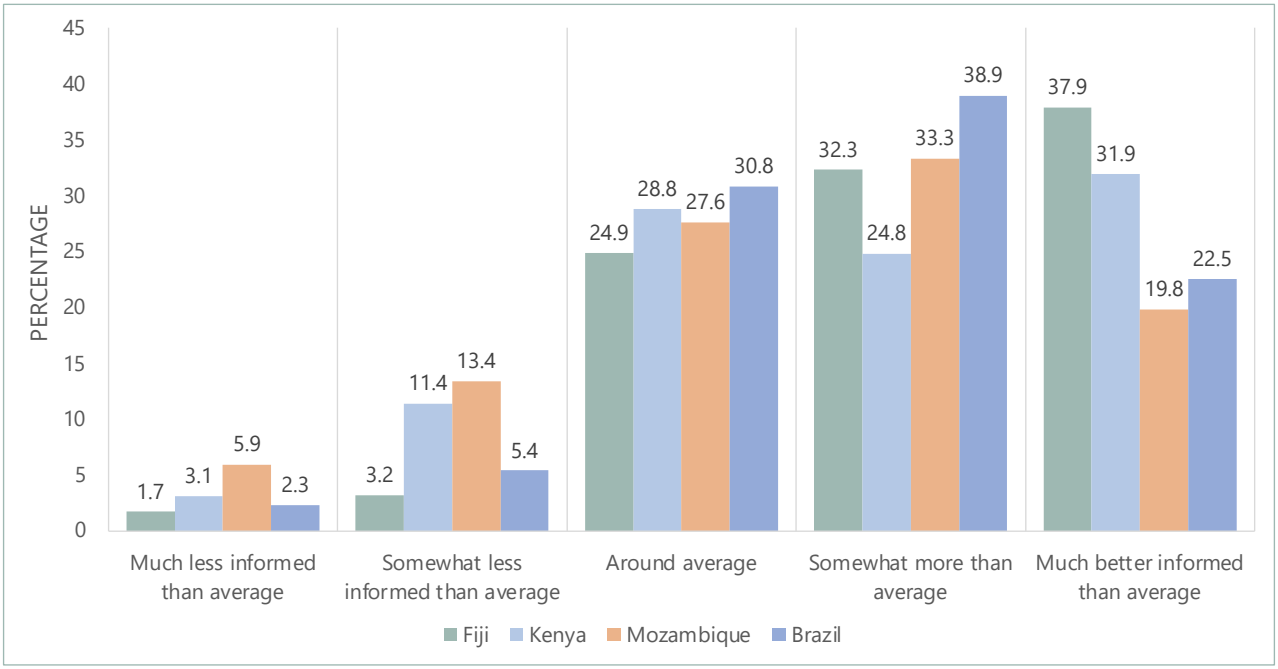


Figure 33 illustrates the results by gender and Figure 34 by study discipline. Male students reported a slightly higher level of confidence in their own personal awareness with the highest percentage of male students reporting that they are much better informed than average, whereas the highest percentage of female students reported being somewhat more informed than average.

A higher percentage of female students also reported an average level of awareness compared to male students. Differences between disciplines are not especially remarkable, while the very highest levels of confidence were observed most often in education, science and agriculture disciplines.

Figure 33: Perception of personal awareness by gender

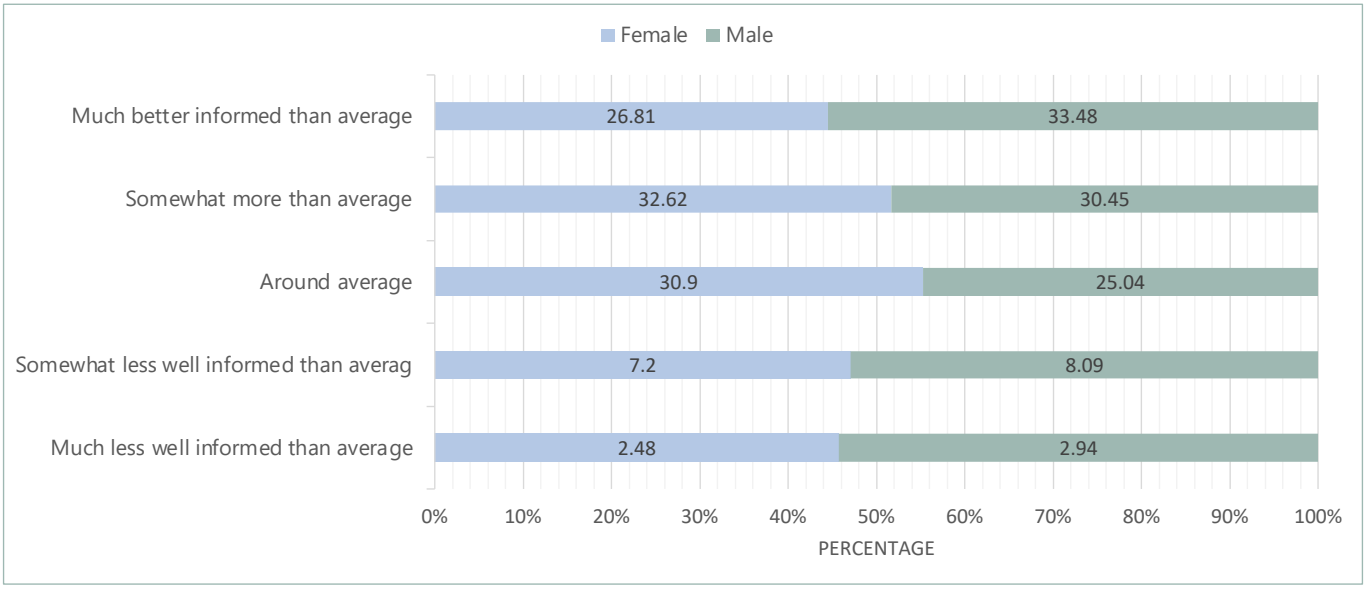
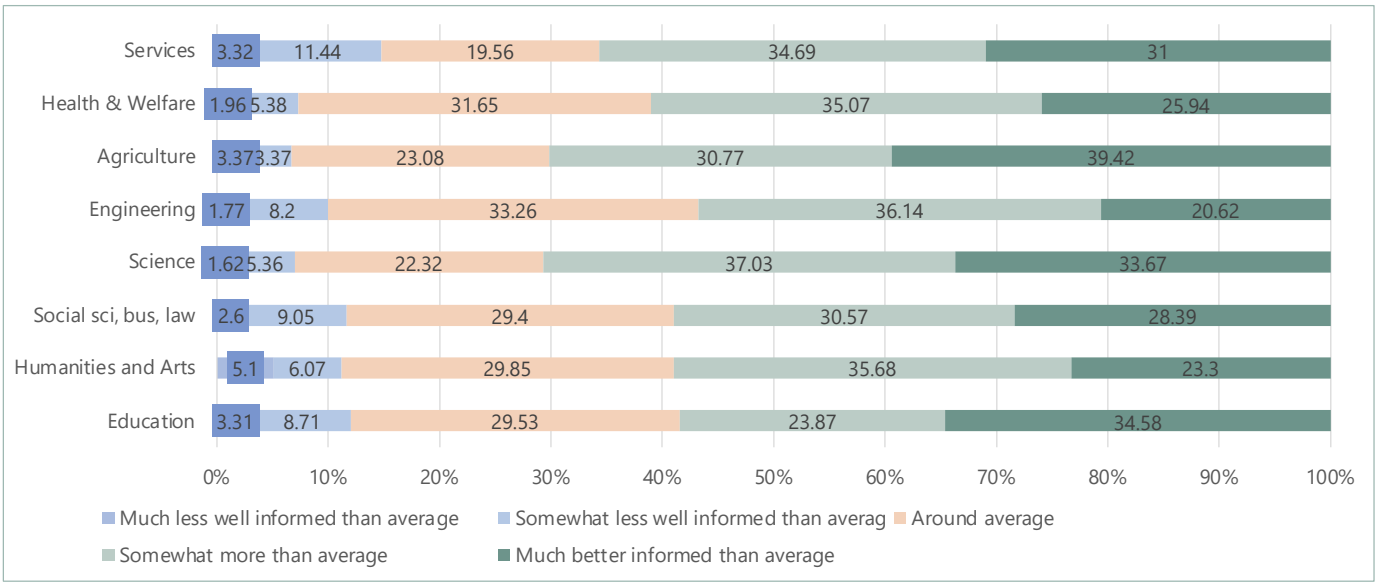


Figure 34: Perception of personal awareness by discipline



5.3 Challeneges for Understanding Climate Change

Students were asked about the challenges faced in relation to learning about climate change. The most significant challenges identified overall are that the issue is 'too complex' (35%) or 'too scientific' (32%), closely followed by the issue is 'too political' (28%). It is encouraging that a very low percentage (8%) of students reported that the 'issue does not affect me' as a challenge. The challenges identified suggest that there is a need in education to address these issues where possible to the extent that they may present barriers to students' learning and understanding. Figure 35 shows the challenges identified by students in each country. The findings suggest that a very low percentage of students in Mozambique believe that 'issue does not affect me' is a challenge, while the percentage in Fiji and Kenya is higher. The issue of being too political is particularly a concern in Brazil where more than 40% of the students reported this as a challenge.

Figure 35: Challenges for understanding climate change

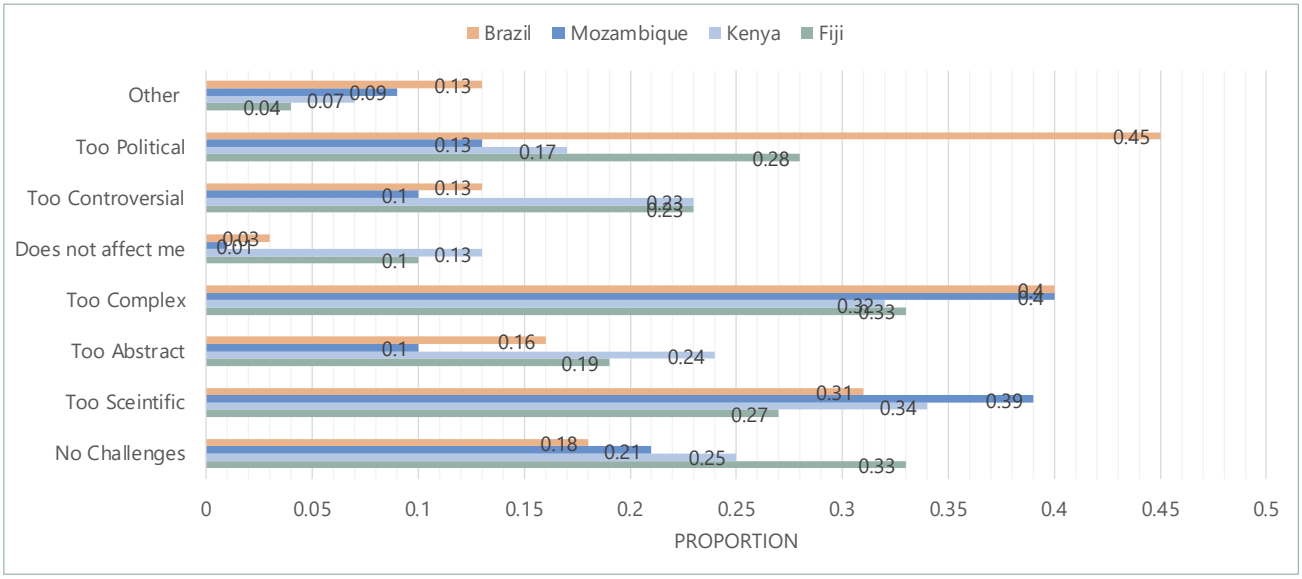
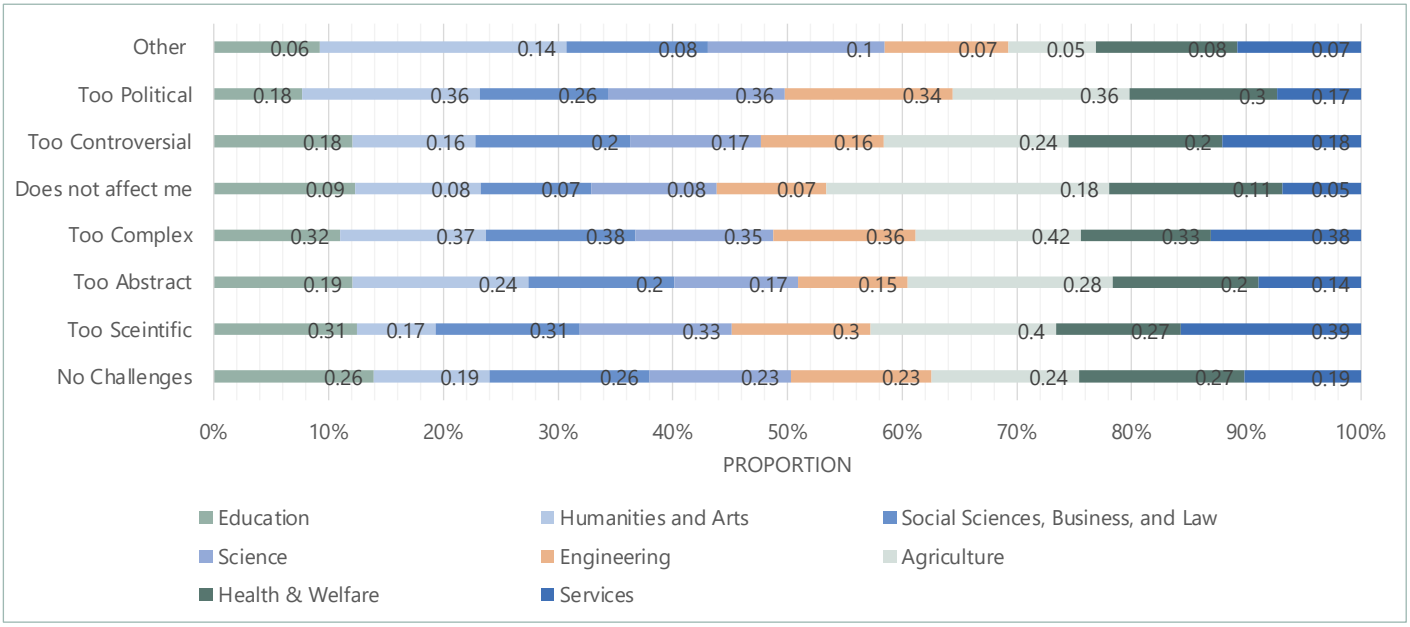


Figure 36 reports the data by student discipline and shows that even science students report that the issue being 'too scientific' is a challenge, although the proportion of students responding this way is lower than for other disciplines. A lower number of students in the education and services disciplines reported that they found the issue 'too political' when compared to other disciplines while a higher percentage of agriculture students reported that they found the issue 'too abstract'.

Figure 36: Challenges for understanding climate change by discipline



Questions derived from the British Social Attitudes Survey were used to measure the extent to which people believe humans cause climate change, the extent to which they think it is a problem, as well as their beliefs about whether citizens and governments are likely to be able to reduce it. Six questions were used for this purpose.

5.4 Causes of Climate Change

The first question of these questions asked respondents whether they "think that climate change is caused by natural processes, human activity or both" as illustrated in Figures 37 and 38. An overwhelming majority of the respondents believe that climate change is caused either entirely or mainly by human activity (65%), but about a third (32%) believe that climate change is equally caused by human activity and natural processes. Differences across country are notable. There is an apparently higher prevalence of 'denial' of climate change in Kenya while this remains a very limited view. 1% reported that they believe climate change is not happening. The percentage of students in Kenya who believe that climate change is caused either mainly or entirely by human activity is lower than elsewhere. A high percentage of students in Brazil (87%) believe that climate change is caused mainly or entirely by human activity and almost none believe that natural processes are responsible.

Figure 37: Beliefs about the causes of climate change

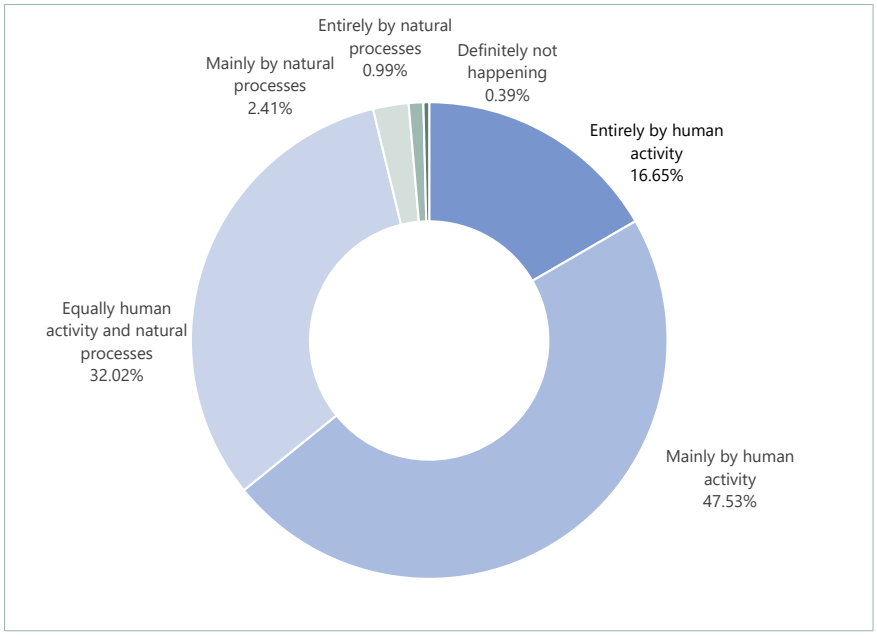
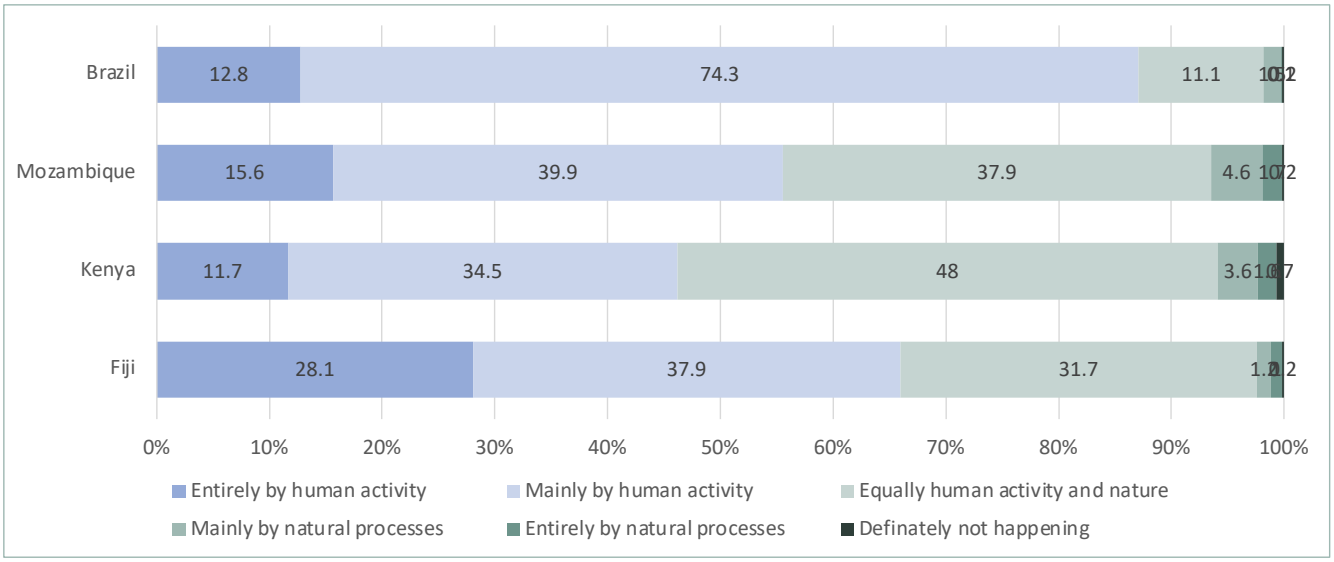


Figure 38: Beliefs about the causes of climate change by country



We examined beliefs about the causes of climate change in relation to the 'environmental concern' scale derived from the Milfont and Duckitt's (2010) inventory. Results are shown in Figure 39. There is a clear indication that students who have lower levels of concern for environment are more likely to believe that climate change is 'not happening' or that it is mainly caused by natural processes.

Figure 39: Environmental concern and beliefs about the causes of climate change

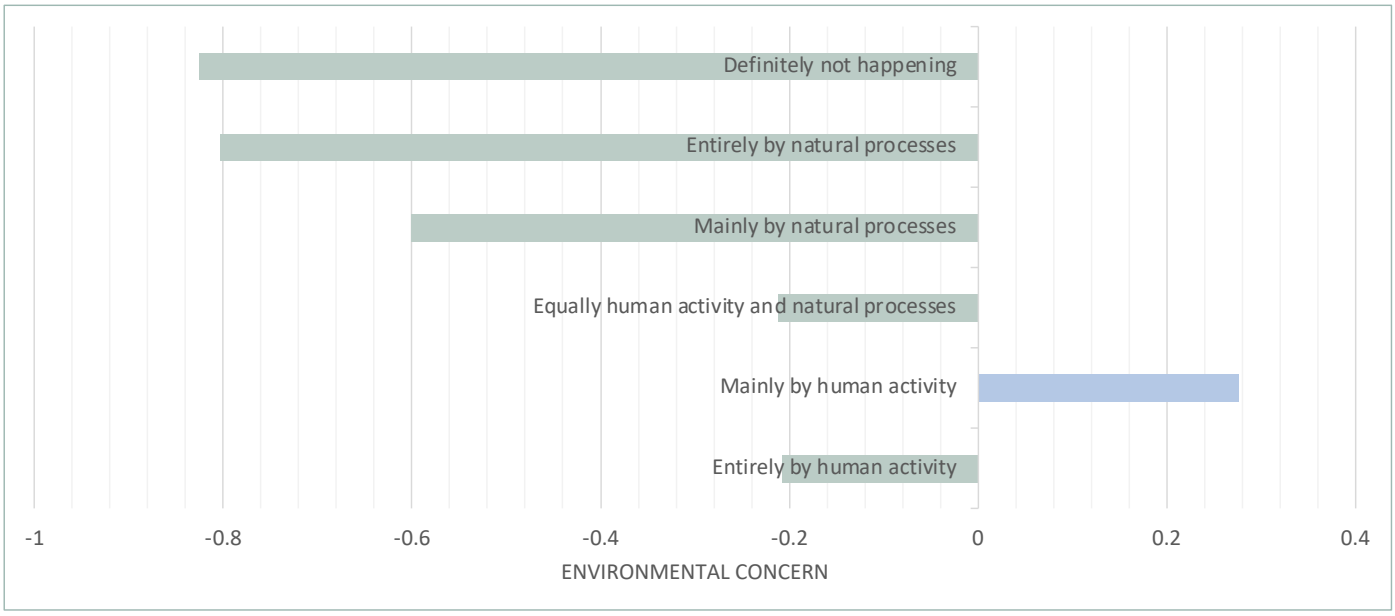
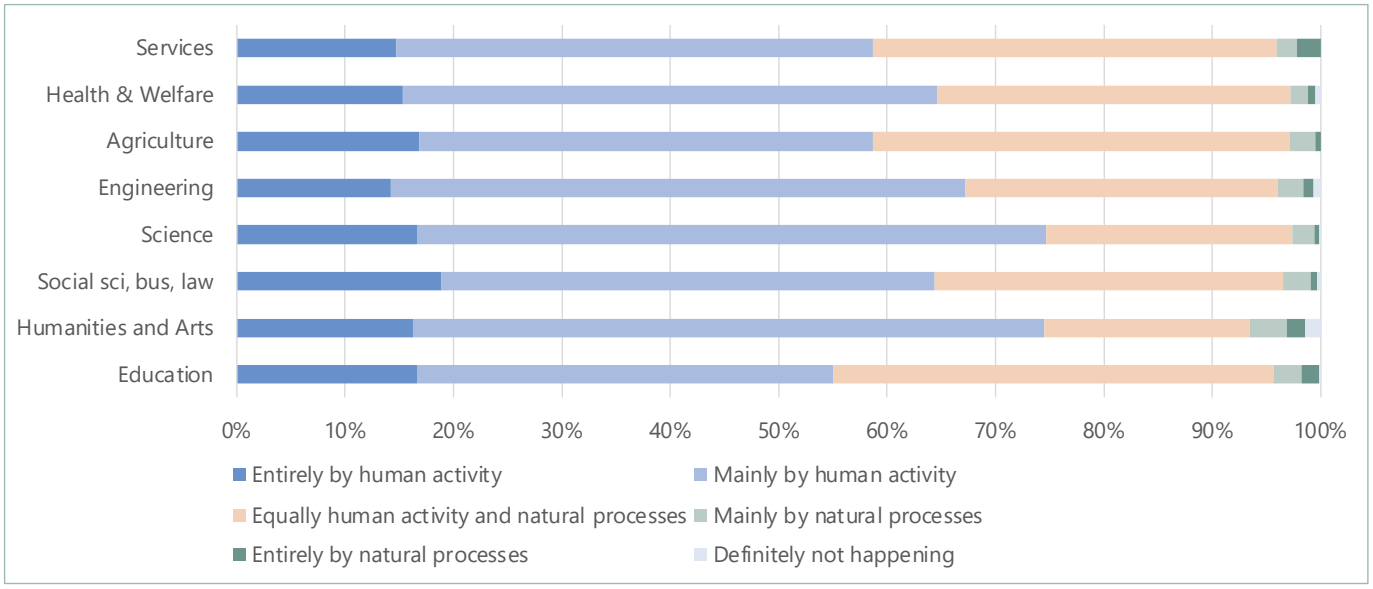


Figure 40 reports students' beliefs about the causes of climate change according to their study discipline. It shows that the highest proportion of students across all disciplines except education believe that climate change is mainly caused by humans. Students studying education, agriculture and services disciplines were more likely to believe that climate change is caused equally by human activity and natural causes. Science students appear to be no more likely than students from humanities and arts to believe that climate change is primarily caused by human beings. Clearly there are various possible interpretations of 'climate change' and while the term is often used as a shorthand for anthropogenic climate change caused

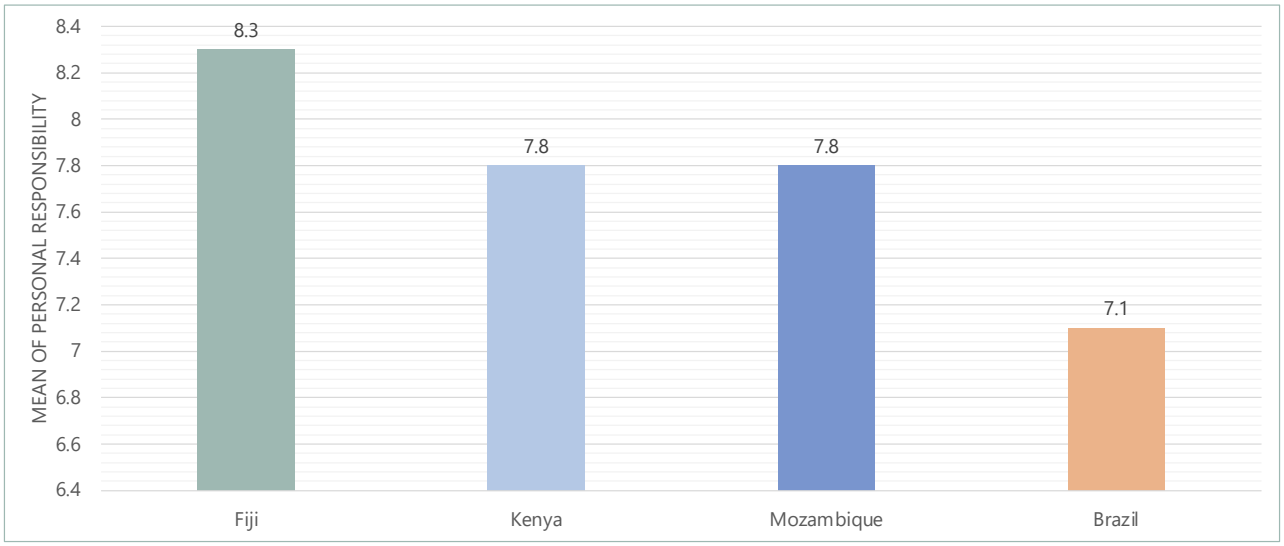
Figure 40: Beliefs about causes of climate change by study discipline



5.5 Personal responsibility

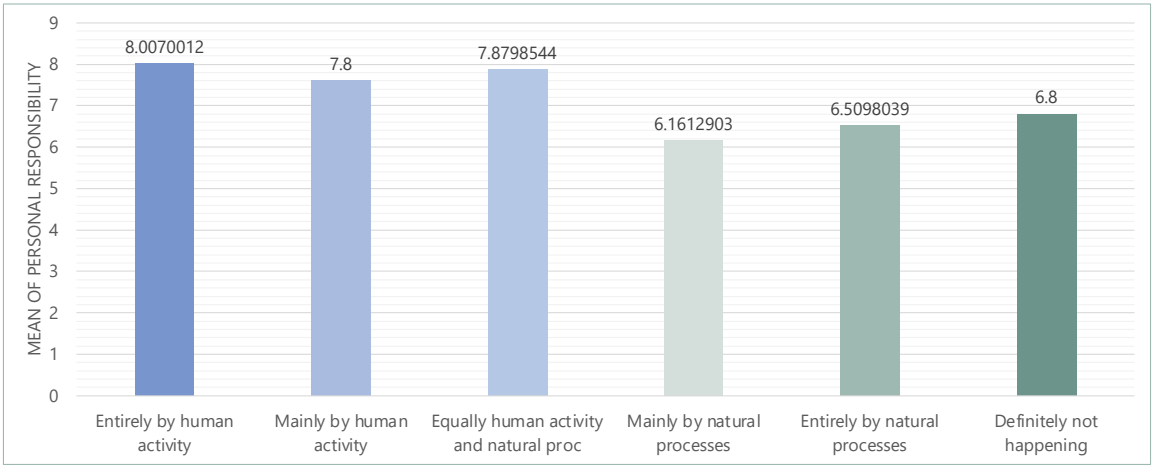
Respondents' feelings of personal responsibility to try to reduce climate change were found to vary notably. Figure 41 illustrates the results using scores on a scale of personal responsibility with respect to climate change mitigation, where 0 indicates 'no responsibility' and 10 denotes feeling a great deal of responsibility. The overall average reported score on this scale is 7.7, indicating that most students felt a relatively high level of personal responsibility. The average is highest in Fiji (8.3) and lowest in Brazil (7.1). While the difference in means is relatively small, it is notable that these results are reversed when compared to the findings in relation to 'environmental concern'.

Figure 41: Extent of personal responsibility



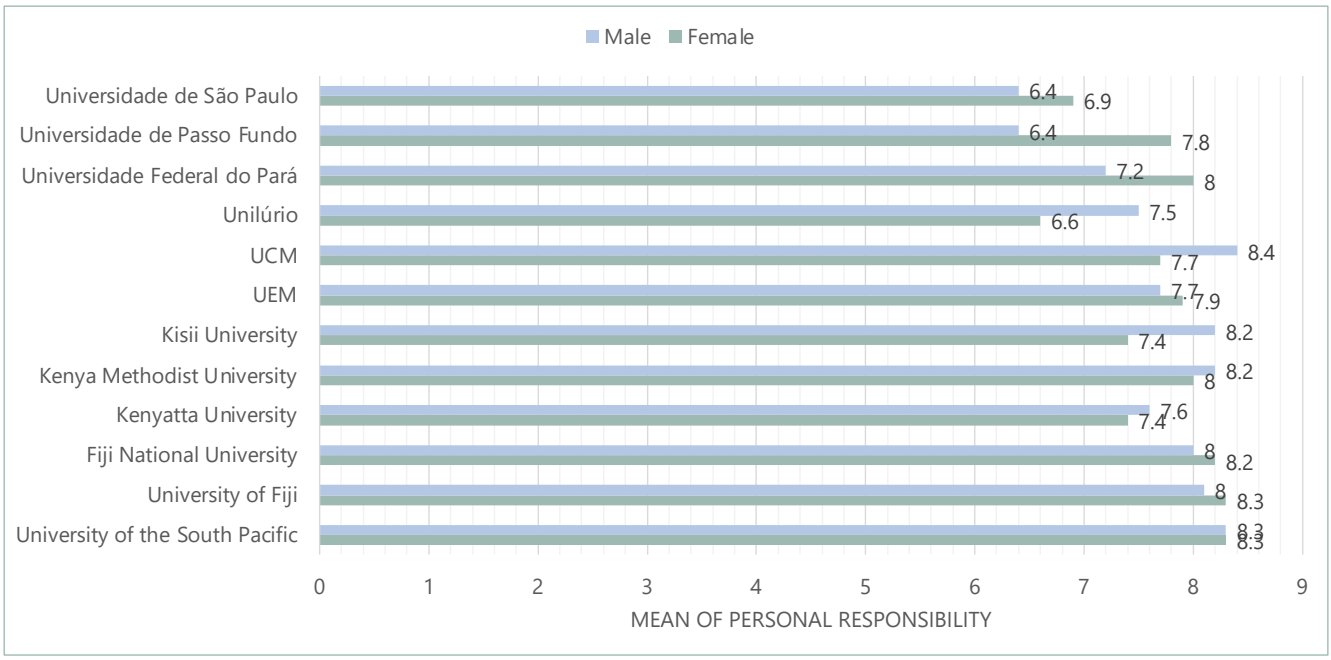
The level of personal responsibility that an individual feels might be expected to be linked to the extent to which they believe that they are contributing to climate change. These concepts are examined together in Figure 42. It shows that respondents who believe human activity is the primary cause of climate change tend to report higher levels of personal responsibility, while those who believe natural processes are the primary cause report lower levels of personal responsibility. However, it is notable that

Figure 42: Mean of personal responsibility by beliefs about causes



Female respondents were shown earlier to have higher average levels of concern for environment. However, Figure 43 shows that higher concern for the environment among female respondents does not necessarily translate into feeling a higher level of personal responsibility. While female respondents in some universities reported a greater feeling of personal responsibility, this was not true across all universities.

Figure 43: Mean of personal responsibility across gender and universities



'Environmental concern' is related to the level of personal responsibility students feel to reduce climate change in Figure 44. It shows that students with a high environmental concern tend to report a higher level of personal responsibility although this finding is largely due to the low levels of environmental concern among those reporting the very lowest levels of personal responsibility.

Figure 44: Variation of personal responsibility by environmental attitudes

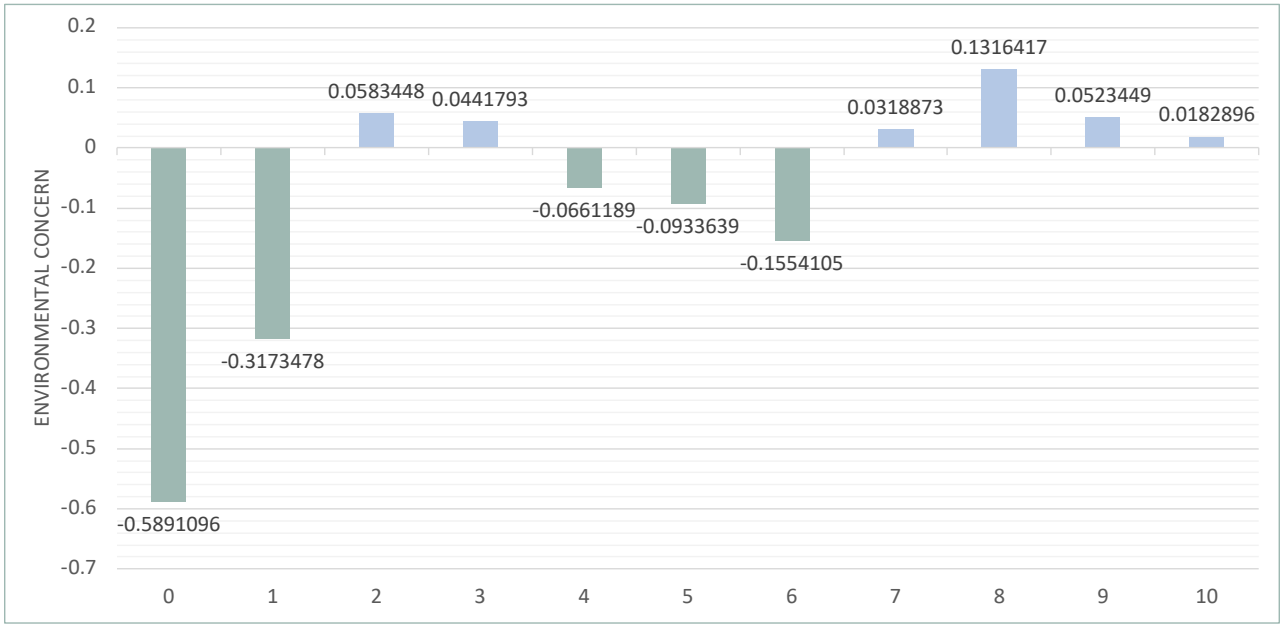
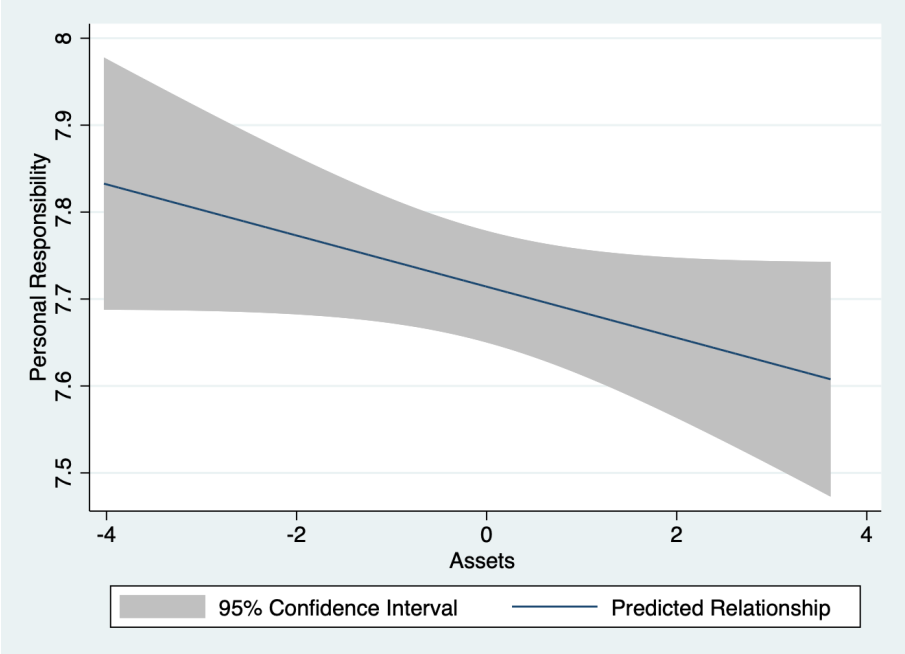


Figure 45 illustrates the relationship between students' socio-economic status (household assets) and feelings of personal responsibility. While the relationship observed is weak, it suggests that less economically advantaged students tended to report stronger feelings of personal responsibility. This could be considered consistent with the idea that less advantaged students might be more likely to suffer more directly from the effects of climate change and therefore to potentially benefit from mitigations. Less economically advantaged students were shown, however, to report lower levels of 'environmental concern' which may not be consistent with this pattern. However, limitations of the validity of the scale as discussed in 2.1.2 and the sections that follow may be of importance here.

Figure 45: Level of personal responsibility by socio-economic status



Students studying agriculture reported stronger feelings of personal responsibility, perhaps due to the direct impact that climate change can have on agricultural activity or to a greater appreciation for responsible stewardship of land and of the role of the weather and climate more generally with respect to crops and livestock. However, there variation in the level of

Figure 46: Level of personal responsibility by discipline

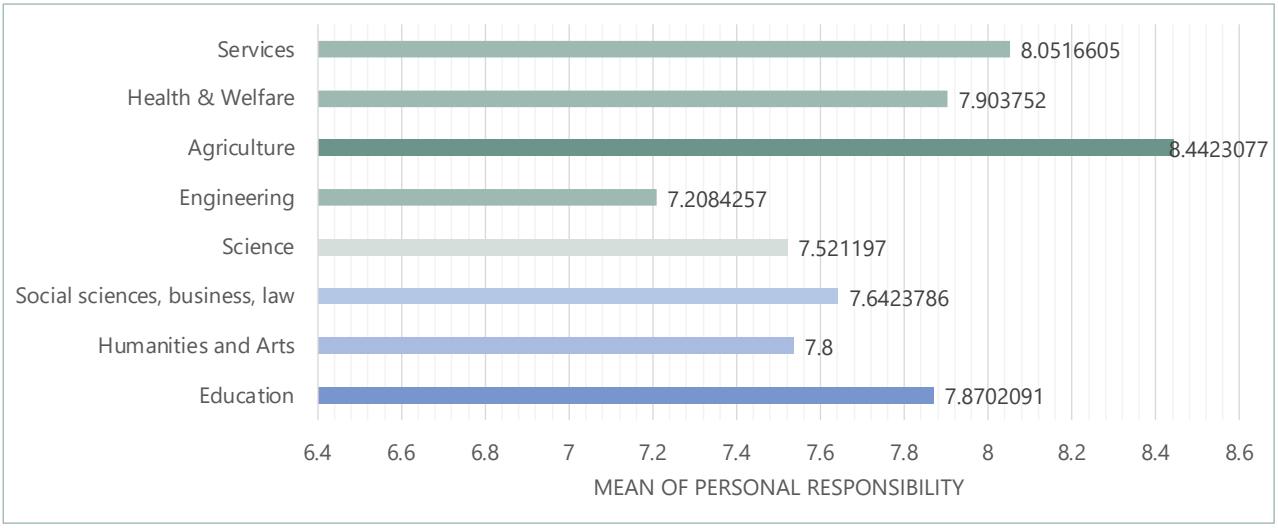
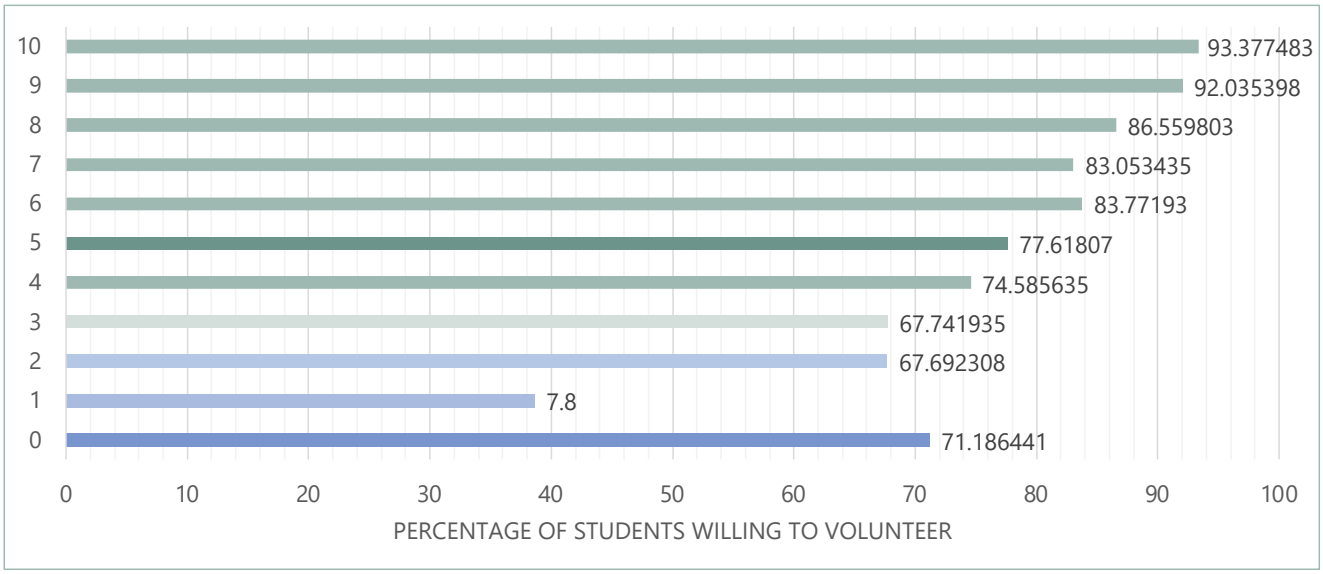


Figure 47: Willingness to volunteer based on feelings of personal responsibility

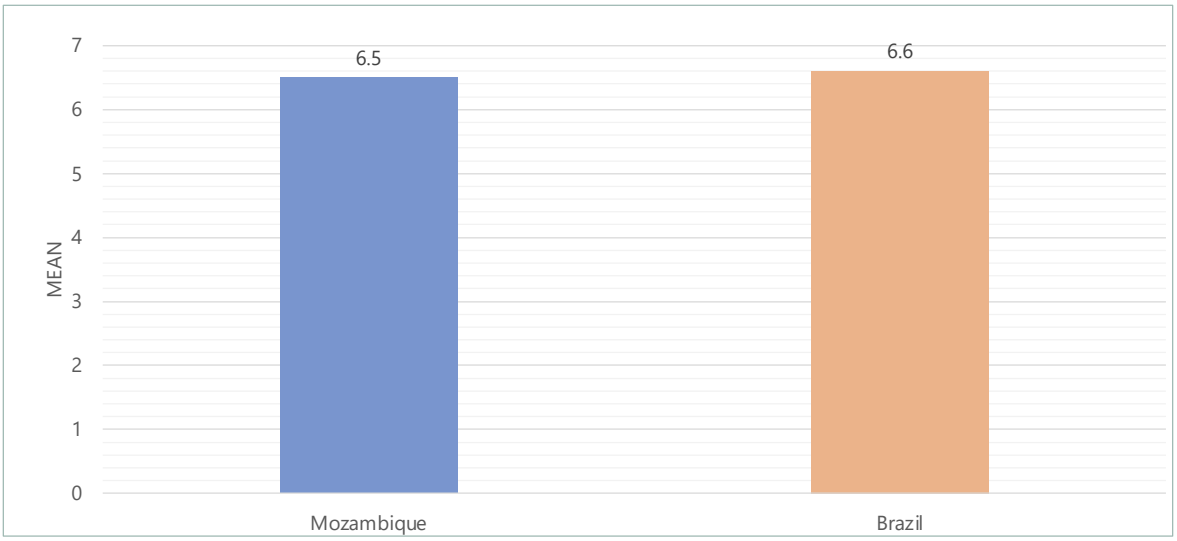


5.6 Personal and aggregate efficacy

We investigated whether feelings of personal responsibility could be expected to translate into action by asking whether respondents thought that whatever action they themselves individually or collectively took would 'make a difference'.

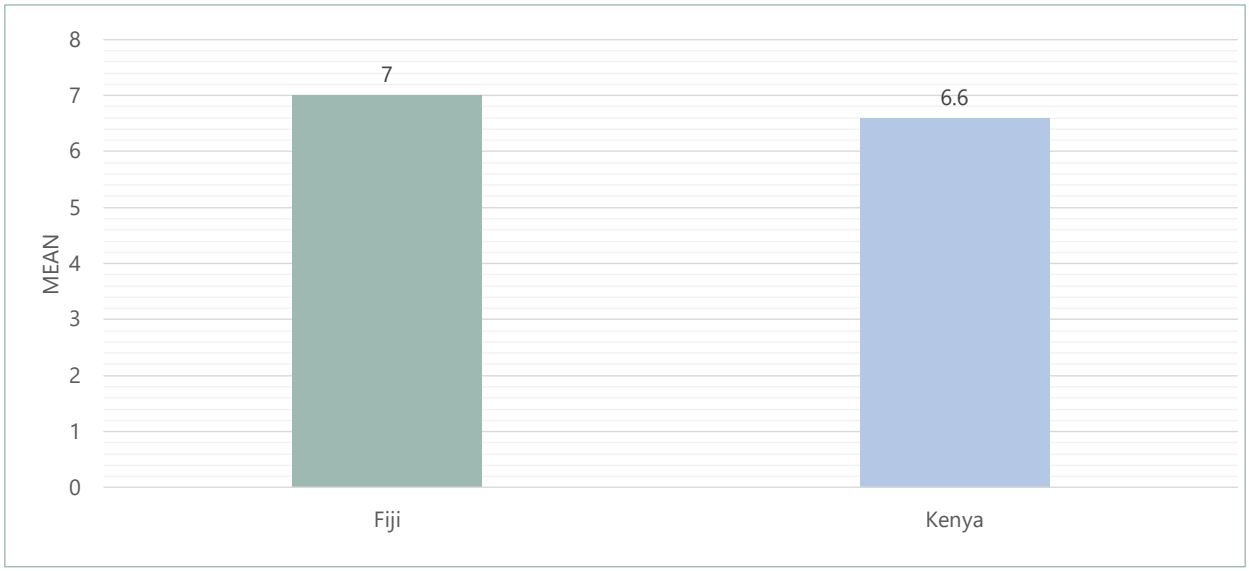
Respondents in countries where the Portuguese survey was used, i.e., Brazil and Mozambique, were asked to state, "how likely (on a scale from 0 denoting "not at all likely" to 10 denoting "extremely likely") are you to limit your energy use to help reduce climate change?". Figure 48 shows very similar average results for Brazil and Mozambique which suggests students are likely to limit energy use, but not overwhelmingly so.

Figure 48: Probability of taking personal action across Portuguese-speaking countries



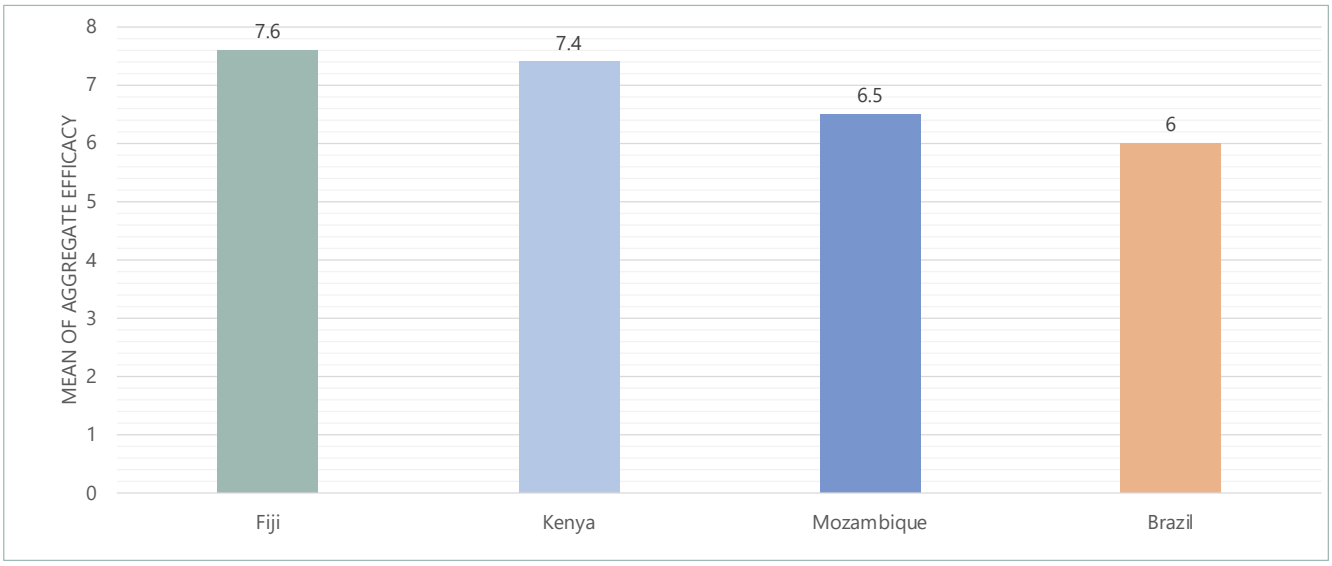
Respondents in Fiji and Kenya were asked "how likely do you think it is that limiting your own energy use would help reduce climate change?" Figure 49 shows that students are optimistic that personally reducing the amount of energy they use would be effective, being slightly more optimistic in Fiji.

Figure 49: Probability of personal action having an impact across English-speaking countries



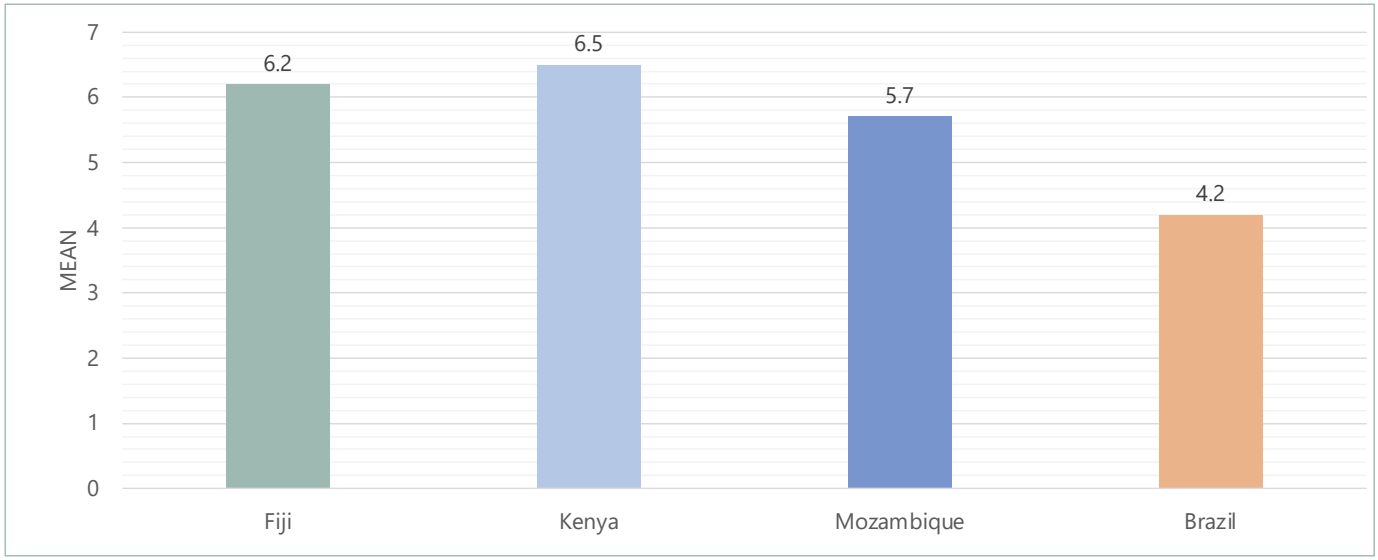
We investigated the extent to which respondents believe that large-scale action by individuals when aggregated would reduce climate change, i.e. beliefs about collective action. Results are illustrated in Figure 50. Compared to the results above, respondents in Fiji and Kenya report a higher level of confidence in collective action (meaning aggregate action) when compared to personal (meaning individual) action. However, it is perhaps surprising that the difference between the results is not larger.

Figure 50: Probability of aggregate action having an impact across countries



The survey also solicited views about whether students believe countries will in fact take action on climate change, as shown in Figure 51. The question employed asked "how likely do you think it is that governments in enough countries will take action that reduces climate change?" Respondents across all countries had relatively low faith that 'enough' countries would take action to address climate change with the mean score being 5.68. Respondents in Brazil were the most sceptical about enough countries taking action and reported a mean score of 4.2 followed by Mozambique with a mean score of 5.7. Students in Kenya and Fiji were more optimistic than average, reporting a mean score of 6.52 and 6.25 respectively.

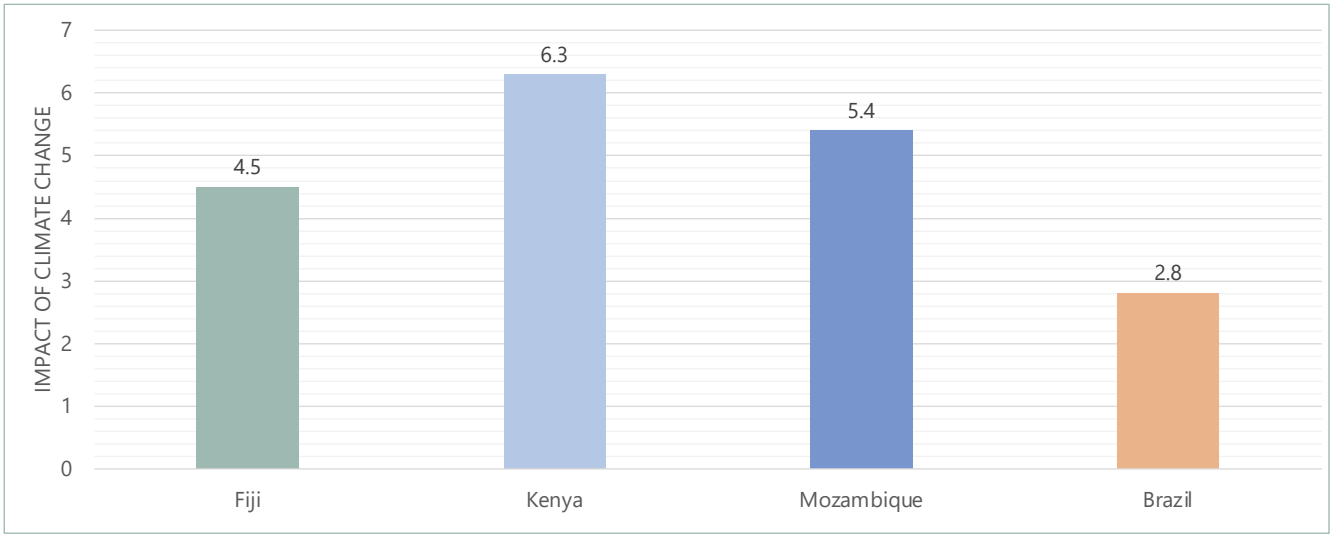
Figure 51: Probability that countries will take action



5.7 Impact of climate change

The extent to which students think that climate change is a serious problem may be expected to relate to the level of personal responsibility they feel as well as to their environmental attitudes and beliefs about the causes of climate change. Respondents were asked to give a score from 0 denoting 'extremely bad' to 10 denoting 'extremely good', to indicate what they expect the impact of climate change will be. Results are illustrated in Figure 52. On average, students in Kenya believe that the impact of climate change will not be especially bad, with a mean score of 6.34. Students in Brazil believe the impact will be extremely bad, with a mean score of 2.80. The large differences in results and high average score in Kenya especially may suggest that some students misunderstood the question, selecting a higher number for a worse impact rather than vice versa. Nonetheless, the results are consistent with earlier findings that students in Brazil are least optimistic in relation to climate change.

Figure 52: Mean perceptions of the impact of climate change across countries



Perceptions about the impact of climate change also differ based on gender of students and the discipline in which they are enrolled as shown in Figures 53 and 54. Female students report lower values on average than the overall mean of 4.7 on this variable indicating that they expect more negative impacts than do males. Science students along with humanities and arts students also expect a more negative impact while students in education and services expect a less negative impact overall from climate change.

Figure 53: Mean perceptions of the impact of climate change across gender

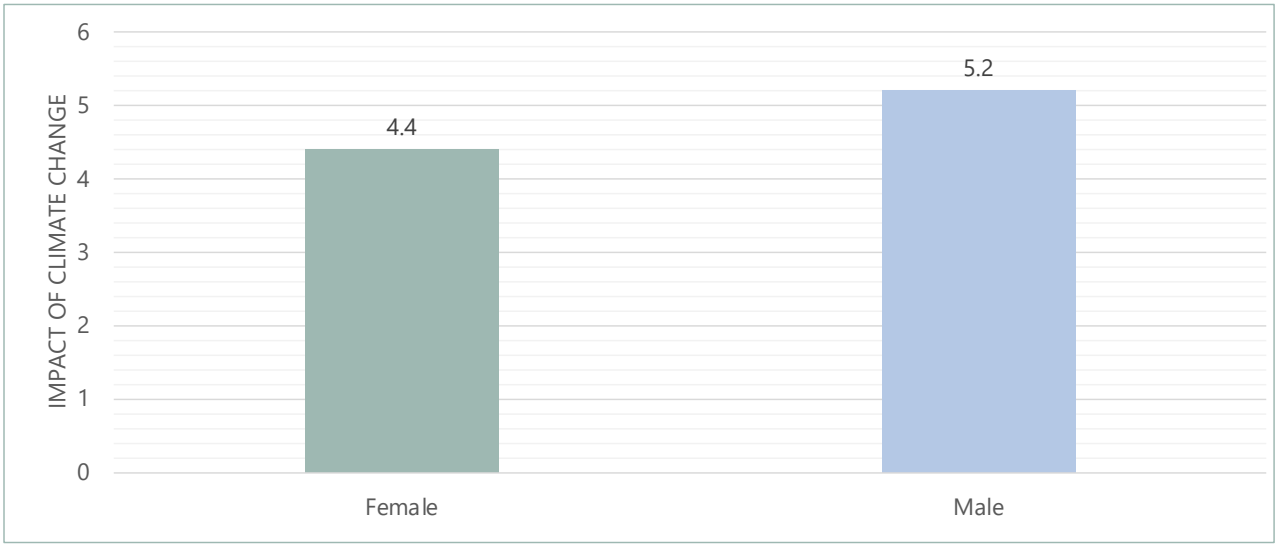
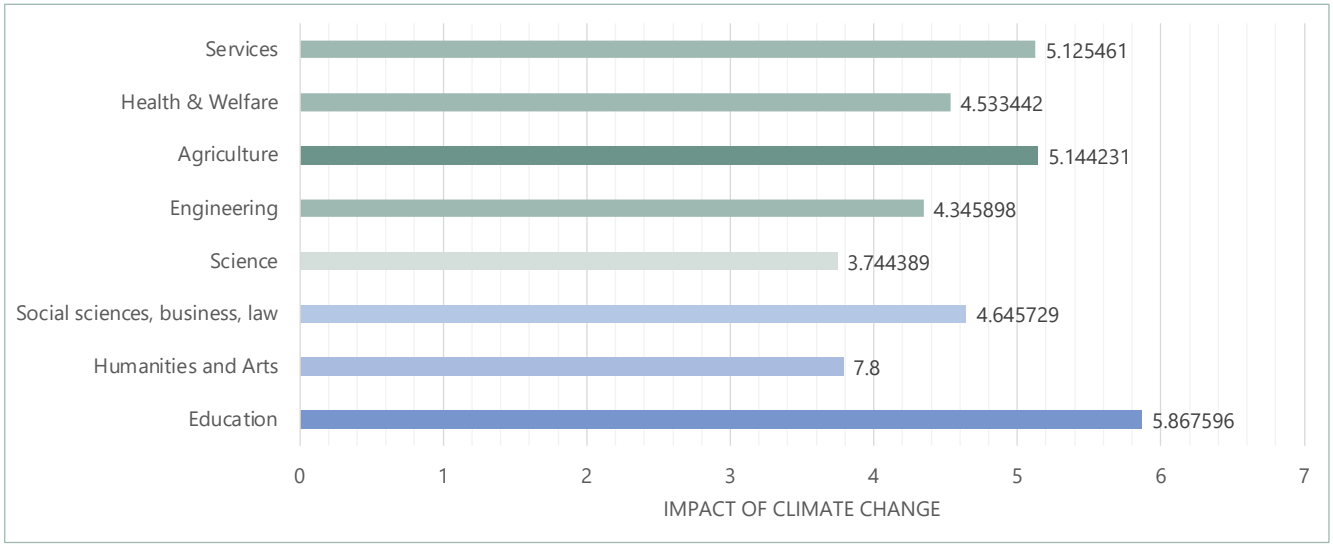
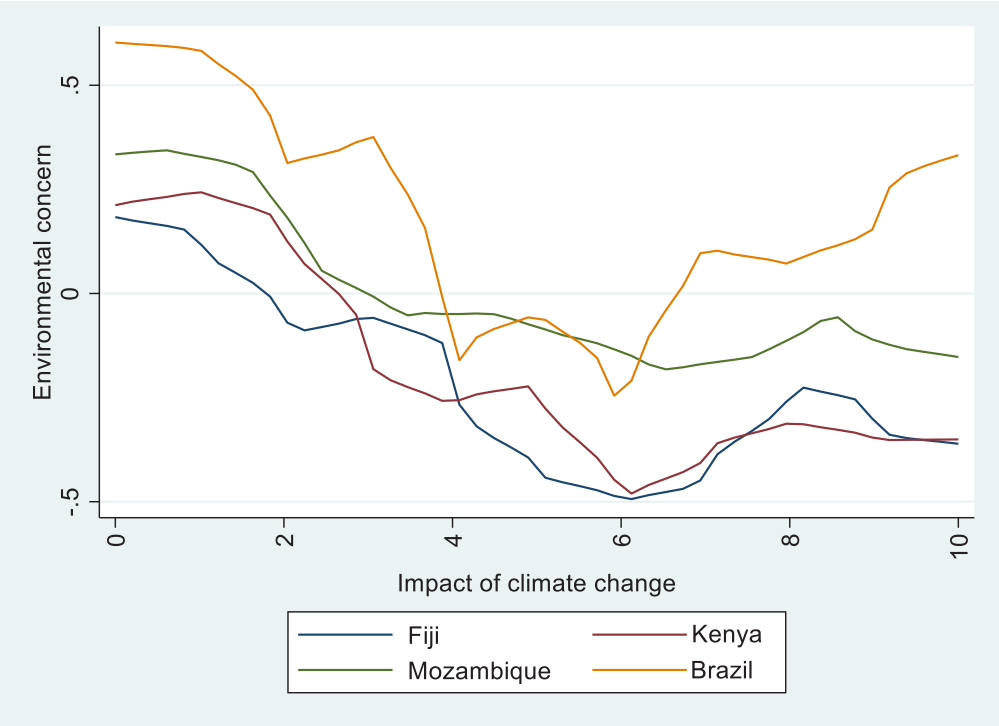


Figure 54: Mean perceptions of the impact of climate change across disciplines



To explore further what shapes students' beliefs about the impact of climate change, we examine assessments of impact of climate change against environmental concern in Figure 55. It shows that students with a high level of environmental concern in all countries in our sample believe that the impact of climate change will be 'extremely bad'. As environmental concern reduces, students feel more optimistic about the impact of climate change.

Figure 55: Impact of climate change by environmental concern and country



6. What universities are doing

6.1 Climate change actions by universities

Table 7 reports students' perceptions of the climate change actions that they believe their university has already put in place. There is sizeable variation in results across universities. Clearly, students' awareness may be more limited in some universities than others and areas of priority may be defined by the ecology and geography of the context so that comparisons are contingent on these considerations. Specifically, some universities may be more susceptible to certain natural disasters than others, compelling them to implement precautionary measures that may not be required elsewhere.

The results show that universities have taken a number of positive actions to address climate change, with more than 50% of the students reporting that efforts have been made in each of the key areas except for in implementing preventive and precautionary measures. These include evacuation plans or secure infrastructure (such as in relation to flooding) which are not in place in most universities, except for in Fiji where students more often report this step having been taken by their universities. On the other hand, landscape restoration and reforestation projects are not identified as an action by students in Fiji universities as frequently as in Kenya and Mozambique. Students in Brazil report lower levels of implementation of nearly all measures, being particularly low for use of renewable energy sources and preventive and precautionary measures. The use of bicycles and/or public transport is reported most in Brazilian universities.

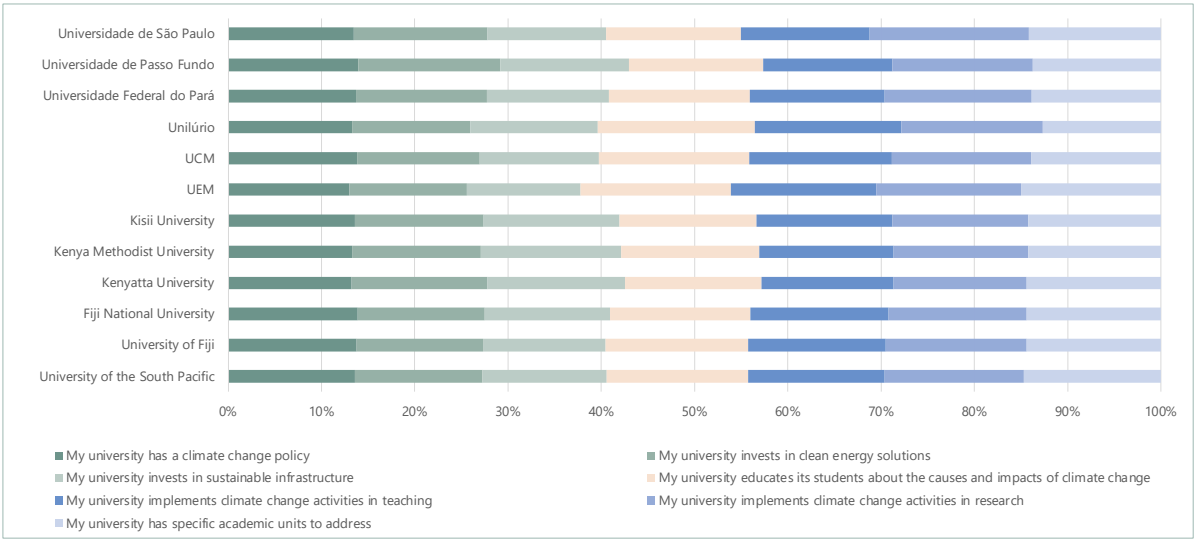
Table 7: Students' perceptions of actions already in place by universities

	Landscape restoration and reforestation		Preventative and precautionary measures		Protection of natural ecosystems		Use of renewable energy sources		Use of bicycles and/or public transport within campus		Buildings allowing for natural light	
University	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
USP Fiji	478	65	570	77	485	65	502	68	437	59	451	61
UoF	239	49	286	59	251	52	175	36	225	46	276	57
FNU	83	42	128	65	89	45	84	43	91	46	124	63
KU	732	75	511	52	690	70	797	81	687	70	793	81
KMU	274	73	145	39	288	77	185	49	197	53	314	84
KSU	357	70	217	43	323	64	222	44	274	54	300	59
UEM	244	82	112	37	213	71	103	34	110	37	127	42
UCM	37	65	18	32	31	54	17	30	18	32	29	51
Unilúrio	39	61	12	19	35	55	21	33	22	34	31	48
UFPA	282	63	63	14	252	57	120	27	266	60	184	41
UPF	291	68	73	17	303	71	201	47	311	73	248	58
USP Brazil	300	44	45	7	367	54	237	35	583	85	375	55
Total	3,356	64	2,180	41	3,327	63	2,664	51	3,221	61	3,252	62

6.2 Universities' actions to address climate change

Students were asked to indicate whether they agreed that their university undertakes specific climate change actions as far as they were aware. They responded on a scale of 1 – 5 where 1 denotes 'totally disagree' and 5 denotes 'totally agree'. The responses are shown in Figure 56 below. The data indicate that students are more likely to agree that their university is implementing climate change activities in teaching and research and that it is educating its students about the impact of climate change. Responses to questions about measures such as a climate change policy, investments in clean energy solutions and sustainable infrastructure may reflect students' less direct knowledge of university activities in these areas. Overall, students in UCM and UniLúrio in Mozambique were least likely to agree that their universities had taken action to address climate change. Although in relation to other questions, students in Brazil generally reported lower levels of satisfaction and agreement with aspects of their university in relation to climate change, the responses here seem to be more in line with responses from students in other universities.

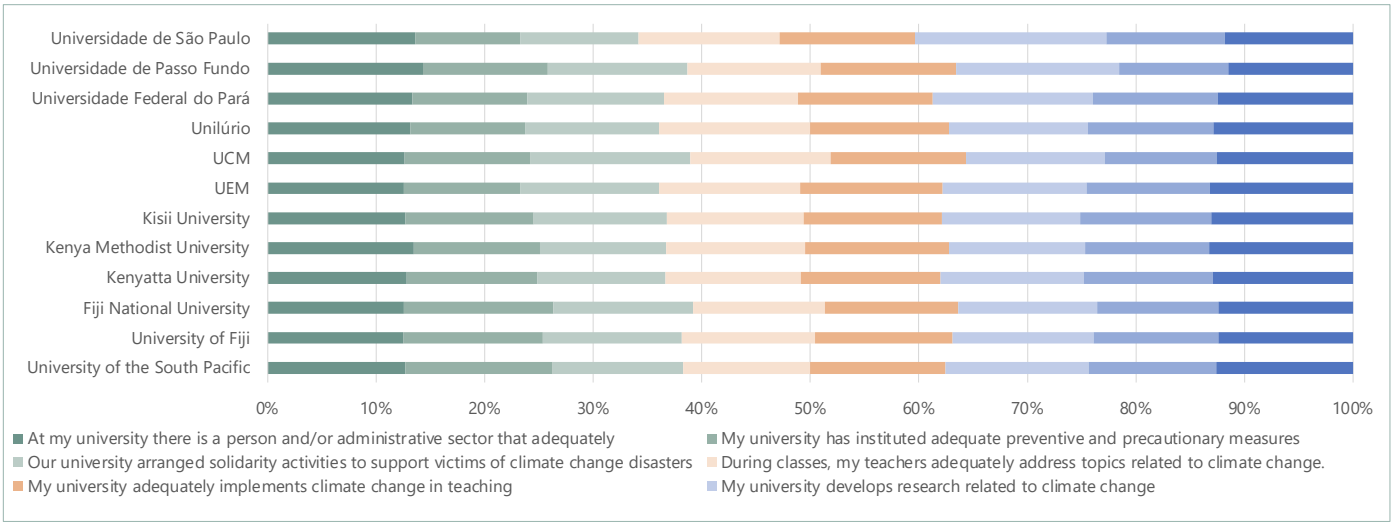
Figure 56: Universities' actions to address climate change



6.3 Adequacy of actions taken by universities

Students were asked to indicate not only whether they agreed that their university had taken certain steps to address climate change, but also whether they felt these steps adequately addressed climate change. Students responded using a 1-5 Likert scale to reflect agreement or otherwise as above. Figure 57 shows that students overall report a high level of agreement with the adequacy of the climate change actions their universities take. However, there is variation across universities with no obvious pattern, although students in Brazil are somewhat less likely to judge their universities' actions as adequate (with the exception of their research), when compared to other universities. This is especially so for the USP in Brazil.

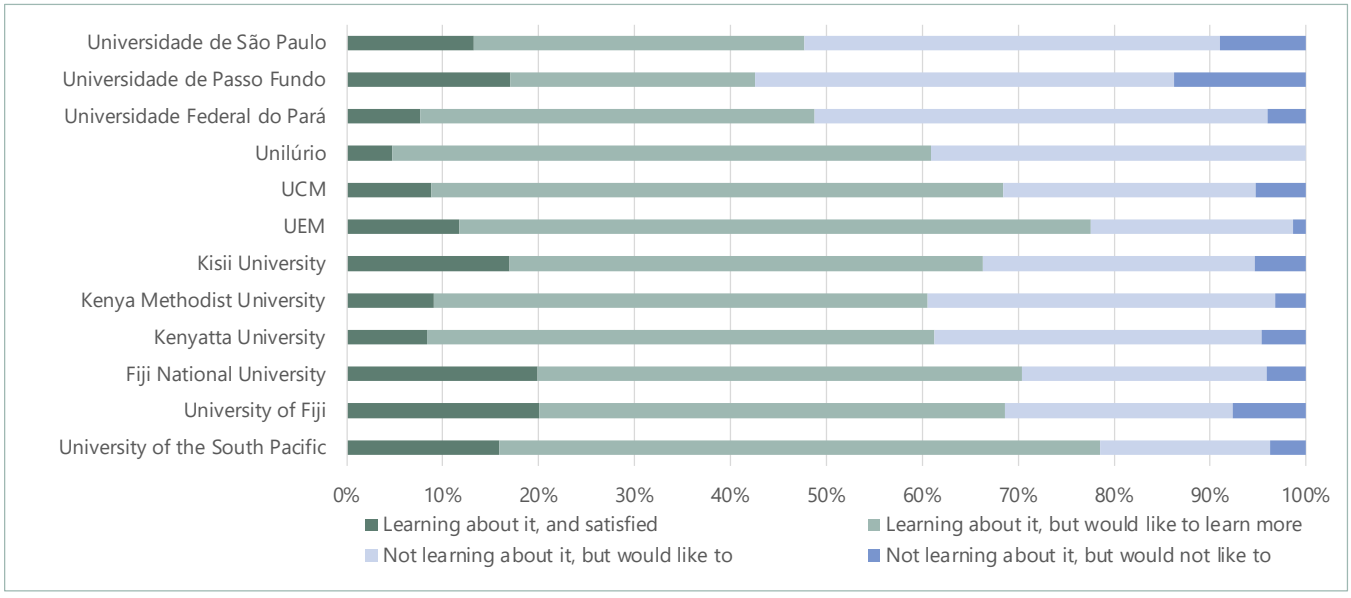
Figure 57: Adequacy of climate change actions by university



6.4 Curriculum Coverage

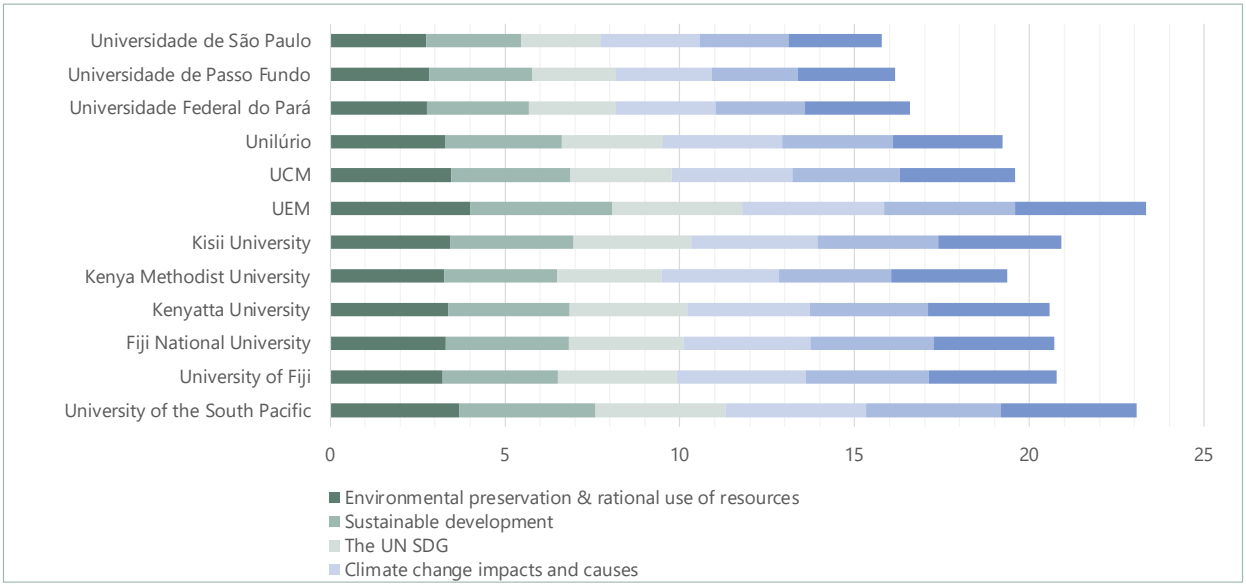
Figure 58 illustrates patterns of students' satisfaction with their learning about climate change at their universities. A high proportion of students across all universities have stated that they would like to learn more, whether they were already learning about climate change or not. Moreover, more students report learning about climate change than not learning about it. However, a fairly low percentage of students reported being satisfied with what they are learning. The highest percentage of students who reported being satisfied were in universities in Fiji.

Figure 58: Student satisfaction with learning



Students were further asked to identify the extent to which specific topics were being covered in the curriculum using a scale of 1-5, where 1 denotes 'not at all' and 5 denotes 'to a great extent (twice or more per semester/term)'. Findings are illustrated in Figure 59. In line with the findings above, students reported more extensive curriculum coverage in relation to most topics in Fiji, followed by Mozambique, with the lowest levels being reported in Brazil. Within the topics, the UN Sustainable Development Goals seem to be receiving the least curriculum coverage across all universities although the differences are relatively small.

Figure 59: Topics addressed by academic curriculum



6.5 Modes of climate change awareness

Students were asked to consider the extent to which they had learned about climate change in activities on campus, research activities, outreach activities and teaching. They responded on a scale of 1-5, with 1 being 'not at all' and 5 being 'extremely'. Responses are shown in Figure 60. In most universities, except the USP and the UoF, students reported learning about climate change most during teaching activities followed by research activities. In 8 out of the 12 universities surveyed, outreach activities were reported as the mode through which students learned the least about climate change. It is notable that students in Mozambique and Brazil report a lower level of learning through all modes compared to students in Fiji and Kenya.

Figure 60: Activities that promote learning about climate change

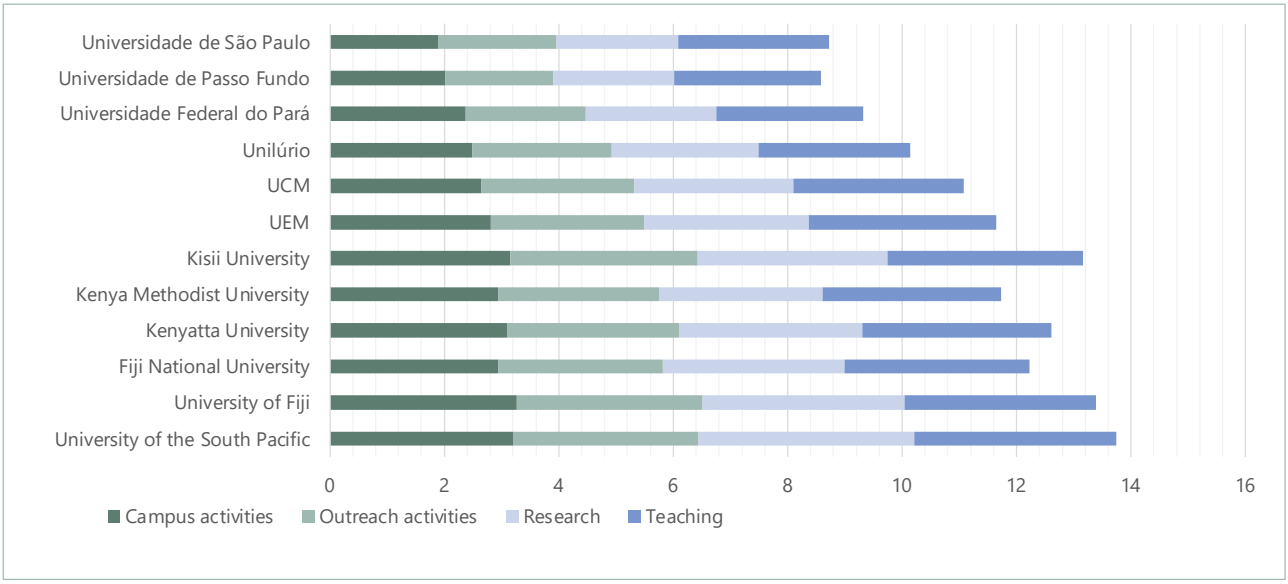
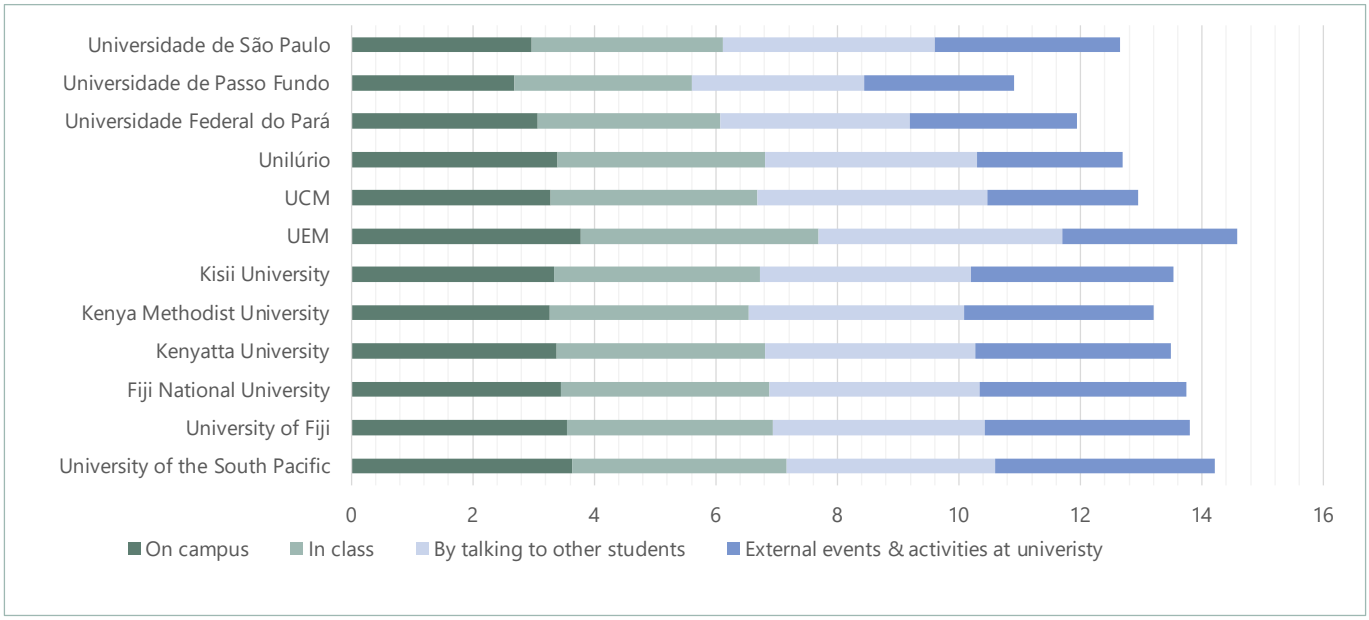


Figure 61: Frequency of hearing about climate change at university

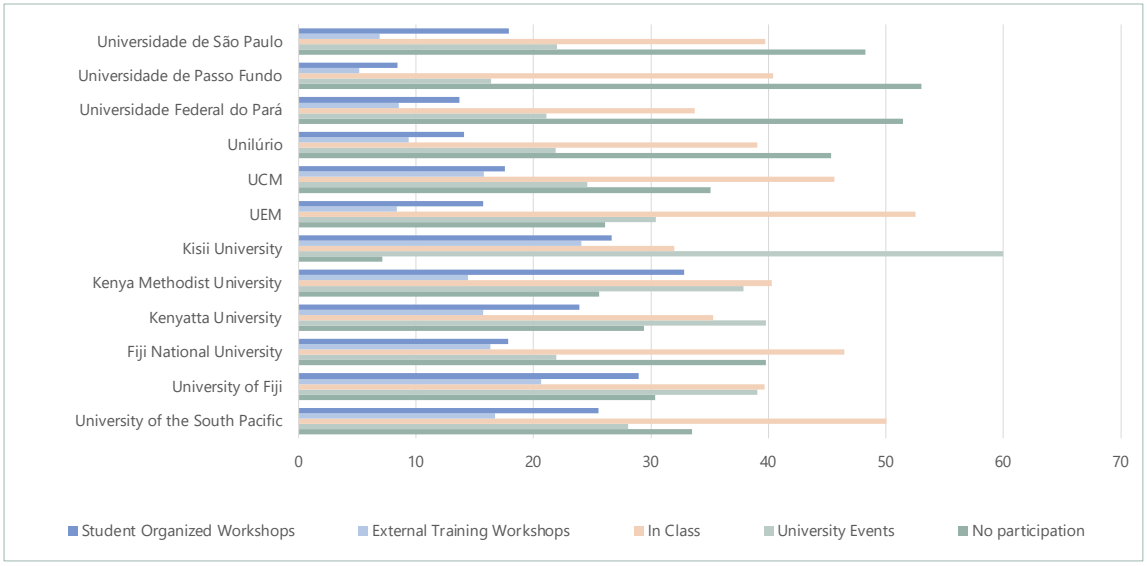


6.6 Student Engagement in Climate Change activities

To gauge the level of student engagement in climate change activities at their universities, students were asked to indicate what learning, research, and outreach activities they had already been involved in.

Figure 62 shows the proportions of students who have participated in various learning activities related to climate change. The results indicate that students have participated most often in activities in class in all universities except Kenyatta University and Kisii University where a higher proportion of students have reported participating in university events related to climate change. Participation in external training workshops is lowest across all universities. Participation levels across all learning activities are less than 50% in relation to almost all

Figure 62: Participation in learning activities

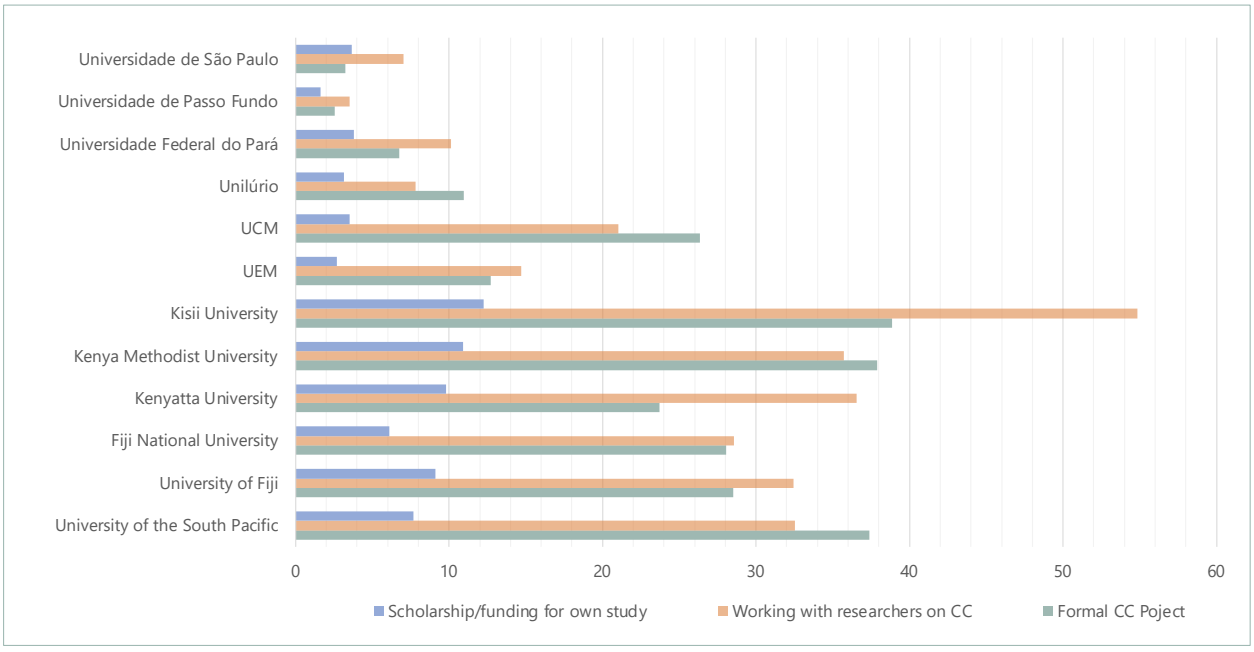


We further investigated how participation in learning activities in class differs across the various disciplines. Students enrolled in science, engineering, agriculture and services courses are more likely to have participated in learning activities in class when compared to students across all disciplines (Figure 63), which may be expected.

Figure 63: Participation in learning activities across discipline

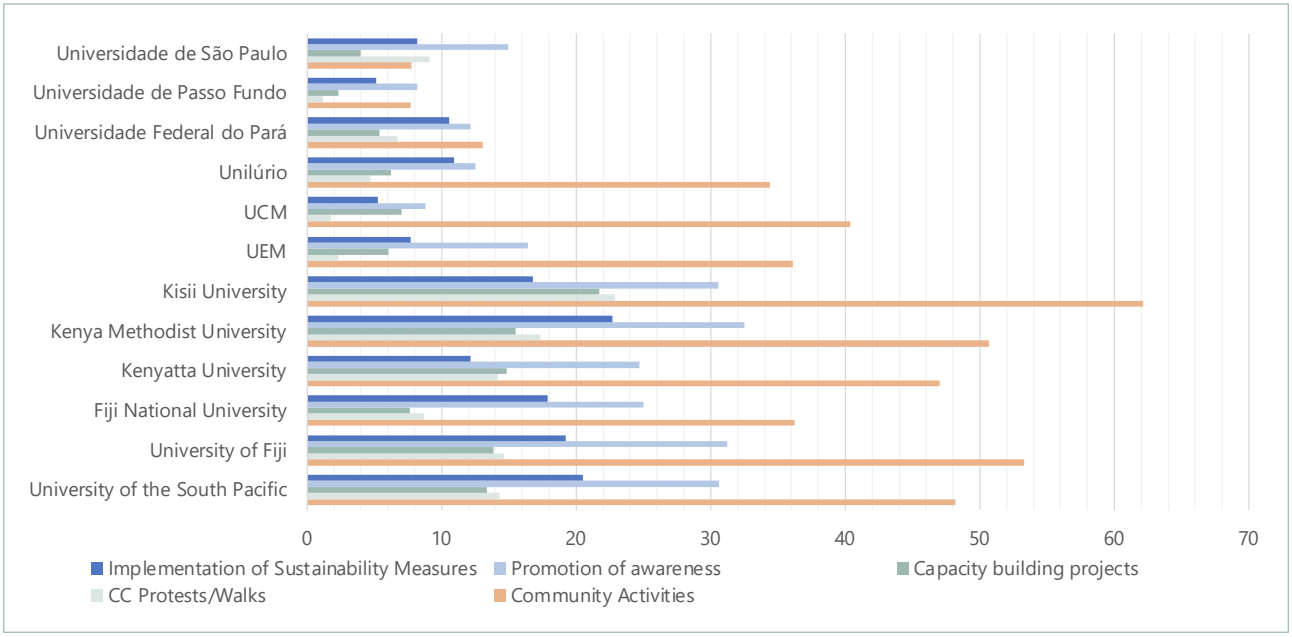
Participation in research activities is much lower than participation in other activities as seen in Figure 64. Less than 10% of students in Brazil reported participation across all types of research activities and participation in universities in Mozambique is also low. Higher levels of participation were reported in Fiji and Kenya, with the leading research activity being working with researchers on climate change projects. Involvement in own studies is the research activity with lowest participation rates. This may be explained by the fact that the student sample was selected from undergraduates who are less likely to participate in research activities than postgraduate or research students.

Figure 64: Participation in research activities



Among the outreach activities about which they were asked, students most often reported participating in community activities followed by promotion of awareness activities across all universities except UFPA and USP in Brazil. Findings are illustrated in Figure 65. The activities with lowest participation were capacity building projects and the implementation of sustainability measures. In Mozambique, protests or walks were the activities students were least likely to participate in. Overall, participation in outreach activities was lowest in Brazil where participation rates were below 10% for almost all activities.

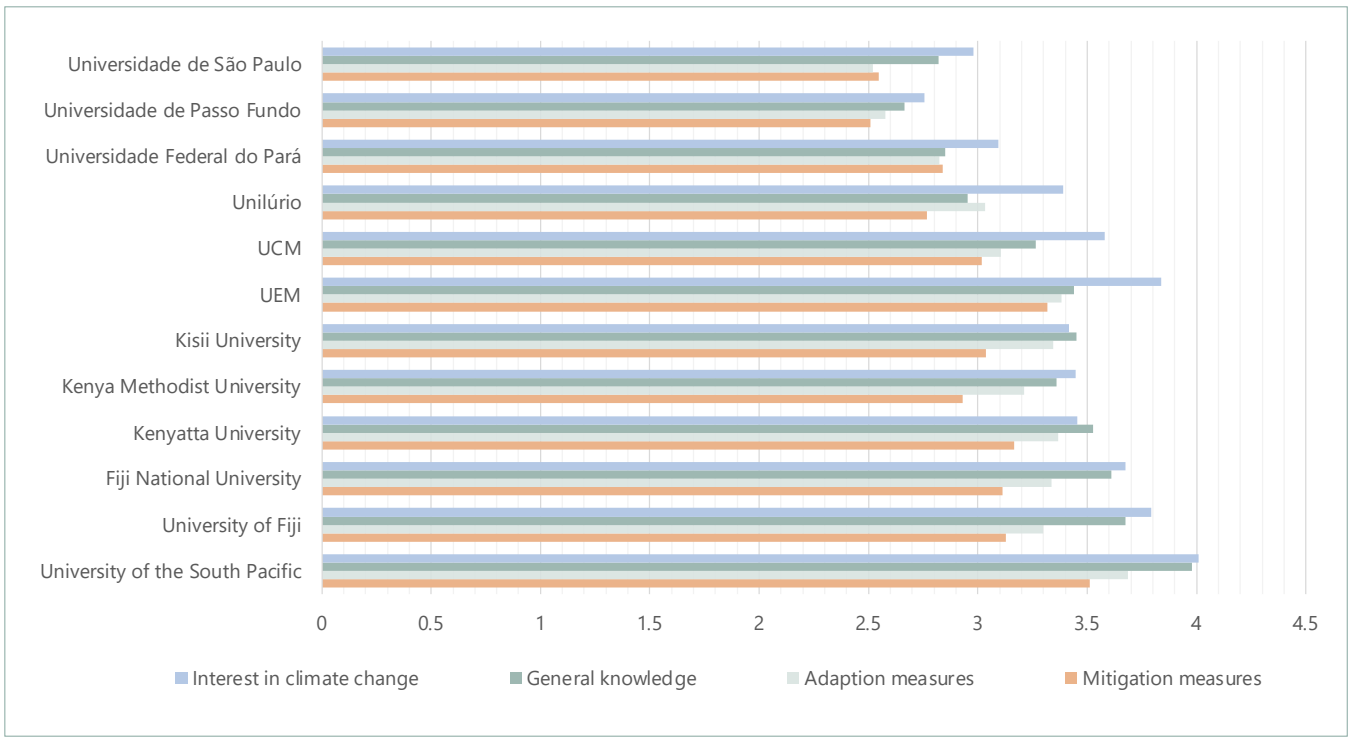
Figure 65: Participation in outreach activities



6.7 Impact of universities on student views and actions

Students were asked to indicate the extent to which their universities influenced their views and actions on climate change in relation to four categories. They responded on a scale of 1-5 in relation to the universities' influence with 1 denoting 'not at all' and 5 denoting 'a lot'. Figure 66 illustrates the results. It shows that according to the respondents, most of the universities do influence their students' interest in climate change and, to a slightly lesser extent, their general knowledge of climate change. However, students in all universities except UniLúrio reported lower average assessments of impact on students' mitigation and adaptation measures. Overall, students in Brazil reported the lowest level of impact of universities on their actions and views. Students in Fiji reported the highest levels of impact.

Figure 66: Impact of universities in student views and actions



7. What universities should be doing

7.1 Role of universities and education

Students report high levels of expectations of universities as places not only to inform and educate them about climate change but also sites in which they can actively partake in activities to mitigate climate change. Students were asked to respond to several statements stating their level of agreement regarding what universities should be doing to address climate change on a scale of 1-5, with 1 denoting 'strongly disagree' and 5 denoting 'strongly agree'. Figures 67 and 68 show that students agree or strongly agree in most cases that universities should be 'trusted spaces for climate change discussions' and that 'education should play a determining role in combating climate change', as well as that 'universities should implement climate change initiatives and incorporate learning about climate change in teaching and learning activities'. As the questions about what universities 'should be doing' do not present students with trade-offs, it is perhaps expected that students' responses would elicit high levels of agreement.

Figure 67: Role of education in addressing climate change

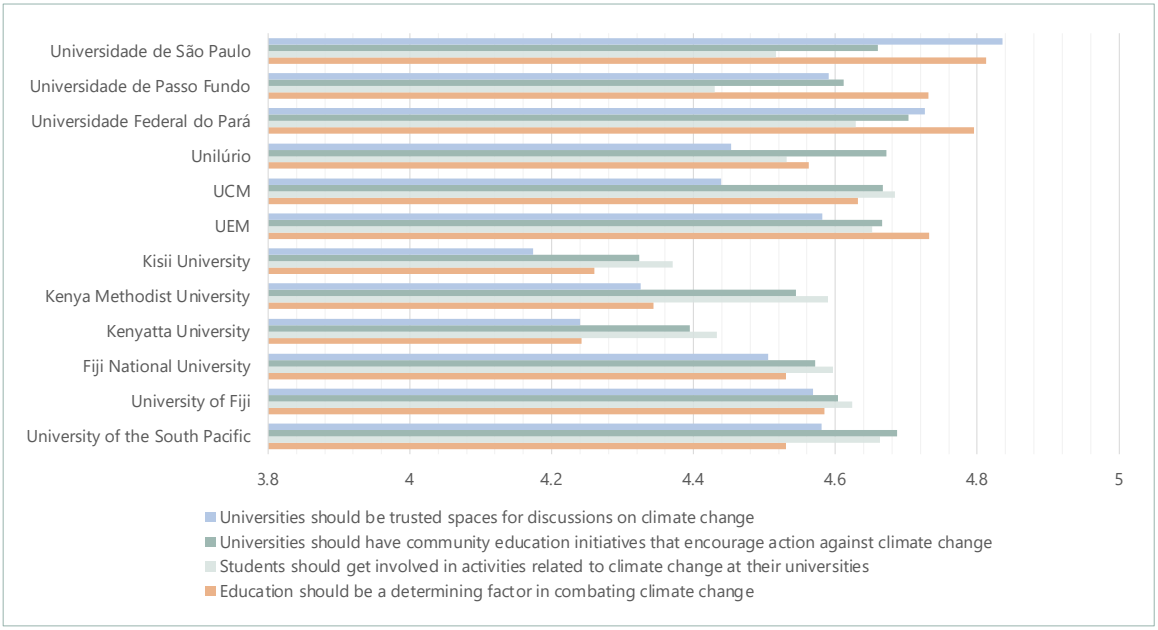


Figure 68: Role of universities in addressing climate change

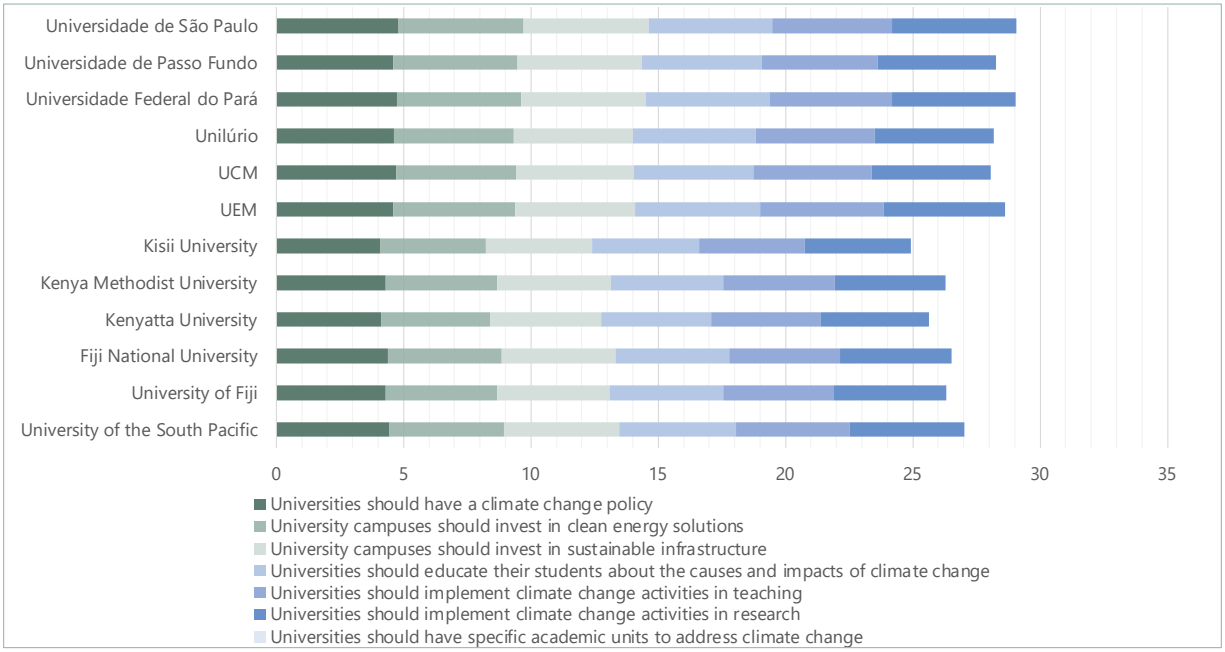
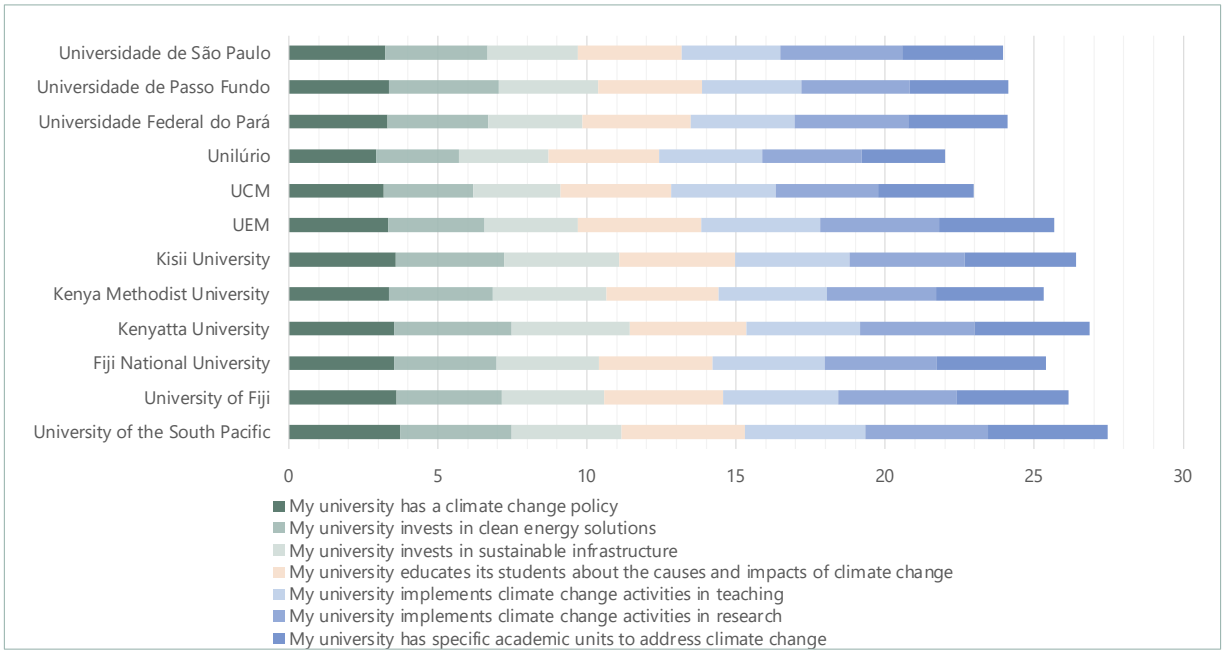


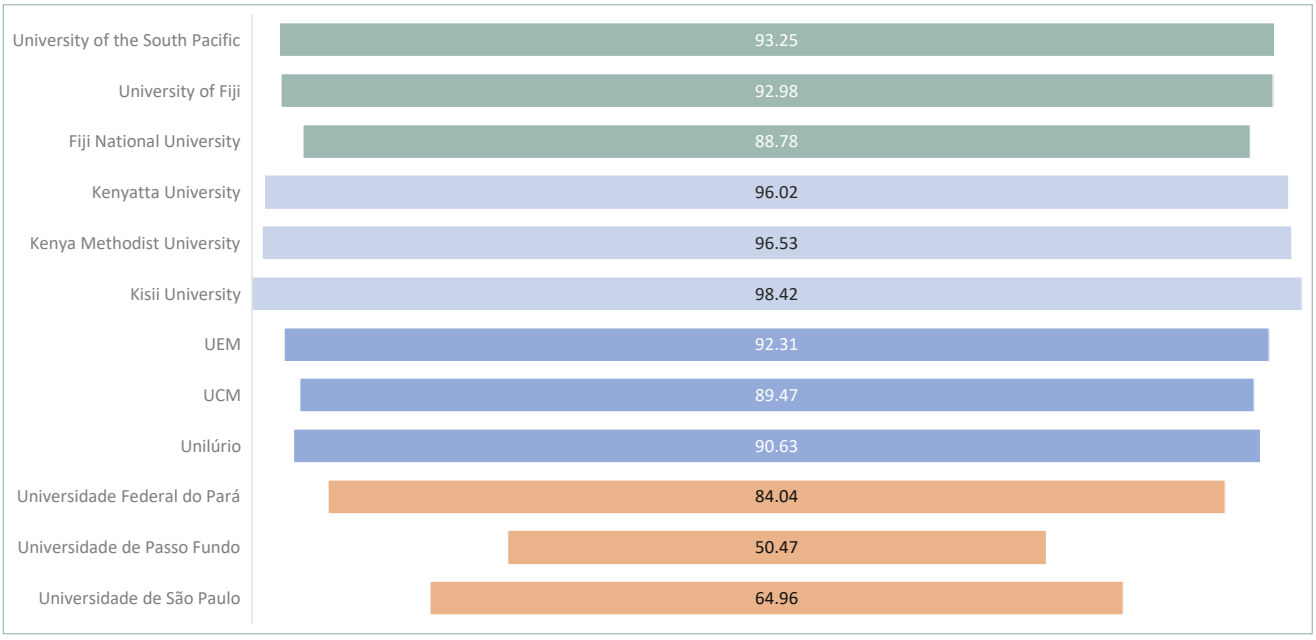
Figure 69: Universities' policies and actions in relation to climate change



7.2 Student Willingness to Engage

Students were asked whether they would be willing to volunteer in climate change activities in their universities. Figure 70 shows that responses to this question were largely positive in all countries except Brazil. More than 90% of the students in almost all universities responded positively. In Brazil, the percentage of students willing to volunteer was much lower, being highest in UFPA (above 80%), followed by USP (above 60%) and lowest in UPF (about 50%). These responses are somewhat in line with differences in reported personal responsibility. Students in Brazil reported feeling the lowest levels of personal responsibility to address climate change and report lower willingness to volunteer in climate change activities. Nonetheless, the findings on this question indicate that students are on the whole willing to take action.

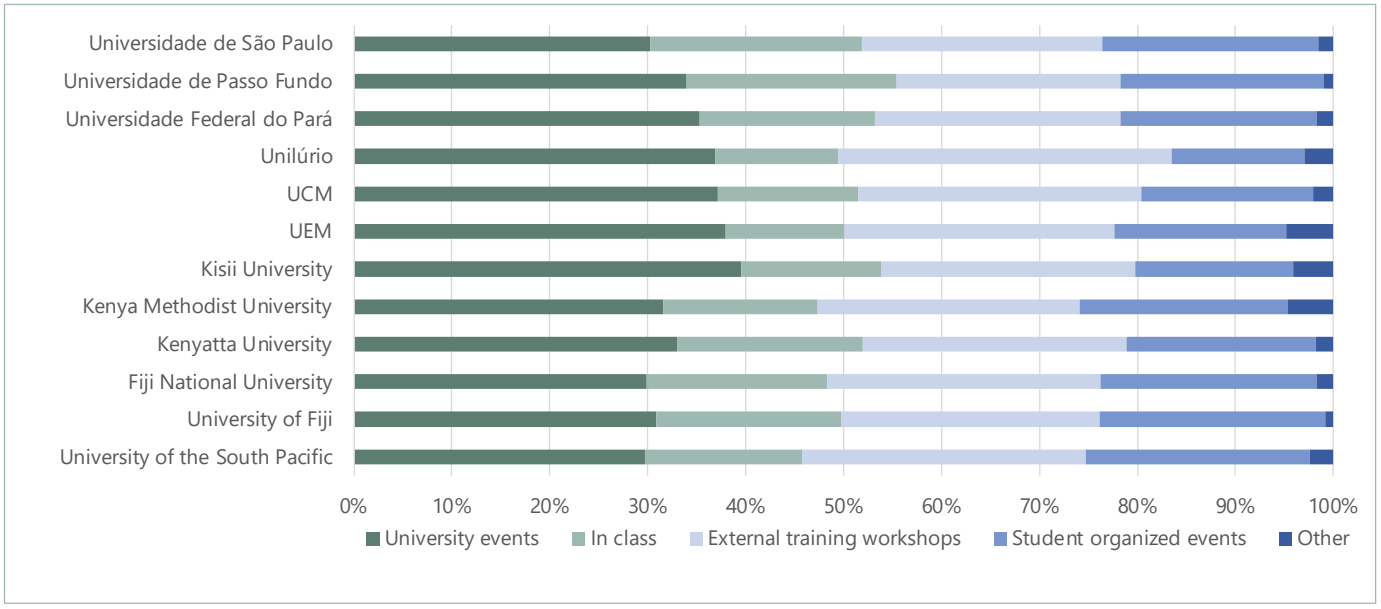
Figure 70: Willingness to volunteer in climate change activities



Students were also asked to indicate which kinds of activities they would be willing to participate in at university (independently of those they actually participate in). Across all activities (Figures 71 – 73) more students demonstrate a willingness to participate than have participated already (see Figures 62-65). This may suggest that opportunities are not always available but may also reflect differences between students' aspirations and realities in terms of participation.

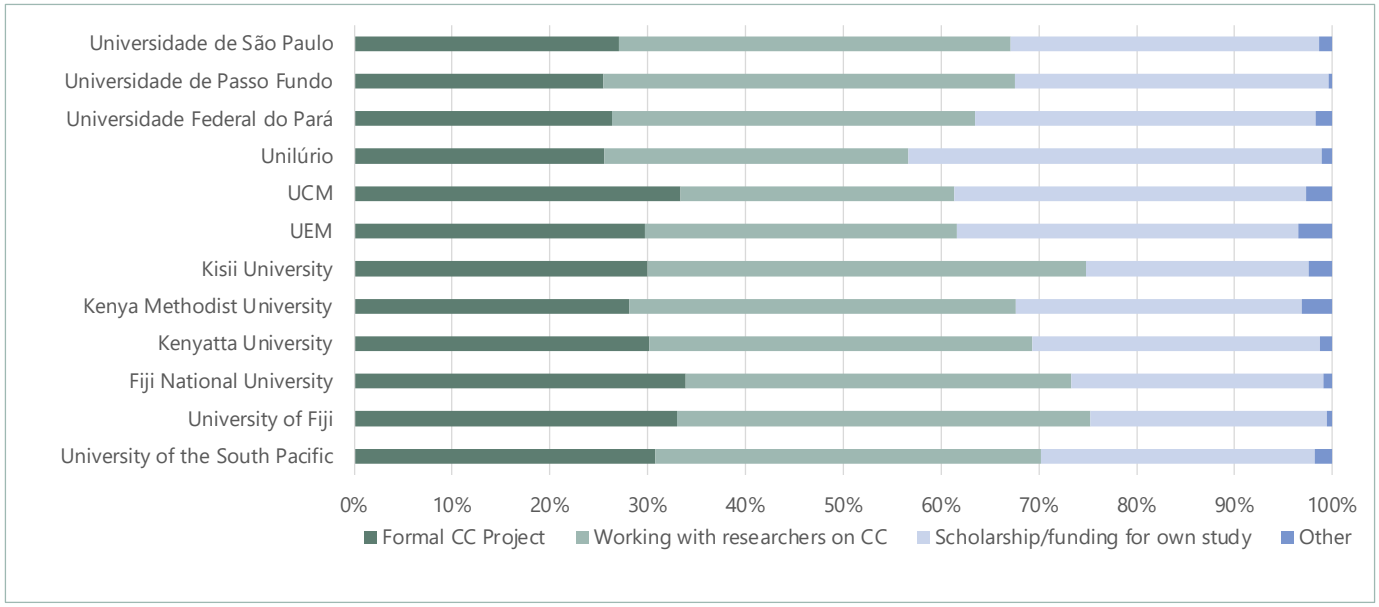
In terms of learning activities, students are most willing to participate in university events across all universities, followed by external training workshops and student organised events. Students are less willing to participate in activities in class. This might be because they already have had opportunities to participate in in-class activities or because they want to focus on more course-specific learning in class and to use extra-curricular opportunities to pursue climate change activities.

Figure 71: Learning activities students are willing to participate in



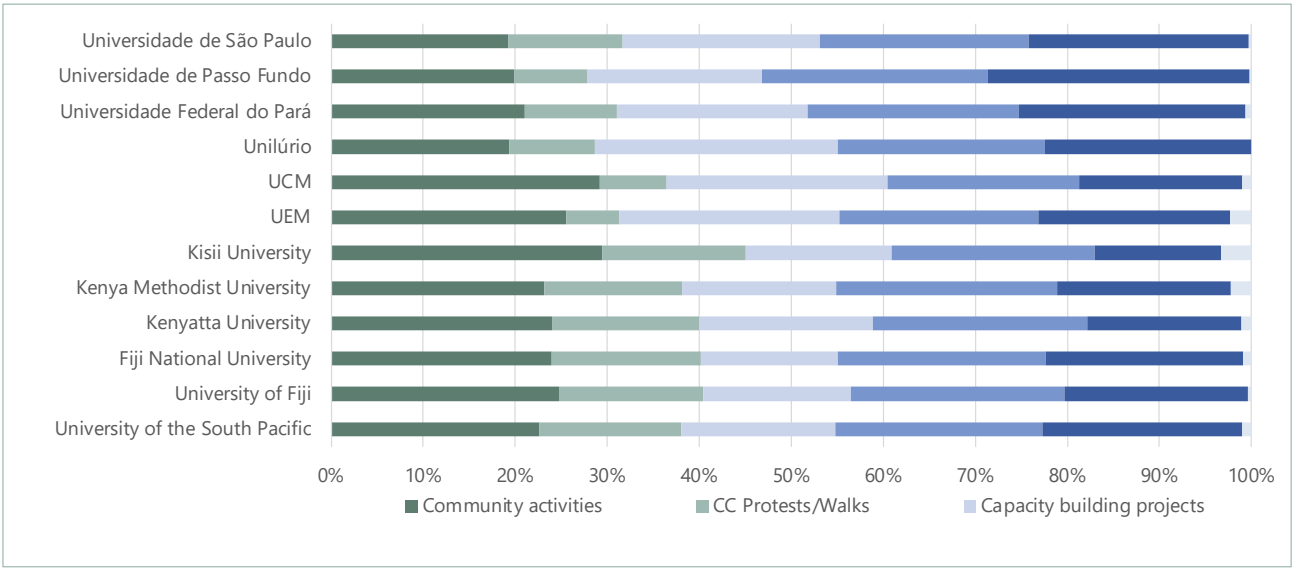
Students reported willingness to participate in research activities. However, students across all universities except those in Mozambique reported being more interested in working with other researchers on climate change projects than undertaking their own formal or funded projects. Willingness to work with other researchers might in the case of undergraduate students be expected to reflect the students' lack of experience in terms of leading their own research projects.

Figure 72: Research activities students are willing to participate in



Finally, students reported willingness to participate in outreach activities. Students in universities in Fiji and Kenya reported higher levels of willingness to participate in community activities and activities that promote awareness followed by implementation of sustainability measures. In Mozambique, greater willingness was reported with respect to capacity building projects alongside community activities, while in Brazil, students are more willing to participate in activities surrounding implementation of sustainability measures. Overall, there is typically a lower level of willingness to participate in climate change protests or walks by comparison with the other four types of activities.

Figure 73: Outreach activities students are willing to participate in



These findings may be taken to suggest that there is potentially significant scope for universities to promote and develop climate change education and activism from the point of view of students.

8. Concluding Remarks

This report contains primarily descriptive reporting of the results of Climate-U's student survey. It does not aim to draw robust inferences about the effects of universities' actions and policies, about the determination of students' views, attitudes or activities in relation to climate change, or about their understanding of and learning about climate change. Such inferences are difficult to draw on the basis of cross-sectional data and many observed relationships may operate in two directions. Moreover, comparisons across countries based on a small number of selected institutions rather than a large representative sample may be considered limited in terms of generalisability. However, findings from the survey do point to a number of suggestive relationships and hypotheses worthy of further investigation, which may shed light on universities' and students' actions and understandings in relation to climate change, particularly given the limited evidence available in many low and middle income contexts. These may be of interest to universities seeking to improve their engagement with issues of climate change and/or to better understand their students' views both on the subject of climate change and of what universities ought to be doing in response.

A consistent finding of the report is that students very often want to learn more about climate change and to participate in a wider range of activities, intended to inform themselves and others about and to limit the effects of climate change. Equally consistent is the finding that, as a whole, students are dissatisfied with their universities' current offer in terms of education on climate change but also of the universities' wider activities to limit its impact on the climate and to promote wider understanding and activism. These are important findings for universities as they give consideration to future efforts to develop their climate-related activity and to engage their students in ways that their students value.

The report finds that, while female and more economically advantaged students as well as those in certain disciplines generally report higher levels of 'environmental concern', countervailing influences tend to mean that environmental concern does not necessarily translate into 'personal responsibility' or 'willingness to act'. Students in some study disciplines, such as science, agriculture and health and welfare show higher levels of environmental concern even after controlling for differences in other background characteristics. But many other factors affect students' assessments of the

threats of climate change and of what they can do to help mitigate these, including country and institutional context. The report has highlighted some potentially illuminating relationships between environmental concern, students' engagement with climate change issues, their perceptions of the causes of and responsibility for climate change and their satisfaction or otherwise with what they are learning on the subject. Results suggest that relationships between students' beliefs about climate change and its impacts and their willingness to act to address climate change are mediated by context, including political and institutional context.

Given the differences in patterns between the country contexts considered, there appears to be some suggestion that, in Brazil for example, high levels of environmental concern could be linked to a perception that not enough is being done to address climate change. In Brazil, students expressed a strong desire to learn more about climate change alongside strong dissatisfaction with what their universities are currently doing. By contrast, in Fiji, where students' assessments of what universities and governments are doing are more optimistic, this may be linked to slightly less environmental concern but also to more personal responsibility, given that more opportunities to be involved in climate-change related activities may be available. It seems plausible that students in closer contact with efforts to address climate change might both be better acquainted with the subject and also be more optimistic in terms of the prospects for successful adaptation and mitigation. Conversely, students who are pessimistic about the likelihood of successful measures to address climate change being adopted or of the potential of collective action may be less willing to participate in climate action and may feel less 'personal responsibility'.

These issues are worthy of further investigation especially insofar as universities may play a role in strengthening students' understanding and confidence in climate action and in galvanising their willingness to act.

Acknowledgements

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About Transforming Universities for a Changing Climate

Climate change is the most significant global challenge of our time, and many of its effects are felt most strongly in the poorest communities of the world. Higher education has a crucial role to play in responding to the climate crisis, not only in conducting research, but also through teaching, community engagement and public awareness. This study contributes to our understanding of how universities in low and middle-income countries can enhance their capacity for responding to climate change, through a focus on the cases of Brazil, Fiji, Kenya and Mozambique. In doing so, it contributes to the broader task of understanding the role of education in achieving the full set of Sustainable Development Goals.

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