

Bursa Uludag University's Contribution to the Society with Sustainability Projects

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Abstract. Universities bring solutions to society's problems with academic research and education and by raising leaders who would be role models. There are more than 8 million university students in Turkey. Approximately ten percent of the population is university students in Turkey. Therefore the positive influence of sustainability projects at universities will be undeniable. Bursa Uludag University (BUU) is a large state university with over 60 000 students and 6 000 staff. The BUU Sustainable Campus Project was launched in the April of 2021 with the sustainability vision of "Being a university that lives sustainability in all activities such as research, education and campus operations." This paper aims to present the contribution of BUU's sustainability efforts to the social cohesion between the university staff and students and among the members of the society and city. BUU's short but significant journey towards sustainable development will be shared in this regard. Several projects such as seed balls, ecological gardens, waste-to-art, an introduction to sustainability, a walk for the environment, no elevators day, rainwater harvesting, and corporate sustainability expert program will be presented to this aim.

1. Introduction

Universities are not just education institutions where students study for degrees and academic research is done. They are also institutions to influence the well-being of society by making proper examples of both social and physical environments along with educational ones.

Global environmental challenges and the need to establish sustainable development have become urgent since the United Nations Conference on the Human Environment was held in Stockholm, Sweden, from June 5–16 in 1972. It was the 1990s when universities decided to take more responsibility in establishing sustainability in higher education and society. In 1990, in Taillores, France, Taillores Declaration was signed by university presidents, chancellors, and rectors as a commitment to environmental sustainability in higher education [1,2]. This declaration was the first official statement made by universities for sustainability. As of 2021, 520 university leaders in over 50 countries signed this document [2]. It is a ten-point action plan for incorporating sustainability in university operations, teaching, and research stating, "University leaders must initiate and support mobilization of internal and external resources so that their institutions respond to this urgent challenge" [1]. In 1993, 90 universities across the globe signed the Kyoto Declaration, which underlines the role of the university in partnering with all segments of society [3]: "To cooperate with one another and with all segments of society in the pursuit of practical and policy measures to achieve sustainable development and thereby safeguard the interests of future generations."

The role of education in sustainable development was also on the agenda of subsequent international conferences, such as the United Nations (UN.) Earth Summit of 1992 in Rio, the UN Millennium Summit in New York in 2000, and in 2015 UN General Assembly, where the sustainable development goals were finalized.

As stated repeatedly in many declarations and international forums, universities play a fundamental role in obtaining societal change and environmental improvements. Therefore the activities of the university should be organized towards sustainability, ecologically sound, and socially just while governing a balanced economy. These concepts should not only be emphasized in the curriculums and research but the critical operations of the university. Since the necessary activities of sustainability, such as water usage, energy consumption, procurement, restoration and improving carbon sinks, food management and many others, necessitates all segments of the public, the university should improve connections with the local community and region. Universities may have multiplier effects on society by implementing best practices in sustainability [4, 5].

Several researchers investigated the integration of sustainability into university operations. Ralph and Stubbs (2014) [6] investigated the factors that influence the integration of sustainability into the operations, teaching, and research activities of universities in Australia and England. They underlined the importance of individuals committed to sustainability goals [6]. They listed the critical factors in embedding environmental sustainability into universities [6]: a strong policy environment, resourcing of strategies, encouragement of leaders, and environmental sustainability advocates. According to McKeown et al. (2002) [7], a sustainable university will need three elements to function: sustainable development orientation integrated into university activities, education about sustainable development, and education about sustainable development in society. However, this is not as easy as it is told. One reason is that faculty staffs, highly significant in this transformative process in universities, still perceive sustainability as peripheral to their functions [8]. Sometimes they do not have the essential information about sustainability [9]. Therefore continuous training and routines contribute to the movement toward the institutionalization of sustainability activities and to following up the process in universities [10].

2. Universities and Sustainability Activities in Türkiye

The Council of Higher Education is the highest supervision body for the higher education system in Türkiye. The council is responsible for the planning, coordination, and governance of the higher education system in Turkey. The numbers of public and private universities are 129 and 75, respectively. According to 2021 records, the total number of students studying at Turkish universities accounts for 8,296,959, which is almost 10% (%9.8) of the total population in Türkiye [11]. The population of Türkiye is 84,680,273, according to the 2021 census [12]. Approximately 92% of the students study at public universities.

Tanç et al. (2022) [13] investigated the sustainability activities of universities in Türkiye and found that 72% of public universities make efforts toward sustainability. The subjects of the sustainability activities common among Turkish universities are zero waste and green spaces. According to the researchers, the other categories rarely studied include cooperation with partners, energy, curriculum, and sustainability policy development [13]. Only seven universities among all published sustainability reports; the researchers [13] associate this situation with the lack of a standard sustainability report template by the Higher Education Council.

Bal et al. (2022) [14] investigated the interest of Turkish universities in sustainability indexes such as GreenMetric. In 2010 only one Turkish university was included in the GreenMetric ranking; in 2014, 10 universities were in the ranking. In 2020, 55 universities were included in the list.

3. Efforts of Bursa Uludag University towards Sustainable Development

Bursa Uludag University launched the Sustainable Campus Project in April 2021, defining its sustainability vision as "Being a university that lives sustainability in all activities such as research, education and campus operations." The university included "being a leader in environmental protection, sustainability, and restoration" into its core values.

Bursa Uludag University set the goals for sustainable development as follows (Figure 1):

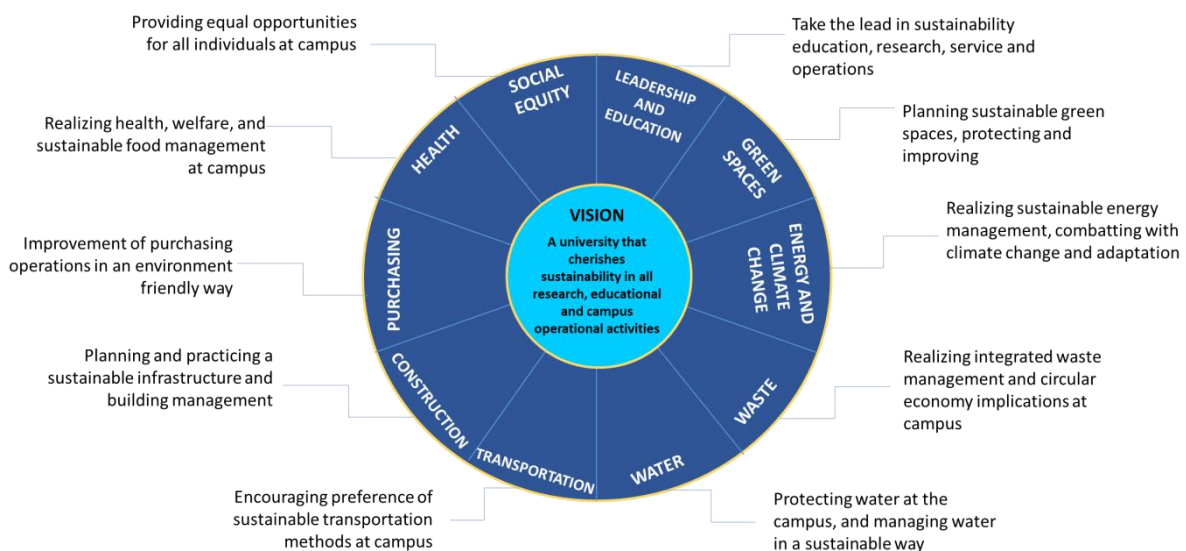


Figure 1. Goals of Bursa Uludag University towards Sustainable Development

Several commissions are/will be established to plan toward the goals. The institutional structure adopted to coordinate, monitor, and report the sustainability activities at the campus, is shown in the figure below (Figure 2):



Figure 2. Institutional Structure to Organize Sustainability Studies at the University

Sustainable Development Board will strategically orient the sustainability activities at the campus and monitor the performance and policies of the university departments towards sustainability. The board will be chaired by the university rector, the top decision-maker at the university. The board will comprise the commission's representatives working towards the university's specific sustainability goals. The names of the commissions are as follows:

1. Sustainability Education and Research Commission
2. Sustainable Green Spaces Commission
3. Sustainable Energy Management and Climate Change Commission
4. Circular Economy and Waste Management Commission
5. Sustainable Water Management Commission
6. Sustainable Transportation Commission
7. Sustainable Construction Commission
8. Sustainable Purchasing Commission
9. Sustainable Health Management Commission
10. Social Equity Commission

Commissions will be composed of the university's academic and administrative staff who work on associated topics. The Office of Sustainability will coordinate the Sustainable Development Board.

Bursa Uludag University has large green areas, some of which function as carbon sinks. The total area of the main campus is 14.41 km² (14411513.8 m²). More than 55% of these fields are covered with forests. The distribution of the sites at the Main Campus of Bursa Uludag University is shown in Table 1 and Figure 3. The distribution of green spaces at the campus is shown in Figure 4.

Table 1. Distribution of the Areas at the Main Campus of Bursa Uludag University

Category	Square kilometer (km ²)	Square meter (m ²)	% in the total
Forests	7.98	7977737.0	55.4
Garden & Arable Field	3.74	3740000.0	26.0
Roads	0.28	281939.0	2.0
Settlement & Buildings	0.18	180203.0	1.3
Parking Area	0.13	131149.0	0.9
Irrigation Pond	0.09	90065.0	0.6
Sports Space	0.06	60918.0	0.4
Other	1.95	1949502.8	13.5
TOTAL	14.41	14411513.8	100.0

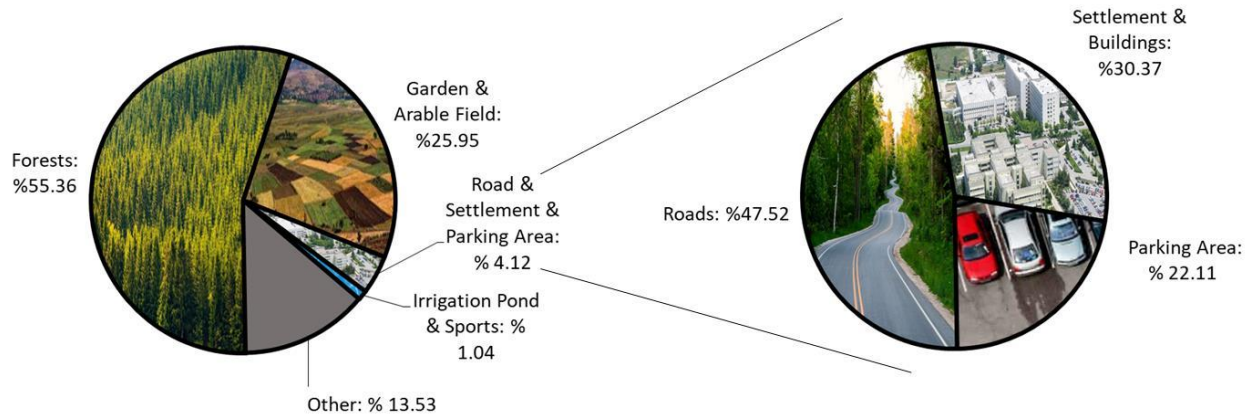


Figure 3. A Schematical View for the Distribution of the Areas at the Main Campus of Bursa Uludag University

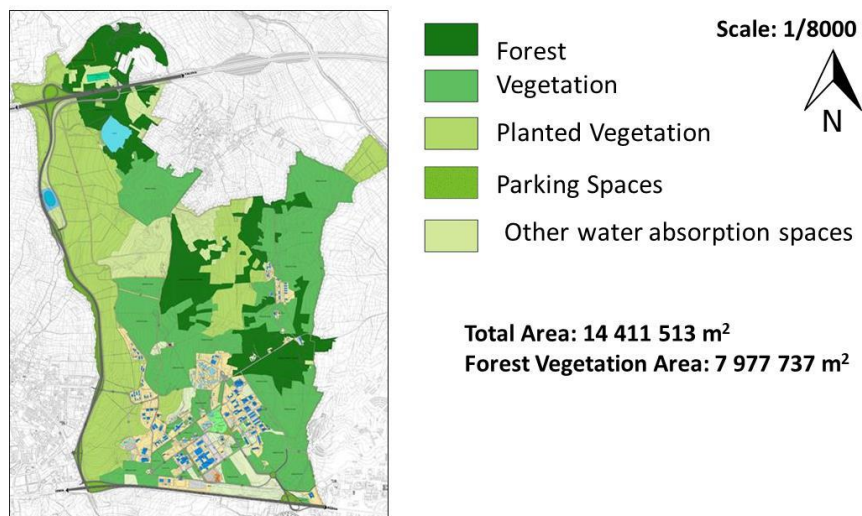


Figure 4. Green spaces at Bursa Uludag University Campus

We calculated the total carbon wealth of the forest biomass at the campus according to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol 4 Agriculture, Forestry and Other Land Uses (AFOLU). Accordingly, the following results were obtained (Figure 3):

- Total C wealth of the biomass at the campus: 9857,74 tons C
- Annual Carbon absorption by the biomass at the campus: 326,03 C/year
- CO₂ yearly equivalent of the absorption: 1195,44 metric tons

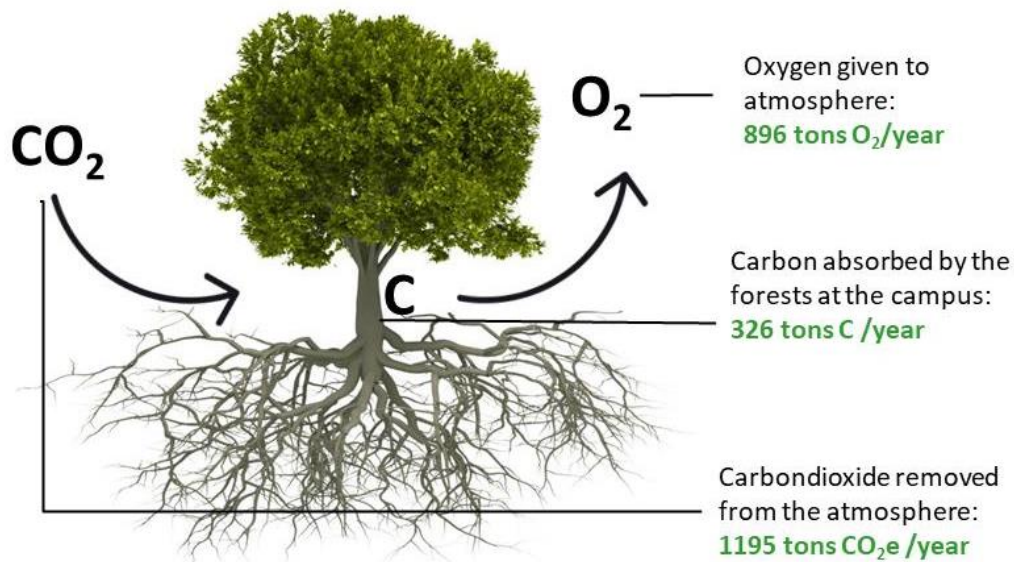


Figure 5. Carbon absorption levels by the sinks at the campus

4. Sustainability Projects Contributing to the Society

4.1. Project name: Waste Collection and Conversion at the Campus

The total area of the main campus of Bursa Uludag University is quite large, almost 14.41 km². Keeping this large area clean is challenging if it is only left in the hands of the responsible staff. The pollution is primarily a result of the unthoughtful behavior of the campus community. Therefore, we launched an awareness-raising project on waste reduction and proper waste management for the campus community. We also believed that the campus community members would take the experience of this action into their lives and be models for their social environment. The components of the Project were the following:

Step 1: We asked the campus community to take photos of the polluted regions of the campus area and send them to our office (BUU Sustainable Campus Coordinatorship) by stating the location of the polluted place. We organized the waste collection points according to these photos and locations.

Step 2: We asked the campus community to write their feelings when they see such polluted places and send them to our office. We used these expressions in our information brochures, leaflets, and presentations.

Step 3: We organized a workshop to convert recyclable materials into objects or art products for a group of volunteers from the campus community. Professors supervised the volunteers by advising on converting waste into art objects. Photos from the workshop can be seen in Figure 7.



Figure 7. Views from the workshop: Volunteers brainstorm on converting waste materials into artifacts under the supervision of professors from the Art Department.

Step 4: Waste collection at the campus. We met with the campus community and local community members in front of the rectorate building to launch the waste collection event. Rector and vice-chancellors also participated in the waste collection activity. The attendants were provided with gloves and waste bags. Students led five groups to visit different campus regions and collect waste in these regions. At the end of the waste collection activity, the waste was weighed and analyzed to see the fractions and given to the waste recycling company. The volunteers separated some of the recyclable waste collected at the second-day event. Photos from the event are shown in Figure 8. More than 150 people joined the waste collection event.



Figure 8. Photos from the waste collection event

At the waste collection event, approximately 169 kg of waste was collected from the campus. The composition of this waste was analyzed and given in Figure 9.

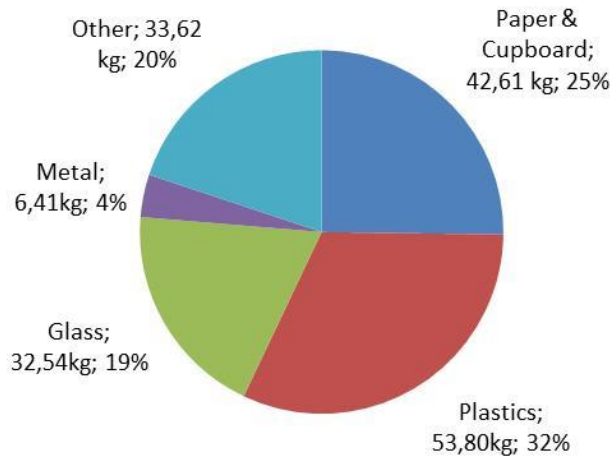


Figure 9. Distribution of waste components collected at the event by weight

Step 5: "Waste to art." We met at the congress center of the university. Several campus community groups worked on converting the recyclable wastes into art objects at the lounge. We organized a half-day seminar for awareness-raising on waste reduction and shared the findings, photos, and written expressions on pollution. Several professors and students made presentations at the seminar. The titles of the presentations were "wastes and our lives," "waste management hierarchy," "wastes in the food chain," "projected waste management at the campus," "the dreams and targets of the Sustainable Campus Student Club" and the statistics of the waste collection event. Animation films on waste reduction were exhibited following the seminar presentations. One of the student club members played her musical composition for climate change on the piano. The program continued by visiting the workshops in the lounge to see the art products generated by recycling the collected waste. A group of volunteers produced musical instruments from recyclables and gave a mini-concert involving the audience. Among the exhibited products were several wooden sculptures, which were made from biomass from the trees at the campus. The event volunteers also made a wish tree from the tree wastes within the campus. The attendees of the event wrote their wishes and hung the tree. More than 200 people attended the event. Figures 10-17 show several aspects and photos from the action day.



Figure 10. Photos from the conference hall



Figure 11. A student group and their professor experimenting with how to obtain hydrogen from waste aluminum



Figure 12. Sculptures from waste woods exhibited (lounge)



Figure 13. A contribution from a professor as an example of using recyclables exhibited (lounge)



Figure 14. Instruments made from recyclables and a mini-concert (secondary school students from the close neighborhood also attended the event and the mini-concert) (lounge)



Figure 15. Contributions of primary school students from the close neighborhood to the event (Primary school students made pictures for our event, and we exhibited them in our presentations),

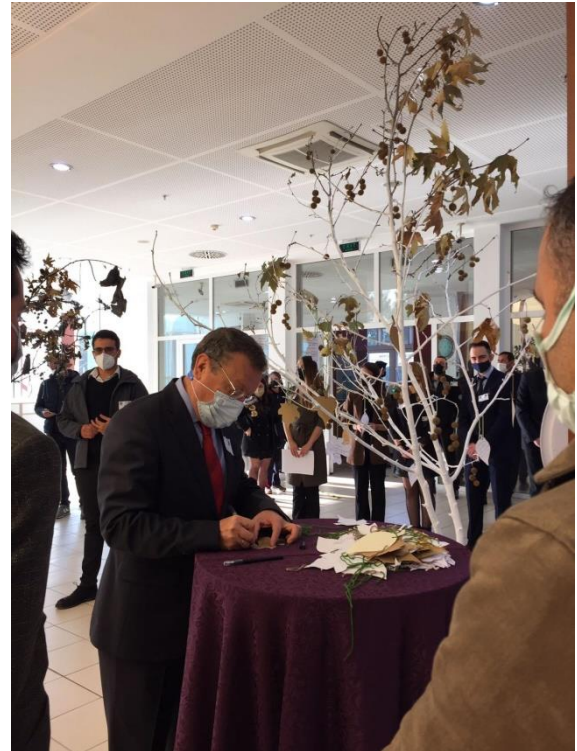
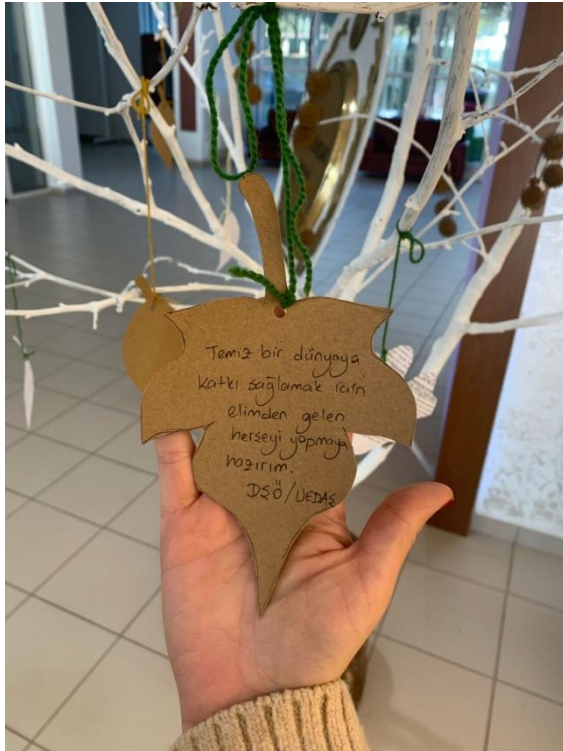


Figure 16. Wish Trees from Waste Woods (lounge)

The action was announced on official university web pages and sent to e-mails of the university community comprised of more than 60.000 students and 7.000 staff. The action was also announced on BUU's social media. Office of Sustainability. Members of the student club of BUU. Sustainable Campus Project also shared the action on their individual social media accounts. Several primary and

secondary level students and teachers in the neighborhood were also informed and invited to the action. Reminders of the action were also sent to the campus community. Several local newspapers were informed about the event. There are also many other social media announcements about the events. The students shared photos, certificates, etc., from their social media accounts.



Figure 17. Newspaper news about the Project

The following components made our action original and innovative:

1. The preparation steps of the action, which involved taking photos and producing written expressions on waste pollution,
2. The participatory approach followed during the development of the action,
3. Increasing numbers of the students showing a willingness to participate in the action during the preparation stages (the action provided the volunteers with a space to share and take part in waste management),
4. Production of art objects from the collected recyclable waste on the first day of the action,
6. The written expressions of the participants and photos were converted into informative leaflets and brochures as a result.
7. The event collected the campus community in such a social and environmental event.

This Project was not an isolated waste collection event; it was an awakening project at the same time. The components of the action included expressing the feelings occurring because of the polluted sites at the campus, questioning the reasons for this waste pollution at such a place with high educated society, and recommendations by the campus society on how to end this pollution. The top administrators of the university, rector and vice-chancellors, attended the action. There was an opportunity to show the situation at the campus with photos and derive an action plan for pollution prevention based on the findings. The action was planned and developed with a participatory approach between professors, students, and the university's administrative staff. All of them were volunteers. Waste leaders were selected among the volunteers. The Project started an environmental movement between the campus community and the local community that will last long and will inspire new actions. The action suits environmental and social development goals by doing community work together, sharing, and encouraging sustainable development. This outreach action helped us to create unity between our employees and the community of which we are a part. The action reached many people. More than 200 people actively participated in the action. More than 20000 people heard about the action. The feedback from the participants was always positive, stating the power of the event, which made the participants think about why we generated those wastes.

4.2. Project name: Seed balls for the Environment

A seed ball is a mini ecosystem, protecting your seeds from birds, ants, and slugs and giving them nutrition as they germinate and grow. A seed ball is a cost-effective valuable technique for revegetating large areas of arid regions [15]. They provide burying conditions without the need to dig a hole for each seed. Seed balls are scattered throughout degraded lands and will sprout when it rains and conditions are just right for germination [15].

We wanted to contribute to the biodiversity at the campus when planning this Project. We invited the campus community and the local community not to throw away the seeds that remain after consuming fruits and collecting them instead. The steps of the Project were announced both to the campus community and the local community as follows:

1. Step 1: We announced our Seedball Project and invited the local community to participate. We gave two months after announcing the Project to collect the remaining seeds after consumption of the fruits.
2. Step 2: We asked them to bring the seeds to our collection point at the university.
3. Step 3: Seedball Workshop: We invited both the campus community and the local community to join us in making seed balls from the seeds we received.
4. Step 4: Seedball Scattering: We identified the empty spaces at the campus and invited the campus community and local community to join us in scattering the seed balls throughout the suitable areas at the campus.

Figures 18-20 show several activities of the Seedball Project.



Figure 18. Seeds sent by the local community for the Project



Figure 19. Seedball Workshop



Figure 20. Scattering the Seedballs

4.3. Project name: A Walk for the Environment

This is a traditional project of Bursa Uludag University. Every year on World Environment Day, we organize a walk on the campus to remind the importance of the environment and sustainable development goals. This year we celebrated World Environment Day and World Bicycles Day on June 3, 2022. We also organized an opening ceremony for the new bicycle park established at the campus. Then we walked through the forest of the campus to enjoy nature. The bicycle park project was a collaborative project between the university and the district municipality. We invited the district residents and our city partners to the Walk we made. Figure 21 shows several activities of the Walk for the Environment project.



Figure 21. Several activities of the Walk for the Environment project.

4.4. Project name: Ecological Gardens

The Ecological Garden project of the Agricultural Faculty of Bursa Uludag University aims to bring the university staff together with the soil, plants, and nature. The students planted one of the 112 ecological gardens of 60 square meters. The irrigation of the gardens is supplied with the harvested rainwater at the university pond with the drip irrigation technique.



Figure 22. Ecological gardens planted by the campus community and their relatives



Figure 23. Opening ceremony of the ecological gardens

5. Conclusions

Wright (2010) [16] in-depth interviews with university presidents (rectors) and vice-presidents from Talloires Declaration signatory universities in Canada and found that the most significant constraints to moving toward sustainability reported are financial predicaments, lack of understanding and awareness of sustainability issues amongst the university population, and resistance to change.

Those findings are valid for the universities in Turkey. The financial barriers are significant constraints to pursuing sustainability initiatives at Bursa Uludag University. New renewable energy investments or new energy-efficient smart buildings necessitate a considerable budget. However, many sustainability initiatives can still be implemented if the effort is put into improving partnerships not only within the campus but outside the campus as well. What we value more than finance is the partnership establishment.

The sustainable mobility initiative of Bursa Uludag University is financially supported by the district municipality and metropolitan municipality, for example. The district municipality worked on bicycle stations for the university, and the metropolitan municipality connected the public transport lines to the university.

The awareness-raising campaigns did not necessitate an exhaustive budget, and the equivalent resources of the university (such as conference rooms, university shuttle, staff, press connections, etc.) were voluntarily dedicated. It is very difficult to measure the effect of a university's sustainability projects on society. However, it can be said that the voice of sustainability was heard even in a very short time.

The sustainability of The Sustainability Project of the university needs dedication and an ongoing effort with perseverance. There will always be a certain level of resistance to change and a lack of awareness regarding sustainability; however, the determination of the rector and a leading dedicated sustainability office would be the key to launching and maintaining sustainability efforts even without the financial resources.

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