Understanding Students' Environmental Awareness and Perception of Green Jobs

A case study for Cambodia | October 2020

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PREFACE

This study presents an analysis on Cambodian students' level of environmental awareness, their perception of green jobs and their representation of green skills. It was done under the GREENCAP Project that aims to strengthen partnerships between Cambodian and European universities in order to help them rethink sustainability among their programs. This study lead to the conclusion that most of Cambodian students from our sample were considered as strongly environmentally aware. The Q-Methodology was used to analyze which skills student's considered as interesting when they projected themselves in a green job. They were divided in 4 factors called nature-lovers, managers, traditionalists and economists. This study was concluded on a set of recommendations for the GREENCAP Project.

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Executive Summary

Floods, drought, hurricanes, deforestation, since 1996, the Kingdom of Cambodia has seen a rise in natural disasters. Around the world, physical changes due to global warming are more and more visible to the human eye. Yet, it seems that low-income or developing countries are often the most impacted, paired with the fact that they often lack financial means and infrastructures to adapt to climate change. In Cambodia, the effects of global warming directly impact the economy of the country that relies a lot on agriculture and tourism. Facing the human and financial costs of those externalities, the Cambodian Government took action through plan, laws and projects to adapt and overcome the effects of a rise in temperature.

As in every country, Cambodia is on all fronts to fight climate change, from developing clean energies, to sustainable urban development or rethinking agriculture. With a specifically young population, Cambodia's best strategy was to invest in education and green jobs to lead the ecological transition. Making sure the workforce will have the proper green skills to make the country more sustainable is one of the top priorities among educational institutions. But in those difficult and challenging times, from climate change to dealing with pandemics, cooperation is key.

In January 2020, the GREENCAP Project was launched as a partnership between Cambodians and Europeans universities. It aims to work with HEIs in order to rethink university programs, create links with the private sector, make sure student's skills match the job market, and promote green opportunities and environmental awareness. As in any project, understanding all stakeholder's opinions really matters in order to take relevant and effective decisions. This study aims to measure student's level of environmental awareness as a way to identify the needs to inform and communicate on it. The second objective is to gather the opinion of students on green job opportunities by asking them if they project themselves in those careers, what opinion they have of it and what kind of green jobs they are attracted to. Finally, this study aims to understand the representation of green skills among students from 4 Cambodian universities (RULE, NUM, UBB and ITC). Aside from this study, another one was made focusing on other stakeholders in the aim to understand which green skills they are

looking for in the greening job market. Those two studies will tell which skills stakeholders and students believe to be relevant when they think about green jobs. They will be used as a first impression to know what will interest students, what is relevant to teach and what will be effective. By taking into consideration student's opinion on green jobs and green skills, we make sure that the GREENCAP Project will work with universities on ideas and projects that will have the support of students.

This study is constituted of a synthesis on the literature on environmental awareness and sustainable education. Understanding the mechanisms behind being environmentally aware and engaging in ecological behavior is helpful prior to create a survey tool. Working on recent research on sustainable education allowed us to highlight how education is changing and what works to teach skills. A survey tool was then created to gather the opinion of students. A first part of this survey focuses on environmental awareness by asking students how they agree with 19 statements inspired from environmental awareness scales from the literature. A second part asks questions on green jobs and a third part uses the Q-Methodology in order to understand which skills students believes to be interesting when projecting themselves in a green jobs. This methodology allows to created groups that have similar opinion through a factor analysis in order to draw recommendations that fits each profile. Recommendations were made to the GREENCAP Projects following the results of this study.

Methodology

The Q-Methodology

The Q-methodology was chosen to analyze data and conduct our study. Going through the literature on how environmental awareness works was useful to create the survey tool that will orient recommendations. The Q-Methodology fits this study in the way that opinions on environmental matters can be really subjective and different for everybody. Moreover, environmental behaviors are strongly linked to feelings, beliefs, values and people's personalities. The Q-Methodology is a method designed to study subjectivity like opinions, beliefs, point of views, values, tastes etc. Subjectivity is the influence of personal beliefs or

feelings in decision-making in opposition to facts[1]. It focuses on how people think and feel about a certain issue. Subjective opinions are typically unprovable but have a structure and a form that can be given by the Q-technique (Brown, 1986). It was invented in 1935 by the physicist-psychologist William Stephenson and is used in a wide range of applications across sociology, psychology, economics, communication and many others as the methodology is very flexible.

A Q-Methodology can be done through a survey tool that gathers respondent's answers but its support can have many forms. When conducting this method, the interviewer ask a respondent to rank possibilities according to a certain question related to something subjective for a person like its feelings, opinions, beliefs or other. The person has to rank possibilities on a Likert style scale

Possibilities to a question are called a statement and the globality of statements is called the Qset. The Q-sort is the way respondents will have ranked the statements on the Likert style grid. It can be a full sentence, a word or a picture but it can also be a sound, a color or a taste. The specificity with the Q-Methodology is that respondents will have to rank those statements according to the scale on an answer grid that follows a normal law. This results in having most of the answers in the middle (Neutral) and only a few strong opinions on the extremes (Strongly disagree/Strongly agree/Not important at all/Very important). Sometimes, when the Q-set has a lot of statements or is administrated online, the interviewer can ask the respondents to do a first sort when he only decides what he globally agrees or disagrees with prior to sort it on a most precise scale that is the final Q-sort. A respondent have to rank every statements which encourage him to consider every item and make arbitrary choices. This allows that even if a person believes to agree or disagree with all the statements, it still have to make a choice and will rank them relative to others. It is recommended that the interviewer gathers opinions and comments of people when they answer the survey. This allows to match profiles together and establish correlations between different choices.

[1] Dictionary Cambridge. Subjectivity. https://dictionary.cambridge.org/fr/dictionnaire/anglais/subjectivity (Data accessed on 1.7.20)

The environmental awareness part

The main objective of it, was to have an idea of how aware students were about climate issues, if they were concerned for themselves, others or the biosphere, their feeling of responsibility or their behavior towards it.

A variety of scales measuring environmental awareness had been developed during 30 years' worth of publications on psychological research on environmental attitude. We were inspired by Shultz's approach to create our own items. We chose 19 statements presented in a 5 points Likert scale in our survey tool. The advantages of using items from different scales is that it enabled us to cover more subjects and to refer to those works for interpretation. It also gives a strong theory background as those items are inspired from research. However, some aspects are absent such as actual pro environmental behaviors, beliefs, values or environmental knowledge.

The green job part

As the study mostly focuses on environmental awareness and green skills representation, the main objective for green jobs was limited in understanding if and how students projected themselves into green careers. The definition of green jobs is not widespread yet and considering that Cambodia just started its green transition, there is a possibility that students are not familiar with environmental opportunities. Some might have already considered occupying a green job when others might have no idea or misconceptions about what a job in the environment is. This part would be useful to answer some questions such as: *Do we need to communicate on green job opportunities? Is there any sector that needs to be promoted?* Are there misconceptions about green jobs? *What is the general opinion of students towards them?* Those interrogations were answered by 4 simple questions in the survey in the aim to gather the general trend.

A. Have you ever considered occupying a green job before? Yes/No/No opinion
B. Do you have a good opinion of green jobs? Yes/No/No opinion
C. How likely do you think you are of occupying a green job later? Very likely, Likely, No opinion, Unlikely, Very Unlikely
D. Which sector are you considering when you project yourself in a green job?

The skills part

In our survey tool, this part is specifically important. The GREENCAP Project aims to strengthen partnerships with Cambodian universities by helping them rethink their programs in including sustainability courses. The point is to make sure student's skills match the ones required by the national job market. A study was made in parallel of this one in order to know which skills stakeholders consider important for students to have. Although, it was obviously necessary to investigate student's opinion on those matters. Prior to implement new programs, this study will focus on student's representation of green skills. The main objective is to understand which skills students consider interesting to learn when they project themselves in a green job. Promoting programs and courses without a consultation of what matters to young graduates could lead us in taking ineffective decisions. Using the Q-Methodology allowed us to distinguish profiles and patterns in group of skills students consider relevant. This helps orient solutions and decisions that fits the opinion students have of green skills.

Prior to make the statements, an analysis was made across different reports on green jobs in order to identify the key skills. Through the UNEP report on Green Job (2008), the Cambodia National Green Growth Road Map (2009) and the ILO report from 2018. We looked for necessary skills among green jobs for specific sectors such as energy, waste management, tourism, industry, agriculture and nature conservation. Those sectors are important in the Cambodian Green Transition and were chosen to focus on accordingly by the GREENCAP Project. Main core skills were identified as necessary across the labor force and across level of occupations (ILO, 2018).

We decided to opt for a form of Q-sort that would only focus on skills by using single words. This allowed us to have a lot of statements, to avoid overwhelming the respondents with too many sentences and to have a wide range of skills present in our Q-set. 47 skills were selected. A small survey was made through Google Forms to make sure all the skills were easily understood. It allowed us to highlight skills that needed to be associated with a definition in the Q-sort such as permaculture, circular economy or carbon market assessment.

The question asked to students to investigate their representation of green skills was to rank the statements according to how they think they were interesting to learn when they projected themselves in a green job. The respondents had to do a first choice limited to 3 options: Not interesting/Neither uninteresting nor interesting/Interesting prior to do a second one extended to Not interesting at all/Very Interesting. This allowed the respondent to make easier choices on the final Q-sort and avoid overwhelming it.

Administration of the survey

Our survey tool was made to collect data among students from the 4 partner's universities of the GREENCAP Project. As the Q-Methodology is used, it was necessary to interact and have exchanges with the respondents after answering the survey. For those reasons, the administration of the survey tool was initially supposed to be made directly in Cambodia after a first phase of research in France. The administration in Cambodia was cancelled due to the Covid-19 situation that made impossible any travelling abroad. We had to adapt our survey tool to distance administration and use a platform that would allow online answering. We also had to find solution to set up interviews with students from afar. In the end, data collection ended on a total of 21 answers to the survey and 15 interviews. We collected 7 answers for the RULE and 6 for UBB almost achieving our objectives of 8 answers for each school. Students from ITC were more difficult to reach as the dean of the university informed us that students were schooled at home due to quarantine. We also gathered only 4 answers for the NUM as mails were mostly left unanswered.

We achieved our objective concerning gender parity with a range of age going from 21 to 46. The low minimum age can be explained by the fact that few bachelor students answered our survey as they were not fluent enough in English to take it. Also, Cambodian students often take breaks between their bachelor and master in order to gather professional experience or save money. Those 2 reasons can explain why ours ample is mostly made of older bachelor and master students. This could eventually bring a bias to the results as older students might be more sensitive to climate change issues or had the opportunity to study it further. Also, there is a potentiality that mostly fluent students that answered our survey are more exposed to international news and knows more about climate change than others.

Results

Results on environmental awareness

Results on student's environmental awareness can be sum-up as follow:

- All students know what climate change is and that it is occurring
- All students stated being worried about climate change and the consequences for nature, their future, their health and other people
- Students are optimistic about the fact that Cambodia will be successful in its Green Transition
- Most students feel responsible and acknowledge that their behavior can have an impact on the environment
- Most students admitted that company have to change their behaviors

Results on Green Jobs perception

Answers of students when asked to project themselves in a green job

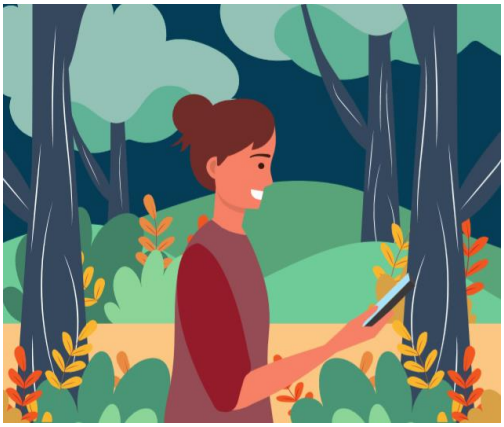
- Only half of the sample had considered occupying a green job before.
- Some students does not have a good opinion of green jobs.
- Students have various ideas of green jobs they can project themselves into. Those green jobs were often out of their study fields.
- Agriculture and waste are often mentioned.

- Jobs in the garment industry or energy sector were never mentioned.

Results on skills

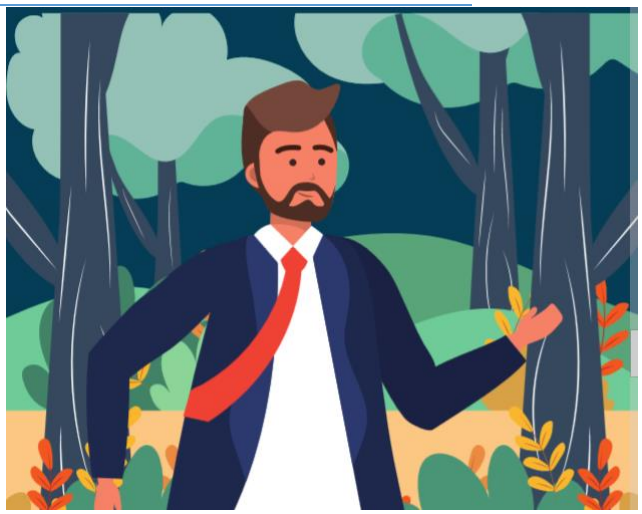
The factor analysis of the Q-Methodology allowed us to distinguish 4 groups of students according to skills they found interesting or not when they project themselves in a green job

Nature lovers



Nature lovers are interested by skills related to all the natural resources. They seems interested by the managing aspect of it but also the scientific aspect (biodiversity knowledge and research). Represented by students from all universities and study field. Composed by 5 students from all universities, 2 of them were PhD students.

Managers

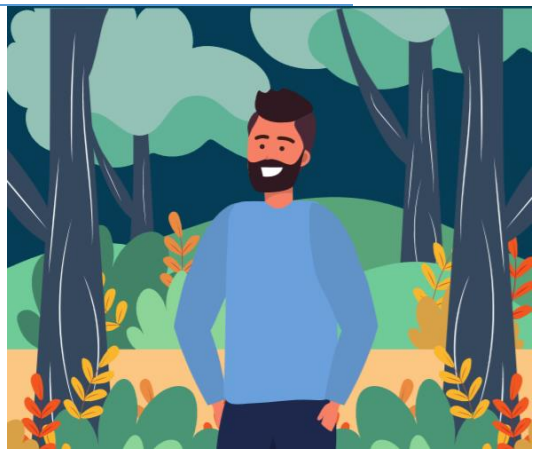


Students from the managers' factor are interested by green skills related to planning and organizing. They are more oriented to lead and plan actions than solution thinking. They would potentially be interested in conservation and NGOs using humanitarian skills. Only factor potentially interested by auditing. Only composed of bachelor students, potentially not aware of other green skills that goes beyond general management. Recommendations will be based a lot on this observation.

Traditionalists

Traditionalists mentioned skills that recall two traditional sectors in Cambodia: tourism and agriculture but are very solution and innovation oriented. Not fond of corporate skills. From various study fields and not only tourism and agriculture.

Economists



Economists are interested by economics related subjects. Very innovative, engineering and solution oriented. But not energy oriented at all, surprisingly. Not very corporate as well. One student mentioned circular economy entrepreneur as a potential green job in this factor. Women are equally inteterested in this factor, which is not usually the case in STEM careers.

Results by groups of skills and sectors

Skills related to the **energy sector** were not that popular during interviews and questions about green jobs. It's management of hydro energy that was usually mentioned as interesting.

Monitoring skills are the ones that enable company or public services to monitor environmental performance and action. They are really important to lead a green transition as they measure objectives and plan actions. They are used in the energy sector, garment industry and project planning. They are skills such as *environmental valuation method, auditing, pollution control analysis or carbon reporting*. Except occasionally among managers, they were unpopular. During interviews, students had a lot of misconceptions on it. Recommendations will focus on fighting those misconceptions and promote them among bachelor students as they are the one potentially oriented by career in it.

Business oriented skills were not really poplar but relates to skills that can be acquired through experience or through personalities such as strategic skills, marketing, entrepreneur skills, negotiation. Those skills are such as entrepreneur skills, communication, negotiation, leadership…

Waste related skills were not often ranked interesting but students from every factor and study fields talked a lot about it during interviews and especially circular economy. It is an interesting sector among them.

Agricultural skills were popular among all factor. Every factor stated being interested by at least 1 agricultural skills. Biodiversity knowledge was specifically interesting in all factors.

During interviews, students stated they were interested in it out of curiosity, or because it was necessary to understand nature in order to find solutions.

Natural-resources related skills were ranked as interesting by all factors.

Research was ranked interesting by all factors.

The importance of alternatives when drawing recommendations

As you will see in the recommendations, there are many alternatives to formal courses and formations. The literature analysis shown that informal education was often a great way to teach skills among students. Especially when it comes to green jobs, making sure a student can master a skills is relevant and will help him a lot when looking for a job. Interviews helped us prove that students were indeed interested in things such as volunteering or working on projects. Also, practical and informal education is often appreciated by students. For those reasons, we encouraged teaching green skills through courses and formations but also real case projects, chapters, seminars, school counselling, internships, company visits or volunteering.

Courses are relevant for skills that are more focused about theory and need strong background knowledge such as environmental economics, energy-related skills or monitoring skills. We would encourage formations such as new bachelor or master for skills that should focus on certain sector. An environmental economics master teaching environmental economics, public policy analysis, environmental valuation, research, and statistics could interest students from factor 4 that are comfortable with numbers. It should be paired with projects and teamwork, as those students are solution-oriented. A master focused on energy could be interesting as well as long as universities make sure to promote it among bachelor students. Also, a formation teaching how to monitor environmental performance, do auditing, consulting and environmental strategy thinking could give strong skills to student for the coming job market.

However, courses and new formations might not work for students from factors nature lovers, managers and traditionalists. Nature lovers from factor 1 represents very different students and the kind of skills does not necessarily aims toward specific jobs. Skills in the nature lovers factor are more oriented towards something students enjoy: natural resources and protecting

the environment, and is also closer to convictions (NGOs, charity, natural conservation) than a proper study field. By this we mean that students from factor 1 could be scientists, law students or management students but working into natural resources protection. For those reason, it would be a mistake to teach those skills in a formal targeted way. Promoting natural resources among students could be done by field trips, volunteering or group projects. It could be especially easier for UBB as they have formations in agriculture. Students from factor 2 are managers but project oriented. They might be more interested in working on actual projects than going to class. Eventually, they could work with companies or do interdisciplinary work with other students. Indeed, we observed that factors were not at all characterized by specific study fields, implying that Cambodian students seems opened in working with each other. Again, volunteering is really encouraged as it is a perfect way to learn and gain experience. One student stated during interviews that volunteering was a way for students not to be discouraged or disinterested by green skills.

Career counselling might have a big role to play in green jobs as certain sector needs to be promoted. It could be interesting to orient students on waste and energy careers. Despite being one important sector in Cambodia, students were not interested by the garment industry as well. However, they would easily project themselves into agricultural, tourism, economists or waste career, which means there does not seem to be a big need for promoting those careers.

Finally, it is possible that creating links between universities and stakeholders (Companies, public sector, NGOs, association) might be a very good way to show students the professional world. They would be able, through company visits, field trips or seminars to meet with professionals, see how skills are useful and which career opportunities exists. This could be potentially beneficial for bachelor students than can struggle imagining more precise study fields (for instance beyond general management or general economics).

Of course, those alternatives are obviously challenged by the fact that formations are already filled with traditional subjects. Students are also often busy with their student's job, which makes seminars, internships or volunteering tricky to implement. As studying abroad or internships are a perfect way to gain experience, money is often a challenge for students in any country but especially developing one. Those barriers to alternative solutions could be tackled by a financial support from the government as an investment in green jobs.

Recommendations

Promote

P1 Promote unpopular sectors among students. Unpopular sectors are the one less mentioned during interviews or in the skills part.

- ✓ P1.a Energy sector among management bachelor students as they are the ones interested by related-skills.
- ✓ P1.b Garment industry
- ✓ P1.c Waste industry

P2 Promote management in NGOs among bachelor students

P3 Promote careers for nature conservation among all study fields

- ✓ P3.a For the public sector
- ✓ P3.b For NGOs
- ✓ P3.c Through volunteering and interdisciplinary associations of students

Encourage

E1 Encourage interdisciplinarity

- ✓ E1.a Let students work with each other on cases or study field to promote cooperation and share knowledge
- ✓ E1.b Encourage students to join associations or volunteer to meet with students from other disciplines
- ✓ E1.c Encourage joining common classes on widely popular subjects such as biodiversity knowledge or agriculture-related skills

E2 Encourage internship, abroad exchange, volunteering to open students to new opportunities

E3 Encourage research

- ✓ E3.a Research methods
- ✓ E3.b Bachelor and Master thesis
- ✓ E3.c PhD through communication during master

E4 Encourage the development of strategic, entrepreneur, marketing, negotiation skills though team work and project, as they cannot really be acquired through classes only.

E5 Encourage innovation and solution-thinking among economists study fields through circular economy or environmental economy or students from tourism and agriculture by encouraging them to seek for solutions.

Teach

T1 Teach green skills though real-cases during courses related to companies or NGOs.

T2 Teach biodiversity knowledge and nature-related case as students are really interested by it:

- ✓ T2.a Make biodiversity teaching the opportunity for interdisciplinarity or field visits
- ✓ T2.bTeach biodiversity knowledge in informal ways: projects, volunteering, and conference

T3 Teach circular economy though solution thinking and innovation with a focus on economists students

T4 Teach through informal education

- ✓ T4.a Conference and seminars
- ✓ T4.b Field visits during classes
- ✓ T4.c Volunteering and promoting engagement in association
- ✓ T5.d Strengthen links with professional with meetings or company visits

Create

C1 Create a Master in management that have a focus on project planning and management around sustainability

- ✓ C1.a Create a Master that promote monitoring skills that are necessary for the green transition (environmental performance analysis, auditing, pollution control, CSR…)
- ✓ C1.b Promote green jobs within environmental management among bachelor students

C2 Create a Master in energy related career and promote it among bachelor students under the condition that they are careers opportunities.

- ✓ C2.a Create a Master that promote energy-related skills that are necessary for the green transition (project planning in the energy sector, feasibility analysis, electricity markets…)
- ✓ C2.b Promote Energy Master among bachelor students in management or economics.

Inform

I1 Inform on misconceptions against certain sectors

- ✓ I1.a Inform about careers in the garment industry, waste sector or energy sector
- ✓ I1.b Inform and break misconceptions about green jobs though career counselling and orientation

I2 Inform on environmental awareness and climate change through classes but also events, campaign, conference

I3 Inform students about the opportunities they have

- ✓ I3.a Inform about career opportunities
- ✓ I3.b Inform about internships opportunities
- ✓ I3.c Inform about abroad opportunitiesI3.d Inform bachelor students about master opportunities
- ✓ I3.e Inform master students about PhD opportunities

Introduction

Floods, drought, hurricanes, deforestation, since 1996, the Kingdom of Cambodia has seen a rise in natural disasters. Around the world, physical changes due to global warming are more and more visible to the human eye. Yet, it seems that low-income or developing countries are often the most impacted, paired with the fact that they often lack financial means and infrastructures to adapt to climate change. In Cambodia, the effects of global warming directly impact the economy of the country that relies a lot on agriculture and tourism. Facing the human and financial costs of those externalities, the Cambodian Government took action through plan, laws and projects to adapt and overcome the effects of a rise in temperature. As in every country, Cambodia is on all fronts to fight climate change, from developing clean energies, to sustainable urban development or rethinking agriculture. With a specifically young population, Cambodia's best strategy was to invest in education and green jobs to lead the ecological transition. Making sure the workforce will have the proper green skills to make the country more sustainable is one of the top priorities among educational institutions. But in those difficult and challenging times, from climate change to dealing with pandemics, cooperation is key. In January 2020, the GREENCAP Project was launched as a partnership between Cambodians and Europeans universities. It aims to work with HEIs in order to rethink university programs, create links with the private sector, make sure student's skills match the job market, and promote green opportunities and environmental awareness. As in any project, understanding all stakeholder's opinions really matters in order to take relevant and effective decisions. This study aims to measure student's level of environmental awareness as a way to identify the needs to inform and communicate on it. The second objective is to gather the opinion of students on green job opportunities by asking them if they project themselves in those careers, what opinion they have of it and what kind of green jobs they are attracted to. Finally, this study aims to understand the representation of green skills among students from 4 Cambodian universities (RULE, NUM, UBB and ITC). Aside from this study, another one was made focusing on other stakeholders in the aim to understand which green skills they are looking for in the greening job market. Those two studies will tell which skills stakeholders and students believe to be relevant when they think about green jobs. They will be used as a first impression to know what will interest students, what is relevant to teach and what will be

effective. By taking into consideration student's opinion on green jobs and green skills, we make sure that the GREENCAP Project will work with universities on ideas and projects that will have the support of students.

By trying to answer the question *How can the Q-Methodology help understand student's environmental awareness and perception of green jobs and green skills?,* this analysis will focus on showing links between the literature on environmental awareness, the method and recommendations. This study is constituted of a synthesis on the literature on environmental awareness and sustainable education. Understanding the mechanisms behind being environmentally aware and engaging in ecological behavior is helpful prior to create a survey tool. Working on recent research on sustainable education allowed us to highlight how education is changing and what works to teach skills. A survey tool was created to gather the opinion of students. A first part focuses on environmental awareness by asking students how they agree with 19 statements inspired from environmental awareness scales from the literature. A second part asks questions on green jobs and a third part uses the Q-Methodology in order to understand which skills students believes to be interesting when projecting themselves in a green jobs. This methodology allows to created groups that have similar opinion through a factor analysis in order to draw recommendations that fits each profile. Recommendations were made to the GREENCAP Projects following the results of this study.

The first part focuses on understanding environmental awareness to promote green jobs through education on sustainability. We will first go through the challenges Cambodia is facing as a developing country. The economic context in the country will help us to understand how green jobs can be helpful. We will present the GREENCAP Project and define green jobs and green skills to explain how they can lead the Green Transition. We will then show how education can enhance green opportunities by going through its role in sustainability. A last part will help us understand the mechanisms behind environmental awareness by trying to understand how pro-environmental behaviors work, with a focus on Azjen's Theory of Planned Behavior. The second part will show how the Q-Methodology helped us understand how aware Cambodian students are and what are their representation of jobs and green skills green. This first part will present the Q-Methodology and how to implement it. We will then

explain how the three parts of our survey tool was created and how data was collected. Then, we will analyze our data by looking at how the sample was constituted and the results on each part of the survey. We will go through each factor that represents a group of students that thought in similar ways. The last part will draw recommendations on how the GREENCAP Project can help Cambodian HEIs rethink their programs according to the results. The three first parts will go through ideas towards environmental awareness, green jobs and green skills. Then we will discuss the results by highlighting the difficulties induced by a distant administration of the survey, statistical robustness and possible bias. This study will be concluded on a final parts that comments alternatives when teaching sustainability in universities.

Part I: Understanding environmental awareness to promote green jobs through education on sustainability in Cambodia

In order to understand how green jobs can lead the Green Transition in Cambodia, it is important to understand the history of the country and the economic context. A first part will explain which challenges Cambodia is facing by looking at its past (history), its present (economic context) and its future (strategic plan). We will explain and define green jobs and how which key sector is impacted. A highlight will be made on how education plays an important role in sustainability. Prior to create our survey tool, we will try to understand how environmental awareness works by looking at what is done in the literature. A focus will be made on Azjen's Theory of Planned Behavior that explain how values, beliefs and feelings impact environmental behavior.

1.1 Cambodia : a developing country facing sustainability challenges

1.1.1 Economic context – Getting to know Cambodia

1.1.1.1 History of Cambodia

Until the late 90s, Cambodia was still recovering from years of political instability due to successive communist regimes and civil war. Understanding the history of this Southeast Asia country matters when working on an economic development project. Indeed, the past, the geography or the climate are variables that impact the demographic, the economic development or the culture. Therefore, understanding it has its importance to understand how education and green jobs were developed.

Between the 10th and the 15th century, today's Cambodia was part of the powerful Angkor Empire that extended on a wide area of Southeast Asia. The country was placed under French protection in 1863 after a period of decline due to Vietnamese attacks. It became part of the

French Indochina in 1887, only achieving full independence again in 1953. While the country was starting its industrialization process, the communist Khmer Rouge movement rose and took over Phnom Penh. It is estimated that 1.5 million Cambodians died from execution on the infamous Killing Fields or from hunger. The Khmer Rouge were drove out of the capital in 1978 from a Vietnamese invasion only leading Cambodia into 20 years of civil war. It was no later than in the 90s that UN encouraged democratic elections and a cease-fire with the Paris Peace Accords in 1991. After a second round of elections following factional fighting in 1997 the country returned to political stability.[2] Cambodia is now developing and aiming higher standards in development, including sustainability and education.

Today, Cambodia is a country of 16 million inhabitants with an average annual growth of 7% since 2011. The country has a very distinctive age structure with half of the population being under 24 years old[3]. Over the past decade, the country has seen a quick decrease of poverty. Still, the Global Multidimensional Poverty Index shows that 37% of Cambodians lived in multidimensional poverty in 2018 with 17.7% under the poverty line[4]. Moreover, the population would lack education and productive skills, even if the number of young people joining university programs increased in the past few years.

Agriculture

In addition to its history, Cambodia's economy is impacted by its geography and the presence of many natural resources on which many sectors rely (agriculture, tourism, fisheries…). Bordering Thailand, Vietnam and Laos, this country has a tropical climate with rainy seasons that justify how important agriculture is in Cambodia, especially with rice cultivation. For decades, it has been the main sector of the economy representing 90% of the GDP in 1985 and employed 80% of the work force. With today's industrialization, agriculture is not the main sector anymore, representing 42% of the employment in 2018 (ILO, 2019a) but remain a key aspect of the Cambodian economy. With climate change, this sector is facing challenges that the government will require strong adaptation from rural population and support from the government.

[2] CIA. Cambodia. Updated 20.5.20, https://www.cia.gov/library/publications/the-world-factbook/geos/cb.html (Data accessed on 20.4.20).

[3] *Ibid.*

[4] United Nations Development Program. Human Development Reports: "The 2019 Multidimensional Poverty Index (MPI) », 2019, http://hdr.undp.org/en/2019-MPI (Data accessed on 20.4.20).

Industry

This decrease in the agricultural sector was compensated by a rise in the industry and services as in any developing country, representing 20% of the work force for the industry and 38% for the services (ILO, 2019a). The garment and footwear were two main sectors of the industry with almost 650.000 jobs in 2017 but its growth is slightly slowing down. With around 1.500 factories according to the Ministry of Industry and Handicraft in 2018, Cambodia exported mostly to European Union and US[5]. Yet those factories are often energy-inefficient and polluting, which rises new challenges for sustainability.

Tourism

Rich by the Khmer history with temples and historical places, but also nature and landscapes, tourism contributes a lot to the economy representing around 28% of the GDP in 2017 and 25% of the employment. It was estimated that 10 million tourists visited Cambodia in 2016[6]. According to the Ministry of Tourism, it will keep increasing with the growing market in China but there is a lot of competition with the bordering countries like Thailand or Vietnam. The government set a "China Ready" strategy in 2016 to take opportunities of the potential of Chinese growth in tourism encouraging measures like mandarin speaking staff, menus translation but also eco-tourism.[7]

Environment

Every aspects of the Cambodian's economy is closely linked to the environment or climate change. The main sectors rely or affect at the same time the quality of the environment. Agriculture could be strongly impacted by drought, flood or modification of the monsoon, but an increase in the use of fertilizer or certain agricultural practices could also impact climate change or the quality of soils and rivers[8]. Tourism depends on the good conservation of historical areas but also the protection of forests and biodiversity but mass tourism can put a pressure on the ecosystem. In the same issues, energy in Cambodia mostly comes from

[5] Open Development Cambodia. 22.12.15, updated 27.1.19, https://opendevelopmentcambodia.net/topics/industries/ (Data accessed on 20.4.20).

[6] *Ibid.*

[7] Black, E. Globe. Cambodia's tourism industry looks beyond Angkor Wat. 29.4.18, https://southeastasiaglobe.com/cambodias-tourism-industry-looks-beyond-angkor-wat/ (Data accessed 20.4.20).

[8] Carruthers, M. Eco-business. How can Cambodian Farming survive climate change? 22.3.19, https://www.eco-business.com/news/how-can-cambodian-farming-survive-climate-change/ (Data accessed on 20.4.20).

hydropower, which impacts river flows but also depends strongly on rain. Finally, the growth of the industry sector is affecting air and water pollution and must be better managed to assure the respect of public health, good environmental standards and efficient use of resources. Considering those specific sectors impacting and being impacted by climate change and Cambodia's vulnerability, environmental matters are a priority. Taking measures to enhance Cambodia's sustainability is important as much for adaptation than for reducing the effects the economy have on the environment.

Cambodia was ranked 150 out of 180 countries on the Environmental Performance Index (EPI)[9] according the ILO Report on Employment and Environmental Sustainability in Cambodia (2019a). Yet it is important to recall that Cambodia was still recovering from political instability a few years ago and that its Ministry of Environment (MoE) was only created in 1993. Being a low-income country, it can be challenging to invest funds in environmental mitigation when priorities lies within developing the economy and reducing poverty. Those objectives can however be complementary as greening an economy can bring opportunities. According to the document, Cambodia outperform the average score in Asia and the Pacific on agriculture and biodiversity. The country needs to improve its standards on environmental health and ecosystem vitality. This includes matters like air quality, water and sanitation, forests, fisheries, air pollution, climate and energy.

According to the World Risk Report, Cambodia has a medium World Risk Index score and is ranked 8th out of 171[10]. This index is estimated based on the exposure to natural hazards like floods, sea-level rise, cyclones, drought and earthquakes. It also takes into account the vulnerability of the societal sphere by computing the coping mechanisms to reduce negative consequences, the ability to adapt with long term strategies and the susceptibility being the likelihood of suffering and harm. Cambodia's exposure to risk is low relative to highly exposed countries like Bangladesh, Chile or Indonesia. Yet, according to the Emergency Events Database there was a substantial increase in natural disasters and associated damage costs

[9] Yale Center for Environmental Law and Policy, Center for International Earth Science Information Network at Columbia University. 2018 EPI Scores. 2018, https"//epi.envirocenter.yale.edu (Data accessed on 20.4.20).

[10] Bündnis Entwicklung Hilft and United Nations University – EHS. World Risk Report. 2017, http://weltrisikobericht.de/english (Data accessed 20.4.20).

between the 1980s and 2018[11]. The country has been more subject to floods, landslides, droughts, typhoons and forest fires, especially exposing the rural population, already struggling with low-income and strongly dependent on agriculture. Rice harvest depends on a predictable cycle of monsoon rains. Higher temperature tends to make the weather unstable, creating droughts or floods and affecting the crops[12]. For instance, in 2013 the agricultural sector of Cambodia was impacted by extreme weather and floods due to the phenomenon El Niño affecting 2.5 million people, creating a 2% fall in the GDP and a decrease in yields on the 2015/2016 period. Moreover, it caused the Tonle Sap's fish stocks to drop due to drought. If the country was to be exposed more often to those kind of natural disasters, local farmers would struggle with income, there would be a pressure on food production and the national economy would suffer. It was reported by health centers that after this period, children were vulnerable to illness like diarrhea or upper respiratory infections[13]. In conclusion, the effects climate change could have on the agriculture and on the overall country by a rise in temperature and a change in precipitation would affect harvest having plenty of serious consequences from farmer's income to children's health. There is an important need for the country to help and anticipate climate change effects on the agriculture requiring a strong institutional support.

In another hand, the natural industrialization process of the developing economy exposes the country to environmental issues. As the agricultural sector's part decrease in the economy, people move to cities in search for jobs in the industry or better education. The urban population is slowly growing in Cambodia, from 19.5% to 23% between 2008 and 2018[14] yet, putting a considerable pressure on urban infrastructures, especially in Phnom Penh. Growth in urban population increase the need for waste management, transport or water supply requiring again a strong support from the public services. Air quality became a source of

[11] EM-DAT: The emergency events database - Universite catholique de Louvain (UCL). www.emdat.be (Data accessed 20.4.20).

[12] The Phnom Penh Post. Climate change considered as flooding hits Cambodia. 15.8.11, https://www.eco-business.com/news/climate-change-considered-as-flooding-hits-cambodia/ (Data accessed 20.4.20).

[13] Save the children. El Nino-induced drought in Cambodia: Rapid Assessment Report. 12.20.17, https://resourcecentre.savethechildren.net/library/el-nino-induced-drought-cambodia-rapid-assessment-report (Data accessed 20.4.20).

[14] Plecher, H. Statista. Urbanization in Cambodia. 11.12.19, https://www.statista.com/statistics/455789/urbanization-in-cambodia/ (Data accessed 20.4.20).

concerns with the increase traffic and rising fuel-intensive industry. Co^2 emission levels rose with an average of 7% in Cambodia between 1990 and 2014 (ILO, 2019a).

1.1.1.2 Cambodia's strategic plan for the future

In its very early days of political stability, Cambodia took engagement over environmental protection. Protecting the environment and natural resources is established as the responsibility of the state in the Constitution of Cambodia, signed in 1993. It is up to the Government to supervise the development of land, water, air, wind, geology and ecological system, as much as mines, energy, forests, wildlife or aquatic resources[15]. That same year, the Ministry of Environment (MoE) was created as the instance responsible for planning environmental impact assessment and other measures concerning the use and conservation of natural resources to environmental education.

In the following years, Cambodia widened its legal framework on environmental protection with a large range of laws covering many issues. In 1996, the Law on the Environmental Protection and Natural Resources Management set the standard for air pollution, followed by many sub-decrees on Environmental Impact Assessment (1999), Solid Waste Management (1999), Water Pollution Control (1999) or Control on Air and Noise Pollution (2000)[16]. In the early 2000s, the Forestry (2002) and the Fisheries Law (2006) set the legal framework to supervise a sustainable use of natural resources. Yet, the Government value their resources as a potential for enhancing the development of the agricultural sector. The Cambodia's Rectangular Strategy – Phase III emphasizes the need for balance between the sustainable use of natural resources for development and its protection and conservation. The intentions towards those resources were renewed with the National Forest Program from 2010 to 2029 and Strategic Planning Framework for Fisheries Sector from 2010 to 2019[17].

[15] Constitution of the Kingdom of Cambodia, article 59

[16] Open Development Cambodia. Pollution and waste. 5.1.16, updated 29.11.18, https://opendevelopmentcambodia.net/topics/pollution-and-waste/ (Data accessed 21.4.20).

[17] Open Development Cambodia. Environment and natural resources policy and administration. 7.9.15, updated 24.11.18, https://opendevelopmentcambodia.net/topics/environment-and-natural-resources-policy-and-administration/ (Data accessed 20.4.20).

The National Green Growth Roadmap was developed by the MoE in 2013 until 2030 in order to promote the development of a green economy with an emphasis on green jobs, green technologies, green finance or green investments. With the ongoing development of the country and the rising concerns towards climate change, the objectives of the country widened to a more inclusive framework, including the UN Sustainable Development Goals (SDGs) and green growth. First, engagements were taken at regional level as cooperation is important and the Regional Road Map for implementing the 2030 Agenda for Sustainable Development in Asia and in the Pacific was adopted in 2017[18]. The aim of this collective action is to organize areas of priorities, implementing arrangements and a process to track the progress made on the SDGs. A special focus was made on social development, disaster risk reduction, climate change and natural resources. Aside, an ASEAN-UN Action Plan on Environment and Climate change was included in the objectives for 2016-2020 showing that environmental matters are taken seriously at all level of cooperation and that Cambodia is engaged on all fronts.

Despite the strong engagement of the Cambodian Government for its natural resources and the vulnerability of the country towards climate change, it is yet limited by institutional abilities. From enforcing laws, policies and regulations to financial means, tackling those objectives is challenging. In an attempt to strengthen its capacity, the Government decided to modernize the MoE in 2016[19].

Nowadays, the main legal framework of reference for environmental development is the National Environmental Strategy and Action Plan (NESAP) covering the 2016-2023 period. This strategy was developed by the National Council for Sustainable Development (NCSD), an instance created by the MoE to reform and modernize the conservation of the environment from sustainable financing mechanisms to improving human wellbeing. It aims to respect the country's objective in parallel with the SDGs including a budget of 260 million dollars for planned projects[20].

[18] Korea Environment Institute. 2018. Environmental Sustainability in Asia : Progress, challenges and opportunities in the implementation of the Sustainable Development Goals. Cambodia.

[19] *Ibid.*

[20] Asian Development Bank. 2018. Cambodia's road map for sustainable development. The National Environment Strategy and Action Plan. https://www.adb.org/publications/cambodia-national-environment-strategy-action-plan.

NESAP Strategic Objectives:

Improve coordination and regulation by strengthening cross-sector collaboration, relevant legal instruments and guidelines

Cross-sector coordination	✓ Promote environmental conservation for sustainable use of resources
Inter-ministerial collaboration	✓ Promote environmental conservation for sustainable use of resources
Productive and sustainable use of land	✓ Encourage spatial planning and classification with a focus on reducing poverty
Good environmental governance	✓ Avoid biodiversity loss and respect ecosystem services and functions
Institutional and human capacity	✓ Apply environmental policy tools and instruments ✓ Support the implementation of the Environment and Natural Resources Code

Improve resource use efficiency for a healthy environment and social well-being, while increasing business competitiveness an incentivizing technological innovation.

Technologies	✓ Promote and apply the development of innovative technologies, products and services
Sustainable cities	✓ Promote inclusive, safe, resilient, and sustainable cities and other human settlements
Waste management	✓ Support national institutions and administrations in improving waste management through reducing, reusing and recycling targets ✓ Improve the management of chemical and hazardous waste

To develop and implement financing mechanisms, benefit sharing schemes and fund mobilization plans for investing in the modernization of the management and conservation of environment and natural resources.

Environmental costs	✓ Encourage the internalization of environmental costs ✓ Encourage the use of fiscal, policy, and economic instruments and processes
Sustainability and inclusiveness principles	✓ Integrate the principles into budgeting, bank lending and other financial arrangements
Decision-making and risk management.	✓ Support social and economic development in decision making process

To raise public awareness, build individual and institutional capacities, promote technology transfer, and strengthen the application of monitoring 28 science and technology to improve the management and conservation of environment and natural resources.

Technology and risk management	✓ Create and implement programs for developing technology that helps environmental conservation, natural resource management and risk management
Public awareness	✓ Promote awareness on the application of environmental decision-making

With those objectives covering a larger range of issues than in the 2000s, the panel of areas of action is wide and ambitious. The NESAP specifically underlines possible constraints due to lack of technical and management capacity and inadequate coordination to achieve the objectives. Moreover, this program could face a lack of financial needs or human resources. Driving the green transition requires an adequate and qualified panel of skills within the public and private sector in order to develop a sustainable Cambodia and rethink the whole economy.

1.1.2 Green jobs to lead the Green Transition

1.1.2.1 The GREENCAP Project

Closely linked to the history of Cambodia, France has often been involved in partnerships with this Southeast Asia Kingdom. Together with other countries, the GREENCAP Project aims to strengthen the relations between Cambodia and the European Union. Launched in January 2020, the project is an Erasmus+ Capacity Building for Higher Education funded by the European Union. As the Cambodian Government engaged itself on a Green Growth Roadmap, the country might face challenges in making sure that its workforce matches the needs of a greening economy. The main objective of the project is to work with 4 Cambodian Universities to improve the matching process of student skills to the needs of organizations, in line with environmental policies. Greening student's curriculum is the path to respecting the SDGs on education and make sure young graduates fit the job market. As stated before, this project follows the commitment of the National Council for Sustainable Development (NCSD). It aims to stimulate economic growth by enhancing environmental protection, sustainable natural

resources management but also focuses on poverty reduction, gender equality, social equity and good governance. To respect the objectives of the NESAP before 2023, an appropriately skilled workforce is needed. In order to avoid skill shortage or skill oversupply, it is necessary to rethink educational programs accordingly to the job market and key sectors of the Cambodian Green Transition. Working closely with Universities, the private sector and students through the GREENCAP Project will help give proper guidelines to how those 4 higher education institutions (HEIs) will have to rethink their programs to provide a quality skilled workforce in line with the government strategy.

10 objectives of the GREENCAP Project[21]

- ✓ To help to better establish **strong links between HEIs and private sector** to give practical insights on course curriculum and research, so that universities can produce skilled manpower as per demand of the private companies
- ✓ To help to adopt or create **specific courses and diploma** (BSc and MSc) related to green growth given that modernization & internationalization of the courses are urgent need to achieve the Cambodian government NESAP 2016-2023
- ✓ To help to promote **innovative teaching on green development** to increase attractiveness of courses
- ✓ To discuss **strategy** to increase the number of full-time master students
- ✓ To help to fulfil the **gap between bachelor and master** studies, and also between tertiary and higher secondary education
- ✓ To help to promote **multi-disciplinary approach** teaching
- ✓ To help to promote **multidisciplinary researches** related to green business or green growth
- ✓ To help to create **career canters** at each university
- ✓ To help to increase awareness for **green higher education** among university and school students
- ✓ To help to create a **green platform** to match students skills and stakeholders needs for green growth and green society

[21] Source: GREENCAP detailed project description, 2019

This report falls into the very first steps of this project and is necessary to set the guidelines for future actions. It was written in parallel of a study on green skills expectations by local (Phnom Penh) and national Cambodian stakeholders that will distinguish the relevant skills expected for the Green Transition. On another hand, this study have the same objective but on the student point of view. Three main objects of focus will help us make useful recommendations for the good continuation of the GREENCAP Project. The first objective is to **understand student's environmental awareness**. Measuring their knowledge, attitude and behaviour in relation to environmental issues is necessary as environmental awareness is the key step towards projecting yourself in a green job and a much required soft skilled in those positions (ILO, 2019b, p29). Those 2 surveys will focus on important sectors in Cambodia that are agriculture, garment, tourism and energy industry and urban development. The second objective is to catch an appreciation of **how students project themselves in a green job** by highlighting their expectations, opinions or interest towards green careers. Finally, the key objective of the survey will be to **understand their representation of green skills** relevant in green jobs. It is necessary as programs will be rethought by taking into account stakeholders and student's expectations. This will help us make proper recommendations as we will identify the needs in promoting certain aspects, may it be skills, careers, environmental awareness or specific programs. A professional committee will then use those results to help Cambodians Universities restructure their curriculum. As the two main objectives of the project are to increase awareness of green business among students and improve their employability, apprehending their environmental awareness and projection in a green job and understanding their representation of green skills will tell the professional committee how to proceed and what should work.

1.1.2.2 Defining green jobs

Rising concerns about sustainability appeared many years ago with the 1972 "*Limits to growth*" report. Over the years, many solutions were thought about to provoke a shift towards a more sustainable society from international legal frameworks to carbon markets to promoting technology and innovations. It seems that today's interests are pointing at green jobs as the key driver to green growth. Periodically, reports and analysis are made to quantify and identify skills, jobs and sectors that are necessary to reduce our global environmental

impact and commit to the engagements taken. Without a proper workforce with quality skills in the right sectors, policies cannot be implemented or enforced and objectives might not be respected. Green jobs are then the main condition to a successful transition.

According to Hofmann and Strietska-Ilina (2014), the need for skills in green jobs came from 4 drivers of change. Worldwide and for many years, we have observed a wide range of **physical change** in the environment. The main observable ones are a rise in global temperatures, ice melting, sea level rising and an increase in natural disasters. It is also observable through a destruction of ecosystems and biodiversity but also an increase of health issues due to air pollution. The physical changes that has been observed in the environment are many and concern a wide span of aspects from nature to humans. Facing those physical changes, policies and regulations have been used to limit the negative impact of human activity on the physical change of the environment. The past decades has seen many world summits reuniting the whole civil society to try to take actions against climate change. Many **laws**, legal frameworks, treaties and engagements have been adopted by all and declined in regional or national objectives. On a national scale, almost every countries has ratified laws with objectives on atmospheric emission reduction, use of renewable energy or waste reduction. Then, the needs for mitigation and adaptation to climate change put **technologies and innovations** as a key sector and a potential solution to reduce our impact. Finally, concerned by environmental issues, it seems that **market trends** are shifting in certain countries towards a greener consumption. Consumers are expecting better standards in the way industries produce and the demand for goods that respect the environment rose. Those 4 drivers of change considerably increased the need for jobs that deal with those environmental matters across the whole workforce.

Due to the various publications on green jobs and green skills, many definitions have been made but none has been officially adopted. Mentioning the same sectors, objectives or principles, they are mostly similar but present a few differences. In 2008, UNEP (p35) defined green jobs as presented:

« Positions in agriculture, manufacturing, construction, installation, and maintenance, as well as scientific and technical, administrative, and service-related activities that contribute

substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes jobs that help to protect and restore ecosystems and biodiversity; reduce energy, materials, and water consumption through high-efficiency and avoidance strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution."

This definition mentions a non-exhaustive list of sectors as green jobs can actually be found in others and serve different objectives than the ones quoted. In short terms, they also stated that they were *« those that contribute appreciably to maintaining or restoring environmental quality and avoiding future damage to the Earth's ecosystems*." This definition might be more suited considering that it is still uncertain to which degree a job can be a green one. They mentioned that they exist in the private sector but also the public and non-governmental ones. Moreover ILO (2019b, p19) recalled a definition from 2016 than defined them simply as jobs that *"help to improve efficiency in the use of energy and raw materials, limit greenhouse gas emissions, minimize waste and pollution, protect and restore ecosystems, and support adaptation to the effects of climate change*".

In low-income countries, the development of green jobs can be constrained by poverty, informal employment, lack of financial funds and support from the government or weak policy enforcement. This can lead to unsafe or informal green jobs. For example, the collection and recycling of electronic waste in low-income or developing countries is often mentioned as very dangerous. That is why the United Nations decided that green jobs had to be decent ones and made it a necessary condition. This requirement was presented in the UNEP report mentioned previously. They define decent employment as a safe, adequately paid position with a certain job security, career prospects and respect for worker rights. This point is specifically important for countries like Cambodia where despite the very high employment rate, poverty, vulnerable and informal jobs are still widespread (ILO, 2019b, p28). The ILO Green Job Agenda First Awareness Raising Workshop from 2011 then admitted that decent work and environmental sustainability would be the two main pillars of the transition.

Despite similarities between definitions, a slight difference highlight that different shades of green jobs exist. When UNEP states than a green jobs contribute substantially to reducing

environmental impact, it is reduced to a job that contribute to it in the ILO's report. Those differences point that it is unsure if a green job is an occupation that explicitly helps reduce environmental externalities or if it can be any position that indirectly contribute to it. According to this principle, one could occupy a job that does not have an environmental purpose nor require green skills, but indirectly help reduce the impact of the organization on ecosystems. This could concerned the accountant of an environmental NGO or the secretary of an energy consulting firm. If their jobs are not properly a green one according to the definitions, they are indirectly helping their firm in its environmental mission. By being necessary to the good function of the green organization, they draw a thin line between what is a green job or not. On the other hand, no matter the level of skill, it is possible that one is affected by the purpose, missions and values of its company no matter how green the job is. If the environmental culture is strong in the company, an individual could feel like his job serve a mission beyond its core functions. There is a distinction between being environmentally aware, having green skills and willing to pursue a green career.

When reports or governments state that green skills are required across the whole workforce, it is because the green transition affects all aspects of the economy and every job. Every individual will have to deal at some point with something related to sustainability and protecting the environment. The only difference is that it would be an occasional task in a traditional job for some or would require a diploma attesting a wide range of green skills for another. One could also occupy a job in a green institution without never feeling environmentally aware. All those reasons explain why the definition of a green job and the outcome of a diploma will always depend on other factors like the willingness of a person to take part in a purpose or the values of a company.

As stated before, if international policies encourage countries to commit to environmental objectives, a shift towards a greener economy cannot occur without the presence of certain drivers for green jobs. The UNEP report (2008, p5) highlight different key drivers to green employment. This aspect is important to understand for the GREENCAP Project but also for Cambodian stakeholders. It is primordial for them to identify which policies and objectives the government is committing itself to and with which tools they will work towards their engagements. Knowing those tools and potentially the financial funds allocated can help

identify which sectors will prosper and that way, which skills are relevant to teach. An inefficient situation would be a government stating that a certain amount of its production of electricity would come from solar energy. Stakeholders like the GREENCAP project would then recommend Universities to teach solar energy knowledge to their students. Yet, without subsidies or encouraging policies towards the solar industry, the sector would not develop and we would have an oversupply of graduates with non-transferable skills. The report highlight that in order to understand which skills are relevant to teach, it is necessary to consider the environment, threats and opportunities. It points that green jobs are driven by:

- ✓ **Subsidies** from the government towards a certain sector that can come from a phase-out out of an industry
- ✓ **Carbon markets** that encourage green projects and employment
- ✓ **Tax reform** that can discourage employment in certain polluting sector
- ✓ **Targets and mandates** to see if there exist policies that encourage the development of greener technologies like energy-efficiency standards or targets for renewable energy production
- ✓ **Energy alternatives policies** to understand which energy are encouraged
- ✓ Extended Producer Responsibility (**REP**) policies
- ✓ **Eco-labelling standards** encouraging eco-friendly design
- ✓ **R&D Budget** and towards which fields of research they are invested in
- ✓ **International aid**

Knowing the strategy of the government, environmental policies but also but by which of the previous points developed the environmental plan is driven by is helpful in understanding which sectors will be the key to the green transition. It helps identify green jobs and the skills that will be required in the economy later on.

1.1.2.3 Green Jobs trends in the world and in Cambodia

Greening the economy towards a more sustainable model is a movement that is occurring worldwide. Reports have been made to quantify the effects of sustainable development on global employment. One was produced by the ILO in 2019 on the impact of the transition to energy sustainability by 2030 and estimates that around 25 million jobs will be created (2019b, p22). Although, as the UNEP report pointed, 4 trends are observed on the impact of

sustainability on employment (2008, p3). First **new jobs** are created that did not exist before. We can find them in emerging sectors as much as traditional ones but they tend to emerge at higher skill levels. The most mentioned ones are jobs in the renewable energy sector that emerge with the need for new clean energy alternatives. New careers opportunities appeared with the need for a workforce that can produce, implement and manage renewables. On the other hand, new jobs were created in more traditional sectors. To mention only a few, pollution controller, carbon analyst, eco-tourism manager are the type of jobs in already existing sectors. Secondly, jobs are going to be **substituted**. For instance, a job in the fossil fuel industry could become a job in the renewables. In 2018, the petroleum Norwegian firm Statoil became Equinor. Some of their 21.000 employees that used to work on petroleum management and projects now work on renewable energy projects[22]. But this does not happen in every cases. More often, if jobs can be substituted, they are not localised in the same region or country. If a job is eliminated because of the shift towards a greener economy, but can be reemployed in another sector, it is not guaranteed that this will be in the same region. Thirdly, jobs are **eliminated** with no direct replacement and force people in those positions to acquire new skills in order to find a new career. Finally, jobs are **transformed**. Sustainable development impacts all sectors at all levels of skills. According to the ILO report, lower-skilled occupations are the one who tend to require no more than environmental awareness or adaptable to more sustainable work processes. Most likely, any job will have to deal with reducing the environmental impact of an organization at some point, no matter the intensity of the environmental aspect of the job. Jobs will be transformed by having to deal with tasks in reducing the environmental impact of a firm on occasional basis.

ILO estimated than 25 million jobs will be created and that 7 million might be lost globally, in this scenario. As stated for the substitutable occupations, 5 million jobs could be reallocated in the same occupation, industry and country. According to the figures, it is possible than 1 or 2 million jobs will not be reallocated in similar positions due to geographical or technical constraints and those individuals will need a reskilling for other career opportunities. In conclusion, high investments will be required across the world to teach proper skills to 20 million people. In the circular economy scenario, it is a total of 7 to 8 million jobs that will be

[22] Equinor. Equinor in brief.https://www.equinor.com/en/about-us.html#shaping-the-future-of-energy (Data accessed on 5.5.20).

created, destruction and reallocation taken into account (2019a, p22). Those two scenarios should be concentrated on a mid-skill male dominated span of occupations. ILO highlight the importance to promote green careers among women to avoid gender inequality.

Understanding the key sectors in the green transition is of great matters in order to know which skills are relevant for the workforce. Obviously, the importance given to each sectors is variable given a country or the strategy of a government. We will see that the upskilling required in Cambodia could be very different than what is recommended by the ILO report as its transition relates on a specific span of sectors.

Renewable energy is one of the most significant sector as most of the world's government are adopting ambitious objectives of renewables in their power mix, trying to reduce the amount of their carbon emission or increase their energy independency. It created a lot of new occupations and employment is rising in this sector requiring specific skills. The ILO reports point a need for low and medium skilled individuals for position like installers, technicians, plant managers or quality engineers. It highlights a need for a higher skilled workforce in engineers and system designers. Jobs in installing, operating and maintaining renewables are usually more local as they are needed and specific in any country. The UNEP report recall how microloans have helped installing around 100.000 solar homes in Bangladesh in rural communities that created a great number of jobs due to a trained young workforce (2008, p8). This kind of projects also highlight the need for finance to support green projects with proper tools to allow the green transition in low-income or rural region. Aside from renewable energy, jobs in energy efficiency will become key positions in many sectors. Reducing the amount of input to produce is primordial to achieve a more sustainable world as much as in the transport industry than in manufacturing in Cambodia.

Considering a wide range of environmental issues, the ILO report states that **environmental goods and services** (including water and waste management) will be a key sector in the transition. Protecting the services provided by the environment is necessary as they concern air, water and soil quality, primordial for human health, but also the fauna, flora and the ecosystems. This sector will see new occupations in medium and low-skilled positions through jobs like environmental engineering technicians or conservationists. Higher positions will see

a rise in atmospheric and space scientists, restoration planners, certifications specialists, economists, climate change analysts, environmental consultants…

Thirdly, the report points that **construction and building** services will mostly see a transformation in jobs as occupations will remain the same but will have to integrate sustainable construction standards. It will require an upskill of existing occupations in low and medium skilled positions like carpenters, plumbers, electricians and high skilled occupations like energy auditors and consultants, architects specialised in eco-building, engineers…

In the **manufacturing** sectors, green jobs will be needed to reduce the considerable impact of the industry on the environment by trying to find solutions for intensive use of energy, use of chemicals, waste or pollution. Low and medium skilled positions will see a rise in jobs like pollution controller officers, energy efficiency auditors or consultant meanwhile higher skilled occupations will require production engineers or eco-designers. The garment industry is a core sector for Cambodia. Its importance was highlighted by the *ILO Green Job Agenda First Awareness Raising Workshop* in 2011. They employ a large amount of the workforce but are highly polluting and not very energy efficient. It had the highest energy cost of all Southeast Asia for the garment industry back then. The workshop pointed that if the manufacturing sector in Cambodia was to become more sustainable, it would be important to train Cambodians for this kind of positions to avoid factories hiring a foreign workforce (2011, p16). Factories mostly recruit middle-skilled managers and Cambodians are often not qualified for supervising positions, which shows the need to teach skills that will enable Cambodians to monitor and enhance energy performance in the garment industry.

Finally, **agriculture** and forestry will mostly require an upskilling to existing occupations in order to reduce the environmental impact of agriculture but also adapt production to climate change. Forestry will need a workforce able to manage the resource in a sustainable way that will avoid its depletion. Low and medium skilled workforce will require skills in organic farming techniques when higher skilled occupations will need oil and water conservationists, environmental restoration planners or agricultural meteorologists. This sector is also very important in Cambodia due to its vulnerability to climate change, as stated before. Yet, contrarily as the renewable or industry sector that gets greener more by markets mechanisms

(energy efficiency reduce costs, higher demand for green products…), agriculture will rely more on a support from the government with policy interventions to overcome the obstacles. Moreover, Cambodia will see opportunities rise in fisheries and forestry as they are a key resource in the country.

If those sectors are the ones mentioned in the ILO report, the GREENCAP Project focuses on sectors determined by their importance in the Cambodian economy. The projects aims to enhance skill education that will allow to green the workforce specifically for the renewable industry, natural resources, garment industry, tourism and urban development.

1.1.2.4 Defining green skills

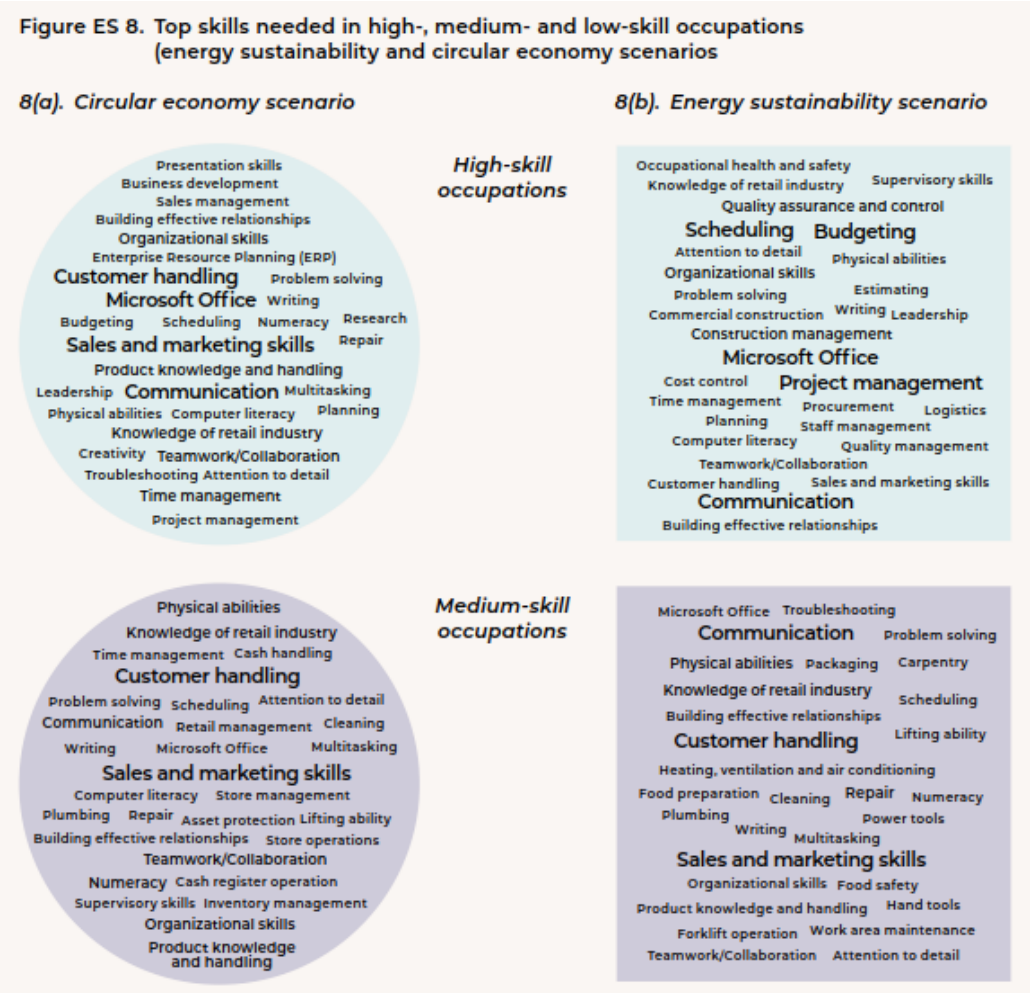
Through the GREENCAP Project and the two surveys conducted in its first steps, we aim to understand which skills Cambodian Universities should teach. As stated before, the first survey aims to understand the perception of potential employers and stakeholders on the skills future graduates need. The second survey is presented in this study and aims to understand the representation students have of green skills when they project themselves in a green job. According to their point of view but also taking into account policies and key sectors, we will manage to advise universities in their teaching programs. On a more general scale, it is necessary for any country to list the skills they require for their transition in order to avoid skill shortages or oversupplies.

The International Labour Organization defines skills as *knowledge, competence and experience needed to perform a specific task or job* (2019b, p204). An earlier definition from Strietska-Illina et al., (2011) states that it is *an ability to carry out a manual or mental activity acquired through learning practice*, in an older ILO report. The organization explains that choosing the skills to teach can be done accordingly by looking at the policies, the key sectors and with social dialogue. They specify the need to be in coordination with macroeconomics, sustainable investments but also industrial policies. As it was presented previously, it is also necessary to be aware of the technical or financial incentives that will prevail where a skilled workforce will be encouraged. This will be seen through knowledge transfers and technology diffusion essential in enabling businesses towards more sustainable and resource-efficient practices. This systemic approach is necessary as not only climate change impact the development of

the global workforce but also automation, demographics, trade and economic trends. The training of a workforce is obviously specific and unique to every country and also depends on the sectors that will be potentially affected by the green transition. The prevailing sectors were developed in the previous part and were quite similar to the ones decided by the members of the GREENCAP Project. The 2 surveys conducted precisely respect the need for social dialogues with the stakeholders and the students when determining the proper skills.

Skills can be listed according to different levels of occupations. Again, ILO defined the nature of change for those levels and the typical skills response that we can observe. Low-skilled occupations will change in a generic way. We will not observe a massive creation, destruction or substitution of jobs but more a need of environmental awareness or simple adaptation to new work procedures. For example a waste collector will have to integrate new procedures according to recycling measures or a carpenter will work with new energy-efficient materials or standards. Then, medium-skilled occupations will see a creation of jobs but also significant changes in occupations in terms of technics and knowledge and will require a consequent upskilling. The changes will be similar for high-skilled occupations and will require new university degrees or longer upskilling programs. For those reasons, our study will mostly focus on medium and highly skilled level of occupations. According to their 2 scenarios (circular economy and energy sustainability), ILO highlighted the top skills needed in each level of occupations. We were inspired by this analysis to identify the skills relevant in our survey.

Figure ES 8. Top skills needed in high-, medium- and low-skill occupations (energy sustainability and circular economy scenarios



Source: ILO. Skills for a greener future. A global view (2011).

We distinguish soft skills, core skills and specific skills.

Soft skills are not specific to a certain subject, job or sector. They can be taught but can also result from the personality or character traits of an individual. Soft skills relate more to who a person is that what she knows[23]. They are generally complementary to core and specific skills and condition how a person interacts in a work place through the different soft skills he possesses. They come in opposition to hard skills that can be learnt and perfected over time. ILO mentions soft skills like *communication, team-work abilities, leadership, creativity, problem-solving skills, negotiation and decision-making skills*… They are useful in any positions but can sometimes be specifically needed in a green jobs.

[23] Kenton, W. Investopedia. Soft skills. Updated 14.4.19, https://www.investopedia.com/terms/s/soft-skills.asp (Data accessed on 5.5.20).

Core skills are the ones that can be fundamental and necessary for a position. They are required across the labour force but can differ according to the occupational level. The organization mentions that environmental awareness and willingness to learn about sustainability are the first core skills necessary for a green job. Yet, we will see later in this study with further research that environmental awareness result from various complex mechanisms and is not necessarily linked to environmental behaviour. Then, they mention *teamwork skills, resilience through changes, communication and negotiation skills or entrepreneurial skills* to seize opportunities created by the green transition. They are similar to soft skills but differ in the case that some of them are of great matters for a green job. Specifically, for medium and higher skilled occupations, analytical thinking can help interpret risk and understand the changes required. Coordination skills can come useful as sustainability is a very interdisciplinary concept and requires to work with scientists, engineers, economists and other disciplines. Innovation skills recall to entrepreneurial skills as they help identify interesting opportunities and solutions to climate change. Then, as many organizations will need help to identify solutions for more sustainable way of producing, energy efficient production or reduce their impact, consulting skills will be useful and jobs in environmental consulting should increase.

Table ES 2. Main core skills required for green jobs, by skill level of occupation

REQUIRED ACROSS THE LABOUR FORCE	REQUIRED IN MEDIUM- TO HIGH-SKILLED OCCUPATIONS
• Environmental awareness and protection; willingness and capability to learn about sustainable development	• Analytical thinking (including risk and systems analysis) to interpret and understand the need for change and the measures required
• Adaptability and transferability skills to enable workers to learn and apply the new technologies and processes required to green their jobs	• Coordination, management and business skills that can encompass holistic and interdisciplinary approaches incorporating economic, social and ecological objectives
• Teamwork skills reflecting the need for organizations to work collectively on tackling their environmental footprint	• Innovation skills to identify opportunities and create new strategies to respond to green challenges
• Resilience to see through the changes required	• Marketing skills to promote greener products and services
• Communication and negotiation skills to promote required change to colleagues and customers	• Consulting skills to advise consumers about green solutions and to spread the use of green technologies
• Entrepreneurial skills to seize the opportunities of low-carbon technologies and environmental mitigation and adaptation	• Networking, IT and language skills to perform in global markets
• Occupational safety and health (OSH)	• Strategic and leadership skills to enable policy-makers and business executives to set the right incentives and create conditions conducive to cleaner production, cleaner transportation

Source: "Skills for green jobs" country reports, ILO, 2018.

Finally, **specific skills** are the one that relates to technical abilities or knowledge to a specific job or sector. Core skills can still be useful in any field or job but specific skills are the ones that gives the ability to do the job like specific knowledge on renewable or knowledge of ocean biodiversity.

1.1.2.5 Threats to green jobs

The development of green jobs in an economy can be subject to many threats. As it requires a coordination between policies, economic trends, an available workforce and support from the government, it is difficult to see all the conditions reunited for an increase in decent green jobs. Many threats and weaknesses can be pointed at like the quality of the educational system, trends in education specific to Cambodian students, demand for Cambodian workers or gender equality.

Encouraging green jobs can be expensive in policy implementation because it requires to rethink university programs, upskill and train the existing workforce and promote green careers to raise awareness. Yet, Cambodia remains a low-income country and finding the financial funds for enhancing education can be challenging. However, the expenses in education in percentage of the GDP amounted to 2.1% of the GDP in 2018, a very low number compared to similar countries like Vietnam spending 4.2% of its GDP or 4.1% for Thailand in 2013[24]. In addition to this lack of funds towards higher education institutions, Universities are under little state supervision. The quality of the institutions are said to be low as the teaching staff have no opportunities for self-improvement such as international experience. Only 7.54% of the teaching staff had a doctoral degree when the study was made. Since the 90s, the number of students in Cambodian institutions was multiplied by 5, yet, the teaching staff only doubled which lead to oversized classes (Un and Sok, 2018). In addition, a lack of investment in career counselling or communication can be highlighted. It has often been mentioned that STEM-related studies (Science, Technology, Engineering and Mathematics) are under-chosen while there is an oversupply of business-related studies (Un and Sok, 2018, Brittish Embassy Phnom Penh, 2015). This undersupply would come from a belief that STEM careers are too

[24] World Bank. Government expenditure on education, total (% of GDP) – Cambodia. 2018. https://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS?locations=KH (Data accessed on 5.4.20).

difficult or does not lead to well-paid jobs. As often, men are overrepresented in the first one (Hofmann and Strietska-Ilina, 2014). This show the need for instances able to raise awareness on STEM and green careers among students to insure a proper workforce in the economy. Funds need to be invested to train and upskill the existing teaching staff to integrate sustainability in their teaching programs, hiring new qualified teaching staff to deal with new programs but also career counsellors to overcome potential misconceptions about STEM or green careers. Otherwise, those issues could become a threat to the development of green jobs.

Secondly, there are trends in education that are inherent to Cambodian students. The Dockside Project aims to improve the quality of higher education and the research capacity of Cambodian universities, co-funded by the Erasmus+ Programme of the European Union. They published an analysis of the stakeholders in the environmental and maritime fields in Cambodia. Stakeholders and potential employers sometimes highlighted a lack of skills but also commitment to environmental issues from Cambodian students and a need for changing behaviours. This could come from the fact that due to Cambodia being a low-income country, students often have to take a student jobs and school dropping rate are high (Un and Sok, 2018). This show again a need to raise awareness for certain fields of study but also give support and follow students that might have struggles committing to their studies due to a lack of interest or resources.

Then, in order to make sure green jobs are developing and in addition to the training of a proper workforce, high instances have to make sure that there will be an effective demand for a Cambodian workforce in green careers. Highly-skilled position were reported to be often occupied by internationals in private sector that are more skilled (ILO, 2011, p16). Moreover, the Dockside Project stakeholder's analysis also highlighted a lack of confidence from stakeholders in Cambodian's skills. This could encourage a human capital drain if the private sector were reluctant to hire locals for green medium and high-skilled positions. Again, the quality of the Cambodian education paired with a lack of confidence from stakeholders could impede the development of a green workforce.

Finally, not promoting gender equality in green careers would be a mistake in the green transition. Women are usually underrepresented in STEM subjects and occupations in the renewable energy sector are also mostly occupied by men (Hofmann, and Strietska-Ilina,, 2014). Yet, they are overrepresented in low-end jobs like waste collection and recycling. As the UN insisted that the development of green jobs must be decent ones, it is also necessary to avoid past mistakes and promote gender equality by attracting women to green careers. In Cambodia, the garment and hospitality industry have been a source of jobs for women with 17% of female workers employed in those two sectors. Increasing equal job opportunities for women mean a higher return on education investment for them (Cunningham, Hollweg, et al., 2018).

Most of those threats could be solved by raising awareness to green careers and providing proper support to students in terms of communication, counselling and financial resources. Rethinking programs would be useless without promoting opportunities. In an attempt to promote STEM careers, the British Embassy in Phnom Penh published a document providing information on related occupations and the skills required for them. In addition to be very helpful, they mentioned the need for Cambodians to be informed about jobs available and required skills. Raising awareness and providing support would be a key aspect to promote green jobs among student.

1.2 Education to encourage green jobs

As the green transition requires green skills and a well trained workforce, education is obviously the key to achieve the objective of limiting the impact of climate change. Green jobs are a tool to drive green growth but for decades, education have always been seen as the main priority. A good educational system allows economic development and enhance sustainability. It has been promoted by the United Nations through frameworks, principles or goals. Moreover, the importance of education for sustainability as often been an important subject in research. Yet, we will see that understanding Cambodia strengths and weaknesses in higher education institutions is important to maximize the chances of the GREENCAP Project in helping Universities rethinking their programs.

1.2.1 A global consensus : UN, Agenda 21, SDGs

The first step towards environmental education was taken during the United Nation Conference on the Human Environment in Stockholm in 1972. It was the very first international gathering that focused on rising environmental issues. It was globally very important because a declaration was adopted stating principles on how the world should deal with climate change. Those principles would later be found as a base in legal frameworks all over the world. The 19th principle supported the importance of environment education[25]. A few decades after, the Agenda 21 was adopted by more than 178 governments at the Earth Summit of Rio de Janeiro in 1992. This plan of action was promoted by the United Nations to achieve a more sustainable world by 2021. It focused on social and economic dimensions such as poverty or human health as much as on the preservation of natural resources. Moreover, education, public awareness and training were adopted as means of implementation to respect those goals, proving that education was still a priority for general economic development but sustainability as well[26].

Education is critical as it first of all can give a sense of environmental awareness that is primordial prior to acquiring green skills. Environmental awareness allows one to acknowledge the impacts of humans on the environment and its negative impacts. Then, education and especially HEIs can teach the green skills necessary for graduates to occupy jobs that will help reduce humans and organization's impact on the environment. Those skills were not traditionally taught at school because, as stated before, new sectors, positions and needs emerged with the rise of climate change. It is through education that environmental awareness and green skills that are critical to achieve green growth are taught.

Later on, the United Nations adopted in 2015 the 2030 Agenda for Sustainable Development with the Sustainable Development Goals (SDGs). They aim to achieve sustainability, economic development, peace and end poverty through a universal plan of action. They are integrated as the 17 goals affect each others. The GREENCAP Project will mostly help Cambodia achieve

[25] Boudes, P. Britannica. United Nations Conference on the Human Environment. 11.2.14, updated 15.9.14, https://www.britannica.com/topic/United-Nations-Conference-on-the-Human-Environment (Data accessed on 18.5.20).

[26] United Nations Sustainable Development. United Nations Conference on Environment & Development Rio de Janeiro, Brazil, 3 to 14 June 1992, Agenda 21

the 4th goal which is quality education. By promoting green jobs, it will also impact the goals concerning affordable and clean energy (7th), decent work and economic growth (8th), sustainable cities and communities (11th) or climate action (13th)[27]. The 4th goal aims to *ensure inclusiveness and equitable quality education and promote lifelong learning opportunities for all* and is made up of 10 targets. By helping Cambodian Universities rethink their programs to better match students' skills to the job market and promote green jobs, the GREENCAP Project in involved in many of those targets. The 7th target might be by far the one closer to the main objective of the GREENCAP Project[28]. It strongly support the idea that sustainability cannot be achieved without a quality education:

> *Target 4.7: By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and nonviolence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development*

Supported by other targets that highlight the needs for equal access to affordable, technical, vocational and higher education (4.3) or qualified teachers in developing countries (4.c), the fourth SDG ensure that education will promote environmental awareness and sustainable development as a pillar for a more prosper world.

1.2.2 Education for sustainability in research

Research about education on sustainability is useful because it helps understand how to implement educational programs according to certain aspects like student's level of environmental awareness or willingness to learn. Several studies interested themselves in understanding how environmental awareness (Angela Maria de Carvalho, Elias and Laércio Antônio Gonçalves, 2011, Emmanuel and Adams, 2011), level of education (Ziadat, 2009) counselling (Dahir, Perepiczka and, Shea, 2014), gender (Sahin, Ertepinar and Teksoz, 2012) or

[27] United Nations Development Programme. Sustainable Development Goals. https://www.undp.org/content/undp/en/home/sustainable-development-goals.html (Data accessed on 18.5.20).

[28] United Nations Development Programme. Sustainable Development Goal 4 (SDG 4). https://sdg4education2030.org/the-goal (Data accessed on 18.5.20).

other variables (van Liere and Dunlap, 1980) affect the way students are aware of environmental issues and its opportunities but also what works best for them to learn about it. Studying education on sustainability allows to understand how students will react to environmental education as strategies to encourage it can work differently. It is important for the GREENCAP Project to think about what recommendations could be made to rethink university programs as they are many ways to teach sustainability and green skills. It can be done in a formal way like optional or elective courses or specialized masters. It can also be taught in a more informal way by creating links between students and stakeholders (companies, NGO, associations…) with for instance, projects, conferences, group work, career counselling, internships, experiences abroad or seminars. This survey will help estimate student's level of environmental awareness and their representation of green skills in order to give recommendations for a professional committee that will help Universities implement sustainability modules. In this part, we will see how research has helped understand how sensitive students can be to education on sustainability and why it is important on the way we rethink programs. We will also see how personal characteristics affect how we receive environmental education and different ways to teach sustainability.

In 2003, A. D. Cortese, studied the critical role of higher education in sustainability. He points that HEIs have an important role to play because most of world's leaders driving the economy and the green transition come from the best institutions. It teaches students and future leaders how to manage, develop and influence society. Yet, it seems that they are leading the world towards an unsustainable and unhealthy path and are failing at shifting the economy towards better models of production. This statement would be true for any other intellectual discipline and profession. He admits that this might be explained by the fact that institutions would fail in teaching proper values that would make decisions-makers lead us to a sustainable society. A long-term effort transformation of the educational system would be much needed at all levels. Hansen (1991) points that there has been a lack of exposure to environmental issues as much in formal than in informal education. This would explain that nowadays, people would overlook the importance of the environment in their job. Moreover, Cortese explains that HEIs would expect from students not to challenge common assumptions like the supposed dominance of humans on nature, the inexhaustibility of natural resources or the fact that ecosystems are able to assimilate all humans' impacts. For those reasons, there must

be a shift in the way education teaches sustainability through new programs but also a shift in values and mindsets. He assumes that HEIs has the moral responsibility to do it as they are the ones able to increase awareness, knowledge, skills and values needed for a sustainable society. He quotes Orr (1994, p.5) saying that *"The kind of education we need begins with the recognition that the crisis of global ecology is first and foremost a crisis of values, ideas, perspectives, and knowledge, which makes it a crisis of education, not one in education*." Cortese has shown that education is not only necessary to teach green skills for green jobs but also to integrate values and change mindset of future graduates that will lead the green transition.

Learning sustainability

The main point of our study is to give an estimation of Cambodian student's level of environmental awareness and understand their representation of green skills in order to help concerned HEIs take appropriate decisions when they will rethink their university programs. Sustainability can be taught by different means and there is not one best way to do it. It should be done, as we have said before, according to macroeconomic characteristics like environmental policies, main economic sectors or need for skills. On another hand, personal characteristics can modify the way students react to environmental education from one place to another. That way, it matters to understand student's level of environmental awareness and attitude when you intervene in educational programs. This allows HEIs to implement the most effective strategies according to what works for students. L.I Estrada-Vidal (2018) studied how attitudinal differences affect education for sustainability on university students. She discovered than gender, area and level of study had an impact on student's environmental behavior. For instance she pointed a better pro-environmental attitude for Social Education students and concluded that women seemed to be more sensitive to it. This last result is recurrent in other research (Sahin, Ertepinar and Teksoz, 2012).

When implementing sustainability in programs, we usually think first about formal education like courses or new specialized formations. Yet, it has not always been proved to be the best solution. It seems that students might be more sensitive to practical and interactive ways of learning when sustainability is concerned (Aisyah and Zainora, 2012). The Educational

Resources Information Centre (ERIC) of the US Department of Education defines informal education as *organized education […] in which knowledge, skills, and values are taught by relatives, peers, or other community members"* (ERIC, 1999, p.12). The span of tools goes from conferences, seminars, workshops conducted by communities, businesses, NGOs and medias to group projects or actions on campus. The main interest of informal education for sustainability is to see how it is applied in real life and directly take action rather than learning about theory and principles. Cortese (2003) highlighted that environmental education must emphasizes active, experimental, real-world problem-solving ways of teaching implying the whole campus and community. He talks about *practicing sustainability.*

Aside from practical ways of learning, counselling can also be considered as informal education. If teaching green skills might be perceived as the critical role of HEIs in sustainable development, it is primordial to advise students towards the opportunities of green careers. School counselling services are playing an important part in the role of institutions for sustainability and must be increased for many reasons. To overcome climate change there is a need for green jobs and a qualified workforce. Shortages and skill-gaps must be avoided and school counselling can take action to promote study fields that are much needed but sometimes overlooked by students. In Cambodia, the gap in STEM studies and the underrepresentation of women in it have often been underlined (Hofman and Strietska-Ilina, 2014). School counselling could help overcome the misconceptions about certain areas of study and promote green careers (Dahir, C., Perepiczka, M., Shea, M., 2014). Their role is of great matters as there will be a need to communicate and encourage new formations once Cambodian universities have integrated sustainability in their educational programs.

Informal education can also be found in implementing sustainability on campus. It's a source of practice and involvement into their community for students where they can learn and engage. It can happen by encouraging environmental projects on campus and communicate on them or by linking courses on sustainability to actions. Students can then apply what they have learnt in class, connect with others and understand how protecting the environment matters outside a classroom (Bilodeau, Podger, Abd-El-Aziz, 2014). Cortese (2003) defined universities as macro-systems of the larger community. According to him, daily activities on a sustainable campus can demonstrate ways to achieve environmentally responsible living on a

smaller scale and serve as an opportunity to teach, learn and do research. Moreover, it reinforces values and behaviors that are desirable in a sustainable community. It makes students more aware of their impact on the environment by limiting it to a campus, helps them build a sense of collaboration and cooperation with other disciplines and teaches them how to implement projects. It can be seen as a way to strengthen formal education. The sustainability consultant estimates that a university that does not involve students with their community will lose 75% of the value of its effort in teaching environmental education.

A study was made on students of a business school after the administration tried to link sustainability to employability (Winfield and Ndlovu, 2019). Nottingham Business School in the United Kingdom reviewed all their courses and had a cross-school approach. They rethought their curriculum and developed partnerships with alumni, businesses and the community to make links between environmental education and the professional world. This can be seen as an informal education approach as there is a will to link learning with real-life matters. This was particularly interesting as students used to think courses on sustainability were irrelevant. This show how important it is to take into account student's opinion, consider the attitudinal differences that there can be towards environmental education and adapt the school's strategy to it. It also show how important it is to demonstrate the impact of sustainable education on their employability by communicating and creating links outside the classroom. Collaboration and interdisciplinarity has often been recommended by research. Cortese points as an issue that higher education is often specialized in one area of knowledge and that traditional disciplines often overlook the need for interdisciplinary cooperation. Moreover, higher education nowadays encourages competition and individuality when today's issues require to work together by crossing knowledge and skills. For instance, implementing a project restoring a damaged natural area would require lawyers, ecological scientists, economists and project planners. Another recommended solution would be a whole-of-university approach (Dybal and Mcmillin, 2009) by linking curriculum, research and sustainable campus operations to engage students. Aside from enhancing the reputation of the university, it provides a meaningful experience for students as stated before.

The literature on environmental education helps understand what works according to specificities. As the GREENCAP Project is doing, it is important to link student's level of environmental awareness and their perception of environmental education to the actions taken in order to make them relevant. But most of the time, an interactive and informal approach is the best way to demonstrate connections between theory and the professional world and is often recommended (Cortese, 2003, Dybal and Mcmillin, 2009). Linking courses to the sustainability on the campus and the professional world gives a wider view to students on the importance of green skills. Interdisciplinary knowledge and system thinking must be encouraged across practice and real-life projects rather than accumulating skills through theory. In this study, the benefits of using the Q-metholodoly will allow us to interact with students through interviews and collect their opinion on environmental education and what they will recon to be relevant.

1.2.3 Higher Education in Cambodia

When looking at higher education today in Cambodia, we can still see the effects of its past. L. Un and S. Sok (2018) explain how education was impacted by the county's history. Cambodia's Higher Education history started in 1953 when the country became independent and started building institutions while enjoying peace and stability. In 1970, the country found itself in wars and genocide which strongly retarded the development of education as HEIs were shut down between 1975 and 1979. After this period, they were supported by socialist's bloc states with limited investments. Even if the country went back to stability in the 90s, it was no later than in 1997 with privatizations that businesses starting operating HEIs and that mass education increased. The gross enrollment rate rose from 1% in the 90s to 16% in 2014-2015. Due to its late development, higher education in Cambodia has still to be enhanced and its quality shows weaknesses. Staff recruitment has stagnated in the past years meanwhile the number of students has strongly increased. Less than 8% of the teaching staff owned a doctoral degree when the study was made. Those lack of funds could threaten the development of environmental education and new programs in universities. Moreover, the detailed description of the GREENCAP Project points important difficulties for students in Cambodia. It seems that most students take their master degree several years after their bachelors. Policies should incentivize students to continue directly their master degree in

order to facilitate transition. Most of them study part-time and does not write a master-thesis, potentially for financial reasons. Then, contrarily to what is advised in the literature (see previous part), there is a lack of multi-disciplinary approach between HEIs and no links with the private sector. The detailed report on the GREENCAP Project warns that environmental awareness is low among students and teachers. Yet, education has been enhanced by including more students from poor households, rural areas and women[29].

The GREENCAP Project aims to strengthen relations between the European Union and 4 Cambodian Universities. They are the institutions that the capacity building project will work with to enhance environmental education. We will present those universities and, how advanced in education on sustainability they are. Most of those information come from the detailed report on the GREENCAP Project that had already analyzed strengths and weaknesses of those institutions.

The first institution is the Royal University of Law and Economics (RULE) that was only established in 2003 and offers diplomas in different areas of study. It is said to be a rather selective institution and is ranked one of the best in Cambodia[30]. The RULE's curriculum does not offer any bachelor or master specialized in environmental matters. The teaching of environmental courses is limited to one or two subjects for the Development Economics and Tourism and Hospitality Management bachelors. Yet, formations like the bachelors in Business Management or Public Administration requires nowadays some knowledge in sustainability. The detailed report on the project highlights that the survey on skill requirements conducted in this study is much needed as the RULE should focus on new market-oriented courses with a close connection with professionals. A key element would be to work with European partners that are already advanced in environmental education to rethink programs.

The GREENCAP Project is also working with the National University of Management (NUM). This University proposes similar trainings than the previous one with departments in management, economics, finance and accounting, tourism, law, and business information

[29] World Bank. Job quality in Cambodia is improving but new policies are needed to benefit from global markets. 19.12.2019, https://www.worldbank.org/en/news/press-release/2019/11/19/job-quality-in-cambodia-is-improving-but-new-policies-are-needed-to-benefit-from-global-markets (Data accessed on 22.5.20).

[30] Royal University of Law and Economics. http://rule.edu.kh/en/rectors-message/ (Data accessed on 23.5.20).

technology. Unlike the RULE, its formations present more environmental courses for certain formations. The master of Public Administration teaches urban and rural development management or management for public and NGOs and the department of economics teaches courses like agro, environmental and development economics.

The third university involved in the GREENCAP Project is the University of Battambang (UBB). Unlike the others, it is not situated in Phnom Penh. It also differentiate itself by offering a few formations specialized in environmental matters. The master in Sustainable Agriculture (UNICAM) and the master of Sustainable Ecosystem Management (CONSEA) were created during a partnership with a European Union Project. Most of their courses concern environmental protection and students from those formations will most likely occupy green jobs in the future. Aside from those 2 formations and the bachelors in Agricultural Economics and Rural Development, the other formations does not offer any environmental education. UBB has made a lot of efforts to promote sustainability on its campus as much through training than through actions. The report points yet a lack of human resources. The GREENCAP Project should help UBB in updating its masters by integrating green growth, strengthen green skills in existing subjects by promoting interdisciplinary and active learning and develop a network of initiative.

Finally, the Institute of Technology of Cambodia distinguishes itself from the other Universities of the project as it is the only science and technology oriented one. It offers formations that teaches green skills like the bachelor in Rural Engineering and the master of Water and Environmental Engineering. The GREENCAP Project has already highlighted 4 needs for the ITC. Their curriculum needs to be updated on green growth based on consultations with the private sector, paired with a training of teachers on green courses and interactive learning, as recommended in the previous part. Greening ITC's curriculum could be done by increasing exchange with European HEIs to allow students to access advanced knowledge and research institute on green growth. It was also mentioned to create a career forum and an online platform to promote job announcements and opportunities, even though this should be implemented in all of the concerned universities. A joint degree program among partner universities on Green Environmental and Natural Resources Managements could be created as well.

In conclusion, most of the partner Universities have a strong will to follow global trends in green growth and update their curriculums to strengthen the quality of their programs. UBB has already taken many actions towards formal environmental education but also within its campus life. If trainings in tourism always have environmental-related courses, it is not always the case for formations in management, law, public administration or economics. The GREENCAP Project have the will to strengthen green skills in those formation as they are much needed in green jobs. The project has already planned actions and recommendations for those institutions as presented in the detailed report of the project. Our study will help support those recommendations by providing information on student's level of environmental awareness and their representation of green skills.

1.3 Understanding environmental awareness

This study aims to answer 3 main questions about Cambodian's students. The first one is to understand their level of environmental awareness. Secondly, we want to evaluate their perception of green jobs, and then, to have an overview of their representation of green skills. As the GREENCAP Project will help universities innovate their programs, the reasons for answering those questions are many. Prior to implement new courses or formations on sustainability, the literature (see previous part) recommended to understand what is relevant, suitable and interesting for students to learn and to take into account their opinion in order to take actions that will be effective and work for them. Then we would also want students to actually consider occupying a green job because it widen their career opportunities and promote jobs that are profitable to lead the green transition. Environmental awareness and willingness to learn about sustainability is a necessity for an effective promotion of green jobs. Yet, research has shown that there exist different shades of environmental awareness and that there is a gap between being aware and actually taking action. Our study will help characterize and measure the level of environmental awareness of students. It will tell us how education can best close the gap between awareness and actual behavior. However, despite the numerous research work on environmental awareness and environmental psychology, authors still struggle to understand the mechanisms of environmental behavior. We will mostly use Kollmuss and Agyeman's paper (2002) to understand the barriers to pro-environmental behavior as they draw the evolution of research on explaining the relation

between awareness, attitude and behavior. A focus will be made on the Theory of Planned Behavior developed by Ajzen (1991) and on values orientation through the work of Stern, Dietz and Karlof (1993). In the first part, we will define the concepts of environmental awareness, attitude and behavior. In the second part, we will present the Theory of Planned Behavior and we will conclude by developing other models of environmental behavior.

1.3.1 Environmental awareness, attitude and pro-environmental behavior

In the first steps of research on environmental psychology, it was common to think that environmental awareness would lead to pro-environmental behavior. Those linear models from the 70s thought that if individuals were aware and had knowledge on environmental issues, they would take action in limiting human's impact on the environment. Kollmuss and Agyeman (2002) detailed in their work the evolution of research to explain the links between environmental knowledge, awareness, attitude and pro-environmental behavior. They point that since the 70s, NGOs base their communication campaigns on knowledge but still fail encouraging actual behavior. This comes from the idea that information and knowledge would enlightened attitude (Maddock and McDonald, 1982 in Davey, 2012). Even knowledge and attitude are not necessarily correlated as Young (1980) and Brand (1997) underlined in Davey's paper. Even the mechanisms between attitude and behavior are more complex as other variables are involved. *Why awareness and knowledge are not enough to encourage pro-environmental behavior?*

Madsen and Ulhøy (2001) define environmental awareness as *knowledge and concern of the impact of human behavior on the climate and the environment.* Kollmuss and Agyeman (2002) refer to pro-environmental behavior as *volunteer behavior that consciously seeks to tackle environmental issues such as climate change, global warming, and environmental degradation, and minimize the negative impact of one's actions on the natural and built environment*. We can accept that occupying a green job can be a pro-environmental behavior as the definition of it is also to reduce the impact of humans on the environment (see previous part). Those 2 definitions give a first understanding of why there is gap between knowledge and action. Environmental awareness has a cognitive and knowledge-based component aside from an affective perception-based component. Cognitive limitations come from the fact that environmental change is time-lapsed and we only see

the effect of our actions later in time through a slow and gradual ecological destruction that humans observe only gradually and because of our cognitive limitations to understand environmental problems (Preuss 1991 in Kollmuss and Agyeman, 2002). Beyond pro-environmental behavior, other research (Afsar, Badir and Safdar Kiani, 2016) focus on environmental passion. The authors use Robertson and Barling's (2013) definition as *a positive emotion that results in an individual to engage in pro-environmental behavior*. Environmental passion is said to be more important than environmental behavior as intrinsic motivation would not be a sufficient condition for it. It creates a feeling of optimism that is beneficial and encourage efforts and contributions of one to an organization's sustainability.

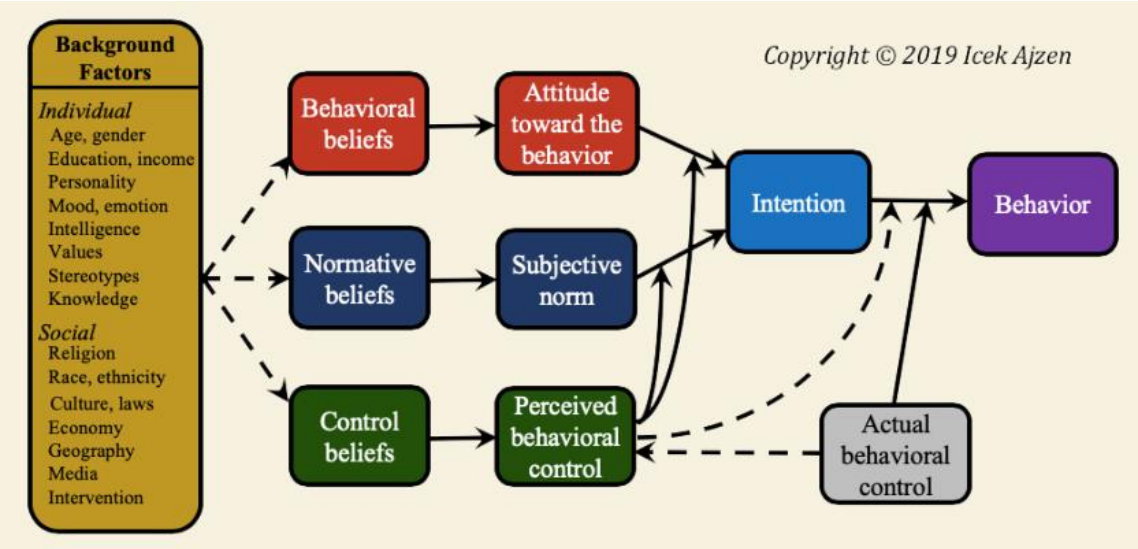
Rajecki (1982) in Kollmuss and Agyeman (2002) defines 4 reasons why there is a difference between attitude and behavior. According to him, knowing about environmental issues and directly experiencing it would have a different influence on people's behavior. People would then be more likely to act if they experience it in their daily lives or see it with their own eyes. On another hand normative influences like social norms, cultural traditions or family customs would influence people's attitude. He also mentions temporal discrepancy as attitude changes over time which lead to inconsistency in data collection and attitude-behavior measurements as the cause to discrepancies in results.

1.3.2 The Theory of Planned Behavior

FIG. 1. Early models of pro-environmental behavior.

Source: Mind the Gap: Why do People Act Environmentally and What are the Barriers to Pro-Environmental Behavior. Kollmuss and Agyeman (2002)

In 1974, Fishbein and Ajzen widened the linear idea of awareness-attitude-behavior to a model that takes into account other variables that can lead to actual actions. It was further developed in 1991 by Ajzen and named the Theory of Planned Behavior. His model shows that we can explain or encourage behaviors through attitude, norms and the sense of control an individual feels he has. The path from knowledge to behavior is actually much more complex than what models from the 70s believed and is influenced by beliefs, intentions and even depends on external factors.



Source: Theory of Planned Behavior with Background Factors, Ajzen (1991) https://people.umass.edu/aizen/tpb.background.html (Data accessed on 4.6.20)

In Ajzen's model, one have **behavioral beliefs** (b). It is the probability that a given outcome will occur from a behavior. It will influence the **attitude toward a behavior** (A) according to if the person think the outcome is going to happen. The attitude toward a behavior tells if the performance of the behavior is positively or negatively valued according to the evaluation of the outcomes. The strength of each beliefs is weighted by the evaluation (e) of the outcome to determine an attitude toward the behavior.

$$A = \sum b_i e_i$$

Then, **normative beliefs** come from a person that one consider as a referent like family, friends, coworkers or other that inspires perceived behavioral expectations. A person will be

motivated to act accordingly to this referent person. This determine the **subjective norm** (SN)as the perceived social pressure to do the behavior. The subjective norm comes from the strength of a normative belief (n) weighted by the motivation (m) to follow a referent.

$$SN = \sum n_i m_i$$

Finally, one can identify factors that influence the possibility to perform a behavior. They are **control beliefs** (c) and determine if the person believes she has a certain ability and control unto the behavior according to factors that will impede or facilitate it. The strength of a control belief is weighted by the perceived power of the control factor (p) and gives a **perceived behavioral control** (PBC).

$$PBC = \sum c_i p_i$$

Those 3 variables (attitude toward the behavior, subjective norm and perceived behavioral control) give an **intention** to act. It differs from the attitude as it is the actual readiness to perform the behavior. Yet the perceived behavioral control and the actual behavior also depends on **the actual behavioral control** that is related to skills, resources and prerequisites to perform the behavior.

We can illustrate this model with our will to encourage Cambodian students to pursue green careers. We can consider *occupying a green job* as the pro-environmental behavior desired because they both have the similar objective of reducing human's impact on the environment. First, students will evaluate the outcomes of pursuing a green career, learning about sustainability or engaging themselves in environmental actions. They will estimate the probability that the outcomes possible (having a successful career, having a real impact on environmental issues, being well paid…) will occur. They will estimate if the outcomes will have a positive impact on their lives that will give the attitude toward the behavior. Then, we would have to understand to whom students refer as models and what behavioral expectations those referents encourage. We would try to have an appreciation of the social pressure to perform *occupying a green job* among students in Cambodia. Finally, students would judge factors that encourage (high demand for green jobs, support from the government towards green growth, potential opportunities…) or impede (low quality

education, low demand for green jobs, lack of income to pursue studies…) to perform the behavior. They will estimate the control they have on it according to how powerful each factor is in encouraging or impeding the behavior. All of this would lead to an intention to actually apply to formations that teaches sustainability or to apply to green jobs.

Ajzen widened its model with individual and social background factors that influence behavioral, normative and control beliefs. Its means that variables like age, gender, education income (and others) as individual variables or religion, culture, economy (and others) as social variables can influence the mechanisms behind pro-environmental behaviors.

Towards models of altruism, empathy and prosocial behaviors

Ajzen's model was created in the 80s but research has added more insights into how pro-environmental behaviors work. Kollmuss and Agyeman (2002) tried to create a framework by attempting to link all the research that has been made on the subject and detailed the evolution of the literature.

Hines, Hungerford and Tomera (1986) are mentioned for their model of Responsible Environmental Behavior inspired form Azjen's theory. It comes from a meta-analysis of 128 pro-environmental behavior research studies where they found that 6 variables were associated with pro-environmental behaviors. They highlight **knowledge of issues** when the person recognizes environmental problems and their causes and **knowledge of action and strategies** when the person recognizes how she can act or lower her impact. **Locus of control**, like the perceived behavioral control in Ajzen's model represents the perception the person have of whether or not she has the ability to change her behavior and that her actions can bring change. Then people with **strong pro-environmental attitudes** are more likely to engage in behaviors. Finally, **verbal commitment** and individual **sense of responsibility** are factors that have a positive influence as well.

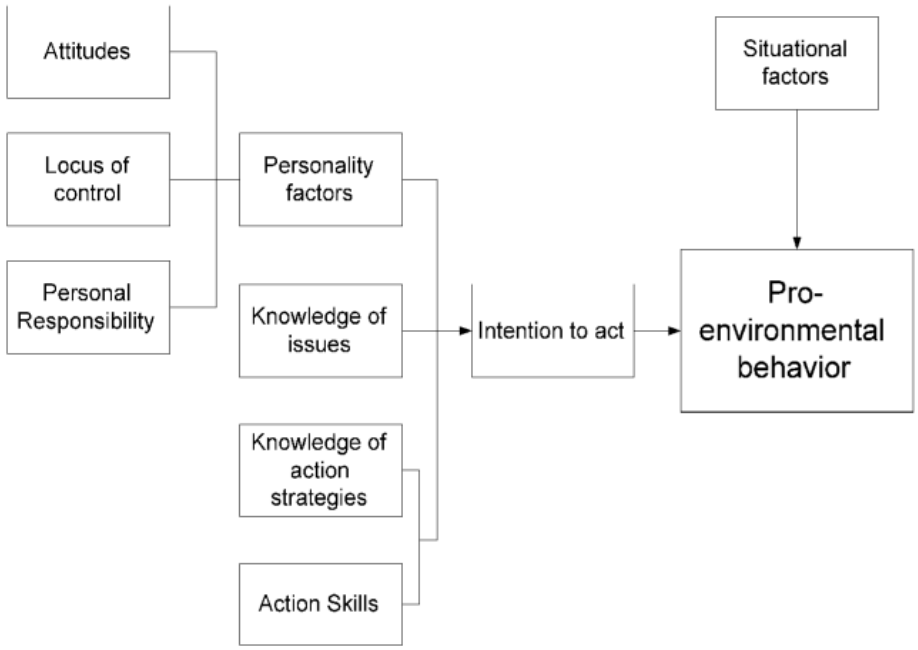


FIG. 3. Models of predictors of environmental behavior (Hines *et al.*, 1986).

Source: Mind the Gap: Why do People Act Environmentally and What are the Barriers to Pro-Environmental Behavior. Kollmuss and Agyeman (2002)

Linear models evolved to models of altruism, empathy and prosocial behaviors. Einsenberg and Miller (1987) are quoted in Kollmuss and Agyeman (2002) to define prosocial behaviors as a *voluntary intention behavior that results in benefits for another*. The difference with pro-environmental behavior is that there is an intention or a motive to do it that is linked to other's interest. They quote Borden and Francis (1978) stating that person with strong selfish and competitive orientations would be less likely to engage in pro-environmental behaviors. They also add the fact that people who have satisfied their personal needs have more resources (time, money, energy) to worry about environmental issues. This recall concepts like Maslow's human needs or the principle of the Kuznets curve that explains why developed countries seems to care more about climate change.

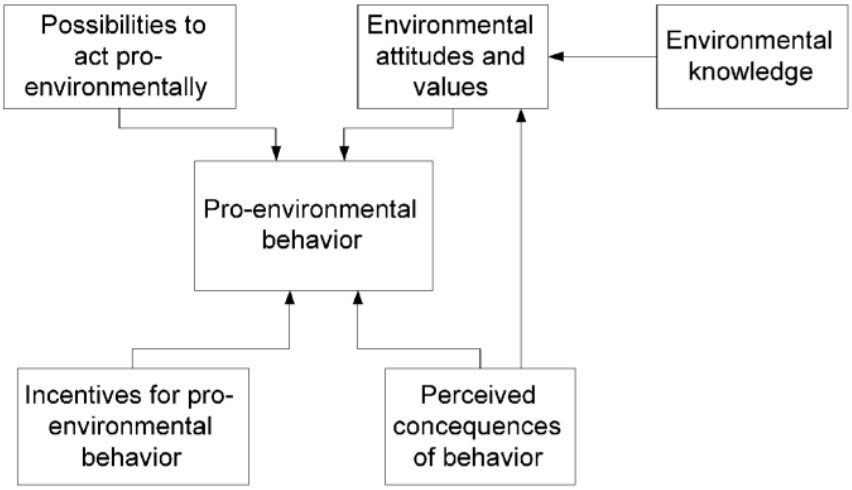
Actually, a study from Diekmann and Franzen (1999) has shown that when people from low-income countries were asked to rank urgent problems, environmental issues were ranked lower but if they were asked to rank it according to their severity they were ranked higher. This shows that even if a person is environmentally aware or have the knowledge of issues and knowledge of actions, their pro-environmental behavior is also influenced by other factors

like locus of control (Hines, Hungerford and Tomera, 1986) or social background factors (Ajzen, 1974) like their economy, income, culture…

Beyond factors mentioned in the literature before, authors working on altruism, empathy and prosocial models believe that altruism is needed to support environmental behavior. Geller, mentioned in Kollmuss and Agyeman (2002) make the hypothesis that individuals must focus beyond themselves and be concerned about their community in order to act pro-environmentally. This state can only be achieved when the need for self-esteem, belonging, personal control and optimism have been satisfied. Later, Stern and al. (1993) used this theory to assume that altruistic behavior increases when a person becomes aware of other's suffering. Those theories are important to us because we will use them when trying to understand student's environmental awareness. Stern later developed the idea of altruistic, egoistic or biospheric orientations when measuring one's level of environmental awareness. It means that some are worried about environmental issues for different reasons. People with egoistic orientations are worried about how climate change can impact their own lives when people with altruistic orientations are worried about the effects on others. Meanwhile, people with biospheric orientations care about the impact of humans on the nature. Shultz (2001) used Stern's theory to develop 12 statements that measure people's environmental awareness according to those orientations. We will use them in our study to understand Cambodian student's level of environmental awareness.

Finally, sociological models have also been developed. Fietkau and Kessel (1981) in Kollmuss and Agyeman (2002) developed a model that explain pro-environmental behavior according to variables that we have already found in previous research. Possibilities to act pro-environmentally refers to infrastructural and economic factors and recall the notions of locus of control and actual perceived behavior of Ajzen. Incentives for pro-environmental behavior are defined by social desirability, quality of life, and money savings similar to normative beliefs of Ajzen. They also pointed perceived consequences of behaviors that can be linked to the evaluation of an outcome in the TPB. They are independent from each other and can be influenced and changed. The external factor that was not mentioned before are values. They are really important in understanding pro-environmental behavior and appear in many research. They shape the intrinsic motivation and matter in environmental awareness

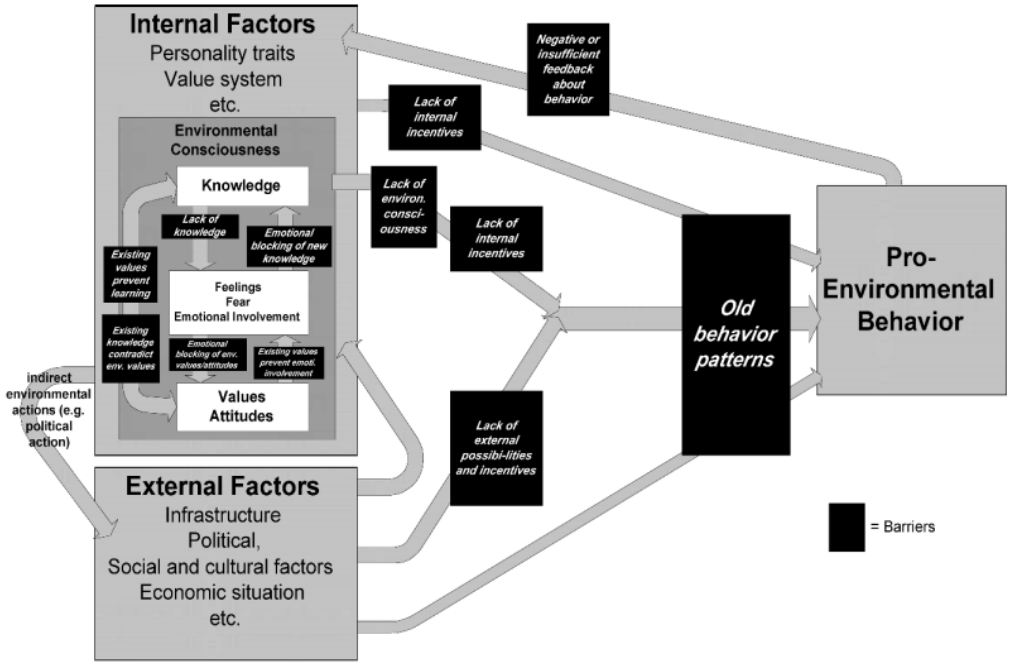
because, according to Blake's work (1999), they close the gap between attitude and behavior. He talks about the value-action-gap and believes that pro-environmental models often fail to take into account individual, social and institutional constraints. Rokeach (1968) defines them as *criteria for guiding actions*. A person's set of values are influenced by the microsystem (mostly peers like family, friends, neighbors, colleagues…) but influenced by the exosystem like the media and the political organizations. At the end comes the macrosystem which is the general environment people lives in (Fuhrer at al., 1995). It is believed that life experience shapes those values. Chawla (1998) found that childhood experience in nature, experience of pro-environmental destruction, pro-environmental value in the family, education are variables that influence the value of feeling concerned for the environment. An affective relationship to the natural world can shape beliefs, values and attitude that favors pro-environmental behavior beyond knowledge or egoistic orientations. De Groot and Steg (2008) is mentioned in (Afsar, Badir and Safdar Kiani, 2016) to also support the idea that values such as apathy for nature and personal inclination to protect the planet are usually found in persons more committed in performing pro-environmental behavior. Stern and Dietz (1994) developed ideas on the value basis of environmental concern. They make the hypothesis that the value orientation can affect beliefs about the consequences on something an individual value and have an influence on the attitude and then the behavior. But they does not influence behaviors directly because between values and beliefs, there is social influence and media that can affect opinions and actions.



G. 4. Model of ecological behavior (Fietkau & Kessel, 1981).

Source : Mind the Gap : Why do People Act Environmentally and What are the Barriers to Pro-Environmental Behavior. Kollmuss and Agyeman (2002)

The work made by Kollmuss and Agyeman (2002) shows the evolution of understanding the mechanisms behind pro-environmental behaviors in research. We can admit that the same concepts can be found in every models under different names and that they are similar. They tried to make a model that is a reunion of all the concepts and more, developed in this part. Yet, they admit that it is impossible to make a complete framework of what influences pro-environmental behavior as they are too many interactions between all the factors.



IG. 7. Model of pro-environmental behaviour (Kollmuss & Agyeman).

Source : Mind the Gap : Why do People Act Environmentally and What are the Barriers to Pro-Environmental Behavior. Kollmuss and Agyeman (2002)

The literature on environmental awareness is important because it shows that knowledge itself won't be sufficient to encourage students to act pro-environmental, if we accept that having student consider green jobs is our desirable pro-environmental behavior in the GREENCAP project. It is also very important to know more education on sustainability in order to make sure relevant choices will be. Moreover understanding the history and the context of

the country matters as culture impacts the way policies can be implemented. Deepening knowledge on the context is really important when using the Q-Methodology. Part 2 will show how understanding the context is helpful when creating our survey tool.

Part 2: Q-Methodology: how aware are Cambodian students of environmental issues and what are their representations of green jobs and green skills?

Going through the literature on how environmental awareness works was useful to create the survey tool that will orient recommendations. The Q-Methodology fits this study in the way that opinions on environmental matters can be really subjective and different for everybody. Moreover, environmental behaviors are strongly linked to feelings, beliefs, values and people's personalities. In the first part, we will define and present what is the Q-Methodology and how to implement it. We will go through how each of our 3 parts were created, based on the literature of environmental awareness scale and reports on green skills. A second part will present how data was collected and how the results were analyzed. The factor analysis will show how 4 groups distinguishes themselves in the representation they have of skills and comments from interviews made with students will help us analyze it.

2.1 Q-Methodology: Presentation

The Q-methodology was chosen to analyze data and conduct our study. In this part, we will present this method, its principles and main objectives. Then we will see how it is implemented and finally why this method is relevant for understanding opinions on sustainability.

2.1.1 Definition, principles and objectives

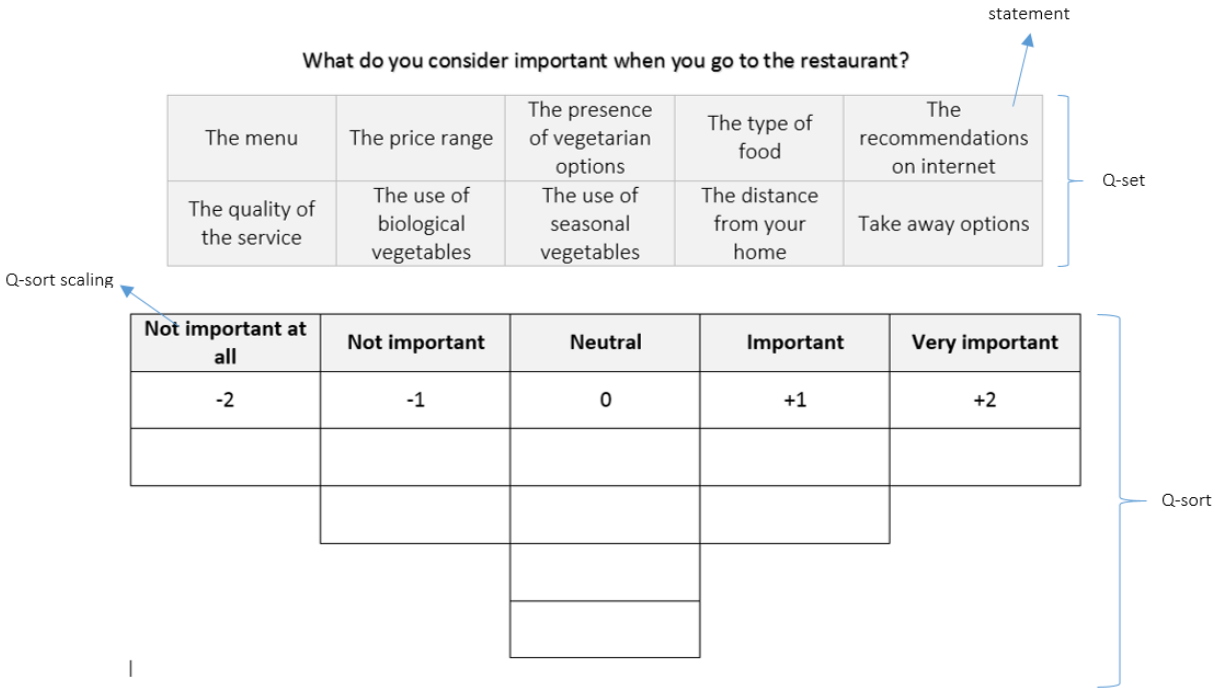
The Q-Methodology is a method designed to study subjectivity like opinions, beliefs, point of views, values, tastes etc. Subjectivity is the influence of personal beliefs or feelings in decision-making in opposition to facts[31]. It focuses on how people think and feel about a certain issue.

[31] Dictionnary Cambridge. Subjectivity. https://dictionary.cambridge.org/fr/dictionnaire/anglais/subjectivity (Data accessed on 1.7.20)

Subjective opinions are typically unprovable but have a structure and a form that can be given by the Q-technique (Brown, 1986). It was invented in 1935 by the physicist-psychologist William Stephenson and is used in a wide range of applications across sociology, psychology, economics, communication and many others as the methodology is very flexible.

The main objective is to focus on an issue, a thematic or a question. It allows, with a few respondents, to seek for similarities between the patterns of the respondents in order to identify profiles. Profiles correspond to how a certain group of people present factors that can explain why they feel, think or believe in a more or less similar way. The Q-Methodology is useful when one is trying to identify recommendations or incentives that will work for a certain group of people. In our case for instance, there are many ways to teach sustainability and to encourage young graduates to consider green jobs. But means to do it can differ across countries or study fields. In our study, we focus on Cambodian students from 4 specific universities. It will help us identify groups that think and feel in similar ways. Maybe those groups will differ in gender, in study fields or age. The main conclusion is that what can work to encourage green careers among students in France might differ than what works for students and Cambodia. It might even differ from a female respondent in the public administration study field under 20 that from a male respondent from the science and technical study field over 24 for instance. With those results, the committee will be able to assume that skills such as statistics, management or policy analysis might be interesting for the first group and energy-related skills for the other. The first part on environmental awareness will give information on the need and ways to communicate on environmental issues. The second part of the survey on green jobs projection will be useful to know how to promote green careers.

Example : Illustration of the Q-Methodology



Source: author

A Q-Methodology can be done through a survey tool that gathers respondent's answers but its support can have many forms. When conducting this method, the interviewer ask a respondent to rank possibilities according to a certain question related to something subjective for a person like its feelings, opinions, beliefs or other. The person has to rank possibilities on a Likert style scale called a Q-sort scaling such as:

→ Not interesting at all/Not interesting/Neutral /Interesting/Very interesting

→ Strongly disagree/Disagree/Neutral /Agree/Strongly agree

→ Not important at all/Low importance/Neutral/Important/Very important

Possibilities to a question are called *a statement* and the globality of statements is called the *Q-set*. The *Q-sort* is the way respondents will have ranked the statements on the Likert style grid. It can be a full sentence, a word or a picture but it can also be a sound, a color or a taste.

The specificity with the Q-Methodology is that respondents will have to rank those statements according to the scale on an answer grid that follows a normal law. This results in having most of the answers in the middle (Neutral) and only a few strong opinions on the extremes (Strongly disagree/Strongly agree/Not important at all/Very important). Sometimes, when the Q-set has a lot of statements or is administrated online, the interviewer can ask the respondents to do a first sort when he only decides what he globally agrees or disagrees with prior to sort it on a most precise scale that is the final *Q-sort*. A respondent have to rank every statements which encourage him to consider every item and make arbitrary choices. This allows that even if a person believes to agree or disagree with all the statements, it still have to make a choice and will rank them relative to others. It is recommended that the interviewer gathers opinions and comments of people when they answer the survey. This allows to match profiles together and establish correlations between different choices.

2.1.2 Implementation of a Q-Methodology

Implementing a Q-methodology requires to understand certain aspects of it and follows different steps. The first step of conducting the method is to understand the concourse definition. This step has nothing to do with data collection or analysis but is important to define the subject and its context. It goes from the main thematic, its structure, its particularities and the selection relevant questions. In our study a preliminary step of research was done prior thinking about the survey tool. As defined in the first part of this study, it was important to understand the definition and specificities of green jobs and green skills. We studied the mechanisms behind pro-environmental behaviors to understand what we were looking for when trying to assume student's level of environmental awareness and we looked at the economic situation in Cambodia. This allowed us to decide to only use the Q-Methodology for the part on skills' representation among students.

The second step is to create the statements that will constitute the Q-set. As stated before it can be made of sentences, words, pictures, sounds etc. The Q-set can be composed up to 50 to 60 statements. The number depends on how many possibilities we have and how long we want the survey to be while avoiding overwhelming the respondent with too many choices.

Statements can be created by doing some research or by pre-interviewing people on the subject and select statements from their comments. The survey tool has to be tested to avoid any misunderstanding or confusion concerning the statements.

The Q-set is then administrated to a small sampling of person call the *P-sampling*. Respondents are usually relevant to the problem under consideration. During the administration of the survey, it is important to gather comments and interact with the respondent because this will later allow to match comments to profiles and interpret results. Different kind of administration exists. Our study is a multi-participant Q-Methodology meaning that each individual answer a Q-sort.

Once the data has been collected, its statistical analysis and interpretation can be done. The main objective is to create factors that can explain answers and the contribution of each respondents to it. By analyzing data, we will look at the level of agreement or disagreement between the individual sorts in order to show similarities or differences between points of view. This is done by looking at the correlation matrix. Then, we try to make groups that present similarities when filling the Q-sort by doing a factor analysis of the correlation matrix. This will allow to find factors that explain why group of people have the same opinion. Analyzing Q-sorts has for main objective to seek for sharing discourses and identify patterns among individual rather than across them (gender, age, social class). Each participant's Q-sort provide a lot of information and that is why you don't need that many respondents (Barry and Proops, 1999).

2.1.3 The use of the Q-Methodology in investigating environmental awareness and sustainability

When setting policies or taking measures about environmental issues, understanding public opinion is important. It allows to take effective decisions and make relevant recommendations. Subjectivity matters when working on sustainability. For instance people have beliefs according to whether or not climate change is caused by human activity, opinions about what is right or what should be done, feelings like fear, anger or indifference or a different sense of responsibility. That is why environmental awareness takes different forms.

Understanding representations is very helpful to set relevant policies that will work and will be accepted. Some people can see environmental issues as something they have no power on and some may feel that they can make a difference. This is interesting to know if we want to see how students perceive green jobs according to how optimistic they are towards the green transition, if they feel responsible or worried. It helps identify shared discourses between different groups and helps make recommendations when implementing a policy is tricky.

2.2 Creation of the survey tool

In order to collect data on the level of environmental awareness and relation to green jobs and green skills of students, we had to think of a proper and effective survey tool that would cover those subjects. As stated before, it was decided to use the Q-Methodology as it presents many advantages when working on subjectivity. However, the method usually requires contacts and exchanges with the individuals answering it in order to gather their opinion, comments, and ideas. It is also necessary to explain and justify and the Q-sort as it allows to distinguish choices and recurrent trends between people. It was initially planned to directly administrate the Q-sort to students in Phnom Penh and Battambang but due to the Covid-19 situation that occurred in 2020, the qualitative study had to be done in distance. We then had to think about a survey tool that would cover our 3 topics and could be administrated online.

Initially, the survey was supposed to be a single Q-sort covering our 3 topics. We decided to divide the tool in 3 parts in order to focus on the representation of green skills, which was the main requirement of the study and to have a more homogenous Q-sort. The first part analyses the level of environmental awareness of students through Likert questions. The second part investigate the perception of students towards green jobs and the third one the representation of green skills. In this part, we will present the 3 components of the survey tool.

2.2.1 Part 1: Environmental awareness

The first part covering environmental awareness was initially supposed to be a Q-sort made of statements inspired from what is done in research. After analyzing Kollmuss and Agyeman's

model (2001) and other piece of work mentioned in part 1.3, we had isolated recurrent subjects and tried to represent them in the statements. It covered categories such as experience and feelings, values, beliefs, feeling of responsibility and attitude.

Example of statements from the first draft:

I believe climate change is a high priority matter.
I am worried about climate change and how it could impact Cambodia.
I am concerned with air pollution rising in Cambodia.
I try to be more aware of my impact on the environment (waste, food, water and energy consumption).

As we decided to only use a Q-sort for skills' representation, we started looking for what was done in the literature in order to measure student's level of environmental awareness. The main objective of it was to have an idea of how aware students were about climate issues, if they were concerned for themselves, others or the biosphere, their feeling of responsibility or their behavior towards it.

Measuring environmental motives

I am concerned about environmental problems because of the consequences for --.		
-- Plants	-- Me	--People in my country*
-- Marine life	-- My lifestyle	-- All people
-- Birds	-- My health	-- Children
-- Animals	-- My future	-- My children[1]

*An alternative wording is 'People in the community'
[1]An alternative wording is 'Future generations.'

Source: The structure of environmental concern: concern for self, other people and the biosphere. Shultz (2001)

The final draft on the environmental awareness part is constituted of 19 statements inspired from 4 piece of work from the literature. A variety of scales measuring environmental awareness had been developed during 30 years' worth of publications on psychological research on environmental attitude. Yet, research slowed down in the 80s because of a lack of theory perspectives, failure in showing correlation between pro-environmental behavior and awareness and inconsistencies across measures (Shultz, 2001). In 1994, Stern and Dietz

investigated the structure of environmental concerns based on their Value-Basis-Norm Theory for environmental attitude. They showed strong evidence of egoistic, altruistic and biospheric value orientations for environmental concerns, as we mentioned in part 1.3. For them, attitude and concerns were based on a person's more general set of values and on the relative importance a person places on themselves, others, animals and the biosphere. Inspired by their work, Shultz (2001) used 12 statements on those 3 value orientations to measure environmental awareness. He asked respondents if they were concerned about environmental problems because of consequences towards different items.

We were inspired by Shultz's approach to create our own items. We decided not to use the 12 of them as a single scale as we wanted to investigate environmental awareness on other aspects such as responsibilities, behaviors or feelings. We combined consequences on plants, marine life, birds and animals into consequences on nature. The two other statements aims to tell if an individual is more concerned about consequences for himself or others.

N°	Statement	Source
1	I am concerned about environmental problems because of the consequences for nature.	Inspired from Stern and Dietz (1994), Shultz (2001)
2	I am concerned about environmental problems because of the consequences for my future.	Taken from Stern and Dietz (1994), Shultz (2001)
3	I am concerned about environmental problems because of the consequences for all people.	Taken from Stern and Dietz (1994), Shultz (2001)

Title: Revised statements on the New Ecological Paradigm as an environmental awareness scale.

Do you agree or disagree[b] that:

1. We are approaching the limit of the number of people the earth can support
2. Humans have the right to modify the natural environment to suit their needs
3. When humans interfere with nature it often produces disastrous consequences
4. Human ingenuity will insure that we do NOT make the earth unlivable
5. Humans are severely abusing the environment
6. The earth has plenty of natural resources if we just learn how to develop them
7. Plants and animals have as much right as humans to exist
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations
9. Despite our special abilities humans are still subject to the laws of nature
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated
11. The earth is like a spaceship with very limited room and resources
12. Humans were meant to rule over the rest of nature
13. The balance of nature is very delicate and easily upset
14. Humans will eventually learn enough about how nature works to be able to control it
15. If things continue on their present course, we will soon experience a major ecological catastrophe

Source: Measuring the endorsement of the New Ecological Paradigm: A revised NEP scale. Dunlap and al. 2000

In order to create our own environmental awareness scale, we were inspired by numerous items developed by Dunlap and Van Liere (1978). They published a widely used scale based on the New Environmental Paradigm (NEP). The NEP came from the observation that new ideas had emerged in the society in opposition to the dominant paradigm of abundance, progress, growth, technology etc. The authors then created a scale as an instrument to measure how the public accepted ideas from the NEP with items on demographics, nature, human needs, resources but also growth and industrialization. In 2000, Dunlap and al. made a revision of the scale in order to include a wider view of ecological facts, a more balanced set of pro and anti NEP items and modify outmoded terminology.

We took 6 items from Dunlap and al.'s work and modified them to fit our survey tool. They allowed us to measure environmental awareness on human's relation to nature, resources and the climate change crisis that were absent from Shultz's scale.

N°	Statement	Source
4	I consider that when humans interfere with nature, it often produces disastrous consequences.	Inspired from Dunlap and al. (2000)
5	I am confident that human ingenuity will insure that we will keep Earth livable.	Inspired from Dunlap and al. (2000)
6	I hold that humans are severely abusing the environment.	Inspired from Dunlap and al. (2000)
7	I think that the Earth has plenty of natural resources.	Inspired from Dunlap and al. (2000)
8	I consider that the so-called « ecological crisis » facing humankind has been greatly exaggerated.	Inspired from Dunlap and al. (2000)
9	I am confident that Humans will eventually learn enough about how nature works to be able to control it.	Inspired from Dunlap and al. (2000)

Then, we modified 6 items from Gatersleben, Steg and Vlek (2002) that were inspired from Steg's doctoral thesis (1999). Their study aimed to show that being environmentally aware does not mean a person will have a significant pro-environmental behavior regarding to the environmental impact of its household. They also mention the idea that when using statements to measure pro-environmental behaviors, certain actions will have a stronger impact on reducing negative externalities. For instance, let's consider a scale measuring environmental behavior with 10 items. One respondent answers to perform only one pro-environmental behavior: he rides his bike to work instead of taking the car. Another respondent assure to perform 9 out of 10 pro-environmental behaviors such as switching the lights when he leaves a room, is careful of its water consumption and recycle but takes his car to go to work. This shows that we can observe two important bias when measuring environmental awareness. There is a possibility that the first person has a lower impact on the environment than the other even though he only performs one pro-environmental behavior. Then, according to the scale, the second person could be considered as more environmentally aware because she takes more actions in reducing its environmental impact. When measuring student's level of environmental awareness, it will be important to keep in mind that certain pro-environmental behaviors can be justified by one's interest (riding a bike to work avoid traffic, is cheaper…) or than projecting itself into a green job can have other motives than ecological concerns (being well-paid, career opportunities, social desirability…).

N°	Statement	Source
10	I believe that environmental pollution affects my health.	Inspired from from Steg (1999), Gatersleben, Steg and Vlek (2002)
11	I worry about environmental problems.	Taken from Steg (1999), Gatersleben, Steg and Vlek (2002)
12	I can see with my own eyes that the environment is deteriorating.	Taken from Steg (1999), Gatersleben, Steg and Vlek (2002)
13	I am optimistic about Cambodia's Green Transition.	Inspired from from Steg (1999), Gatersleben, Steg and Vlek (2002)
14	I consider that a better environment starts with myself.	Inspired from from Steg (1999), Gatersleben, Steg and Vlek (2002)
15	I think that people who do not take the environment into account try to escape their responsibility.	Inspired from from Steg (1999), Gatersleben, Steg and Vlek (2002)

2 remaining items came from Robertson and Barling (2013) that developed an environmental passion scale and a pro-environmental behavior scale.

N°	Statement	Source
16	I am passionate about the environment.	Taken from Robertson and Barling (2013)
17	I enjoy engaging in environmentally friendly behavior.	Taken from Robertson and Barling (2013)

The 2 last items completed the absence of statements on one's lifestyle and the role of companies in the Green Transition. They doesn' come from any specific source but fill the gap on two aspects we thought to be important, especially for students that can project themselves in companies.

N°	Statement	Source
18	I try to be aware of how my lifestyle impact the environment.	Author
19	I believe companies must find new sustainable ways to produce.	Author

Those 19 statements were presented in a 5 points Likert scale in our survey tool (Annexe 1). The advantages of using items from different scales is that it enables us to cover more subjects and to refer to those works for interpretation. It also gives a strong theoric background as those items are inspired from research. However, some aspects are absent such as actual pro-environmental behaviors, beliefs, values or environmental knowledge.

2.2.2 Part 2: Green job Perception

As the study mostly focuses on environmental awareness and green skills representation, the main objective for green jobs was limited in understanding if and how students projected themselves into green careers. The definition of green jobs is not widespread yet and considering that Cambodia just started its green transition, there is a possibility that students are not familiar with environmental opportunities. Some might have already considered occupying a green job when others might have no idea or misconceptions about what a job in the environment is. This part would be useful to answer some questions such as: *Do we need to communicate on green job opportunities? Is there any sector that needs to be promoted? Are there misconceptions about green jobs? What is the general opinion of students towards them?* Those interrogations were answered by 4 simple questions in the survey in the aim to gather the general trend.

- ✓ *Have you ever considered occupying a green job before? Yes/No/No opinion*
- ✓ *Do you have a good opinion of green jobs? Yes/No/No opinion*
- ✓ *How likely do you think you are of occupying a green job later? Very likely, Likely, No opinion, Unlikely, Very Unlikely*
- ✓ *Which sector are you considering when you project yourself in a green job?*

2.2.3 Part 3: Green skills representation

In our survey tool, this part is specifically important. The GREENCAP Project aims to strengthen partnerships with Cambodian universities by helping them rethink their programs in including sustainability courses. The point is to make sure student's skills match the ones required by the national job market. A study was made in parallel of this one in order to know which skills stakeholders consider important for students to have. Although, it was obviously necessary to investigate student's opinion on those matters. Prior to implement new programs, this study will focus on student's representation of green skills. The main objective is to understand which skills students consider interesting to learn when they project themselves in a green job. Promoting programs and courses without a consultation of what matters to young graduates could lead us in taking ineffective decisions. Using the Q-Methodology will allow us to distinguish profiles and patterns in group of skills students consider relevant. This will orient solutions and decisions that fits the opinion students have of green skills.

Prior to make the statements, an analysis was made across different reports on green jobs in order to identify the key skills. Through the UNEP report on Green Job (2008), the Cambodia National Green Growth Road Map (2009) and the ILO report from 2018. We looked for necessary skills among green jobs for specific sectors such as energy, waste management, tourism, industry, agriculture and nature conservation. Those sectors are important in the Cambodian Green Transition and were chosen to focus on accordingly by the GREENCAP Project. Main core skills were identified as necessary across the labor force and across level of occupations (ILO, 2018). Finally, we identified other skills that were often mentioned aside in those reports or usually taught in higher education. The skills chosen are presented in the annex as a Q-set in the second part of the survey tool.

2 versions of this part of the survey tool were made. The first one was constituted of statements under the form of sentences. This attempt aimed to cover skills and sectors as opinions or beliefs. Yet, it presented disadvantages as it would have taken a consequent time to read and answer for the interviewee. It was also difficult to cover all skills and represent sectors in a balance way.

Representation of green skills. (Initial draft)

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*Being able to monitor **environmental performance** in firms (waste, emissions, and energy use) is a key skill for future managers.*

*Future leaders or managers must be able to implement **Corporate Social Responsibility** in firms as the interest for standards is rising.*

*Career in **nature protection** are interesting and attractive in Cambodia as forest areas are in decline.*

***Circular economy** projects are interesting because they can help both firms and the public sectors improve waste valorisation.*

***Auditing** offers interesting career perspectives as they help firms respect standards.*

We decided to opt for a form of Q-sort that would only focus on skills by using single words. This allowed us to have a lot of statements, to avoid overwhelming the respondents with too many sentences and to have a wide range of skills present in our Q-set. 47 skills were selected. A small survey was made through Google Forms to make sure all the skills were easily understood. It allowed us to highlight skills that needed to be associated with a definition in the Q-sort such as permaculture, circular economy or carbon market assessment.

The question asked to students to investigate their representation of green skills was to rank the statements according to how they think they were interesting to learn when they projected themselves in a green job. As we used Qsortware, a first rank was made where the respondent had to do a first choice limited to 3 options *Not interesting/Neither uninteresting nor interesting/Interesting* prior to do a second one extended to Not interesting at all/Very Interesting. This allowed the respondent to make easier choices on the final Q-sort and avoid overwhelming it.

Q-Sort Scaling for the green skills' part

Strongly Disagree	Disagree		Neither Disagree nor Agree	Agree		Strongly Agree
-3	-2	-1	0	+1	+2	+3

Representation of green skills (final draft)

Carbon market assessment*	Energy performance analysis*	Sustainable agriculture practices	Circular economy*	Research skills	Soil and water conservation management	Humanitarian skills	Basic biodiversity knowledge
Environmental conservation planning	Eco-tourism project management	Management of hydro energy	Strategic skills	Sustainable land use	Permaculture *	Innovation	Management of wind energy
Communication	Project planning and management	Environmental valuation methods*	Auditing	Sustainable forest management	Management of gas energy	Marketing	Marine and water protection and conservation
Eco-design	Leadership	Natural resources management *	Knowledge in renewable energy	Consulting	Corporate Social Responsibility	Risk analysis	Law of the environment

Life cycle analysis	Environmental economics*	Carbon reporting	Public policy analysis*	Management of solar energy	Sustainable finance*	Entrepreneurial skills	Environmental performance monitoring
Sustainable tourism management	Waste valorization policy implementation	Eco-building*	Organic farming management	Negotiation	Environmental sociology*	Pollution control analysis	

*Required a definition

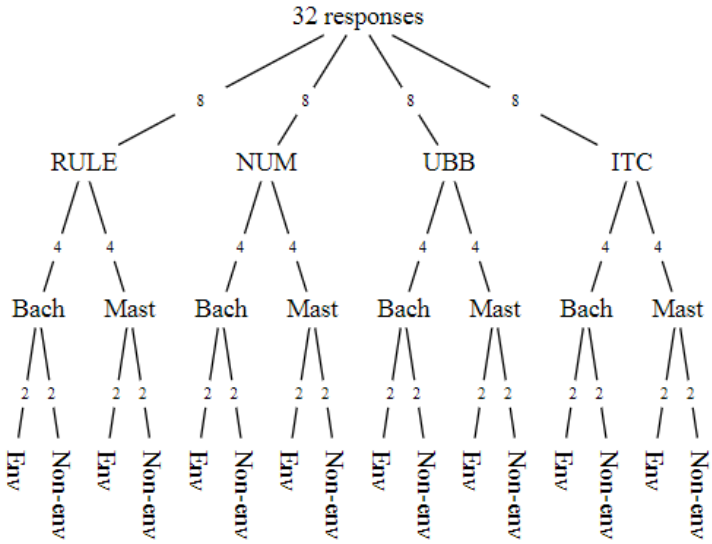
2.3 Data collection

Our survey tool was made to collect data among students from the 4 partner's universities of the GREENCAP Project. As the Q-Methodology is used, it was necessary to interact and have exchanges with the respondents after answering the survey. For those reasons, the administration of the survey tool was initially supposed to be made directly in Cambodia after a first phase of research in France. The administration in Cambodia was cancelled due to the Covid-19 situation that made impossible any travelling abroad. We had to adapt our survey tool to distance administration and use a platform that would allow online answering. We also had to find solution to set up interviews with students from afar.

2.3.1 Sampling

The Q-Methodology aims to gather opinions among people in order to identify different profiles as group of respondents that distinguish themselves from others. Those differences are explained by factors to justify why statements are ranked a certain way among a group. For those reasons, it was important to have a sampling of respondent that covered a wide and heterogeneous span of people. At best, it has to follow a certain logic like having half of respondents from each gender or an equal amount of respondents from each university.

Sampling logic to gather 32 responses in a representative way



Prior to administrate the survey, we settled up objectives of data collection. We estimated that 32 answers should be sufficient to gather enough data. As our study focus on 4 different universities, we logically decided to collect 8 answers for each partner. Following the same logic, those 8 responses should be constituted of 4 students from a Bachelor and 4 from a Master degree. After an analysis of all the Bachelor and Master program in the 4 HEIs, we identified formations that taught at least one subject related to green skills. In our diagram, those formations are represented under the code *env*. It allowed us to distinguish students that might have already been sensitized to environmental issues, green jobs or are familiar with green skills. It was decided to interview 2 students from a formation that has at least one subject related to the environment (*env*) and 2 from formations that doesn't have a single subject related to environmental matters *(non-env)*, for Bachelor and Master. Obviously, we aimed to have an equal amount of answer from women and men.

Identifying the targeted formations was sometimes tricky as certain formations were not schooled at the moment or if formations did not had any English speaking students. Also, certain university had more *non-env* coded subjects than others which made it difficult to avoid an overrepresentation of a study field in the sampling. For example, formations in

tourism would mostly always teach sustainable tourism but it could also be the only *env* coded subject in the University. We would then have to avoid having the tourism formations represented too many times to allow a data collection among other study fields. Also, bachelors in management were usually coded *non-env*. A perfect example is the study field public administration which existed in bachelor and master, and coded both in *env* and non-*env*. The sampling for the ITC focus on 2 *env*-coded formations as data was not available.

Number of students required from each university to answer the survey

University	Formation	Code	Number of students
RULE	Bachelor **Public Administration**	*Non-env*	2
	Bachelor **Tourism** and Hospitality Management	*Env*	2
	Master of Business **Management**	*Non-env*	2
	Master of **Laws in Public**	*Env*	2
NUM	Bachelor in **Economics**	*Env*	2
	Bachelor **Finance**	*Non-env*	2
	Master of **Public Administration**	*Env*	2
	Master of **Logistic and Supply Chain** Management	*Non-env*	2
UBB	Bachelor **Rural** development	*Env*	2
	Bachelor **Management**	*Non-env*	2
	Master Sustainable **ecosystem management**	*Env*	2
	Master **public administration**	*Non-env*	2
ITC	Bachelor **Rural** engineering	*Env*	4
	Master **Water and environmental engineering**	*Env*	4

Responsible and staff in each university kindly helped us identify English-speaking students from each formation so we could contact them for interviews.

2.3.2 Data collection through interviews

Data collection was greatly impacted by the covid-19 situation as we could not travel and student being quarantined home were difficult to reach. If gathering answers to the survey was done without difficulties on Qsortware, organizing interviews with students took some time.

We had initially planned to set up video-call interviews during which students would answer the survey online. It would have allowed them to ask questions if they did not understand something, especially for the skills. Interviews on the Q-set would have been made at the end of the interviews. When we started collecting our data, we encountered many issues with this approach. Once we had the details of the students that constituted the sampling in each university, we contacted them by mail to ask if they would agree to answer the survey through a visio-call interview. First of all, we got very few answers and no feed-back from students. We assumed that they might have been discouraged by the length of the interview (approximately 45 minutes). Finally, we realized that skype interviews would have taken a lot of time and we would have encounter issues such as difficulties to set interviews, jet lag and connection problems.

It was then decided to try a different approach more adapted to the difficulties induced by the covid-19 pandemic but also by the young profile of our respondents. Indeed, our study being made on students that usually have a student job aside in Cambodia, it was important to take into account their habits and to consider other options that would be more suitable for them.

The second approach consisted in sending the link to the survey in a mail that explained what the point of the study was and that the student would be contacted afterwards to know if he would agree to comment its answers. As we worked with young students, we decided to communicate in a way that was different and less formal. It was suggested to chat with students using vocal messages on platform such as Facebook Messenger, WhatsApp or Telegram, which is widely used by Cambodians. Vocal messages would allow a voice-to-voice

communication by permitting the student to listen to the questions numerous time and take some time to answer.

This approach was way more successful as we immediately started having answers on our survey. We then contacted students by mail again to ask them if they would agree to chat on Facebook Messenger, WhatsApp or Telegram. We would then prepare questions, send them by vocal message and wait for the student to answer. We would sometimes have to call back the student if no answers were given. We had a few specificities with one student that agreed to do it through a visio-call or one student that preferred answering questions through mail. It was difficult to conduct the interviews from distance but changing our approach in order to be more flexible to our profile of respondents allowed us to gather more responses.

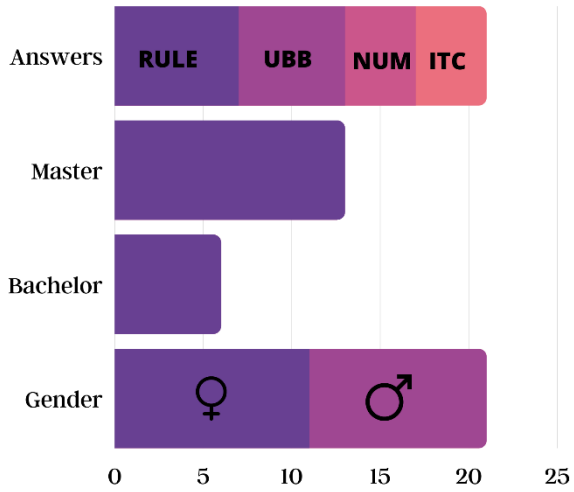
2.4 Data Analysis

The data collection part was followed by a statistical analysis on different aspects. In this part, we will present how it was analyzed. Firstly, we will see how our sampling was affected by the difficulties induced by a distance administration and how our objectives were achieved. We will present general statistics on our sample. Then, we will analyses answers on our 19 statements concerning environmental awareness in order to understand to which extend Cambodian students are environmentally aware. We will also try to highlight specific themes that are more or less mentioned by students. The last and main part will focus on a factor analysis of the 47 skills used in the Q-Methodology part of the survey. We will present how we conducted the analysis and its main results. We will show the relation and opinion students have towards green jobs in order to understand how they relate to it and which sectors they found to be relevant or interesting. Finally, in this same part, we will use comments from interviews to make links between results and factors.

2.4.1 The sample

Prior to collect data and administrate our survey, we had decided on a sampling that would assure a heterogeneous and representative picture of Cambodian students across gender, level of study and study fields. Our sample was strongly modified during the data collection. We encountered issues on the rate of answers from students due to disinterest or lack of time (Cambodians students often occupy a student job), language barrier or technical problems with the questionnaire.

<u>Objectives</u>



We aimed to gather 32 answers across all 4 universities. Despite using a new and less formal approach at the start of the data collection that made reaching students easier, we were unable to achieve this objective. Students were contacted by mail and re-contacted every week as a reminding of the survey. Some were contacted directly on Telegram if the university had provided a phone number. They were reached again towards the end of the data collection by their own universities. We had the same issues with the interview part as some never answered, some informed us that they were not comfortable enough in English to take the interview and some were lacking time. In the end, data collection ended on a total of 21 answers to the survey and 15 interviews.

We collected 7 answers for the RULE and 6 for UBB almost achieving our objectives of 8 answers for each school. Students from ITC were more difficult to reach as the dean of the university informed us that students were schooled at home due to quarantine. We also gathered only 4 answers for the NUM as mails were mostly left unanswered.

We achieved our objective concerning gender parity with a range of age going from 21 to 46. The low minimum age can be explained by the fact that few bachelor students answered our survey as they were not fluent enough in English to take it. Also, Cambodian students often take breaks between their bachelor and master in order to gather professional experience or save money. Those 2 reasons can explain why ours ample is mostly made of older bachelor and master students. This could eventually bring a bias to the results as older students might be more sensitive to climate change issues or had the opportunity to study it further. Also, there is a potentiality that mostly fluent students that answered our survey are more exposed to international news and knows more about climate change than others.

Sampling corrected

University	Formation	Nb	Sampling corrected	Nb
RULE	Bachelor **Public Administration** (non-env) Bachelor **Tourism** and Hospitality Management (env)	2 2	1 Bachelor of **Law** (non-env) 1 Bachelor **Tourism** (env)	1 1
	Master of Business **Management** (non-env) Master of **Laws in Public** (env)	2 2	2 Master **Law** (non-env) 1 Master **Tourism** (env) 1 Phd	2 1 1
NUM	Bachelor in **Economics** (env) Bachelor **Finance** (non-env)	2 2	1 Bachelor **Urban** and **transport mobility** (env) 1 Bachelor **Tourism** (env)	1 1
	Master of **Public Administration** (env) Master of **Logistic and Supply Chain** Management (env)	2 2	1 Master of **Public Administration** (env) 1 Master of **Economics** (non-env)	1 1

UBB	Bachelor **Rural** development (env) Bachelor **Management** (non-env)	2 2	1 Bachelor in **Economics**	1
	Master Sustainable **ecosystem management** (env) Master **public administration** (non-env)	2 2	1 Master in **Public Administration** (non-env) 1 Master of **Rural Development** (env) 1 Master of **Economics** (non-env) 1 Master **SEM** (env) 1 Master in **Management**	1 1 1 1 1
ITC	Bachelor **Rural** engineering (env)	4	1 Bachelor in **Science**	1
	Master **Water and environmental engineering** (env)	4	1 Phd 2 Master in **Water** and **Environment** (env)	1

Our objectives on study fields were affected by the non-answers that lead us to prospect students from other formations than the ones initially chosen. We still managed to keep an equal environmental and non-environmental ratio for formations. As we stated before, a formation noted as *environmental* means they teach at least one subject in relation to environmental matters and sustainability, implying that the student is familiar with green skills. Even though we couldn't reach students from desired formations such as Logistic and supply chains as the garment industry is important in Cambodia, public administration or management for some reasons, we still managed to have a rather satisfying representativity within the sample. Answers were spread across students from law, tourism and economics, with a few students from specific formations such a SEM or Urban and transport, which represented the Development-oriented study field.

Our sample is constituted of 21 respondents across 4 universities. 52% of our respondents are women which allowed us to respect the gender parity in our study. As stated before, our range of age goes from 21 to 46 years old with a mean age of 25. This was explained by the fact that English-speaking Cambodian students are often older. This also probably explains why 70% of our respondents are from a master or PhD level. We have a slight overrepresentation of law

students but as the sample is small, this only represents one student. Representation of other study fields is stable with around 15% for each other general fields (management, economics, tourism, development and science) without considering the 2 PhD students that answered our survey. As stated before equally, 52% of our respondents come from a formation with non-environmental classes which respects our willingness to have half of respondents less familiar with environmental matters. We obtained more answers from RULE and UBB than from ITC and NUM.

2.4.2 Environmental Awareness

Measuring the level of environmental awareness of Cambodian students was made through the survey by asking them how they agreed with 19 statements. There existed no widely spread method measure environmental awareness and we had many aspects of it we wanted to cover. Analyzing student's environmental awareness means having an appreciation of how strong their concern towards climate change is but also on which aspects it seems stronger. Prior to start our analysis, it is necessary to mention that out of 19 statements, 4 had a formulation that forced us to sometimes take them out of the analysis. Indeed, statements *5, 7, 8, 9* were presented in the opposite sense of being environmentally aware:

I am confident that human ingenuity will insure that we will keep the earth livable.
I believe the balance of the nature is strong enough to cope with the impacts of modern industrial nations.
I consider that the so-called "ecological crisis" facing humankind has been greatly exaggerated.
I am confident that humans will eventually learn enough about how nature works to be able to control it.

Prior to look more deeply into what environmental awareness is constituted of, we simply looked at how students answered to the statements. We quickly took a look into how each statements were answered by considering a score ranked on 105 (5 points being the maximum for all the 21 students). We also looked at the minimum and maximum scores, their mean and also how many students answered that they strongly disagreed or agreed for each statements.

The first three statements were taken from Shultz (2001) to see how students were worried about environmental problems because of the consequences for nature, their future or all people. All students answered that they agreed to be worried about consequences for nature (96/100) and all people (101/105). The score is lower for concerned about their future due to 3 students that did not disagreed nor agreed with that but otherwise, all 19 other students were concerned about climate change.

Generally, students agreed that when humans interfered with nature it had disastrous consequences but the score is quite low (80/105) as one students disagreed and 5 others did not had an opinion on it. Nobody contested the idea that humans were abusing the environment meaning that all students were mostly all acknowledging the impact of humans on nature.

Students were skeptical and torn apart concerning whether or not human ingenuity will overcome climate change, nature will be able to cope with damages, if the ecological crisis had been exaggerated and if humans could control nature. Many students (9/21) disagreed or did not had an opinion on the fact that human ingenuity will overcome climate change with only 4/21 students strongly agreeing with it. Quite surprisingly, 9/21 students answered that they agreed that nature would be strong enough to cope with the impacts of industrialization and not a student strongly disagreed with it. Surprisingly again, 8 students agreed that the ecological crisis was greatly exaggerated with 6 students having no opinion. This result is quite concerning as the ecological crisis will indeed have pretty serious and considerable consequences on humankind. Finally, 12/21 students agreed that humans will learn enough about nature to be able to control it and only 2 said to disagree with that idea.

Going back on more environmentally aware-oriented statements, all 21 students agreed to be worried about effects of environmental issues on their health and acknowledged seeing with their own eyes that the environment is deteriorating. Those two statements are enough to confirm that all students acknowledged and experienced global warming and are worried about at least one thing on it. 20 out of 21 of them said to be worried for it on general.

If one students think Cambodia won't be successful in its green transition, most of them are optimistic about it but the grade is quite low (80/105). Moreover, most of all students agreed that a better environment starts with themselves and try to be aware of how their lifestyle impacts the environment, with a high grade of 89/105. Finally, no one stated to enjoy taking environmental friendly behaviors and 5 of them are strongly environmentally passionate.

Looking at statements individually, it seems that students all reckon the existence of climate change and are worried about it. Scores are encouraging as it seems that most of students acknowledge their responsibility, take action and reckon that humans are abusing the environment. There does not seems to be one students that is not slightly environmentally aware which is a good news but answers on 4 specific statements were surprising as for the ecological crisis that would have been greatly exaggerated and for the ability of humans to control nature. Looking now at how individual students answered will help us know more about who is more strongly environmentally aware.

Looking at each students individually allow us to see who is more optimistic, feel responsible or has a true passion for engaging in environmental friendly behavior. Again, we can say that most students are environmentally aware and results are positive but we will look deeper into respondents that distinguishes themselves. We calculated a score that measures general environmental awareness taking the 15 statements that, if a student agreed with it, meant he was aware of the impact of climate change. We took out 4 statements that had a negative formulation or did not necessarily meant to be or not be environmentally conscious. With the higher grade possible of 5 for 15 statements, the closer a student is to 75, the more environmentally aware he is.

Considering that if a student would not be environmentally aware, he would have answered disagree (2) or nor disagree nor agree to all the statements (3). This would give us a grade between 30 to 45 to consider that a student was not environmentally conscious. Between 45 to 60, we consider a student as environmentally aware and beyond strongly environmentally aware. Results are encouraging as all students care about environmental issues and only 2 students can be considered as not strongly environmentally aware with score of 55 to 59. Those two results can be discussed as when looking closer, the student with a 59 score was

just missing one point to be considered strongly environmentally aware. As a conclusion we can affirm that Cambodian students are mostly strongly environmentally aware, adding that all students specifically admitted seeing with their own eyes that the environment is deteriorating and being worried for their health. Only 3 students answered at least once to disagree with a statements on being environmentally aware but no student had once put a score of less of 5 on any statements. Means on score goes from 3.7 to 4.9.

Our index that measures optimism means that, acknowledging that all students are environmentally aware, it is interesting to see how they believe humankind can deal with global warming. On a maximum score of 20, we considered that below a grade of 10, a student is pessimistic towards the possibility to overcome climate change. In our sample, only 2 students were skeptical, thinking that human ingenuity and nature coping system won't be able to balance the negative effects of industrialization. However, most students except one are optimistic towards Cambodia's Green Transition. The mean and median for the optimism index is of 14/20 going from 9 to 18, meaning that students are mostly optimistic.

Then, the responsibility index measures how students admit that their action and behavior can have an impact on the environment. The closer a student is to the grade of 25, the more he believes to be responsible of his actions and admits that he can have an impact on environmental issues. Cambodian students in our sample all reckon to have a part of responsibility towards climate change with a mean and median around 20/25 and a lower grade of only 17. No students disagreed that their lifestyle did not had an impact on the environment.

Finally, most students answered positively to the three statements that measures environmental passion. Being environmentally aware, taking environmental friendly behavior and being passionate about it are very different thing. Yet it seems that in addition to being mostly strongly environmentally aware, students in our 4 universities also enjoy learning and taking action towards climate change.

Those results are mostly really positive. However, we have to point a few bias that might contest the results and that will be deepened in the third part. Indeed, our sample is really

small as we were on a qualitative study. It means that if our sample is strongly environmentally aware, we cannot affirm that this is representative of all Cambodian students from our universities. Then, it is possible that when being prospected to take part in the study, students felt more motivated when they were already sensitized to climate change issues, implying that our survey was answered by students because they were environmental conscious or passionate. Finally, not all Cambodian students are English speaker and it is possible that students that answered our survey are more exposed to international news about climate change. Also, a consequent part of our sample are master students that might have been more exposed as well during their studies to environmental issues.

2.4.3 Green jobs perception and green skills representation

The last and main part that concludes this data collection is the analysis of our 21 answers on green skill's perception. Through our survey administrated on Qsortware, we collected 21 Q-sorts that represents how our students (the *P-sample*) considered interesting to learn 47 skills chosen thorough the literature. The objective of analyzing Q-sorts is to group people that have similar ways of thinking. By regrouping people, we conduct a factor analysis that will to a certain extend explain why and how a group of people think that way. This will help make recommendations on how and what to teach a certain group of people. At the end of the statistical analysis, we will be able to distinguish groups that have different perception of green skills. We will try to link this qualitative analysis to the questions on green jobs to see with which kind of occupations students see themselves with those skills. We will obviously use our interviews to feed the factor analysis and explain choices.

2.4.3.1 Q-sorts analysis

Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	100	15	21	23	-15	-20	23	31	42	-9	19	-3	-10	21	-7	17	26	31	-28	8	3
2	15	100	17	31	22	-11	49	26	4	21	23	27	-4	1	-3	9	8	11	-1	-15	0
3	21	17	100	1	-1	17	4	33	-10	-5	19	-14	7	11	-1	6	1	11	4	25	17
4	23	31	1	100	23	10	27	-6	18	3	-8	29	21	22	35	1	37	28	-2	24	1
5	-15	22	-1	23	100	-10	33	26	16	-16	15	10	23	4	3	18	24	23	22	9	19
6	-20	-11	17	10	-10	100	-10	-8	-16	-2	-3	-11	-1	-3	17	-5	-6	-6	-9	8	-23
7	23	49	4	27	33	-10	100	33	19	6	16	-4	-8	20	-3	44	36	25	19	19	19
8	31	26	33	-6	26	-8	33	100	20	-21	37	-3	-8	-6	-35	28	-8	6	-1	17	3
9	42	4	-10	18	16	-16	19	20	100	-11	17	6	-1	35	-19	33	33	17	10	30	22
10	-9	21	-5	3	-16	-2	6	-21	-11	100	-6	2	2	-32	24	2	-8	8	-13	6	-2
11	19	23	19	-8	15	-3	16	37	17	-6	100	-3	-43	-29	-22	31	-9	33	-1	6	19
12	-3	27	-14	29	10	-11	-4	-3	6	2	-3	100	8	-8	-7	-15	-1	3	0	0	-29
13	-10	-4	7	21	23	-1	-8	-8	-1	2	-43	8	100	29	14	-20	38	-13	39	14	-13
14	21	1	11	22	4	-3	20	-6	35	-32	-29	-8	29	100	-12	6	35	3	17	31	21
15	-7	-3	-1	35	3	17	-3	-35	-19	24	-22	-7	14	-12	100	4	11	12	-9	-19	-7
16	17	9	6	1	18	-5	44	28	33	2	31	-15	-20	6	4	100	19	30	27	3	24
17	26	8	1	37	24	-6	36	-8	33	-8	-9	-1	38	35	11	19	100	31	31	23	11
18	31	11	11	28	23	-6	25	6	17	8	33	3	-13	3	12	30	31	100	3	1	28
19	-28	-1	4	-2	22	-9	19	-1	10	-13	-1	0	39	17	-9	27	31	3	100	4	16
20	8	-15	25	24	9	8	19	17	30	6	6	0	14	31	-19	3	23	1	4	100	0
21	3	0	17	1	19	-23	19	3	22	-2	19	-29	-13	21	-7	24	11	28	16	0	100

We conducted our analysis by editing our data on a platform created by KenQ prior to import it to the online software of the same name. The very first step of the analysis is the correlation matrix. It aims to tell how a respondents has a similar way of thinking than another. It shows how opinions converge or differ among the sample. A value close to 100% means that a respondent has a very similar way of thinking from another one. On the contrary, a value close to 0% will mean they have very divergent or opposite opinions.

In our sample, divergence does not go as high as 43%. On the contrary, we only have similar repondents up to 49%, meaning that one respondent answered similarily on 49% of the skills with one respondents. Those numbers are actually low but it can be explained by the consequent number of statements. When having to rank 47 items, it can be difficult to find similarities, especially with only 21 people. Interestingly, the 6th respondent has a divergent opinion with almost all the sample.

2.4.3.2 The factor analysis

If the correlation matrix helps identify first similarities and divergence between respondents, the factor analysis allows to group those people together. Every factor is a linear combination of respondents that have a similar way of thinking. The more factors we have, the more the information is lost across them. KenQ uses the principal component method to group similar Q-sorts into factors together.

We aim to select factors with eigenvalues superior to 1 with the higher cumulative explained variance possible. The cumulative explained variance gives the percentage of the phenomenon explained by the number of factors chosen. The objective is to have fewer factors possible with a high percentage of cumulative explained variance.

Factor extraction

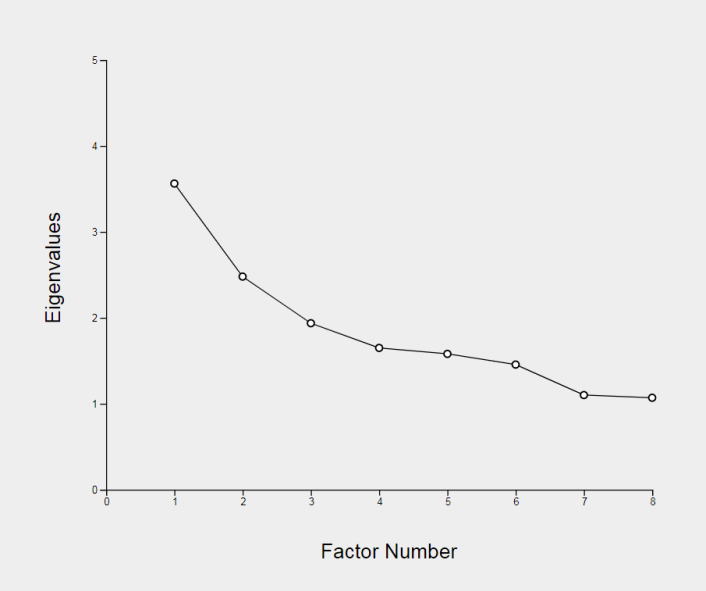
Part. N...	Participant	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
1	1	0.4991	-0.1833	0.0417	-0.5721	-0.2796	-0.2215	0.147	-0.1954
2	2	0.3984	-0.1393	0.5379	-0.0604	0.4059	0.0772	0.3713	-0.1038
3	3	0.2509	-0.1485	-0.1178	-0.2051	-0.0914	0.7131	0.2567	-0.2325
4	4	0.4122	0.4573	0.4957	-0.2743	-0.0523	0.0489	-0.1858	-0.0903
5	5	0.4674	0.149	0.1025	0.3708	0.3773	0.1133	-0.2651	-0.1648
6	6	-0.2103	0.0913	0.0619	-0.1394	-0.196	0.6153	-0.434	0.0941
7	7	0.6956	-0.0327	0.2152	0.1375	0.1016	0.0713	0.2207	0.1606
8	8	0.4751	-0.4644	-0.1711	-0.177	0.3714	0.2741	0.0361	-0.0473
9	9	0.5965	0.0435	-0.2354	-0.2011	-0.0868	-0.3929	-0.1821	0.2545
10	10	-0.1393	-0.0143	0.5373	0.0989	-0.1774	0.0494	0.4116	0.5828
11	11	0.3724	-0.6729	0.0773	0.0844	0.0364	0.1041	-0.2883	0.0236
12	12	0.0088	0.1575	0.3809	-0.2648	0.5674	-0.2615	-0.2303	0.0284
13	13	0.0436	0.7583	-0.1088	0.0472	0.2371	0.1881	0.1684	-0.0698
14	14	0.3973	0.4863	-0.4237	-0.2355	-0.1303	-0.0661	0.166	-0.1319
15	15	-0.1406	0.347	0.5552	0.1673	-0.44	0.1614	-0.0739	-0.1494
16	16	0.5595	-0.2392	0.0002	0.3638	-0.1969	-0.0003	-0.1193	0.2463
17	17	0.5609	0.5407	0.0154	0.0358	-0.151	-0.0748	-0.0382	0.0061
18	18	0.5232	-0.0967	0.3203	0.115	-0.3461	-0.0658	-0.2344	-0.1755
19	19	0.2723	0.3419	-0.284	0.5787	0.2532	0.1002	-0.0085	0.0955
20	20	0.3467	0.2082	-0.2714	-0.3616	-0.0229	0.2995	-0.0963	0.5574
21	21	0.3992	-0.1293	-0.2101	0.4099	-0.3488	-0.0795	0.228	-0.1801

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Eigenvalues	3.5617	2.479	1.9365	1.649	1.5798	1.4554	1.1006	1.0693
% Explained Variance	17	12	9	8	8	7	5	5
Cumulative % Expln Var	17	29	38	46	54	61	66	71

In our analysis, enough information were given as all the eigenvalues are superior to 1. Up to factor 8, it explains 71% of the phenomenon. Ideally, we will chose between 4 to 5 factors which would explain between 46% to 54% why students think certain skills are interesting. More factors would disperse the information and we would struggle to make links between the opinions and characteristics. It is desirable to have factors that restitute up to 60 to 70% of the information. It is possible that the number of statements chosen impacted how much factors can explain skill's representation.

After 4 factors, an additional factor won't add as much content in explaining the phenomenon as for the previous ones. We then looked at data with 4 then 5 factors. We used a varimax rotation and the auto-flag to be sure than certain individual won't contribute to more than 1 factor or too strongly to one.

Eigenvalues evolution across factors



Looking deeper into our 5 factors, we found patterns into the skills chosen. It was easy to draw conclusions on what a factor likes or not. You will find below a presentation of how students from each factors ranked skills. As students ranked 47 statements, we chose as interesting or not interesting skills that had a z-score higher or lower than 1 or -1.

Factor 1: Nature lovers

Skills liked	z-scores	z-scores	Skills disliked
Sustainable forest management	1.647	-1.151	Risk analysis
Natural resources management	1.604	-1.178	Marketing
Marine and water conservation planning	1.537	-1.302	Management of hydro energy
		-1.508	Entrepreneur skills
Research skills	1.533	-1.79	Sustainable finance
Soil and water conservation management	1.313	-1.803	Carbon Reporting
		-2.107	Auditing
Sustainable agriculture practices	1.307		
Circular economy	1.25		
Basic biodiversity knowledge	1.247		
Law of the environment	1.184		

At first sight, it is easy to notice the presence of nature in the green skills ranked by students from the first factor. Those students mostly focused on natural resources when they projected themselves in a green job. More importantly, a quite complete span of natural resources was mentioned from soil, water, marine, forest and lands. It seems that those students are interested by the managing aspect of dealing with natural resources as natural resources management and soil and water conservation management show. Moreover, students were also interested on the scientific aspect of the biodiversity and also research. On another hand, students from the first factor seems not interested at all by skills too closely related to business. Being an entrepreneur, finance, marketing or auditing are seen as not really interesting for a green job according to factor 1, which could imply an interest for green jobs on the biodiversity and resources aspect of the environment but strictly related to nature. Despite students from factor 1 wish to learn green skills related to natural resources, the energy-related skills were all ranked as not very interesting.

Factor 2: Managers

Skills liked	z-scores	z-scores	Skills disliked
Eco-tourism project management	1,906	-1,081	Environmental sociology
Research skills	1,821	-1,11	Environmental economics
Project planning management	1,507	-1,138	Innovation skills
Environmental conservation	1,479	-1,28	Negotiation skills
planning		-1,281	Sustainable agriculture practices
Humanitarian skills	1,422	-1,309	Eco-building
Communication	1,393	-1,393	Circular economy
Auditing	1,195	-1,393	Waste valorization
Leadership	1,194	-1,565	Carbon market assessment
		-1,621	Carbon reporting

As obvious as for nature lover, factor 2's students like planning and organizing. They seem to be found of an aspect of green skills that is more into action and leading projects. Eco-tourism project management, project planning management and environmental conservation planning are the proof of it. As for environmental conservation and humanitarian skills, it seems that they might be interested by the aspect of sustainable management that touches sectors like NGOs or tourism. Interviews will be useful to interpret how those students perceive the management aspect of the environment. Moreover, soft skills like communication and leadership are mentioned. Factor 2 seems to draw a profile of people that likes to organize actions, communicate and lead. One very interesting aspect of this group is that auditing was ranked not interesting at all by all the other factors except this one. As the need for monitoring is rising with climate change, it will be useful to understand what distinguishes those students that like auditing. Opposed to planning-related skills, factor 2 voted as not-interesting more theoric skills such as environmental economics or environmental sociology. If they enjoy taking action, they might not be very fond of finding ideas. Indeed, circular economy, waste valorization and innovation show that they are

interested in leading and planning but might not be the best for thinking about solutions to issues implied by global warming.

Factor 3: Traditionalists

Skills liked	z-scores	z-scores	Skills disliked
Organic farming	1.766	-1,122	Negotiation skills
Eco-tourism project management	1.719	-1,133	Marine and water conservation planning
Sustainable tourism management	1.604	-1,145	Auditing
		-1,249	Energy performance analysis
Sustainable agriculture practices	1.371	-1,333	Natural resources management
Innovation skills	1.261	-1,437	Strategic skills
Research skills	1.169	-1,536	Carbon reporting
Basic biodiversity knowledge	1.051	-1,749	Consulting
Leadership	1.044	-1,901	Waste valorization
Sustainable land use	1.033	-2,149	Eco-design

Factor 3 is the hardest to interpret has there is no homogeneity in the skills represented. The closest link we can make out of the results is the representation of two key sectors for Cambodia: agriculture and tourism. Students from this factor mentioned tourism twice and skills related to lands twice as well. Even though agriculture and tourism are not related, we stated in the first part of this study that Cambodia depends a lot on its lands because agriculture feeds the population, is an important employment sector and an important source of revenue. Also, lands are related to tourism. We would usually think that agriculture and tourism have nothing in common. Potentially, students from factor 1 aims to protect nature, but students from factor 3 are reunited by a will to protect Cambodia itself. That would explain why agriculture and tourism are found in the same group even though they relate to skills from very different study fields. Interviews will be helpful to understand how students relate

to those two sectors. The mention of innovation skills and leadership could imply a willingness to find solutions for what does not work in those sectors rather than occupy traditional job in them. On another hand, they seem to be not very fond of skills such as auditing, strategy or consulting, keeping two traditional sectors out of business-related skills. Factor 3 is not interested in carbon reporting or energy performance analysis which implies a potential aversion for numbers or monitoring skills. At last, it is interesting to notice that if circular economy is often mentioned as interesting, waste valorization is often ranked lower. Potentially, students could have misjudgements on this sector.

Factor 4: Economists

Skills liked	z-scores	z-scores	Skills disliked
Environmental economics	2,534	-1,039	Marine and water conservation planning
Circular economy	1,367		
Environmental valuation method	1,347	-1,09	Management of wind energy
Eco-building	1,314	-1,39	Management of gas energy
Management of hydro energy	1,083	-1,465	Sustainable tourism management
Research skills	1,045		
Public policy analysis	1,031	-1,564	Negotiation skills
		-1,695	Auditing
		-1,786	Sustainable finance
		-2,285	Organic farming

Factor 4 distinguishes itself by being the only factor that shows an interest for economics and more number-related green skills. The first three skills usually mentioned were environmental economics, circular economy and environmental valuation method. Students from this factor are the only ones interested in theorical skills. In addition, they are also interested in eco-building and management of hydro-energy. It seems at first look that factor 4 is the more technical, engineering, and solution-oriented. To prove this point even more, research was also mentioned. It is possible that factor 4 would be key students to find solutions, innovate, and work with data analysis and numbers as they are mainly not interested by management related skills. Interestingly, if hydro-energy seems like a good thing to learn, they are not fond of wind and gas.

Factor 5

Skills liked	z-scores	z-scores	Skills disliked
Organic farming	1,981	-1,038	Waste valorization
Sustainable tourism	1,566	-1,042	Environmental valuation method
management		-1,148	Eco-building
Sustainable land use	1,564	-1,154	Innovation skills
Leadership	1,56	-1,247	Basic biodiversity knowledge
Management of gas energy	1,354	-1,459	Research skills
Strategic skills	1,35	-1,558	Carbon reporting
Law of the environment	1,045	-1,977	Humanitarian skills
Sustainable forest management	1,042		
Sustainable agriculture practices	1,038		

As it is ideal to limit the number of factors to concentrate the information, we had yet to decide if factor 5 was interesting for us to keep. When looking into the patterns of this factor, it is strongly similar to factor 3 that focuses on traditional sectors in Cambodia. Although, this one has no more than 4 green skills related to agriculture in it which is more than for the one mentioned previously. Yet, we will choose not to keep it because it lacks uniformity as the agricultural side is paired with skills such as gas energy, law or leadership that are difficult to link with the resources side. Adding the fifth factor would only allow us to explain 54% of the phenomenon instead of 46% representing just 3 respondents.

2.4.3.3 Skills in general

Prior to link factors with interviews and comments, it is interesting to see which green skills were more popular than other taken out of factors and groups.

Energy-related skills

	Factor 1		Factor 2		Factor 3		Factor 4	
Statements	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**
Management of hydro energy	-1,3	**43**	0,74	**11**	0,65	**12**	1,08	**5**
Management of wind energy	-0,74	**37**	0,63	**15**	0,22	**23**	-1,09	**41**
Management of gas energy	0,09	**22**	-0,31	**28**	-0,89	**37**	-1,39	**42**
Knowledge in renewables	1	**10**	-0,77	**33**	0,18	**25**	0,48	**18**
Management of solar energy	-0,62	**34**	-0,74	**32**	0,42	**18**	-0,69	**35**

At first sight, it seems that skills related to the energy sector were not really popular. We were expecting to see a factor that would distinguish itself by an interest to skills related to the energy sector but they were usually ranked in the middle.

Monitoring skills

	Factor 1		Factor 2		Factor 3		Factor 4	
Statements	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**
Environmental valuation method	-0,3	28	-0,37	29	-0,45	33	1,35	3
Auditing	-2,11	**47**	1,2	**7**	-1,15	**40**	-1,7	**45**
Consulting	-0,66	**35**	0,51	**17**	-1,75	**45**	-0,1	**27**
Risk analysis	-1,15	**41**	0	**25**	-0,33	**31**	0,63	**16**
Carbon reporting	-1,8	**46**	-1,62	**47**	-1,54	**44**	-0,2	**31**

Life Cycle Analysis	-0,83	**38**	-0,77	**34**	-0,27	**30**	-0,95	**38**
Environmental performance monitoring	0,41	**18**	-0,94	**36**	0,49	**15**	0,24	**22**
Pollution control analysis	0,59	**16**	-0,37	**30**	-0,79	**36**	-0,76	**36**
Public policy analysis	-0,25	**27**	-0,94	**37**	0,28	**19**	1,03	**7**

A very common and disappointing trend is the unpopularity across all factors of technical green skills that are really needed in companies and public sector. Skills concerned are useful to analyze and monitor negative impacts or emissions, find and implement solutions to externalities or control effectiveness or production or projects. They are really important in the Green Transition and needs to be put forward.

Business-oriented skills

	Factor 1		**Factor 2**		**Factor 3**		**Factor 4**	
Statements	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**
Strategic skills	-0,21	**26**	0,82	**10**	-1,44	**43**	-0,02	**25**
Marketing	-1,18	**42**	-0,26	**27**	0,13	**26**	-0,99	**39**
Entrepreneur skills	-1,51	**44**	0,17	**22**	0,83	**11**	-0,46	**32**
Negotiation skills	-0,36	**29**	-1,28	**41**	-1,12	**38**	-1,56	**44**
Corporate Social Responsibility	-0,56	**33**	0,2	**21**	0,55	**14**	0,32	**19**

On another hand, we also noticed that certain skills more business-oriented were not really popular. Some of them were by the management factor but those below were commonly not perceived as very interesting to learn when projecting themselves in a green job.

Waste-related skills

	Factor 1		Factor 2		Factor 3		Factor 4	
Statements	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**
Circular economy	1,25	**7**	-1,39	**44**	0,18	**24**	1,37	**2**
Waste valorization	-0,49	**30**	-1,39	**45**	-1,9	**46**	-0,8	**37**

Waste valorization was ranked very low by all factor. Considering that circular economy was slightly more considered as interesting, it is possible that students consider the waste sector as reductionist or low-skilled as suggested in the literature. Interviews will later be useful to interpret those results.

Agricultural-related skills

	Factor 1		Factor 2		Factor 3		Factor 4	
Statements	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**
Sustainable agriculture practices	1,31	**6**	-1,28	**42**	1,37	**4**	0,25	**20**
Soil and water conservation management	1,31	**5**	1	**9**	-0,46	**34**	0,99	**8**

Basic biodiversity knowledge	1,25	**8**	0,71	**13**	1,05	**7**	0,66	**14**
Sustainable land use	0,54	**17**	0,63	**14**	1,03	**9**	0,14	**23**
Permaculture	-0,16	**25**	0,74	**12**	0,02	**28**	0,25	**21**
Organic farming	0,77	**13**	-0,8	**35**	1,77	**1**	-2,29	**47**

Surprisingly, skills related to the agricultural sector were popular among all factors except organic farming that was ranked the lower for the economists and managers. Agricultural skills being popular among students is a good thing as this sector is primordial for Cambodia. We could have expected a disinterest for those kind of skills as the agricultural sector is often seen as not interesting by young students in developed or developing countries.

Natural-resources related skills

	Factor 1		**Factor 2**		**Factor 3**		**Factor 4**	
Statements	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**
Environmental conservation planning	0,73	**14**	1,48	**4**	0,89	**10**	0,73	**12**
Sustainable forest management	1,65	**1**	-0,03	**26**	-0,05	**29**	0,76	**11**
Natural resources management	1,6	**2**	0,4	**19**	-1,33	**42**	-0,18	**30**

Skills related to natural resources were quite popular especially among factor 1. It seems to be an interest for nature among a ll factors.

Research and basic biodiversity knowledge

	Factor 1		Factor 2		Factor 3		Factor 4	
Statements	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**	z-score	**Rank**
Research skills	1,53	**4**	1,82	**2**	1,17	**6**	1,05	**6**
Basic biodiversity knowledge	1,25	**8**	0,71	**13**	1,05	**7**	0,66	**14**

Finally, it is really interesting to notice that all factors with no exception ranked research skills and basic biodiversity knowledge as interesting.

This first impression of the factors allow us to already see how students distinguishes themselves across skills and study fields. In the next part, we will interpret the factors with opinions and comments collected through interviews. We will then try to link our factors with characteristics on students and answers on green jobs.

2.3.3.4 Green jobs perception

Representation of green jobs among students from the sample

One of the main question of our study was to understand how student perceived green jobs. We decided to analyze answers to green jobs among skills analysis rather than alone. Also, we only had 4 simple questions on green jobs as we did not wished to overwhelmed students with a too long questionnaire. The main objective of questioning students on their opinion on green jobs was to pair the results with what we had for interviews.

For green jobs, results were way sharper than for answer on environmental awareness that were way more homogenous and close. Indeed, only 11 out of 21 students had already considered occupying a green job later on. 6 students have no or a bad opinion of green jobs. 5 students stated that they were very likely to occupy a green job later and only one law student stated she was not interested in them.

2.3.4 A deeper analysis of factors

Factor 1: Nature lovers

Students from factor 1 were identified as *nature lovers* interested in all the different forms of natural resources from forests to water to soil. They stated being interested in circular economy and basic knowledge of biodiversity, and surprisingly law. Not interested in business or corporate-related skills, looking deeper into the profiles of respondents from factor 1 will tell us more about how interested they are into the natural resource side of sustainability.

Factor 1 is composed of a very different span of profiles despite students being all interested in nature-related skills. It is composed of 2 female students and 3 male students from 22 to 39. One on them is from the RULE and the 4 others are equally from UBB and ITC. As UBB has formations that focuses on rural development and agriculture, and ITC on science, it is not surprising to find those students here. This is a perfect example of how looking deeper into factors can help us understand students. As 4 of our respondents are from study fields focused on science/biodiversity, we could possibly think that student from factor 1 are more interested in the science side of natural resources or potentially the NGOs and conservation aspect. 2 of our respondents are PhD students and we also have one master student and 2 bachelor students. Interestingly, those students are from economics and science-oriented formation. Finally, looking into what they answered when asked about what kind of green jobs they were thinking about is also very useful. One student answered to be very interested in voluntary work or NGOs which could imply that the natural resources side of green jobs could interest students on the humanitarian side. Interestingly, this respondent had answered that he believed that nature could not cope with industrialization and that humans could not learn how to control it. Another respondent stated that he could project himself working in forestry and fresh water and another one in environmental science.

During interviews, one student explained that soil and water management was interesting because it was first closely related to her own project but was also really important for the Cambodian economy. Another explained that for natural resources oriented skills, practical and basic knowledge of biodiversity was more useful. According to him, forests, lands and

water are the basic elements and being visible to everybody is one reason to why this sector is interesting. Aside from skills, he said that avoiding the depletion and maintain natural resources not only depended on skills and knowledge but also on public and individual awareness. This recall to how the literature stated that environmental awareness was a necessary skills for green jobs.

Factor 2: Managers

Factor 2 is composed of *managers* that enjoys planning but was also the factor to mention soft skills such as communication, humanitarian skills or leadership. They were also the only factor to be interested in auditing. Factor 2 is equally composed of men and women, and of tourism and law students. 3 of them are from the RULE and one from UBB but all of them are bachelor students. When looking at programs from bachelor levels, student are usually taught basic and traditional knowledge in their study fields. It is possible that they did not had the opportunity to feel the need for more technical skills than management-related ones, being only bachelor students. On the contrary, respondents from master levels would be more potentially interested in more technical and specific skills as they are getting closer from the labor market. Potentially, the so-called manager factor might just not be very familiar with the wide span of skills that could be useful when working on green management jobs. However, answers from which kind of green jobs they projected themselves into show us that they have a quite specific and precise idea of how green skills can be useful. Students from factor 2 project themselves in jobs such as recycling and waste reduction, community engagement, agriculture or urban mobility. One student that is not from this factor smartly pointed project management planning was important because in order to have success in a project, planning, anticipating problems, having objectives, drawing framework and establishing a budget could be what made a project successful.

Factor 3: Traditionalists

Traditionalists from factor 3 were students that ranked as interesting skills related to agriculture or tourism and were not really fond out corporate-related skills. We had made the supposition that if students from two different study fields such as agriculture and tourism

where in the same factor, it would be because they were potentially driven by the transition in Cambodia more than tourism or agriculture in themselves. This factor is equally composed from men and women. Most of them are student from NUM, respectively in economics, law and tourism, and the last respondent is from the RULE and study rural development. Our sample for this factor goes from 22 to 27 and on the contrary of factor 2, is only composed of master students. As we already mentioned before, this factor is difficult to read through. 2 students indeed projected themselves in agricultural related green jobs even though one of them studies economics. Another one studies tourism but mentioned recycling and waste sector as a potential green job, showing that students are not afraid of interdisciplinarity when projecting themselves. However, one law student stated not being interested in green jobs and was actually one of the respondent to have the lower environmental awareness score.

For those traditional sector lovers, innovation was a very interesting skill to learn. One student stated that if one lacked creativity or design thinking, innovation was the solution. Interestingly, he said that environmental problems were growing (especially in agriculture and tourism) but solutions were not going as fast. According to him, creativity and critical thinking could develop innovative solutions. We could potentially think that even if Cambodia is a developing country, students are seeing the challenges in the so-traditional agricultural sector and see innovation as a key solution. Therefore, they are not disinterested in agricultural green skills or agriculture as green jobs. To this same student, green jobs are more about being social-oriented than profit-oriented as they contributes to the society. Innovation is what makes a green job creative and important to the public.

Another students from this factor explained being interested in sustainable land use because we can widely gain advantage from land not only for now but also for future and for next generations. Although, sustainable agriculture practices and soil and water conservation were not that interesting for her as soil and water are not lacking at the moment in Cambodia. If the agricultural sector is very interesting, this student pointed the need to focus on important matters such as land use rather than soil.

On another hand, one student from another factor explained that sustainable land use and everything natural-resources related was not interesting according to her because it was too

technical. She specified, as we had guessed, that those areas of environmental studies were slightly political as well because of the Cambodian context that limited the exploration of non-traditional ways to support agriculture and land use. Even though this opinion is against what two other students stated about innovation and advantages from land use, it's important to see different points of view.

Factor 4: Economists

Factor 4, as the *economists* of our sample, represents the data analysis/number-lovers/monitors/engineering-minds of our study. This group strongly distinguished themselves with skills oriented towards economics, solutions-thinking (circular economy, eco-building, research) and data analysis through environmental valuation method and public policy analysis. Our last factor is composed of 3 women and 2 men going from 21 to 27. 3 of them are from the NUM and the others from ITC and UBB. Very different study fields are represented from international business, urban transport and mobility, water and environment, management and economics.

One respondent stated that he projected himself as a circular economy entrepreneur. According to him, it could be very sustainable to use circular economy in the future. Moreover, investors are looking for sustainable growth in developed countries and circular economy is a huge potential for growth, aside from the sharing economy. This students specifically sees waste of resources as opportunities when he projects himself in green jobs. For this reason, he's not interested in the agricultural sector or skills such as organic farming because it is not new and he seeks for future opportunities. A student from another factor developed a lot on circular economy stating that is was really interesting when immersing into a green job as it is a broad topic. According to her, focusing on "Reduce, Reuse, and Recycle" is now more relatable in the daily life consumption and exudes individual behavior in terms of environmental awareness and entrepreneur mindsets, which recall a lot our first student that project himself as a circular economy entrepreneur. Likewise, this students mentioned the financial opportunities of using resources to their maximum and turning it into a profitable economy.

Environmental economics is one of the key skill of this factor. A student from another factor explained that the reason why this skill is interesting is because economics focuses on profits, making money and GDP but when focused on environmental matters, it look into actions that affects profits. She mentions how climate change and the weather can affect crops culture, water resources and the weather. Seeing environmental economics as something that can help prevent risks global warming can have on important sectors such as agriculture is one interesting aspect of this subject. A student from this factor sees environmental economics as the way to measure costs and benefits. This allows to implement relevant policies but also develop recycling and renewable projects. It is a source of tools that can be used in the Green Transition.

A respondent from another factor completed by adding that environmental economics looked at the financial impact of environmental policies and helped understand policies and regulations effects on the economy, which can be linked to the fact that economists also ranked policy analysis as really interesting skill to learn. She gives an example of a project from existing policies of the RGC (Royal Government of Cambodia) on urban transport. The Ministry of Public Works and Transports (MPWT) created a law supported by the Ministry of Interior (MoI) and they noticed that policies and regulations had some financial impacts for drivers and road users as well in terms of emissions and pollutants in the air. For those reason, environmental economics (also paired with public policy analysis and environmental valuation method) are really important for public service in a green transition. This student closes her development by saying that environmental economics helps governments plan further regulations in a strategic way.

Management of wind-energy is surprisingly the only energy-related skills of all factor and no students mentioned this sector as interesting for green jobs. The only mention made of it was a student from this factor stating that the energy sector was very important without having any other comments to make on it.

Aside from factors, students made comments during interviews that were really interesting and helpful to understand how they perceived Cambodian key sectors and certain skills.

As we stated, we noticed that certain corporate or business-oriented skills were sometimes not really popular. It was the case for marketing, sustainable finance, auditing or consulting for example and students had a lot of comment to justify those choices. For one students of the economists factor, marketing or consulting is simply just a routine job and not really interesting. Another student developed in the same ideas that management, auditing or consulting skills were technically important but not really interesting because what is important at the moment for a country like Cambodia was to first take action, join hands and do things like joining NGOs.

A student stated that marketing was not really interesting because it does not focus on issues and solutions but can be very useful once you have a good understanding of the problems. For another, it just does not suits everybody, as some people can be shy or not creative. Interestingly, one mentioned not to trust marketing for public issues such as climate change. According to him, some time is spent to discuss how to manage things and how things needs to be done but action is lacking. Some students did not like those skills because they would simply not be relevant to them. For one, auditing sounds vague and does not know how it can help, and accounting-related skills are stressful and annoying. As auditing was not really popular, it was associated to "*a lot of digits and decimal, easy mistakes of interpretation, excel forms, piled up documents and bald-headed staff*".

On another hand, basic biodiversity knowledge was really popular across all factors and students also had a lot of comments to make about it. For an economist who was very opportunity-oriented, basic biodiversity knowledge is useful to understand projects. He specifically explained that cross-skilled knowledge was really interesting when working on sustainable projects. Another student explained that as he had volunteered in a lot of social work with environmental NGOs and organizations, he knew the importance of basic biodiversity knowledge and that it could make a difference when looking for a green job or to be part of the solution. Knowing about basic biodiversity knowledge helps take proper actions towards a problem as we need to understand clearly a situation before acting. He concludes by saying that not only science students needs to know about it because if we project ourselves in a green job, we will find it hard to get familiar with solutions and innovations. For others, it is just something new to learn.

In addition, research was also ranked as very interesting in all factors. It was commented that research was of great interest for climate change due to the scarcity of non-renewable resources and global concerns. Research could for example find solutions to recycling those resources to ensure sustainability of ecosystems and sustainable development. Another makes the link between research and biodiversity knowledge saying again that we need to be familiar with biodiversity to understand problems and find solutions.

Finally, we had the impression that the waste sector was not really popular among students because waste valorization was ranked very low across all sectors However, students often commented about circular economy and mentioned waste numerous times when projecting themselves in green jobs. It went from circular economy entrepreneur, to recycling and waste reduction or designing of eco-materials. A student commented on the opportunities there were between the waste sector and the energy sector. He pointed at the two types of waste in Cambodia being plastic and chemical waste and agricultural waste that was a huge potential to be transformed in electricity or biogas.

If energy is not the most popular sector among Cambodian students, one acknowledge its importance by recalling that the country had a shortage of electricity in 2019 due to water shortage just like their neighbors. He insisted on the need for technical resources to manage and process it locally. Another one mentioned the importance of the energy sector (and specifically wind energy) because energy is important to live and Cambodian connect daily with material like fans, air conditioning, rice cookers. According to him, wind energy would be safer than water energy, probably implying a need for diversification due to the shortages of 2019.

Volunteering was often mentioned during interviews. One explained that young Cambodians could feel lost or misunderstand the need for skills when projecting themselves in green jobs. Volunteering would be a good way to inspire students to take action and love the environment and show them how they can act within green jobs. Many students and teens get involved in volunteering in Cambodia because it gives experience and network but it is not that widely spread.

As for the GREENCAP project, we also had to focus on the garment industry sector that is really important in Cambodia. There is a consequent need for energy monitoring skills, auditing and consulting in those sectors. But neither the skills nor the sector was really popular among students. Once stated that factory jobs were just a stage of recovery from a long war and that the younger population needed human resources to help grow in the Cambodian economy. Another one said that the Cambodian private sector was lacking environmental awareness.

In conclusion, our analysis gave us 4 factors that indicates which skills or sector a group of students like or not. We will then be able to make recommendations according to those different profiles as they are constituted by different students. Interviews were really important in the interpretation of our results. Seeing how students have different ways of thinking about the environment and green skills, we are convinced that the Q-Methodology is appropriate for sustainability matters. The main results of going through our data was that students were mostly strongly environmentally aware, mildly interested by green jobs and could be distinguished between *nature lovers, managers, traditionalists and economists*.

Part III: Drawing recommendations from the analysis

Initially, the GREENCAP Project was developed to strengthen partnerships between Cambodian and European universities around green jobs. The final aim of this project is to see Cambodian partners implement new projects/formations/courses and take action towards preparing students to a greening job market. As the project started in January 2020, this study on student's environmental awareness, perception of green jobs and representation of green skills and the other study on Cambodian stakeholder's representation of green skills are the premise of it. Stakeholders from the GREENCAP Project will work together until our 4 universities are able to offer formations that will teaches strong and relevant skills to make student ready for the job market.

Our 2 studies fit as a first impression of what could be done. Taking decisions on what to teach and what interests students without having an idea of their opinion could have lead the GREENCAP Project to implement irrelevant or potentially ineffective decisions. This specifically show how the Q-Methodology is relevant for sustainability-related policies. Our analysis on skills' representation precisely shown us how surprising and unpredictable results can be. For example, we would not have guessed that students would be this found of basic biodiversity knowledge or research.

On another hand, we might have missed their disinterest for monitoring-related skills, or misunderstood their expectations from waste-oriented careers. Skills analysis was specifically important to understand student's opinion and the whole study mattered to draw recommendations that stakeholders from the GREENCAP Project will be able to discuss. In a first part, we will present our recommendations on environmental awareness. In a second part, we will discuss recommendations for promoting green jobs, teaching green skills by factors and then skills in general. As a conclusion, we will discuss the robustness of the analysis and the importance of thinking about alternatives when teaching sustainability.

3.1 Recommendations on environmental awareness

Thorough our analysis on environmental awareness, it was evident at first sight that students were in general informed and aware on what was going on with climate change. Except a few nuances and surprising results on certain statements, there is nothing concerning or alarming in what students answered. From our results, we can totally affirm that not a student from our sample can be considered as not environmentally aware. Moreover, almost all of them affirmed to be passionate about environmental matters. As we had saw in the literature (Robertson and Barling, 2013, Afsar, Badir and Kiani, 2016), environmental passion is different and stronger than environmental awareness. By calculating scores, we could tell that 19 out of 21 students were considered strongly environmentally aware and that this results could be nuanced as the two others students were quite close in terms of points. As a conclusion, we can affirms that:

- → All students know what climate change is
- → All students are worried about climate change, consequences for nature, their future, their health and other people
- → Students are optimistic about the fact that Cambodia will be successful in its Green Transition
- → Most students feel responsible and acknowledge that their behavior can have an impact on the environment
- → Most students admit that companies have to change their behaviors

In general, there is no need for a strong and consequent promotion or communication on informing students that climate change exists. Moreover, as environmental awareness is a key skill for green jobs, there will be no need for universities to put consequent means into informing students about it. Our recommendations will focus on small specificities that caught our attention in the analysis of the results. Indeed, 3 statements got quite surprising answers. 14 students did not disagreed with the fact that *"the balance of the nature is strong enough to cope with the impacts of modern industrial nations".* This statement was taken out of the general environmental awareness score because it was formulated in an inverse way. Answering a *strongly agree* with it could have been disputable as it does not mean one is not environmentally aware. However, taking in consideration all the physical changes occurring

within the ecosystem at the moment (temperature and sea level rising, depletion of the resources and biodiversity…), it is quite unlikely that nature is able to cope with the impacts of our way of living. Students being mostly environmentally aware, it was surprising to see that they believed nature to be strong enough to cope with climate change. On the same idea, 14 students did not disagreed with the fact that the ecological crisis is exaggerated. Again, considering the disastrous consequences that a rise of 2°C could have, those results are surprising. Finally 19 students believed that humans will learn how to control nature.

If students are environmentally aware, our recommendations could focus on informing students about the seriousness of the consequences of climate change. They seems to be aware of consequences on nature, the impact of our way of living that we are all responsible, but unaware of how strong the impacts could be. From those results, we could imagine that if universities wanted to promote environmental awareness, they would not need to focus on providing general information or trying to make students feel responsible but more on informing about consequences. As basic biodiversity knowledge was a very popular skill, I believe we can affirm that students are interested and comfortable with learning about science and facts. The GREENCAP Project could consider, for example, to make students work on cases or projects during classes that would focus on natural consequences climate change have towards the nature. Using facts, data, and real cases could be a good way to make sure students are fully aware of how serious global warming is. However, it is necessary to be careful in assuming that all students are environmentally aware because of a possible bias in the study, that we will see in part 3.3.3.

3.2 Recommendations on skills

3.2.1 Green jobs in general

As we stated previously, results on green jobs perception were sharper than for environmental awareness. If all students admitted to be environmentally conscious, only half of them had already considered occupying a green job before and some did not have a specifically positive

opinion of it. However, students had specific and various ideas of green jobs they could project themselves into from tourism to NGOs to waste sector (even though skills were often ranked low in the skill's analysis).

On the contrary than for environmental awareness, there seems to be a bigger need for promoting green jobs, especially on certain sectors. The GREENCAP Project and partners should keep encouraging students to consider working for NGOs, sustainable tourism, agriculture, economics etc. A focus need to be done on careers that could concerned the garment industry as neither the skills nor the sector was popular among students. Maybe highly-skilled positions within this industry might be promoted. The energy sector might be equally promoted among student. Factor analysis showed that no particular factor were interested in energy careers, which would imply that it is not sure what kind of student to target. Managers could eventually be interested in project planning energy-related career or economists on the data analysis/numbers kind of careers. This would mean to aim bachelor students among economics or management fields as career in the energy sector would require a dedicated master.

Aside from certain sectors or group of skills that require courses or the creation of new formations, informal education has a big role to play in order to teach sustainability and promote green jobs among students. Seminars, conferences, field or company visits can be a good opportunity for students to meet with professionals, see their workplace, their missions and get a real-life appreciation of green jobs. If they are misconceptions or a disinterest for certain careers, this kind of action might be more helpful than classes to promote green opportunities. School counselling might also have an important position in advising students on their career. They are the ones able to orient students or identify profiles that could match with specific green careers. There is a big need for orientation among bachelor students, especially in management as they were not really aware of the existence of green management-related skills. But there is also a need to orient master students, potentially towards internships or abroad experience if possible, but this requires a financial support from the government as students often occupy student jobs. School counselling can also orient students towards research as all of them stated be interested in it.

3.2.2 Recommendations on skills by factor

Our analysis allowed us to identify 4 groups of students that had a similar opinions on which green skills were interesting to learn when projecting themselves in a green job. This will enable us to make recommendations on those specific groups and teach skills in a more targeted way. However, we struggled to identify similarities between respondents aside for them liking the same skills. We would have expected for example to have more students from UBB in the *nature lovers* factor as this university focuses a lot on agriculture and nature, or to have more men than women in the *economists* factor as engineering and STEM careers are usually more popular among men. Despite our difficulties in making links between factors and demographic characteristics, knowing that very different students are present in each factor is a good thing, meaning that Cambodian students are really open-minded and able to project themselves outside their original study field.

3.2.2.1 Factor 1: Nature lovers

In the Cambodian Green Transition, nature conservation plays an important role for the economy. The natural resources sector was a key point in the GREENCAP Project and students from factor 1 distinguished themselves by a strong attraction to nature-related skills.
Recommendations on teaching nature-related skills must focus on specificities we observed in our factor. Students that are interested in working in the nature conservation sector are interested by all natural resources and not one in particular. It seems that they are interested by the management and planning aspect of it considering the skills we are seeing. Yet, it is not clear how they related to working in nature conservation for the NGOs sector. Indeed, skills such as "humanitarian skills" are absent from this factor but nature lovers stated that they were interested in law of the environment, which is a useful skill for NGOs in order to protect nature. When teaching nature-related skills, universities should not hesitate to focus on basic science or ecology as students were really interested and curious about basic biodiversity knowledge. Interviews showed that some of them were just curious and other affirms that it was important for all kind of green jobs.

3.2.2.2 Factor 2: Managers

If Cambodia wishes to strengthen young graduate's skills in managing sustainability, they should focus on students that fits in factor 2. Those students are not fond of theoric or economics kinds of skill such as environmental economics, environmental sociology or circular economy but will make good managers in any sector. Indeed, tourism and humanitarian skills were mentioned. When teaching about managing sustainability, skills related to monitoring performance, implementing innovations, or being solutions oriented does not really interest those students. Universities should focus on project planning as it seems to interest factor 2. Those students will make good leaders in the Green Transition. Working on real cases with stakeholders or eventually other study fields could be a good idea for those students. As we stated previously, universities could target management bachelor students in order to try to interest them in careers in this sector.

3.2.2.3 Factor 3: Traditionalists

Students are not disinterested from traditional Cambodian sectors such as tourism or agriculture and stills project themselves in those positions. However, developing skills in agriculture or tourism should focus on being innovative. Indeed, it seems that students from this factor were not interested by traditional skills taught in those study fields but more in finding solutions, implementing projects and improving what is failing in those sector. As we advised for other factors, teaching skills in those fields could also focus on projects planning, solution-thinking and meeting with stakeholders.

3.2.2.4 Factor 4: Economists

Careers related to statistics, economics, data analysis and environmental valuation are very important in any sector of a Green Transition. Students from the economists' factor are not

afraid of numbers and data. Universities should teach skills such as environmental economics, environmental valuation method or public policy analysis. However, it could be interesting to avoid teaching those skills in a too theorical way as students from factor 4 are solution-oriented. They commented a lot on circular economy and are also interested in eco-building. Teaching about economics should be paired with working on projects. It is unnecessary to try to teach management or business-related skills to those factor as they are not really fond of it and find it uninteresting. Also, if we surprisingly had no factor that distinguished themselves by liking energy-related skills, economists does not seem fond of it as well.

3.2.3 Recommendations on skills in general

Aside from specific factors, we can draw recommendations on certain skills and sector in particular.

As in any Green Transition, the energy sector is primordial to assure a decrease in carbon emissions due to fossil fuel energy. We were expecting some interest from students towards the energy sector. Yet, skills related to energy were not popular at all and were rarely ranked as interesting. Factor 1 (nature lovers) was interested in knowledge in renewables. Factor 2 (managers) and factor 4 (economists) were slightly interested in management of hydro-energy, which is one of the main source of energy in Cambodia. However, solar, wind and gas were not popular at all among students. They did not had a lot to say about it during interviews or when they projected themselves into green jobs.

The energy sector needs to be more promoted among students. Potentially, it needs to be promoted on the management and project aspect of it, as the engineering and science side of it could only be developed at the ITC. The GREENCAP Project could think about creating a master specialized in energy or implementing energy projects. However, it could be interesting to be sure that students will be actually interested in it first (as it does not seem to be the case here) or it would need to be promoted by universities or career counsellors. Career

counsellors could have a role to play in promoting careers in the energy sector. Universities could also consider seminars or company visits to allow students to get familiar with this study field. It might be nice to focus on bachelor management students that seems to struggle in projecting themselves into skills that are not the one traditionally taught in management.

Also, many skills that we can call *monitoring skills* were not popular at all. Those skills are related to a need in greening economies to quantify pollution, emissions and analyze data in order to draw recommendations for projects or companies. Some of them are more related to management but students from factor 2 were not interested at all in them. As we said, this could be explained by the fact that students from this factor were all bachelor students. This way, they would only be familiar with what is usually taught in bachelor, which is often limited to basic, traditional and introductive subject. It could be interesting to sensitize management bachelor students to sustainability in management. Seminars or career counselling could eventually convince them to consider management master turned towards green careers in management that focus on consulting, auditing, performance analysis… Bachelor's classes in management could also have parts or chapters related to sustainability, as it is often done in first cycle level. This would be for instance a few classes on eco-design during marketing or some chapters about CSR during strategy classes. Encouraging green careers among management bachelor students should be limited to introductive chapters, career counselling, project or seminars.

Similarly, business-related skills such as entrepreneur skills, marketing, strategy, negotiation were not popular among students. It might not be relevant to focus on them as students are not specifically fond of them and as certain soft skills usually comes with experience or personalities.

Waste valorization is an important sector for the Cambodian Green Transition. At some point, we were afraid that students would thought that it was a low-skilled sector or that they would not be interested in it. Skills related to waste were ranked quite low except for circular economy for factor 1 and factor 4. Students from every factors had a lot to say about circular economy and were really enthusiast about it. It seems that students are indeed interested in the waste sector but on the solution/innovative/project side of it. Teaching skills in this field

could be done by working on projects around the campus or by volunteering, as it won't fit as a single formation or is interesting for all study fields. Moreover, students often projected themselves in waste green jobs when asked about it.

Even though agriculture is an old and traditional sector, Cambodian students are not disinterested at all by it, as it would have usually be in developed countries. All factors ranked at least one agricultural-related skills as interesting. Again, they seemed to be interested in improving the sector, working on projects and finding solutions. The agricultural sector in Cambodia will be strongly impacted by climate change. According to our result, universities could develop skills related to agriculture among science, economics and management students and they would be interested in it.

Finally, as mentioned before, all universities should encourage research. All factors were interested by it and students commented a lot on how research was important to find solutions and solve environmental issues. Students were also really fond of learning about basic biodiversity knowledge. This could be a good bridge towards the fact that students were not familiar with the consequences of climate change on nature. Universities should not be afraid of using basic science to convince student that consequences of climate change are serious. However, as it could be difficult to teach biodiversity when programs are already full with subjects, it could be as well taught as real cases, projects, seminars or field visits.

Analyzing skill's representation among student was really useful to draw recommendations as we could easily guess who was attracted to what, and how those students differed between themselves. However, students in all factors were all different, which implies that, except for management bachelor students, it was difficult to advise how to target each factors as students from all study fields levels and gender are mixed in factors.

3.3 Discussing the robustness of the analysis

Conclusions and assumptions we draw from those results must obviously be nuanced. Indeed, the administration of our survey was done by distance. Then, statistical robustness can be discussed due to how the analysis was made and the representativity of the sample. Finally, there are a lot of bias possible in this study.

3.3.1 Distance administration of the survey

Our results might have been impacted by the way the survey was administrated. The Q-Methodology being a qualitative study, it is always better to administrate it directly to the person. By being enable to conduct the study in Cambodia, we had to do it from distance which induced a few difficulties. Because of those reasons, results can be discussed.

First of all, due to not being in Cambodia, it is impossible to make sure that we asked the right questions through our survey tool. As every culture is different, it is possible that some subjects are more important than others in Cambodia. By not being able to meet with Cambodian students or being present in universities, it was impossible to have an opinion from Cambodian on the survey tool prior to administrate it, and the survey tool was tested on French students. The same issues was encountered when trying to make recommendations. It would have been really useful and relevant to ask student their opinion on ideas and recommendations as it is always difficult to assume and orient stakeholders without having a good understanding of the context.

Then, the survey tool was administrated on an online software at distance. It was initially planned for students to take the survey during a visio-call interview in order to make sure that they would have been able to ask questions if they did not understand something and in order to gather comments while doing it. However, visio-call administrations was cancelled as it was demotivating students from taking the survey and it would have taken too much of their time. Due to this, it is impossible to know if the student did the survey meticulously by reading all

the indications. As it was self-administrated, it is possible that some rushed it and answered without thinking. However, as it was possible to consult the answering time on Qsortware, it seems that nobody answered it too fast as answering range time went from 15 to 55 minutes. Also, we were unable to gather interviews for all students as we explained in the second part.

3.3.2 Statistical robustness and extrapolating results

As in every statistical analysis, we can discuss the robustness of the results. Our analysis was conducted on a very small sample of students from 4 universities. It is obviously impossible to say that the results we got from this group is representative of Cambodian students from RULE, UBB, NUM and ITC. If the factor analysis makes sense in the way that we were able to give names to groups (nature lovers, managers, traditionalists, economists) and that it was obvious that groups distinguished themselves in the kind of skills they liked, it is always tricky to draw so sharp conclusions. Putting people into categories can always be seen as making quick assumptions. Statistics must always be taken carefully as numbers and data can say different things depending on how we read them. Factors is a way to see who have similar opinions but the appreciation of describing how a factor looks like and how they think is left to the subjectivity of the researcher. It is possible that some assumptions or hypothesis that were made are wrong or misinterpreted. For those reasons, factors must be read with care. The Q-Methodology is useful to have a first impression of opinions and feelings but is very subjective.

Robustness can also be discussed for other reasons. As we interpreted surprising results on 3 specific statements of the environmental awareness part, it could also be explained by the fact that, potentially, students would not have understood those questions. Eventually, they would have also be disturbed by the fact that questions usually were in the environmentally aware sense and then were formulated in the inverse way. In the same idea, some results on skills could also be explained by the fact that they did not understood it. A small survey was made on a few people in order to check if all skills were understood by everybody and certain skills were defined in the survey tool. However, skills such as auditing, permaculture or risk

analysis were maybe not clear enough, which would explain results. Also, some students refused to take part in interviews because they stated not being fluent enough in English, despite the fact that they had already taken the survey. It is possible that some questions or indications were misunderstood by students, occasionally.

3.3.3 Bias

The presence of potential bias could change the interpretation of results. A bias that often occurs in social science research is the social desirability bias. It happens especially quite often in environmental related studies. Social desirability can be explained by the fact that one wishes to be appreciated by the investigator. They would answer in a way they believe to be good, right, or adequate, even though they do not really think that way. By answering like what we believe to be good, one seek for validation from the investigator. But a respondent can also answer such as how he wishes he would think. It would be difficult for one to admit not to care about the consequences of the environment on other people as nobody wants to think about himself as egoist. It is possible that students all assured to be environmentally aware or worried even though it was not as strong as it looked. However, students answered *no opinion* quite often, which could imply that they were not afraid not to answer when they were not sure.

Then, our results might have been strongly impacted according to how the sample was chosen. It is necessary to point that not all students are English fluent in Cambodia. As the survey was made from distance, we only had to take fluent students. They were selected by university staff themselves. There is a possibility than students being all English-speaking would have brought a bias in the study. Indeed, we could make the hypothesis that English-speaking students could be more exposed to international news, information and data on climate change on internet or social media. Understanding English would expose them more to the consequences of climate change. Then, as students were selected by staff, it is possible that they identified students they would know would agree or be motivated to take the

survey. By agreeing to take it, this could imply that all students are interested by research and projects. This kind of opportunity-opened students tends to invest themselves a lot into projects, volunteering or extrasolar activity and might potentially be more aware of environmental issues. Finally, it is strongly possible that students were convinced to answer the survey because they were indeed environmentally passionate. It could have been interesting to specifically ask non English-speaker or people openly not interested by environmental matters to answer the survey. For this reason, the conclusion assuming that all students of our sample are environmentally aware must be taken with care as it does not represents all students in those universities.

Finally, as the Q-Methodology requires to rank all skills, it is possible that certain students were interested by all of them but had to make choices. Certain skills would be considered as not interesting when the students would have just been missing room.

3.4 The importance of alternatives when drawing recommendations

As you can see in the recommendations, there are many alternatives to formal courses and formations. We saw in the literature analysis that informal education was often a great way to teach skills among students. Especially when it comes to green jobs, making sure a student can master a skills is relevant and will help him a lot when looking for a job. Interviews helped us prove that students were indeed interested in things such as volunteering or working on projects. Also, practical and informal education is often appreciated by students. For those reasons, we encouraged teaching green skills through courses and formations but also real case projects, chapters, seminars, school counselling, internships, company visit or volunteering.

Courses are relevant for skills that are more focused about theory and need strong background knowledge such as environmental economics, energy-related skills or monitoring skills. We would encourage formations such as new bachelor or master for skills that should focus on certain sector. An environmental economics master teaching environmental

economics, public policy analysis, environmental valuation, research, and statistics could interest students from factor 4 that are comfortable with numbers. It should be paired with projects and teamwork, as those students are solution-oriented. A master focused on energy could be interesting as well as long as universities make sure to promote it among bachelor students. Also, a formation teaching how to monitor environmental performance, do auditing, consulting and environmental strategy thinking could give strong skills to student for the coming job market.

However, courses and new formations might not work for students from factor 1, 2 and 3. Nature lovers from factor 1 represents very different students and the kind of skills does not necessarily aims toward specific jobs. Skills in the nature lover factor are more oriented towards something students enjoy: natural resources and protecting the environment, and is also closer to convictions (NGOs, charity, natural conservation) than a proper study field. By this we mean that students from factor 1 could be scientists, law students or management students but working into natural resources protection. For those reason, it would be a mistake to teach those skills in a formal targeted way. Promoting natural resources among students could be done by field trips, volunteering or group projects. It could be especially easier for UBB as they have formations in agriculture. Students from factor 2 are managers but project oriented. They might be more interested in working on actual projects than going to class. Eventually, they could work with companies or do interdisciplinary work with other students. Indeed, we observed that factors were not at all characterized by specific study fields, implying that Cambodian students seems opened in working with each others. Again, volunteering is really encouraged as it is a perfect way to learn and gain experience. One student stated during interviews that volunteering was a way for students not to be discouraged or disinterested by green skills.

Career counselling might have a big role to play in green jobs as certain sector needs to be promoted. It could be interesting to orient students on waste and energy careers. Despite being one important sector in Cambodia, students were not interested by the garment industry as well. However, they would easily project themselves into agricultural, tourism, economists or waste career, which means there does not seem to be a big need for promoting those careers.

Finally, it is possible that creating links between universities and stakeholders (Companies, public sector, NGOs, association) might be a very good way to show students the professional world. They would be able, through company visits, field trips or seminars to meet with professionals, see how skills are useful and which career opportunities exists. This could be potentially beneficial for bachelor students than can struggle imagining more precise study fields (for instance beyond general management or general economics).

Of course, those alternatives are obviously challenged by the fact that formations are already filled with traditional subjects. Students are also often busy with their student's job, which makes seminars, internships or volunteering tricky to implement. As studying abroad or internships are a perfect way to gain experience, money is often a challenge for students in any country but especially developing one. Those barriers to alternative solutions could be tackled by a financial support from the government as an investment in green jobs.

Recommendations made come from a deep literature analysis on various important subjects in order to make sure all aspects of the context were understood. Looking through research on education for sustainability or environmental awareness helped us created a survey tool that would give us a background for recommendations. If we were able to draw suggestions from our results in this part, it is necessary to keep in mind that they are based on assumptions made from a very small sample and without being in Cambodia. Any ideas given in this part should be reconsidered depending on the circumstances.

Conclusion

If cooperation is key, there is no successful project without involving all stakeholders. By understanding how students related to environmental issues and green opportunities, we made sure their opinion was taken into account prior to make recommendations. Looking at the history and the economic context was also helpful to understand how each sector is key for the economy and impacted by global warming. As green jobs and green skills are a trending concept, we also made sure that we understood the implications, challenges and threat they implied. Reports on green skills allowed us to identify to 47 statements students had to rank in the survey tool. Moreover, going through the implications of environmental awareness enabled us to cover different aspects of it in our survey tool from feelings to responsibility to values. It also helped us to realize how complex environmental behaviors are and that measuring environmental awareness is tricky.

The Q-Methodology was really interesting in the way that approaching the skill question by looking at similar group of students allowed us to target recommendations but also see what works in general among all of the factors. It confirmed its relevance in sustainability matters when trying to set policies or projects and allowed us understand student's representation of green skills. We created an environmental awareness scale that fitted our needs and that allowed us to discover that Cambodian students were strongly environmentally aware.

By analyzing how students represented green skills, we observed 4 different groups of students. Nature lovers that were interested in natural resources skills to solution-oriented economists that enjoys working with numbers. One group distinguished themselves by being the potential leader of the Green Transition and others by showing that students were still interested by the traditional sectors in Cambodia. Interviews with students allowed us to explain those choices but also to understand how it is to be a student in Phnom Penh or Battambang.

Without the cooperation of students, we would not have been able to identify which skills were popular and which skills they were not fond of about. Recommendations were drawn out of the results on environmental awareness and the factor analysis. The GREENCAP Project

will use them to support ideas and decision in the continuation of the project. Hopefully, this study will contribute in implementing new formations or project that will interest students in considering green careers.

Education is the key to solve many problems in the world. Thorough the survey and interviews, Cambodian students showed they were invested, educated, aware and motivated to take action to lead the Green Transition. Talking with them about various subjects such as the relevance of volunteering as a way to learn skills and gain experience, the importance to understand the globality of a problem when looking for a solution or how to think out of a study field is the reason we could think of innovative solutions for recommendations. During this study, students proved they were curious enough, open-minded, motivated and open to opportunities which lead us to believe that students will follow Cambodia in facing global warming.

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Annex

Survey Tool

ENVIRONMENTAL AWARENESS AND REPRESENTATION OF GREEN SKILLS

With the National Environment Strategy and Action Plan, Cambodia engaged itself in enhancing environmental protection and sustainable natural resources management to advance Cambodia towards a developed country. This green transition will offer new employment opportunities and will requires new skills. The GREENCAP Project is an ERASMUS + Capacity Building for Higher Education funded by the European Union aiming to help Cambodian Universities in this matter.

The objective of this survey is to explore your **environmental awareness**, your **vision of green jobs** and your **representation of green skills**.

Part 1 - Environmental Awareness

For each items below, indicate the response that best characterizes how you feel about the statement, where: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree and 5 = Strongly Agree.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. I am concerned about environmental problems because of the consequences for nature	1	2	3	4	5
2. I am concerned about environmental problems because of the consequences for my future	1	2	3	4	5
3. I am concerned about environmental problems because of the consequences for all people	1	2	3	4	5
4. I consider that when humans interfere with nature it often produces disastrous consequences	1	2	3	4	5
5. I am confident that human ingenuity will insure that we will keep earth livable	1	2	3	4	5
6. I hold that humans are severely abusing the environment	1	2	3	4	5

7. I believe the balance of the nature is strong enough to cope with the impacts of modern industrial nations	1	2	3	4	5
8. I consider that the so-called « ecological crisis » facing humankind has been greatly exaggerated	1	2	3	4	5
9. I am confident that humans will eventually learn enough about how nature works to be able to control it	1	2	3	4	5
10. I believe that environmental pollution affects my health	1	2	3	4	5
11. I worry about environmental problems	1	2	3	4	5
12. I can see with my own eyes that the environment is deteriorating	1	2	3	4	5
13. I am optimistic about Cambodia's Green Transition	1	2	3	4	5
14. I consider that a better environment starts with myself	1	2	3	4	5
15. I think that people who do not take the environment into account try to escape their responsibility	1	2	3	4	5
16. I am passionate about the environment	1	2	3	4	5
17. I enjoy engaging in environmentally friendly behavior	1	2	3	4	5
18. I try to be aware of how my lifestyle impact the environment.	1	2	3	4	5
19. I believe companies must find new sustainable ways to produce.	1	2	3	4	5

Part 2: Green Jobs Perception

The United Nations define **green jobs** as those that contribute appreciably to maintaining or restoring environmental quality and avoiding future damage to the Earth's ecosystems.

Have you ever considered occupying a green job before? Yes/No/No opinion

Do you have a good opinion of green jobs? Yes/No/No opinion

How likely do you think you are of occupying a green job later? Very likely, Likely, No opinion, Unlikely, Very Unlikely

Which sector are you considering <when you project yourself in a green job?

Part 3: Green Skills Representation

Green jobs require green skills that are needed in all sectors at all levels in the workforce.

We want to understand which skills you consider interesting or relevant when you project yourself in a green job. For each items below, please indicate if you think the skill is interesting to learn when projecting yourself in a green job.

Carbon market assessment *	Energy performance analysis*	Sustainable agriculture practices	Circular economy*	Research skills	Soil and water conservation management	Humanitarian skills	Basic biodiversity knowledge
Environmental conservation planning	Eco-tourism project management	Management of hydro energy	Strategic skills	Sustainable land use	Permaculture*	Innovation	Management of wind energy
Communication	Project planning and management	Environmental valuation methods*	Auditing	Sustainable forest management	Management of gas energy	Marketing	Marine and water protection and conservation
Eco-design	Leadership	Natural resources management *	Knowledge in renewable energy	Consulting	Corporate Social Responsibility	Risk analysis	Law of the environment
Life cycle analysis	Environmental economics*	Carbon reporting	Public policy analysis*	Management of solar energy	Sustainable finance*	Entrepreneurial skills	Environmental performance monitoring
Sustainable tourism management	Waste valorization policy implementation	Eco-building*	Organic farming management	Negotiation	Environmental sociology*	Pollution control analysis	

You have just ordered the skills you consider more or less interesting to learn when you project yourself in a green job. You will now be asked to do the same exercise with a more selective range of scores. Each score has a limited amount of items possible where: -3 = Strongly Disagree, -2 = Disagree, 0 = Neither Agree nor Disagree, +2 = Agree and +3 = Strongly Agree.

Strongly Disagree	Disagree		Neither Disagree nor Agree	Agree		Strongly Agree
-3	-2	-1	0	+1	+2	+3

Demographic questions

What is your age?

What is your gender?

Where do you study? UBB/RULE/ITC/NUM

What is your formation? Bachelor/Master and year