

Closing the Loop: A Campus-Wide Waste Minimization Initiative Through Education for Sustainable Development

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INTRODUCTION

The main campus of IIUM in Gombak, Kuala Lumpur, is located in a valley of the district of Gombak, a suburb of the capital city. The 2,832,799.5 sqm campus houses 30,700 students, academics, and administrators all together. From that size, about 1,002,700.00 sqm or 35 % is the forest vegetation. Hence, it has important ecosystem functions as carbon sequestration to mitigate global warming effects. The campus provides complete education building, infrastructures and facilities, student's dormitory, and residential houses. About 3,246,478 kg of total solid waste generated from the campus population in the year 2019. This is equal to 0.290 kg per person per day compared to the National average of 0.5 to 0.18 kg per person per day for the same year. However, this amount manifests in the high amount of carbon emitted which recorded about 3.8 million tons of carbon dioxide equivalent (MTCO₂e) of landfill methane produced from waste generated on campus.

WASTE COMPOSTING PROGRAM

The food waste composting program is started as a Go Green Initiative to reduce food waste generation and produce compost as a value-added product. Hence, it demonstrates the full loop of circular economy in the context of food waste to compost (Figure 1). The sustainability of governance is shown through the involvement of various internal stakeholders for the IIUM Campus Sustainability Initiatives. This partnership enhances

students and researchers' involvement on the full loop of the circular economy food waste framework (Figure 2).

The overall composition of IIUM municipal waste consists of 55 % of recyclable items and 45 % of food waste. Meanwhile, from the 1,460,915 kg of food waste generated at IIUM in 2009, only about 0.2 % or 64,929 kg of food waste were used for composting. On the contrary, it shows the untapped potential of food waste for composting. It is a challenge to educate the campus community to separate their food waste from the general waste in café. Other types of waste are still found in food waste before entering the composting process. The composting capacity needs to be improved to cater to most of the cafeteria at Mahallah. On top of the numbers described, the message from this initiative is that it requires a campus community-wide involvement to ensure the success of IIUM aspiration towards Zero Waste Campus. It needs a change in how we govern our waste and change the behaviour of the IIUM campus community towards sustainable consumption. Therefore, this initiative demonstrates the promotion of education for sustainable development, ESD approach in providing various forms of education.



Figure 1. IIUM Circular Economy of Food Waste

The overall activity of the circularity of food waste or 'From Fork to Farm' initiative is located in IIUM Gombak and Kuantan campus. The initiative covers several strategies and structures of activities which involves all communities; the academia who are the researcher and lecturers, the administrative staff, and the students as the biggest group community. Throughout their varsity years, students will be experiencing sustainable community practices which would later turn them into agents of change in society. The initiative is possible by providing the right or conducive environment for the campus community to change their behaviour, separate the food waste from the source.



Figure 2. Educational Awareness and Campaign for Zero Single-Use of Plastic

There are several facilities provided to accommodate the Zero Waste initiative at IIUM:

1. The IIUM Recycling Centre
2. Food waste separation facility at 50 café, canteen, and restaurants inside the campus
3. Food waste composting centre by the campus waste operator, IIUM Daya Bersih Sdn. Bhd.

To administer the whole process, the IIUM food waste composting research group led by the Kulliyah of Engineering developed the IIUM waste minimization guideline. The IIUM Zero Single-Use Plastic Campaign and food waste separation are led by the student EcoClub. Selected courses and research related to food waste conducted as part of the student and researcher's research activity contribute to campus sustainability living lab initiative. The waste minimization initiative provides a venue for students to learn the real-world issues related to sustainable development in their campus daily life. The use of compost for own consumption, such as community edible garden and landscaping to reduce the fertilizer procurement and improve soil quality and performance.

INVOLVEMENT OF VARIOUS STAKEHOLDER TOWARDS SUSTAINABLE DEVELOPMENT

As one of the Go Green Initiative, the food waste composting begins in 2016 under the Strategy Map 2016-2020 (Figure 3) of the Office of the Executive Director, Development and Planning. It is part of IIUM's sustainable campus vision and mission. The vision stated that 'We enVISION IIUM Campuses to be sustainable and Conducive for a Learning and Innovative Community based on Sustainable Development Goals' and the Mission stated 'To provide a sustainable campus environment which is liveable, safe, environmentally friendly and effectively functional'.

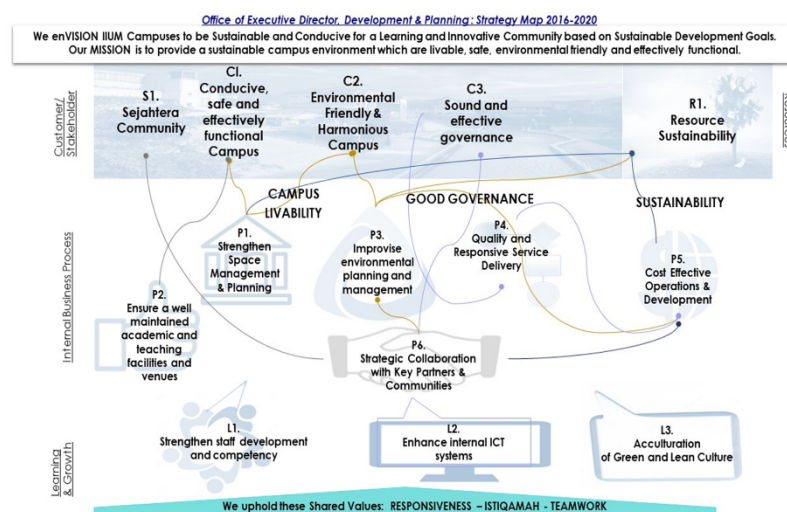


Figure 3. IIUM Office of the Executive Director, Development and Planning, Strategy Map 2016-2020

The IIUM Go Green Initiative was championed by IIUM Go Green Committee, which are represented by researchers from Kulliyyah of Engineering and the practitioners or

the technical staff from Development Division, Daya Bersih Sdn. Bhd. and Residential Service Department of IIUM, showcasing the trans-disciplinary approach of sustainability. Moreover, students' EcoClub involvement in the educational campaign on Zero Single-Use Plastic is another effort to support Zero Waste Campus Initiative (Figure 2). One of the University's core subjects is on waste management and students are able to practise the inputs from that subject onto real-world problems through class projects inside the campus. The introduction of Sustainable Development: Issues, Principles, and Practices (UNGS 1201) conducted by Sejahtera Centre for Sustainability and Humanity (SC4SH), functions to give awareness to the campus sustainability community wellbeing. At the same time, the Centre functions as a connector for the internal stakeholder to accelerate this initiative by being part of the University's transformational process (Figure 4). This is part of its function as a secretariat for Regional Centres of Expertise, RCE on Education for Sustainable Development, ESD.

The contributing and complementary action towards sustainability governance can clearly be visualised in various parts of the university. There are 85 lecturers involved in the University's core subject, UNGS 1201: Sustainable Development: Issues, Principle & Practices, which is an introductory course to Sustainable Development. About 1000 academic and administrative staff participated in the workshop of Insan Sejahtera and Taa'ruf Intellectual Discourse, TIDE program where there is the section on the introduction of the ESD, sustainable development goals, SDGs and IIUM campus sustainability initiative. The course shared about SDGs and inter-and trans-disciplinarily approaches of a campus sustainability initiative, i.e. food waste composting initiative. Apart from that, students are actively participating in the effort through EcoClub student organization which consists of members from various faculty or Kulliyyah. They are also involved in the Zero Single-Use

Plastic campaign as part of sustainable lifestyle. Members of the GoGreen Committee have regular meetings for the improvement of the program.

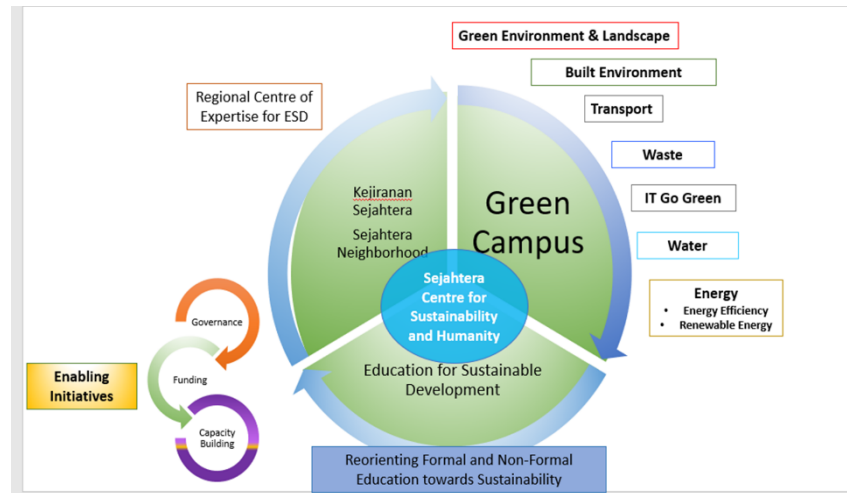


Figure 4. Three Main Functions of IIUM Sejahtera Centre for Sustainability & Humanity

Accelerating food waste initiative through ESD gives an example of how the coordination between the campus operation, education, and research accelerates the organizational transformation process, from the unsustainable practices towards the sustainable ecosystem.

ACHIEVEMENT AND SHOWCASE OF IIUM AGENDA

The main objective for the IIUM circularity of food waste is to reduce food waste production and generate valuable products from waste to protect our environment. The successes of this initiative are beyond what the data could record. The food waste reduction recorded above reflects the effort behind the food waste separation at source by the campus community and the process of compost production. Further, the 97% or MYR 41,500.00 saving from pesticide procured reflects a portion for our landscaping. In the context of Maqasid Shariah, the IIUM circularity of food waste signifies good life (Hayat al-tayyibah), being moderate (wasat) through responsible consumption and encourages harmony with nature and avoiding resource exploitation and wastage. In Quran (30:41) – “Corruption has spread on land and sea as a result of what people’s hands have done, so that Allah may cause them to taste ‘the consequences of’ some of their deeds and perhaps they might return ‘to the Right Path.” Avoiding wastefulness expressed in Quran 6:141- "But waste not by excess, for Allah loveth not the wasters" and in Quran 7:31 – "Eat and drink, but waste not by excess, verily He loves not the excessive". The circularity of food waste promotes good practices, reduces the use of pesticides, and uses its own composting which helps in regenerating the soil and improving our environmental quality. Conservation of the environment principles and human beings are warned not to misuse or damage the natural resources (Quran 7:31, Quran 6: 141). The campaigns for zero waste plastic and food waste separation align with these Ayat. Overall, to ensure ecological sustainability, it is vital to everyone to make sure that our activity does not jeopardize the environment.

However, the main objective of this initiative is not only focused to reduce waste generation. The development of human capacity has contributed to the effort of transforming

IIUM. Many of the campus sustainability initiatives have the potential to educate the community to practice sustainable living and ecosystem. These initiatives provide a platform for the IIUM community to experience how to live sustainably in the context of sustainable living and ecosystem. Providing the right facilities helps to create a conducive environment for behavioural changes coupled with the continuous awareness talk related to this activity through various ESD programs and activities to the campus community. This is either through food waste separation in café or restaurants inside campus or source separation for recycling and community gardening.

Sustainability governance demonstrates how we govern our food waste from waste separation, composting process, landscaping, and gardening. There is a connection between campus operation and action research where the researcher transfers the knowledge to the practitioner and where the practitioner shares the tacit knowledge in handling the composting to improve the compost quality and for the overall campus operation performance. This is how we achieve sustainable living status. In the context of ESD, we promote the experiential and transformative learning for the campus operator to be part of the University agenda, 'Humanising Education'. The initiative promotes the five components of the 21st century of learning, i.e.: Learning To Know (the development of skills and knowledge needed to function in this world e.g. formal acquisition of literacy, numeracy, critical thinking and general knowledge), Learning To Do (the acquisition of applied skills linked to professional success.), Learning To Live Together (the development of social skills and values such as respect and concern for others, and the appreciation of cultural diversity), Learning To Be (the learning that contributes to a person's mind, body, and spirit. Skills include creativity and personal discovery, acquired through reading, the Internet, and activities such as sports and arts), and Learning To Become (when individuals and groups gain knowledge, develop skills,

and acquire new values as a result of learning, they are equipped with tools and mindsets for creating lasting change in organizations, communities, and societies). This is where the community involved in this initiative can change themselves and others in the community.

THE WHOLE COMMUNITY TRANSFORMATION OF RCE GREATER GOMBAK

The main agenda for the whole community transformation of RCE Greater Gombak depends on the active participation of the community through various approaches of ESD. This should include not only the University but also the involvement of RCE Partners or stakeholders in the region. The vertical implementation of ESD involves Higher Education Institutions and schools and the lateral collaboration of sharing knowledge with the local government, local community, and private entity. Here it is referred to as the quadruple helix in the form of collaboration. This initiative contributes to strengthening the internal capacity of the IIUM as the secretariat of RCE Greater Gombak by implementing the RCE vision mission. Functioning as a demonstration site, IIUM showcases how a sustainable society looks like, through the circularity of food waste. The process involves food waste separation, food waste composting, landscaping, and community gardening. It showcases active participation from this initiative as part of the IIUM community co-learning experiences. Hence, it is part of the adult social learning that brings into the transformation of the University.

Having campus sustainability with its food waste composting provides a platform for the researcher to conduct their research and apply it for landscaping purposes or 'Testbed'. Students learn about the composting technique and the IIUM campus community indirectly contribute to the close loop of IIUM food waste composting and production. This action gives an example of how the applied research, scientific knowledge accelerates and improves campus operation. The tacit knowledge by the technical staff involved in IIUM Food Waste Composting Centre supports the overall process. Executing this initiative to support the whole university's transformational approach.

Through the implementation of the circularity of food waste, the IIUM community contributes to Goal 1 'To build a society that is socially resilient, culturally sustainable, environmentally friendly and economically viable'. One proverb describes, 'One cannot teach others while they did not practice what they preach' or A person must be capable to apply their teachings before teaching other people. Second Goals, by demonstrating the circularity of food waste as an issue with the inter and transdisciplinary approach, IIUM showcases how 'To establish the Real-world Lab platform which addresses cross-cutting issues, i.e. social, environment and economy by implementing transdisciplinary approach'. Overall, the project contributes to short term mission number one and three of RCE GG (Figure 5).

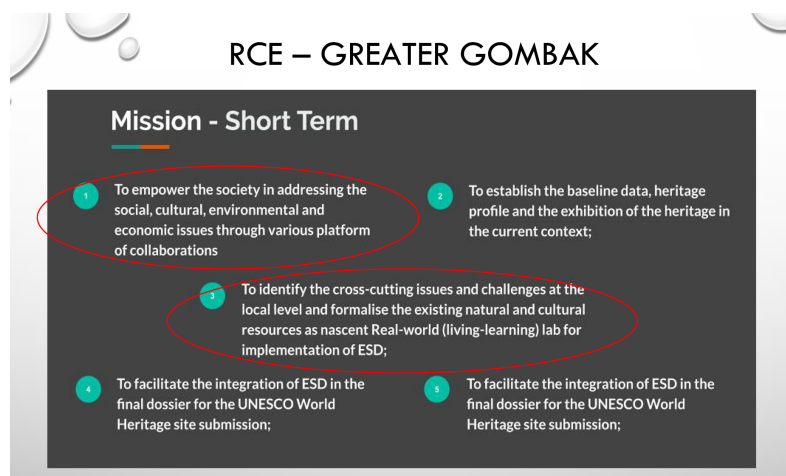


Figure 5. RCE Greater Gombak – Short Term Mission

From the perspective of the transformational organizational process, this is a process of building up the internal capacity of the sustainable community which has potential for the community of practices, CoP of IIUM Campus Sustainability. This creates a pathway of how the non-formal approach of ESD took place in the transformational process. However, more effort is needed to develop CoP in a more integrated approach.

The University's core subject, UNGS 1201 'Sustainable Development: Issues, Principle & Practice' creates another platform for the student to get involved in campus sustainability initiatives. This includes the circularity of food waste as a formal approach of ESD. SC4SH which is also the secretariat for RCE Greater Gombak, RCE GG as a network organization plays a crucial role in connecting the internal stakeholder by facilitating and introducing the ESD approach to the internal campus community through the various channels of initiatives mentioned above.

CONCLUSION

This concludes that despite the challenges faced by this initiative, the project demonstrates the five pillars of 21st-century learning of UNESCO. It shows the demonstration of the University's transformational process towards a sustainable ecosystem and sustainable living. The project is aligned with the aim of RCE Greater Gombak for Whole Community Transformation Towards Sustainable Society through the empowerment of the community for circularity of food waste, 'From Fork to Farm' towards sustainable development. The circularity of food waste initiative with the ESD approach that promotes inter-and trans-disciplinary in HEI is an illustration of how closing the loop of food waste provides a platform for potential CoP for transformative and experiential learning, the democratization of knowledge, and social learning with the Islamic values for IIUM campus sustainability.

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