

Solid Waste Management Scenario in Two Public University Campuses: KUET and Khulna University

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Introduction and Background

Solid Waste Management (SWM) at university level is crucial for maintaining health and safety of the students, teachers and staffs. It also contributes to the campus environment and aesthetic beauty. In the developing countries like Bangladesh, a common tendency is seen that the people are less concerned about dumping waste. It is regularly observed that students in the educational institute dump wastes wherever they want even if there are trash cans available. Again, the trash cans are not always available. Even the institutional bodies are not that much concerned about this situation. Though some institutes have a concerned body to monitor the situation, most of them do not have. Khulna University of Engineering & Technology (KUET) and Khulna University (KU) are the two most prominent public universities in Bangladesh. This paper focuses on the prevailing waste management practices and facilities of KUET and KU campuses. It also draws some recommendations for the improvement of overall waste management scenario of the university campuses.

2.0 KUET and Khulna University as Study Area

Khulna University of Engineering & Technology (KUET) is situated at Fulbarigate area, 13 km away from the core of Khulna City. It was established initially as Khulna Engineering College in 1969 and was eventually upgraded to Bangladesh Institute of Technology (BIT), Khulna and finally granted as a University in 2003. The 101 acre campus consist of four functional zones, 1. Residential Zone for Students (6 halls for male students and 1 for female students), 2. Residential Zone for Faculties and Staffs, 3. Academic and Administrative Zone, 4. Cultural cum Social and Recreational Zone (including cafeteria, playgrounds etc.). Khulna University (KU) is situated at Gallamary on southern side of Khulna Satkhira Highway. It is about 5 km away from the core of Khulna City. It was established in 1991. The 105.75 acre campus also consists of 3 halls for male students and 1 for female students. Presently there are 4000 students, 300 teachers and 200 staff in KUET. Khulna University has 7000 students, 450 teachers and 550 staff.

3.0 Category and amount of solid waste in KUET and Khulna University

The universities mainly generate two types of solid wastes- bio-degradable and non-degradable. Bio-degradable wastes are those which can be decayed or degraded (e.g. food leftovers, papers, kitchen wastes). Non-degradable wastes are not degradable or decayed naturally (e.g. plastic materials, pens). The amount of wastes collected from

different zones of KUET campus is 530 kg and Khulna University is 310 kg respectively, shown in Table 1 below.

Table 1: Amount of solid wastes generated in KUET and Khulna University

University	Amount of degradable wastes (kg.)	Amount of non-degradable wastes (kg.)	Total wastes (kg.)
KUET	240	290	530
Khulna University	140	170	310

Source: SWM Plant of KUET, 2016 and SWM staff of Khulna University, 2016.

Stakeholders of University Solid Waste Management

There are different types of stakeholders for managing solid wastes in university. The stakeholders are mentioned in the Table 2.

Table 2: Stakeholders involved in university solid waste management

Stakeholder category	Stakeholders
Primary	Students, Teachers; Voluntary organizations active in the university; Canteen operators
Secondary	Household members of teachers' and staff quarter; Shopkeepers within and adjacent university campus
Tertiary	Khulna City Corporation (KCC); Khulna Development Authority (KDA); Non-Government Organizations (NGOs) and Community Based Organizations (CBOs) involved in waste management; Researchers; Volunteers as development activists; Universities and colleges (as researchers and consultants)

KCC is responsible for the urban Solid Waste Management (SWM) of Khulna City. The SWM by the Conservancy Department of KCC organizes waste collection from the city corporation bins and secondary transfer stations located on different major roadsides throughout the city. KCC trucks pick up waste from the roadside bins and transfer stations having demountable containers. KUET and Khulna University are located within Khulna metropolitan area but adjacent outside of KCC boundary. As the university authorities request KCC, KCC collects wastes from the universities by its trucks. The administrative process for inclusion of the two universities within KCC jurisdiction is at final stage.

Waste Management Scenario of KUET

KUET is one of the most well organized campuses of the country as far as waste collection and management is concerned. A noteworthy number of waste bins are located at various points of the campus. Solid wastes generated from the residential halls, staff and faculty quarters, academic and administrative buildings and such other

places are collected in separate waste collecting vans based on their bio-degradability (Figure 1).



Photo 1: Waste bin in front of administrative building of KUET



Photo 2: Waste bin established by Chatra (Student) League



Photo 3: Roadside waste bin in KUET campus



Photo 4: Waste collection from campus by van



Photo 1: Waste bin in front of administrative building of KUET



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Photo 3: Roadside waste bin in KUET campus



Photo 4: Waste collection from campus by van



Photo 5: Green Watchman in waste collection in KUET



Photo 6: Waste Management Plant in KUET



Photo 7: Degradable and non-degradable wastes in SWM plant



Photo 8: Compost produced in SWM plant

Figure 1: Existing Solid Waste Management Practice and Facilities in KUET

Source: Field survey, 2015-2016.

The collected wastes are then taken to the KUET Solid Waste Management Plant, located adjacent to the bachelor quarter no. 19. In the plant, bio-degradable wastes are processed through aerobic decomposition for composting. The decomposition process continues for 90 days within which, the wastes get converted into compost. The compost thus produced is being used the flower plants and agro-forestry gardens of the campus. The compost is also sold at the rate of BDT 12 per kg. On the other hand, the non-degradable wastes are further screened and sold away or burnt by the incinerator in SWM plant.

Waste Management Scenario of Khulna University (KU)

Unlike KUET, there is no fixed waste management and processing system prevalent in Khulna University campus. However, the presence of waste bins at various locations in the campus is a good indicator of the awareness regarding waste collection and management. Khulna University administration took initiative in 2015 to impose the management of solid wastes generated in the administrative and academic buildings.



Photo 1: Scattered wastes in the courtyard of 1st academic building



Photo 2: Scattered waste in the courtyard of 2nd academic building



Photo 3: Indiscriminate dumping of wastes near Khan Bahadur Ahsanullah (KBA) Hall



Photo 4: Wall campaign in 2nd academic building for throwing waste into dustbin



Photo 5: Plastic waste bin and basket in the administrative building



Photo 6: Plastic drum as waste bin in KBA Hall



Photo 7: Waste collection from the administrative building area



Photo 8: Secondary waste transfer station or dumping site of Khulna University

Figure 2: Existing Solid Waste Management Practice and Facilities in Khulna University

Source: Field survey, 2015-2016.

A temporary contractually appointed van driver with a van collects solid wastes generated in administrative building, three academic buildings, central library and medical center. The collector disposes of the wastes in a secondary dustbin or disposal site measuring 120 sq. ft. encircled area at the southern side of Khulna Satkhira Highway. University authority requests KCC to dispose of the wastes from this site to its final disposal site at Rajbandh. There are two four storied buildings as Teacher-Officer Quarter and two four storied buildings as Staff Quarters in Khulna University campus. Twenty (20) families of teachers and officers and Thirty two (32) staff families live in these buildings. There is no systematic solid waste management system for the Teacher-Officer and Staff Quarters. Household members indiscriminately dispose of the wastes in Quarters nearby space. Noteworthy here is the fact that, although KU lacks the on-site waste processing system, it has a fairly good system of waste storage, collection and transportation. The University Authority

is pretty aware about this issue and is trying its level best to ensure that the waste management processes run smoothly and efficiently.

Problems and Limitations of SWM Management in KUET and Khulna University

The study finds some problems and limitations of SWM in the universities. The problems and limitations are:

- a) Inadequate budgetary allocation for SWM in the universities
- b) Inadequate number of permanent staff for SWM and most of the staffs are appointed on temporary or Master roll basis
- c) Lack of facilities for the staffs involved in SWM
- d) Inadequate number of trash cans in Khulna university
- e) Absence of separate zone or space for secondary waste transfer stations and compost plant in Khulna University Master Plan
- f) The universities do not have voluntary organizations formed by students, teachers and others for SWMS
- g) KCC has no regulatory bindings especially dedicated to the SWMS of the universities and other educational institutes
- h) KDA could not keep special provisions for SWM of educational institutes in the SWM Chapter of its City Master Plan and
- i) Absence of guideline on university SWMS specifying the roles of stakeholders.

Recommendations for Improving the SWM System of KUET and KU

Some recommendations are made for the improvement of SWMS of the universities. The recommendations are as follows:

- a) Keeping adequate budgetary allocation for the SWM in universities
- b) Increasing number of permanent staff for SWM
- c) Increasing facilities for the staffs appointed on temporary or Master roll basis
- d) Putting trash cans in every classroom and also in some other appropriate locations
- e) Forming voluntary organizations in university by students, teachers and others for educating students about waste management system and adverse impacts of improper waste management
- f) KCC can incorporate the issue of university SWMS in its Ordinance and legal documents
- g) KDA should keep special provision for SWM of universities and other educational institutes in its City Master Plan
- h) Formulating guideline on university SWMS specifying the roles of stakeholders
- i) Provision of separate zone or space for secondary waste transfer stations and SWM plant in Khulna University Master Plan
- j) The universities especially Khulna University can take step to ensure

involvement of tertiary level stakeholders i.e. Khulna City Corporation (KCC), Khulna Development Authority (KDA), Non-Government Organizations (NGOs), Community Based Organizations (CBOs) and students' voluntary organizations.

- k) More studies can be conducted on different aspects like volume of wastes; problems, scopes and potentials of resource recovery from wastes; behavioral pattern of students, teachers, and concerned stakeholders etc.

Conclusion

Apart from the other universities of Bangladesh, KUET and Khulna University have potentially succeeded to manage the wastes at a significant level. The authorities are concerned about the cleanliness of their campuses and definitely aiming to create an environment friendly sustainable premise. Though there are some problems and limitations in the waste management system, both the universities can overcome the problems and limitations in coordination and cooperation with all stakeholders.