



Analysis of strategy to raise awareness
on
Waste Management in Asia
within the project

**GREEN waste management new edUcation System for recycling and
environmental protection in asia / GREENUS**

WP2: Pilot Eco-Campus project

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1. Introduction – Country profile with respect to Waste Management

1.1 Vietnam

Urbanization, together with strong economic and population growth are causing rapidly increasing domestic waste volumes, with waste generation in Vietnam doubling in less than 15 years. The total amount of waste generated is estimated at over 27 million tons. With a forecasted growth rate in domestic solid waste generation of 8.4% per year for urban areas and a total growth rate of about 5% annually, the amount of waste is expected to grow to 54 million tons nationally in 2030.

Three key facts about the production of solid waste areas: (i) the total amount of waste is estimated in Hanoi to grow by 4.75% annually to 5.6 million tons per year in 2030; (ii) the total amount of waste is expected to grow annually in Phu Tho by 5.10% to almost 1 million tons in 2030; and (iii) in Hai Phong, which has a larger rural population, the total amount of waste is estimated to grow by 3.2% annually, reaching 1.15 million tons in 2030.

Vietnam has committed itself to move towards collecting, transporting and treating 100% of non-household waste by 2025 and 85% of waste discharged by households by 2025 in urban areas through its recently approved revised National Strategy on Solid Waste Management. Priority is envisaged to be given to large-scale treatment facilities using modern technologies with a substantial focus on recycling and upgrading landfills to prevent environmental and health impacts. Municipalities, regional and central governments, however, are currently struggling with the collection, transport, treatment and disposal of the growing waste streams. Vietnam has grown so rapidly and waste generation has increased so much, that the collection, transport, disposal and treatment systems and the financing for these systems, has been unable to keep up with the increased volumes of waste being produced:

- Current waste operations are labour intensive and inefficient; fees do not even cover the operational costs. Waste collection and transport is characterized by fine-grained and labour-intensive collection. Due to the lack of transfer stations, small waste collection trucks must travel substantial distances to the landfill sites. Both the labour-intensive collection and lack of transfer stations leads to relatively high collection and transport costs. The current real costs per ton of waste are estimated to be US\$24 for collection, US\$11 for transport and US\$4 for landfilling, with a total of US\$39 for Hanoi; while the average fee per household is VND 26,500/household/month or VND 218,630/ton (US\$ 9.7/ton) comprised of VND 172,600/ton (US\$ 7.6/ton) for collection and VND 46,030/ton (US\$ 2/ton) for transport. The difference between the costs of

waste management and the fees received are covered by the respective Provincial/City Peoples Committees.

- Waste recycling is dominated by the informal sector where processing of recyclables is carried out in craft villages without proper monitoring of operational practices, leading to significant pollution and health hazards to workers and environment. Vietnam is home to 2,800 craft villages that include not just those that make handicrafts for tourists, but many villages where industrial activities take place as well as those that specialize in recycling all sorts of discarded plastic, including from waste streams. The informal sector typically gathers the most valuable recyclables directly from households and at street level before the waste enters the formal collection channel. The informal sector separates, bales and sells the products to the processing industry, recycling about 10% of the domestic solid waste. Processing of recyclables is mostly carried out in these craft villages without proper regulation, monitoring and enforcement of operating practices. These activities lead to substantial pollution of air, water and land and cause serious health hazards for the workers. At the same time, craft villages provide considerable employment.
- There is low public awareness and insufficient access to a formal waste collection and recycling system, which leads to substantial illegal littering of wastes by households in the canals, lakes and paddy fields and on the beaches and in oceans. Some volunteer groups, such as "Keep Hanoi Clean" are devoted to citizen engagement initiatives to clean cities and raise the public profile of the solid waste issues, but this is not sufficient to avoid the accumulation of waste and plastics in the environment.
- Even for the waste that is collected by municipalities, most it is still disposed of in insufficiently designed and poorly controlled landfills causing significant environmental issues. There are 660 landfills in Vietnam receiving some 20,200 tons of waste daily. Out of these 660 waste disposal sites across the country, only 30% can be classified as engineered landfills with daily coverage of waste. The cities of Hanoi and Ho Chi Minh City (HCMC) have mega landfills covering areas of 85 ha and 130 ha respectively. Only 9% of the landfills have weighing scales and only 36% have a bottom lining. Most of landfills have no compactor, landfill gas collection, leachate treatment or environmental monitoring system and are poorly managed, mostly due to lack of funding. This is causing multiple environmental and health problems and risks particularly in areas with high waste generation levels and population density, including: (i) groundwater contamination having a direct impact on the water wells of the communities who are living around the landfills; (ii) contamination of surface waters through the discharge of toxic liquid wastes without adequate leachate treatment or as a result of poor operational practices; (iii) polluting air emissions from landfill gas releases or from

open waste burning; (iv) health risks, especially for the many scavengers; (v) animals (flies, cockroaches, rats) spreading illnesses; and (v) spreading of waste, particularly plastics, to surrounding environment and further into the river and ocean system.

- The uncovered waste and the large number of small, poorly located landfills/dumpsites together with the waste littered by households and incorrectly recycled in craft villages are the causes of plastics being blown by the wind over the rice fields, into canals and rivers and ending up on Vietnam's beaches and in the ocean. Land-based sources of poorly managed plastics are estimated to be responsible for 80% of the ocean plastics. The presence of plastics in coastal areas, beaches and other key natural tourism destinations, such as Halong Bay, causes substantial economic damage to Vietnam's tourism industry. These shortcomings in waste management are negatively affecting economic development and sustainable growth in Vietnam. The Asia-Pacific Economic Cooperation estimates the costs of marine plastics and debris to the tourism, fishing, and shipping industries to be US\$1.3 billion for the Asia-Pacific region.

1.2 Myanmar

Myanmar is rich in natural resources and is a global biodiversity hotspot. Myanmar's forests and fishing industry are two significant contributors to the economy, and yet these sectors are also potentially under threat from over exploitation and mismanagement. The management of solid waste, air pollution, and the use of plastics provides another growing challenge.

The actual amount of waste generated by households and industry is not known. There is no regular waste sampling and analysis carried out, and there is insufficient information on the exact waste collection coverage in different geographical areas. In Mandalay, information from the weighbridge at the controlled waste dumpsite that covers three townships suggests it receives 980 tons of waste per day and that the average waste generation is 0.8 kg per person per day. This waste is collected after the informal sector has taken out the recyclable materials. Based on international experience, the waste generation rate in rural areas is probably about 0.4 kg per person per day (50% of urban waste generation). This would result in a national average of 0.56 kg per person per day (60 % rural areas and 40 % urban areas) and follows internationally observed ranges for a lower-middle-income country averaging at 0.53 kg per person per day (Kaza et al. 2018). At a national level for Myanmar, 0.53 kg per person per day results in a nationally generated waste quantity of 10.5 million tons of municipal waste per year (or 28,850 tons per day). Out of this, 4,160 tons per day is estimated for Yangon (5.2 million people) and 1,120 tons per day for Mandalay (1.4 million

people) (Central Statistics Organization 2016). In addition, solid waste is rapidly increasing, and both the Yangon City Development Committee (YCDC) and Mandalay City Development Committee (MCDC) have prioritized solid waste management as a result.

Municipal solid waste is composed mainly of organic materials (77%), while the remainder comprises plastic (13%), paper (7%), and others (3%). This has been confirmed by observation and evaluation of the waste composition of Yangon and Mandalay (IGES and CCTE 2016). **The large organic fraction provides opportunities** for reducing the wastes going to the dumpsites. Based on the analysis of the landfill waste disposal data, it could be concluded that the waste collection coverage is about 53% in Yangon and 84% in Mandalay. Public cleanliness and insufficient waste collection are some of the main problems in municipal waste management due to the (a) limited public awareness of cleanliness; (b) lack of sufficient containers, especially for households, and as a result households put their waste in small (shopping) bags outside; (c) inadequately organized street cleaning as pushcart operators are acting both as street sweepers and waste collectors; and (d) the income from solid waste management services is insufficient to cover the costs of solid waste collection and disposal.

To increase the effectiveness of the waste collection, increasing the waste collection in cities to 100% should be a priority objective. Due to the low waste collection coverage, a substantial quantity of waste is illegally dumped, resulting in blocked drainage systems and creating extra work for the by Pollution Control and Cleansing Department (PCCD) to clean the drainage systems. In addition, to improve the efficiency of the expenditures and particularly optimizing the costs of waste collection, it is important that the planning of the routing of the collection equipment is done as efficiently as possible and that the areas of waste collection in the cities are substantially increased to achieve a 100% waste collection target.

Due to the current practice of open dumping of waste and the insufficient collection coverage and cleanliness, there are key environmental and operational issues:

- Landfills are almost at their full capacity, and their operation as an open dumpsite is not well organized.
- Waste dumping without any compaction in combination with steep slopes is a dangerous situation for waste pickers and reduces the landfill capacity.
- There is observed surface water and groundwater contamination from toxic waste components.
- There is potential impact of contaminated water on surrounding farmland.
- Leachate infiltration into the underground is environmentally hazardous and not acceptable regarding groundwater protection.

- Windblown light plastic material litters surrounding area.
- There is methane production, release of greenhouse gas, and potential for landfill fires.
- Solid waste disposal sites are a major source of diseases for nearby population, agricultural lands and workers, and waste pickers.

In Vietnam and Myanmar, Universities are very suitable sites to implement sustainable development, in part, because the autonomy of the governance structure and local politics are less complex than they are at the scale of the cities. With a smaller scale and more structured administration, universities can better reduce the cumulative effect of local environmental problems, an area where cities sometimes struggle. The influence and resources that Vietnamese and Myanmar universities can apply to issues of sustainability place them in a unique position to become key leaders in the promotion of sustainable development throughout their respective countries. Given the social, economic and cultural capital of higher education institutions and their role in educating the next generation of leaders, the institutional practices present on campus should lead the sustainability movement by being ecologically sound, socially just, economically viable and humane for present and future generations.

2. Eco-Campus Project overview and goals

The central objective of a University solid waste action plan is to maximize resource recovery (i.e. the proportion of solid waste stream recovered for high resource value use), with the corollary that this minimizes waste disposal to landfill. The main strategy is to apply the “waste hierarchy” – avoid purchasing products which will end up as waste, repair and reuse, then recycle, and finally if there are no other options, dispose. This also recognizes that environmentally preferred procurement is a major factor in avoiding waste in the first place.

Since the environmental impact of responsible waste management is inherently beneficial, continually improving the delivery of the service itself represents a positive sustainability action. Waste management is data intensive – but unlike energy and water, there are no “waste meters” to track performance. Hence regular data collection and audits are necessary. The first step will usually be a full waste characterization study to describe the waste stream, evaluate existing waste management practices and identify gaps, with the aim of informing the development of additional systems for avoidance, reuse and recovery.

The results of the preliminary research in Vietnam and Myanmar, indicated that inside the University campuses no sustainable waste management procedures are applied. Therefore, the main objective is to apply the concept of sustainability in waste management, to create

new policies and develop Campus-wide initiatives as part of an Action Plan in each and all of the Partner Country Universities.

Our strategy is expected to raise awareness on waste management to staff and students in the Universities. The strategy that we are going to apply targets in creating a sustainable eco-friendly behaviour. Summarizing, we can conclude that the strategy we would like to apply aims to achieve the following:

- 1) Raising public awareness, changing public attitudes and providing education.
- 2) Prevention and Minimization of Waste Production
- 3) Maximize Waste Recycling and Composting
- 4) Rising Role of Vietnam and Myanmar Universities' staff and students

3. Strategy of the Eco-Campus approach

The Eco-Campus approach that will be implemented in the Vietnamese and Myanmar Universities, will be based on the latest version of the **Greening Universities Toolkit** (V.2, 2014) - **Transforming Universities into Green and Sustainable Campuses**, developed by the United Nations Environment Programme (UNEP).

The objective of this Toolkit is to inspire, encourage and support universities to develop and implement their own transformative strategies for establishing green, resource efficient and low carbon campuses. It will provide an opportunity to build stakeholder capacity to deliver systemic, institution-wide integration of sustainability principles into all aspects of University business. This initiative is intended to improve the sustainability performance of universities globally and to provide support to other stakeholders embarking on their own sustainability journeys. Further, it will enhance the practical relevance of universities to sustainable development and by extension, the new paradigm of the "green economy". In short, the aim is to encourage and promote the contribution of universities to the overall sustainability of the planet.

This Greening Universities Toolkit is designed to provide universities with the basic strategies and tactics necessary to transform themselves into green, low carbon institutions with the capacity to address climate change, increase resource efficiency, enhance ecosystem management and minimize waste and pollution. To effectively support this journey and other transformative processes in Universities, the Toolkit is structured in such a way that the focus

is on the sustainable planning, design, development and management of the University campus.

The Toolkit will serve as a guide for developing, implementing and monitoring all necessary actions, in order to improve the Campuses performance with respect to their waste management, which is the focus of this proposal. At the same time, it will allow for future synergies and indirectly promote all other aspects of campus environmental sustainability, such as energy efficiency and climate change, water and wastewater treatment, biodiversity and ecological services.

4. Methodology of implementation

Universities are major employers, major investors and major purchasers of goods and services. There are opportunities across all these areas for intervention, in terms of direct and indirect support for local jobs, ethical/sustainable investment and “green” procurement strategies which can help integrate sustainability along the supply chain. Fortunately, there is no need to “reinvent the wheel” – given the intent of this Toolkit as a resource relevant to universities worldwide, strategies and frameworks with evidenced global applicability are adopted where possible, and adapted where necessary. The Eco-Campus project will be implemented through the following steps, which will be followed in each of the Vietnamese and Myanmar Universities. Some of these steps will be modified according to the initial assessment, SWOT analysis and individual targets on waste management:

1. Mission statement from the University
2. Identification and engagement of University stakeholders
3. Development of a sustainability policy
4. Establishing a Sustainability Committee and Action Team
5. Determining the baseline on waste management, setting objectives and targets and selecting monitoring indicators
6. Developing and implementing an Action Plan on Waste Management
7. Awareness and training
8. Dissemination and communication
9. Monitoring and possible corrections in the Action Plan

Each of these steps is analyzed below.

4.1 Context of study areas

4.1.1 Hanoi University of Science and Technology (HUST) – Vietnam

Hanoi University of Science and Technology (HUST) is leading university in Vietnam in the area of Science and technology. It counts nearly 37.000 students, including 30.000 undergraduate, 7.000 graduate students, and 1200 faculty members in 17 schools, 2 faculties, 7 research institutes and 4 centres. Currently, 3 schools (School of Chemical Engineering, School of Biotechnology and Food Technology, School of Environmental Science and Technology) at HUST have modern lab systems with a large number of staff and students conducting research, so the amount of wastewater and solid waste generated from these labs is very large. Besides that, a large amount of chemicals and raw materials naturally, will discharge the chemicals, raw materials and experimental products into the environment, including a significant amount of solid waste (usually laboratory supplies, chemical packaging, waste products, waste by-products and sludge) and wastewater. The types of waste generated from these laboratories have a complex composition and in many cases, the presence of hazardous wastes (hazardous wastes) that are almost undetected, monitored, controlled, leading to negative impacts on the environment and human health.

In higher education institutions, although the amount of waste (which may contain a certain amount of hazardous waste) is not small, the amount of waste is often put into the system of waste collection, management and treatment. In addition, educational activities to raise awareness of environmental protection for students of higher education institutions are less organized, or just focus on potable water quality and not at all on waste management. Furthermore, the lack of funding causes limited awareness of environmental protection for a large number of learners trained in higher education institutions, because available funds is the main human resource that will motivates people in developing countries.

4.1.2 Ho Chi Minh University of Technology (HCMUT) – Vietnam

HCMUT is one of the leading universities of technology in Vietnam. The university plays an active role of cultivating talents and providing human resources with strong technical skills, which are recognized equivalent to those of other advanced countries in the Southeast Asia. Up to present, HCMUT has remained as the key centre of research excellence greatly contributing to technology transfer activities in Southern Vietnam. Totally, the university has 1,163 staff and 26,278 students enrolled in 11 faculties.

At HCMUT, rubbish bins are completely collected, but not yet sorted. All wastes generated from the University campus are collected by the local municipal waste collection system. The official new recycling policy has not been issued but the University is now aware of improving

waste management. Most of documents are encouraged to circulate electronically and limit to paper printing. HCMUT needs to upgrade its international programmes in the field of environmental management to provide qualified human resources being able to solve national waste issues, particularly in Southern Vietnam, where the environmental problems are getting worse year after year. Therefore, the needs for external supports in upgrading academic curriculum and other research and teaching capacity is regarded as one of our priority and concern. The University expects the Erasmus plus programme could support its Faculty of Environment and Natural Resources to develop their educational capacity as this is the Faculty's first experience for Erasmus+ capacity building proposal.

At HCMUT, the Eco-Campus project would be a flagship pilot/project as this matches with existing regulations of Peoples' Committee of Ho Chi Minh City, including: Decision No. 1832/QD-UBND dated 17 April 2017; Decision No. 44/2018/QD-UBND dated 14 Nov 2018). Under the Decision No. 44/2018/QD-UBND of Ho Chi Minh City People's Committee, regulating municipal solid waste aggregation and sort in Ho Chi Minh City. Accordingly, organizations, agencies, households and individuals must sort their garbage before putting them out for collection.

TOTAL TARGET STAFF and STUDENTS in Universities in Vietnam: 80000

4.1.3 Yangon Technological University (YTU) - Myanmar

Waste in Yangon Technological University Campus is not well managed. Garbages are discharged at the landfill sites around academic area and servant quarters. The garbages are not classified (such as) plastic, glass and kitchen (or laboratory) waste. The Yangon City Development Committee (YCDC) collects the wastes from the campus every month. Therefore, we would like to collaborate and learn the strategies for waste management so that our campus environment would become smart and clean. The wastes are discharged traditionally at the concrete waste tanks and pollute the university campus environment. A concrete waste tank is located about 10 m in the east of the main building in the (YTU) Yangon Technological University campus in Yangon city, Myanmar. There is no waste discharge pipeline in all the laboratories and a hazardous waste management system is also needed in the university. The waste truck from the Yangon City Development Committee (YCDC) collected the garbages from the waste tank monthly but the waste tanks are not adequate. The waste tanks have no arrangement for the garbage types classification and no recycle, reuse system. The YTU campus needs to establish a new waste management system and policy for waste management.

4.1.4 MTU – Myanmar

MTU is one of the institutions collaborated with Ministry of Natural Resources and Environmental Conservation (MoNREC). MTU has collaborated with MoNREC to develop State of Environment for Myanmar, Environmental Impact Assessment Procedure, Emission Guidelines for Environment, Myanmar Climate Change Strategy and Action Plan (MCCSAP 2016-2030), and Policy Development for Domestic Wastewater Treatment. MTU also closely collaborated with JICA and Mandalay City Development Committee (MCDC) for solid waste management, industrial wastewater, and municipal wastewater treatment systems. In upper Myanmar, our university is the main technological university which can provide design and technology for waste treatment systems. With the development of Myanmar economic growth, environmental problems are increasing and also technology development is needed to encounter these problems. Currently, all the stakeholders from industrial, educational, government sectors are cooperating to solve these environmental problems. Our department is also doing researches on design and treatment of industrial wastewater and organic solid waste management.

TOTAL TARGET STAFF and STUDENTS in Universities in Myanmar: 10000

4.2 Mission statement from the University

Many organizations, including many universities, adopt a mission statement as well as (or instead of) a statement of their vision for the future. A mission statement helps explain the motivation for the vision; it should answer (in general terms) the questions who, what, and why, and lay the foundation for future action. A mission is more realistic than a vision.

It is about what the organization plans to do rather than what it wants to be. However, a mission statement on campus sustainability and waste management does not of itself guarantee implementation of its commitments. Voluntary agreements by definition provide no mechanisms to enforce accountability. On the other hand, commitment to an external agreement can provide the basis for a University to develop its own internal sustainability vision and policy. Arguably, international declarations and charters have also helped to shape the growing consensus on the role of universities in sustainable development, and even national legislation.

Action to be taken for Eco-Campus: A clear and realistic mission statement will be drafted by each University with respect to waste management on campus.

4.3 Identification and engagement of University stakeholders

Genuine engagement of academics, administrative / operational staff and students in the early stages is crucial to the successful initiation of the Eco-Campus initiative. Indeed the organized participation of students and staff in every aspect of the sustainability transition is essential to success. The primary stakeholders are the staff and students, but within these constituencies there are of course particular groups and individuals whose involvement is critical:

- University leadership – the office of the President / Vice Chancellor and the governing Council or Board,
- Academic and operational executives
- Key operational departments – facilities management, Chemical Engineering Department, Environmental Management Department, Marketing and Media Department, student housing and Campus restaurants as waste generator units
- Academic experts in various aspects of sustainability
- Academic and operational staff associations
- Student association and student clubs.

In addition, the number of groups and individuals who affect, or are affected by the University and its activities extends well beyond the immediate University community to include:

- Alumni, who may be scattered across the world;
- Public and private sector funding bodies, which have their own agendas and objectives;
- Government and corporate research partners
- National and international associations to which the University may belong
- External suppliers of goods and services, for whom the University may represent a major economic development opportunity
- School students and their families, as future University students
- The local community within which the University is situated.

The level and method of involvement of each of these groups will be determined by the specific Eco-Campus targets for each University, the sustainability vision and Communication strategy (see 4.9 below).

Action to be taken for Eco-Campus: A stakeholder map will be developed in each University, based on the following aspects, a) who needs to be involved, b) why do they need to be involved, c) how they should be involved d) what resources are required to involve them.

4.4 Development of a sustainability policy

The University's sustainability policy is the high level driver for its short- and long-term sustainability goals. Sustainability' implies that the critical activities of a higher education institution are (at a minimum) ecologically sound, socially just, and economically viable, and that they will continue to be so for future generations. A truly sustainable University would emphasize these concepts in its curriculum and research, preparing students to contribute as working citizens to an environmentally sound and socially just society. The institution would function as a sustainable community, embodying responsible consumption of food and energy, treating its diverse members with respect, and supporting these values in the surrounding community. The development of a complete sustainability policy should include the following pillars:

- Electrical energy management and conservation
- Campus heating
- Fresh water conservation
- Storm water management
- Facilities Planning, Renovations and Construction
- Transportation
- Purchasing materials and consumables
- Solid waste management
- Management of 'green' spaces and biodiversity

Although all the above pillars are connected and form part of the same Campus sustainability policy, in the framework of this proposal we will focus on Solid Waste management.

The concept of sustainable solid waste management is often discussed regarding the effectiveness of waste management systems in reducing the negative impact of solid waste generated to humans, economics and the environment. Hence, over the past decades, various concepts related to sustainable solid waste management were introduced such as integrated solid waste management, zero solid waste generation concepts, waste disposal approaches from sources and solid waste management hierarchy. Reduction, reuse and recycling practices (as described in Section 2 above) by campus communities are critical to reducing the number of solid waste send to the landfill. The waste hierarchy concept is very practical to be implemented by higher education institutions. However, consistency in executing each component of waste hierarchy is challenging and important to be addressed carefully. The development of a sustainability policy with respect to waste management will serve as the 1st step towards developing and implementing a comprehensive sustainability policy throughout the Campus, for all pillars described above.

Action to be taken for Eco-Campus: Review of existing sustainability policies in Asian and European Universities focusing on waste management. Modification of policies according to each University requirements and development of a draft sustainability policy.

4.5 Establishing a Sustainability Committee and Action Team

The Committee, representing staff and students and chaired by a member of senior management, is responsible for input to and review of the University's sustainability policy, objectives, targets and action plans and for final management approval. Top University management should appoint a sustainability manager with sufficient authority, resources and freedom to act, who may head a professional sustainability unit and/or coordinate an action team of staff and student volunteers, depending on the size and resources of each University. The Sustainability Committee and Action Team that will be established in the framework of this Project, will initially focus on Waste Management issues, however, throughout and especially after the end of the project, based on their acquired experience they will prepare the ground for similar work in the other pillars described in 4.4.

Action to be taken for Eco-Campus: Each University will establish a Sustainability Committee and Action Team.

4.6 Determining the baseline on waste management, setting objectives and targets and selecting monitoring indicators

The Sustainability Committee will guide the Action Team to obtain data and assess the current Campus situation with respect to waste management. Then, the Committee will perform a **Strengths, Weaknesses, Opportunities and Threats** (SWOT) analysis, which will be used as the starting point for prioritizing issues for action (for example through application of risk assessment methods) and setting objectives and targets. Objectives are overall goals arising from the University's sustainability policy; targets are detailed performance requirements set to achieve the objectives. Targets should be challenging but achievable, and will reflect each University's commitment to sustainable development and the ultimate achievement of a sustainable University. In each University, the two essential targets will be:

- **Minimize production of each waste stream in campus**, focusing on the most troublesome stream (measured as kg of waste produced/capita)

- **Increase diversion** from landfilling in a gradual and sustainable way (measured as kg of waste not landfilled/kg of total waste produced)

Note that: Per capita refers to the total population of the University (staff + students) and that these targets can be also applied to specific waste streams (e.g plastics).

Objectives and targets are typically linked to indicators, to enable tracking of the Eco-Campus initiative progress. The selected indicators will be based on the Likert scale. The Likert scale is a metric scale commonly involved in research that employs questionnaires. It is the most widely used approach to scaling responses in survey research and is fully compatible with the UNEP-Greening Universities Toolkit. Likert scaling is a bipolar scaling method, measuring either positive or negative response to a statement.

Action to be taken for Eco-Campus: The Sustainability Action Team will perform a qualitative and quantitative assessment of waste management in each Campus. This assessment will be used by the Sustainability Committee to perform a SWOT analysis, set measurable targets and establish specific monitoring indicators.

4.7 Developing and implementing an Action Plan on Waste Management

As mentioned earlier, development of Campus sustainability includes taking action on several different pillars and not only on waste management. However, this proposal focuses on waste management, therefore the Action Plan will describe campus-based initiatives that aim to improve the overall management of the University solid waste. The University solid waste stream is usually extremely diverse, ranging from food organics to electronic waste and laboratory glassware, and actions to deal with these varied components need to be prioritized according to impact. The Action plan may include (but is not limited to) the following activities:

1. Policy and behavior change

Development of standards which address longevity, durability, repairability, recyclability of products

Financial strategies to assign waste costs incurred – and savings achieved – to the responsible cost centres.

On Campus Waste Management awareness programs

On Campus programs targeting teaching and research to minimize generation of

hazardous wastes.

Signing contracts with the recycling industry, mainly for plastics

All new and refurbished buildings to have 'Building User Guides', which aim to minimize waste generation and maximize opportunities for reuse and recycling

2. Waste Management in Campus

Individual staged and prioritized programs for waste minimization which address each component of the University waste stream according to environmental impact, thus prioritizing action.

Performance-based waste management contracts to specify resource recovery targets. Recyclables collected at source (e.g. paper/cardboard) where practicable, to support local job creation^a

Installation of different color garbage bins in strategic Campus locations: white for paper/cardboard, yellow for glass, blue for plastic and grey for aluminum^a

Detailed electronic waste, chemical waste and biological waste audit

Purchasing of poly-styrene foam compaction equipment

3. Closing the loop

Campus-based product exchange and reuse initiative (2nd hand shops)

On-site composting of food and 'green' campus residues (tree prunings, leaves)

Campus based programs to process collected recyclables (depending on the recycling companies active in each University's region)

a. depending on the recycling companies active in each University's region and if the University has established a contract with them

Action to be taken for Eco-Campus: Initiatives to be developed according to each University's policy and priorities, and implemented as part of the Eco-Campus Action Plan.

4.8 Awareness and Training

Awareness building and training opportunities need to be included in the Action plan described earlier. Staff at all levels and students in each University will be introduced to sustainability awareness training as part of regular induction procedures, explaining the University's sustainability policy and action plans, the impacts of the University's activities (particularly with respect to waste management) and the importance of compliance with relevant legislation and regulations.

In each University, training needs (for staff and volunteer students) will be identified that are associated – initially – with Campus waste management issues, but in view of expanding them to address all aspects of environmental sustainability. University staff performing specialized environmental management functions must have appropriate education, competence, experience and training. It is important that such staff are exposed to the most recent technology and knowledge base relevant to the organization's significant environmental impacts. Training and development opportunities will also be provided for students working as volunteers or interns on environmental or other sustainability projects. They may be integrated with, or managed separately from, the University's usual curriculum, and may be run as an incentive scheme (e.g. fee-free) to encourage participation. Training includes but is not limited to the following:

- National legislation and local policies on waste management
- Data acquisition and use of statistics
- Collection and separation of waste at source
- Basics of composting
- Communication strategies for knowledge dissemination
- Establishing cooperation with industry to forward recyclable fractions
- Developing regional academic clusters for exchange of BAPs (best available practices) on Campus waste management

Action to be taken for Eco-Campus: Before the implementation of the Action Plan, two separate training programs will be developed: 1. for staff and 2. for students. The first group of trained staff will form the Sustainability Committee and the first group of students will become members of the Action Team.

4.9 Dissemination and Communication strategy

The Action Plan will need to incorporate a communications strategy to facilitate engagement of the University community and maximize the chances of success for the Eco-Campus project. Towards this purpose, **ISO 14063: 2006 Environmental management – Environmental communication**, will be used. ISO 14063 gives guidance to an organization on general principles, policy, strategy and activities relating to both internal and external environmental communication.

The Sustainability Committee will review the procedures described in ISO 14063 and will develop the communication strategy, based on the SWOT analysis and targets (section 4.6),

the stakeholder map (section 4.3) and the Action Plan to be implemented (section 4.7). Dissemination and Communication actions include but are not limited to the following:

- Development of a Poster 'it's in your hands' campaign visible both indoors and outdoors
- Eco-Campus newsletter distributed electronically to staff, students and Alumni
- Eco-Campus accounts in social media (Facebook, Instagram)
- Award programs for students e.g. for collecting a specific target (in kg) of a type of waste or re-using items such as coffee cups
- Campus-wide seminars on waste management, followed by brainstorming sessions with the participation of external private entities (e.g. recycling companies)
- Participation of the University in international 'sustainable campus' competitions, such as:
 - The International Sustainable Campus Network (ISCN) (established the International Sustainable Campus Excellence Awards)
 - Green Gown Awards
 - Association for the Advancement of Sustainability in Higher Education (AASHE)

Finally, the Eco-Campus communication strategy is crucial for promoting the overall campus sustainability and developing further actions beyond the duration of this project.

Action to be taken for Eco-Campus: Development of a comprehensive Communication Strategy based on the SWOT analysis, targets and the Action Plan.

4.10 Monitoring and possible corrections in the Action Plan

Audits provide a way of tracking progress towards achievement of objectives and targets and – through implementation of audit recommendations – driving continual improvement. Management review enables update of policies and objectives to align with changing circumstances, and the effectiveness of the system overall. Sustainability reporting informs the university and wider community of what has been achieved, and equally, what remains to be achieved. The internal audit will be performed by the Sustainability Committee (section 4.5).

Action to be taken for Eco-Campus: A yearly Sustainability Report will be prepared by each University, focusing on waste management and assessing

the progress made each year, with respect to the set targets and indicators (section 4.6).

5. Expected results and impact

The Eco-Campus approach, through all its 9 steps, is expected to have significant short and long term results. The short-term expected results are the following:

- Development of clear policies, targets and monitoring indicators that can be reviewed and adjusted yearly
- Trained staff and students to perform waste management actions
- Hands-on experienced students on basic and advanced aspects of waste management
- Reduction in the quantities of waste produced in Campus and an increase of the quantities of waste diverted from landfilling

The long-term expected results are the following:

- The concept of 'zero waste' becomes 2nd nature to staff and students. They will always have in mind that each waste is a potential resource to be exploited.
- Potential revenue from agreements with recycling companies and/or from the compost produced in Campus.
- The waste management policies and Action Plan will form the basis for further development of the Eco-Campus in order to cover all aspects of sustainability: energy consumption, potable water protection, wastewater treatment, quality of atmospheric air, biodiversity protection.
- Each University will be seen as an example of environmentally sustainable organization at the local and regional society.
- The yearly reduction in Campus wastes will have an impact on the total city waste to be landfilled
- Each University will be able to participate in international consortiums such as the following:
 - EcoLeaD (Japan): Environmental Consortium for Leadership Development (EcoLeaD) is an academia-industry-government-NGO/NPO consortium with 24 international partners in Asia-Pacific
 - GUNI-AP: The Global University Network for Innovation in Asia and the Pacific aims to improve higher education in that region through the application of the UNESCO decisions on higher education taken at the World Conference on Higher Education in 1998

6. Summary of the Eco-Campus Project

The Eco-Campus project corresponds to the WP2 of GREENUS. It will be implemented in all Partner Universities, both in Vietnam and Myanmar. The strategic objective is to initiate a permanent process to increase the environmental sustainability of each institution. Towards this purpose, the UNEP Greening Universities Toolkit - Transforming Universities into Green and Sustainable Campuses, will be used. This Toolkit is based on 9 gradual steps, from the drafting of a new sustainability policy and establishment of a Sustainability Committee, to Campus-wide waste management actions and their monitoring based on specific targets. A comprehensive Communications Strategy is included (based on ISO 14063), in order to increase the impact of the project and ensure it is maintained beyond the duration of GREENUS.

ANNEX 1 – Campus questionnaire

The questionnaire has been designed for the purpose of the project **GREENUS**. It concerns students and staff of the participating Universities of Asia and its goal is to collect information about participants awareness towards waste management. The questionnaire is confidential information between the project researchers and the participants.

Waste management is the precise name for the collection, transportation, disposal or recycling and monitoring of waste. This term is assigned to the material, waste material that is produced through human being activity. This material is managed to avoid its adverse effect over human health and environment.

Proposed questionnaire

Section 1: Demographics	
<i>Q1: Please choose your gender.</i>	
Answers	Male
	Female
<i>Q2: Please choose your age.</i>	
Answers	18 - 29
	30 - 39
	40 - 49
	50 - 59
	≥60
<i>Q3: Please choose the University that you are currently studying or working.</i>	
Answers	Ho Chi Minh City University of Technology (Vietnam)
	Can Tho University (Vietnam)
	University of Science and Technology (Vietnam)
	Yangon Technology University (Myanmar)
	Kyaukse Technological University (Myanmar)
	Mandalay Technological University (Myanmar)
<i>Q4: Please choose your current position in University.</i>	
Answers	Student

Professor
Administration Staff
Other Staff

Section 2: Awareness (choose between 1 to 5 where 1 means not at all and 5 very much)

Q1: I am aware with waste problem.

Answers 5 , 4 , 3 , 2, 1

Q2: I am aware with the environmental impacts of waste problem.

Answers 5 , 4 , 3 , 2, 1

Q3: I am aware with the economic impacts of waste problem.

Answers 5 , 4 , 3 , 2, 1

Q4: I am trying to recycle my waste.

Answers 5 , 4 , 3 , 2, 1

Q5: When I recycle I separate properly the waste according to its the category.

Answers 5 , 4 , 3 , 2, 1

Section 3: Attitude towards environmental & behavior change tools. (choose between 1 to 5 where 1 means not at all and 5 very much)

Q1: I believe that the existence of informational posters towards recycling methods and waste separation in the campus will help me to adopt a more eco- friendly behavior.

Answers 5 , 4 , 3 , 2, 1

Q2: I believe that the existence of recycling infrastructure in the campus will be helpful to reduce waste.

Answers 5 , 4 , 3 , 2, 1

Q3: I believe that the continuing information about waste management through courses and workshops in the campus will be helpful to reduce waste.

Answers 5 , 4 , 3 , 2, 1

Proposed questionnaire after applying poster and bins

Section 1: Demographics

Q1: Please choose your gender.

Answers Male

Female

Q2: Please choose your age.

Answers 18 - 29

30 - 39

40 - 49

50 - 59

≥60

Q3: Please choose the University that you are currently studying or working.

Answers Ho Chi Minh City University of Technology (Vietnam)

Can Tho University (Vietnam)

University of Science and Technology (Vietnam)

Yangon Technology University (Myanmar)

Kyaukse Technological University (Myanmar)

Mandalay Technological University (Myanmar)

Q4: Please choose your current position in University.

Answers Student

Professor

Administration Staff

Other Staff

Section 2: Awareness (choose between 1 to 5 where 1 means not at all and 5 very much)

Q1: I am aware with waste problem.

Answers 5 , 4 , 3 , 2, 1

Q2: I am aware with the environmental impacts of waste problem.

Answers 5 , 4 , 3 , 2, 1

Q3: I am aware with the economic impacts of waste problem.

Answers 5 , 4 , 3 , 2, 1

Q4: I am trying to recycle my waste.

Answers 5 , 4 , 3 , 2, 1

Q5: When I recycle I separate properly the waste according to its category.

Answers 5 , 4 , 3 , 2, 1

Section 3: Attitude towards environmental & behavior change tools (choose between 1 to 5 where 1 means not at all and 5 very much)

Q1: I believe that the informational posters towards recycling methods and waste separation that had been placed in the campus helped me to adopt a more eco-friendly behavior.

Answers 5 , 4 , 3 , 2, 1

Q2: I believe recycling bins that had been placed in campus helped me to reduce waste.

Answers 5 , 4 , 3 , 2, 1

Q3: I believe that courses and workshops that had taken place in the campus helped me to reduce waste.

Answers 5 , 4 , 3 , 2, 1

ANNEX 2 – Draft Eco-Campus “It’s in your hands” posters

PROPERLY RINSE ALL CONTAINERS

GLASS

- ▶ All glass containers, bottles and jars, regardless of color.



PLASTIC

- ▶ All plastic containers of food products, personal hygiene products, household cleaning products and bottles, featuring one of these symbols :



- ▶ Caps and lids.
- ▶ Plastic bags (regrouped in one bag).



PAPER & CARDBOARD

- ▶ Newspapers, magazines, flyers, phonebooks and books.
- ▶ Paper sheets, envelopes and paper bags.
- ▶ Cereal, cookie boxes and egg cartons.
- ▶ Cardboard boxes, cardboard rolls and cylinders.
- ▶ Milk and juice cartons.
- ▶ Aseptic containers (Tetra Pak™ type).



METAL

- ▶ Aluminum containers and foil.
- ▶ Cans and aluminum bottles.
- ▶ Tin cans.
- ▶ Caps and lids.



It's in your hands

It's in your hands



Recycle Plastics

To:

- Reduce energy usage
- Reduce consumption of fresh raw materials
- Reduce water and air pollution
- Protect environment

It's in your hands



Recycle Paper

To:

- Save energy, water and landfill space
- Reduce greenhouse gas emissions
- Make new paper products

It's in your hands



Recycle Aluminium

To:

- Save energy
- Reduce your carbon footprint
- Help to satisfy an increasing demand
- Protect environment