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UI GreenMetric with May 2021 Covid-19 Update and Our Universities

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Abstract: Currently, for awareness of environmental problems and to solve problems related to the environment, the largest duty falls to other public institutions like universities. Especially our universities, educational institutions with highest information production and information flow to society, are institutions where environmental awareness should be highest. For this reason, currently universities are ranked on both national and international scales with points according to sustainable and applicable **social contribution** and the magnitude of **social responsibility** projects.

In terms of universities, the **concept of green campus** includes the main lines of an approach focused on sustainable environmental management accepted for the last 10 years around the world. In order to attain this academic concept, universities around the world came together to determine a variety of environmental indexes and ranked universities in terms of sustainable environmental policies and management.

In our study, a road map to ensure universities in Turkey can be included in the top ranks in the world in general in terms of sustainability and environmental awareness indexes and how they can become green campuses was researched. In this context; the **UI GreenMetric Certificate System**, determining the road map for world universities to recognize and integrate the green campus concept at sustainable environmental scale, was implemented on an international platform by Indonesia University in 2010 and until 2021, it has undergone various updates in the historical process. The last update was made on the basis of Covid-19 in May-2021 and it took its final form. Covid-19 updates are only in the size of scoring indicators; no changes were made in the total scores and percentiles of the main categories.

Keywords: Sustainable Environmental Management, Green Campus, UI GreenMetric Certificate, Covid-19 Update

INTRODUCTION

Through the centuries, the natural balance of the world has unfortunately been disrupted by both natural and anthropogenic activities. In present day conditions where consumption is maximized, according to **ecologic footprint** measurements, it is predicted that if every person in the world consumed as much as a person in North America, 5 fresh new earths would be required. This value is 3 earths for consumption by everyone at levels of a European and 2 earths for consumption at levels of a person living in Turkey [1]. With the increase in urbanization, industrialization and technological developments, both living habits and consumption habits have changed. Initially the results of this change and development were ignored, but over time major environmental problems like the greenhouse effect, thinning of the ozone layer, water and soil pollution and reductions in biological diversity and natural resources began to threaten the presence of all organisms. Before using resources held by us for future generations, studies about what can be done to meet the needs of the present day began. Environmental problems became more intransient on one hand due to the careless use of natural resources in parallel with economic development and on the other due to pollution exceeding the carrying capacity of the ecosystem [2].

The carrying capacity of the ecosystem for pollution forms the basis of the **ecologic footprint** concept. The natural assets of any ecosystem are defined as the **carrying capacity** of the natural resources of a planet to healthily sustain the number of organisms at the uppermost numerical margin or to maintain life of the housed organisms. The **ecologic footprint** concept is the biologically productive soil and water area (glaciers and deserts are outside this definition) required to produce the resources consumed and to dispose of waste produced by an **individual, society** or **activity** with current technology and resource management. **Biological capacity** is a scoring indicator of the production

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capacity of a geography for renewable natural resources. Ecological footprint is represented in 'global hectare (gha)'. This includes the necessary area of plant cover to ensure absorption of waste carbon dioxide and infrastructure. When making ecologic footprint calculations, two basic assumptions are made; first that consumed resources and produced waste can be monitored and second that the biologically productive area required to dispose of waste can be measured. Ecological footprints calculated based on these assumptions show how much biologically productive area individuals use on the production and consumption axis. For our planet, the carrying capacity for human demands began to be exceeded from the middle of the 1970s and since 1975, the natural resource production and carbon-holding capacities of our planet continue to be clearly exceeded each year [1].

Environmental problems threatening the world in a global sense make it necessary to take precautions for the future. If we examine the historical process in a global sense, the **Human and Environment Conference** in Stockholm associating sustainability with economic growth and development began for the first time in 1972 with the aim of ensuring equity in distribution of resources between generations in economic, social and environmental dimensions and creation of a pattern to ensure future generations will benefit from current assets in the same way [3]. The Tbilisi International **Environmental Education Conference** in 1977 focused on the need for environmental education. One of the most important developments about this topic is the **Talloires Declaration** in 1990. This declaration defined the preliminary steps to be taken toward sustainability and this declaration included the need for environmental education in higher-education institutions [4-6]. Our universities, which should be a model for the country and city, are at a key point in terms of awareness about environmental problems and sustainability. Our universities should act as a model guide, leading society in all aspects of teaching in society, not just education. For this reason, currently universities are ranked on both national and international scales with points according to sustainable and applicable **social contribution** and the magnitude of **social responsibility projects**. The majority of these projects include awareness and responsibility projects related to the environment/ecosystem [1].

The placement of universities on national and global scales was a role model in the name of ensuring success for sustainable development in different criteria [7]. Universities are expected to be innovation centers for sustainable development through education, teaching, research and knowledge transfer. Within this scope, the **sustainable university campus** concept gained importance [4].

The quality of academic studies, research and education-teaching in universities has been measured and assessed by a variety of accreditation organizations for a long time. However, assessment of environmental consciousness and sensitivity and studies and processes taken on the way to creating a sustainable green campus is very new. In this field, reliable measurement systems accepted on a global basis are very limited with the Green League, Environmental and Social Responsibility Index and UI GreenMetric systems among limited examples. Within these three measurement systems, the UI GreenMetric system is chosen most often on a global basis [8-9].

THEORETICAL METHOD

"UI GreenMetric with Covid-19 Update" World Universities Ranking System

The first and only global sustainability ranking for universities in the world, 'Universitas Indonesia GreenMetric World University Rankings (UI GreenMetric WUR)' designed and implemented by the Indonesian University since 2010, considered as the most important evaluation tool in its field, encouraging internationalization in which respected universities from all over the world participate. It is a platform that draws attention to issues related to sustainability and aims to create global awareness on environmental awareness [10]. The UI GreenMetric measurement system aims to assess the green campus policies and activities to encourage a sustainability culture in universities. For this, specific criteria were created to measure the sustainability of universities. The suitability of the ranking for universities in developed and developing countries is one reason for attracting attention as a global ranking system [11].

The true aim of the ranking system is to increase awareness about the importance of sustainability topics in the university and surroundings. Currently, it is known that higher education has great importance for the topic of coping with environmental and social problems. The UI GreenMetric system emphasizes the importance of the role that can be played by higher education institutions by performing assessments and comparisons about sustainability development in assessment and education,

sustainability research, greening campuses, environmental awareness and social responsibility in addition to social support topics [12]. A comprehensive green campus mission aimed at achieving sustainability will indirectly create a new generation of socially and ecologically responsible citizens [13].

The basic aims of the UI GreenMetric measurement system can be summarized under four headings:

- To contribute to academic studies about sustainability in education and greening campuses
- To ensure social change in universities in line with sustainability targets
- To create a self-assessment system about sustainability in higher education institutions in the world in general
- To inform states, international and local environmental agencies and society about sustainability programs in university campuses [14].

As emphasized above, the UI GreenMetric measurement system criteria comprise **environmental**, **economic** and **social** concepts in short. For the action plan of universities to count as sustainable, environmental-social-economic concepts are especially emphasized. In fact, this ranking system is a coping mechanism to overcome obstacles to sustainability in our world [15].

Figure 1. UI GreenMetric Core Concepts and Interactions

As can be seen in fig.1, the concept of green university draws its inspiration from the environmental sustainability concept; environment, economics, and society. Whereas the environmental aspect consists of natural resource use, environmental management, and pollution prevention, the economic aspect comprises a profit and costing. Education, community, and social involvement make up the social aspect [16].

Development is an important facet of the present world, which is essential for the societal well-being. But these developments should not exert much pressure on the resources which can deteriorate the environment. The environmental, social and economic wellness is the need of the hour, which amalgamates together in the concept of sustainable development. Solving these environmental problems and preventing new ones will require an understanding and appreciation of the linkages between environmental well-being and human wellbeing. However, many of these linkages are not apparent. To bring environment and development concerns to people's notice, to enable them to understand the linkages between the two, to encourage them to take appropriate action, and to equip them with the skills necessary for taking the required action, education is necessary for all this [5].

Historical Development of "UI GreenMetric with Covid-19 Update" Ranking Categories

The desire to combat the negative externalities of climate change and its variability has gained a lot of ground over the last few decades. This has resulted in the development of several approaches among which is the UI GreenMetric university ranking developed in 2010 [17]. UI GreenMetric

categories and scoring indicators can be revised to provide solutions to the problems encountered today. In 2010, the UI GreenMetric measurement system included 5 categories and 23 scoring indicators, while these scoring indicators were increased to 34 in 2011. In 2012, the green statistics category was removed from the basic categories and the setting-infrastructure and education categories were added instead [18].

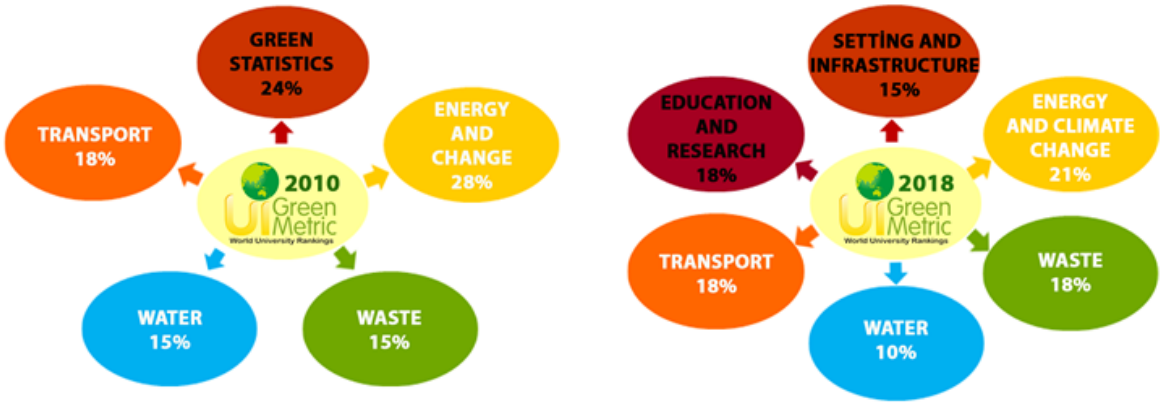

Figure 2. Historical Progression of UI GreenMetric Categories Stages

With the unpreventable increase in global problems like **carbon footprint** and **global warming** in 2015, changes were made to the scoring indicators and points in the **energy and climate change** category. In 2018, the **education** category was expanded to include **education and research** [14]. 6 categories have increased to 39 scoring indicators, as shown in fig. 2. In 2019, the theme was Sustainable University in a Changing World: Lessons, Challenges, and Opportunities. improved the scorring indicator in the and more explanation about smart building indicators. In 2020, the theme of the questionnaire is Universities' Responsibility for Sustainable Development Goals and World's Complex Challenges. In 2020 UI GreenMetric questionnaire tried to approach the impacts that university can provide in an effort in planning a green campus to community [19].

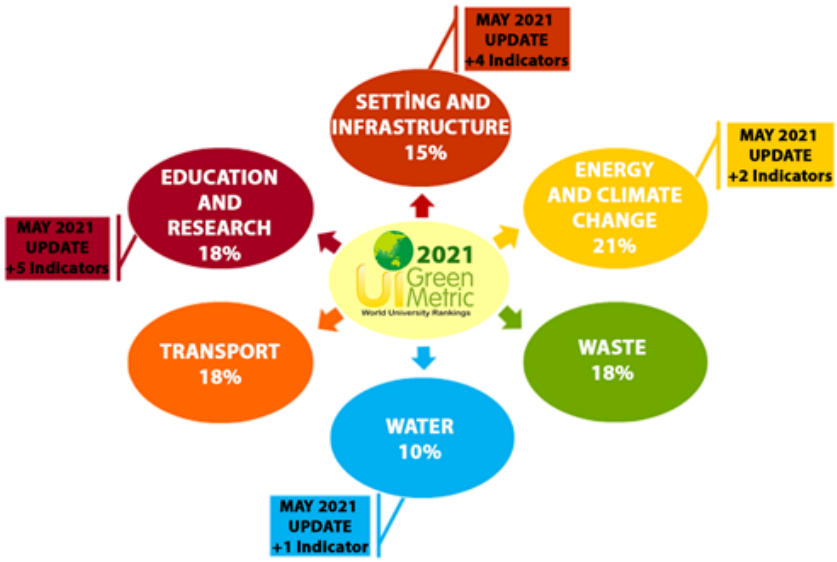

Figure 3. UI GreenMetric Introduced with May 2021 Covid-19 Updates.

As summarized in fig.3; in the update on May 2021; In addition to the roadmaps followed by the universities in the fight against the Covid-19 pandemic and the training that is effective in this fight, statistics and vaccination researches, the accessibility and service areas of the university-affiliated health institutions, the security and security units' response processes additional have been of scoring indicators added by participating in the evaluation. After the Covid-19 update, there are 6 categories and a total of 51 scoring indicators in the UI GreenMetric measurement system. It increased from 6 category 39

scoring indicator to 6 category 51 scoring indicator. As seen in fig. 3 and fig. 5, the total scores of the categories did not change. However, some of the sub-indicator scores of the 4 categories (Setting and Infrastructure, Energy and Climate Change, Water, Education and Research) were deducted and new scoring indicators were introduced with the Covid-19 update.

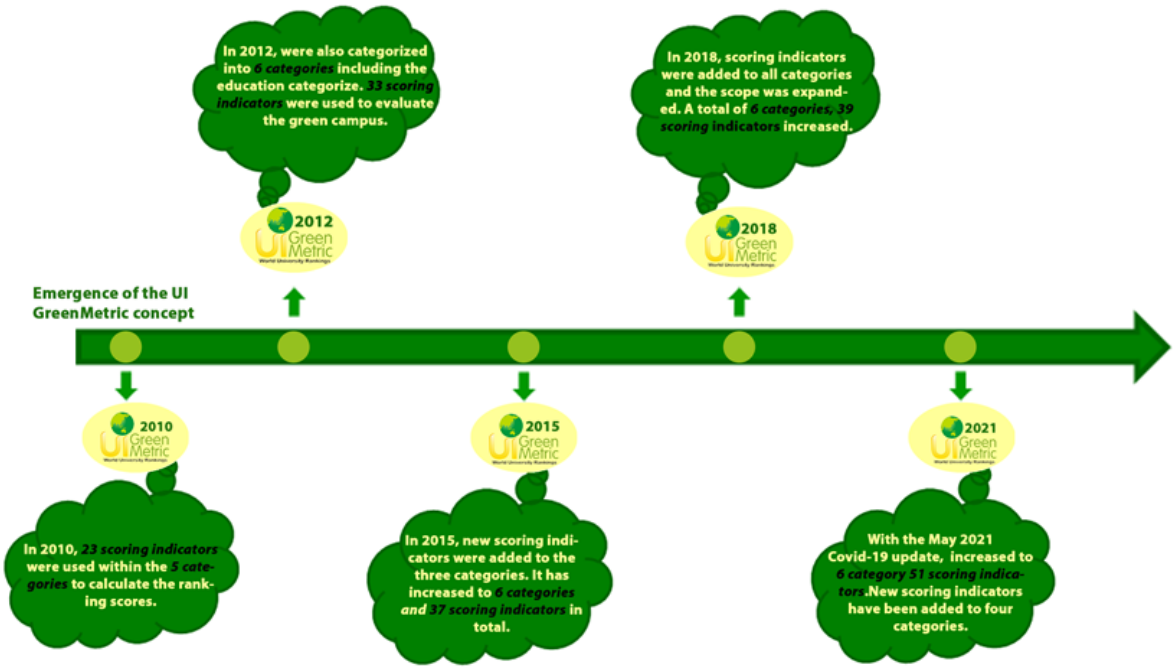

Figure 4: The Birth of UI GreenMetric and Its Development in the Historical Process

Linked to the variation of criteria through the years, the expectations from universities can be listed as follows;
Preservation and increase in green space,
Water and energy savings,
Application of recycling policies for waste,
Reduction in the number of vehicles on campus,
Transition to zero-emission transport use,
Inclusion of renewable technology studies,
Presence of energy-efficient settings,
Lowering total carbon emissions through improvements in terms of sustainability.
Simultaneous sustainability of 6 categories in universities in the process of combating the Covid-19 pandemic.

Benefits of "UI GreenMetric with Covid-19 Update" Measurement System

One of the leading benefits is the increased international recognition of universities with this measurement and ranking system. Additionally, this system created a global network of all universities included increasing awareness of sustainability topics within the campus and in the long term social change is planned to occur.

The benefits for universities of inclusion in the UI GreenMetric measurement system can be summarized by the following items [20];

- **Recognition on an international platform:**
  It ensures global display of all activities performed for environmental sustainability by universities participating in the UI GreenMetric, visits to websites with the aim of investigating university activities by institutions wishing to create a prepared environmental sustainability road map and is a tool for global recognition of universities allowing contact when necessary.
- **Perspective on campus quality of life:**
  Adoption of green campus policies by inclusion in the UI GreenMetric measurement system is thought to create positive observations in terms of the view of campus by society.

- **Increased awareness about environmental sustainability topics:**
  Universities are very suitable institutions to create awareness in very different categories. Inclusion of universities, which lead society in their region in every sense, in the UI GreenMetric measurement system has an important place in creating and increasing environmental awareness among society especially.
- **Selection Priority:**
  Inclusion of universities in the UI GreenMetric measurement system and pioneering green campus practices are predicted to be a determinant factor in terms of student acceptance and selection processes between universities by students.
- **Social Change:**
  The target is to encourage change in the long term in order for universities to implement environmental awareness activities related to environmental problems on a global basis.
- **Creating a communication network:**
  Universities included in the UI GreenMetric measurement system become members of the "UI GreenMetric World Universities Ranking Network". Due to this network, they must share the best environmental sustainability practices during inclusion in the competitive environment about development and implementation of criteria.
- **5R sustainability on campus:**
  For sustainable management of all types of recyclable waste, the 5R (refuse, reduce, reuse, recycle, rot) principle must successfully become a part of life on campus.
- **Renewable Energy Strategy:**
  Sustainable energy management and increasing the use of renewable energy are integrated into campus life.
- **Renewable Water Management:**
  Recycling of green water and gray water ensures sustainability of the water cycle within campus and thus unnecessary use of drinking water is limited.
- **Carbon (C) Footprint Management from local to whole country:**
  Universities integrated into the UI GreenMetric system ensure long-term success in sustainable C footprint management.
- **Developing Policies to Cope with Possible Pandemic Processes and Sharing them with Universities in the UI GreenMetric Network:**
  Sharing between universities that are members of the UI GreenMetric network will play an important role in managing the Pandemic process in the most effective and fastest way.

Basic Categories and Points for "UI GreenMetric with Covid-19 Update" Measurement System

Setting and Infrastructure category performs assessment of the area where the university is located and targets increases in total green space.

Energy and Climate Change category assessment is based on production and consumption of renewable energies. The target is popularization and development of renewable technologies.

Waste Management category assesses separation of waste sources, separate collection and recycling/disposal topics targeting minimization of waste.

Water category targets reduced water use and increased use of gray water (treated water).

Transport category was seriously revised in recent years, and encourages reduced use of private vehicles on campus and increased use of ring services.

Education and Research category targets increased sensitivity and awareness by including topics related to environmental sustainability in lessons, publications, research and activities [14].

As can be seen in the figure below attempting to summarize the **UI GreenMetric** measurement system visually, the **indicators** given points for each **category** are [19];

The maximum points table for the **Setting and Infrastructure Category** with **15%** share are (200*+100*+200*+100*+200*+200+**100***+**100***+**100***+**100***+**100***=1500 Points) with every university entering the ranking receiving **≤ 1500 Points** in this category.

The maximum points form for the **Energy and Climate Change Category** with **21%** share is (200+300+300+300+200+200+**200***+**200***+**100***+**100***=2100 points) with each university entering the ranking able to receive **≤ 2100 points.**

The maximum points for the indicators in the **Waste Management Category** with **18%** share are (300+300+300+300+300+300=1800 points) with each university entering the ranking able to receive ≤ **1800 points** in this category.

The maximum points for indicators in the **Water Category** with **10%** share are (200*+200*+200+200+**200***=1000 points) with each university entering the ranking able to receive ≤ **1000 points** in this category.

The maximum points for indicators in the **Transport Category** with **18%** share are (200+300+200+200+200+200+200+300=1800 points) with each university entering the rankings able to receive ≤ **1800 points** in this category.

The maximum points for the indicators in the **Education and Research Category** with **18%** share are (300+200*+200*+200*+200*+200+100+**100***+**100***+**100***+**100***=1800 points) with each university entering the ranking able to receive ≤ **1800 points** in this category.

Note: Asterisk (*) indicates new scorings indicator in 2021

Green indicates new May 2021 Covid-19 update

The total points for indicators in all categories are 10000 (1500+2100+1800+1000+1800+1800=10000 points), with world universities entering the ranking according to their total points.

Figure 5. UI GreenMetric with May 2021 Covid-19 Update Categories and Scoring Indicators

Assessment of Status of Turkish Universities in "UI GreenMetric" Ranking

With high young population rate and growing education sector in Turkey, both in the context of universities gaining competitive power in the national and international field and to increase, develop and popularize sustainable development in the country in general, sustainability in higher education has critical importance. Universities comprise one foot of the tripod between **education**, **business** and **state** for both students and graduates and academics and administrative stakeholders. For this reason, the effects of the ranking process on stakeholders cannot be ignored in relation to continuation of the sustainable development of Turkey [21].

The number of universities from Turkey entering the ranking in the UI GreenMetric measurement system and awareness appear to be increasing every year. In Turkey in 2021, there are a total of 207 universities including 129 state universities, 74 foundation universities and 4 foundation vocational high schools [22].

While Bilkent University was included on the list in 2010 when the first ranking was performed, 56 universities had entering the ranking abiding by criteria in various categories by 2020.

Table 1. Top 10 Universities in Turkey According to UI GreenMetric Ranking [GreenMetric 2020 Ranking]

			MAJOR CATEGORİES					
Rank	**Universities**	**WUR*/ TP****	**Setting and Infrastructure**	**Energy and Climate Change**	**Waste Management**	**Water**	**Transport**	**Education and Research**
1	**Istanbul Technical Uni.(ITU)**	**71 / 7800**	**1050**	**1225**	**1575**	**850**	**1475**	**1625**
2	**Middle East Technical Uni.(METU)**	**103 / 7500**	**1125**	**1150**	**1200**	**825**	**1525**	**1625**
3	**Erciyes Uni.(EU)**	**142 / 7175**	**1100**	**1250**	**1200**	**750**	**1375**	**1500**
4	**Ozyegin Uni.(OU)**	**143 / 7175**	**825**	**1175**	**1375**	**650**	**1450**	**1725**
5	**Cyprus International Uni.(CIU)**	**148 / 7150**	**975**	**1400**	**1125**	**825**	**1475**	**1350**
6	**Ege Uni.(EU)**	**165 / 7050**	**1075**	**1175**	**1200**	**700**	**1425**	**1475**
7	**Aksaray Uni.(ASU)**	**186 / 6900**	**1025**	**1150**	**1575**	**475**	**1275**	**1400**
8	**Hitit Uni.(HITU)**	**208 / 6700**	**900**	**1400**	**1800**	**400**	**1425**	**775**
9	**İzmir Institute of Tech. (IZTECH)**	**217 / 6675**	**1175**	**1175**	**1350**	**575**	**1475**	**925**
10	**Yildiz Technical Uni.(YTU)**	**244 / 6425**	**800**	**975**	**1050**	**800**	**1525**	**1275**

*World University Rankings

**Total Point

CONCLUSIONS AND RECOMMENDATIONS

In terms of ensuring sustainable development in developing countries like Turkey, the **UI GreenMetric** measurement system is a highly important certification system which ranks universities. In fact, this network creates a serious competitive environment in the name of reaching the upper ranks among universities on a global basis. In areas with competition, it is unavoidable that quality scoring indicators will increase.

Based on all these categories and scoring indicators, some recommendations can be summarized as follows in order for universities to enter the upper ranks of the UI GreenMetric ranking system and to continue sustainable development;

- Increasing the number of green settings on campus, preserving and expanding green space and improving infrastructure will support low C emissions and strengthen the sustainable Green Campus motto of the university while increasing future points for settings and infrastructure/energy and climate change categories.
- Due to global environmental problems, integrating the state policy of **zero waste** systems in universities is mandatory. For this reason, integration and sustainability of the **zero waste** system (minimization of waste, preventing of waste at the source, separation of waste at the source, separate collection, recycling/disposal, composting, chemical/hazardous and medical/pathologic waste disposal, etc.) will also ensure serious points increases for the waste management category.
- The reuse (irrigation water, cleaning purposes, etc.) of gray water (used domestic wastewater) and green water (rainwater) by collection with appropriate methods at suitable points will comprise added value in the name of water savings and recycling of waste water and thus will simultaneously increase points in the water category.
- Reduction in the use of private vehicles within the campus and selection of ring services, along with opening bicycle paths to encourage bicycle use, will cause a fall in the dimension of C footprint and increased points in the transport category.
- Organizing periodic training to inform academics, educators, administrative personnel, other personnel in the university and students about sustainable development and increase environmental awareness will ensure development of social responsibility while supporting increased points in the education category [23-26].
  Thus, each individual in the university will see themselves as a part of a system and expend efforts to fulfil their responsibilities.
- All education programs and lesson curricula in universities should integrate lessons like sustainability, **social sensitivity, environmental awareness** and **social responsibility** in the name of sustainability of solutions to environmental problems.
- Student clubs based on volunteerism should be given all types of support to increase environmental consciousness and awareness (social sensitivity projects) and to organize activities.
- Universities should attach the same degree of importance to all scoring indicators in each category without regard to point intervals. In fact, only universities achieving homogeneous points in each category will succeed in sustainable environmental management in a true sense.
- "National sustainable green campus platforms' should be created and membership of these platforms should be ensured for the relevant units in universities.
- Universities following developments related to sustainability internationally, with active participation, being members of these organizations and continuously up-dating themselves will assist in stepping closer to national and global targets.
- Thanks to the UI GreenMetric May 2021 Covid-19 update; It is foreseen that the sustainability of the education-training program and research policies of universities can be managed with the least possible damage.

A lower limit in order to enter the UI GreenMetric measurement system will create a competitive environment which will increase activities in order to obtain better points for universities in the ranking. Additionally, lower limits for each criterion will ensure a homogeneous distribution for all categories and support a more effective and just ranking.

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