

CAPACITY BUILDING IN MUNICIPAL SOLID WASTE MANAGEMENT IN ASIAN COUNTRIES OF VIETNAM, CAMBODIA AND THAILAND: THE STATE OF THE ART AND THE CASE OF THE ERASMUS+ “SWAP” PROJECT

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ABSTRACT: Asia has experienced a significant increase in population and consumption, leading to a rise of waste generation. However, the ability of socio-economic systems in the region to effectively manage and dispose of this waste remains insufficient. The Erasmus+ Project “SWAP” (Sustainable solid WASTE management and Policies) aims to build capacity in higher education and technical and vocational training in the field of solid waste management in Vietnam, Thailand, and Cambodia. This workshop abstract provides an in-depth exploration of the current state of education on solid waste management in these countries, the challenges they face, the structure, the objectives, and the main results of the SWAP-project.

Keywords: Sustainable Solid Waste Management, Policies, Southeast Asia, Capacity Building, Higher Education, TVET Courses, Teaching Material, Training Hubs, Vietnam, Thailand, Cambodia, Massive Open Online Courses

1. INTRODUCTION

Asia is one of the largest waste producers globally, with Southeast Asia projected to witness a substantial increase in waste generation from 468 million tonnes in 2016 to 602 million tonnes expected by 2030 and 712 million tonnes expected by 2050, respectively (Kaza et al., 2018). Despite this alarming trend, the readiness of countries such as Vietnam, Thailand and Cambodia to address the waste management challenge is low, particularly in terms of awareness, education, and training capabilities in sustainable solid waste management. Capacity building for both the formal and informal waste management sectors is thus an urgent priority in this region. Higher Education Institutes (HEIs) in many Southeast Asian countries lack comprehensive degree courses on solid waste management and policies, leading to a gap in knowledge and skills required by the labor market. Additionally, the informal sector employs a significant percentage of workers in Southeast Asia, and their involvement in waste management necessitates targeted training. The SWAP project aims to strengthen the capacity of the project partners in Vietnam, Thailand and Cambodia in solid waste management by focusing on higher education, vocational training, and educating informal workers. This abstract provides insights into the current state of education on solid waste management in the target countries, highlights the challenges in municipal solid waste management, and outlines the objectives, methodological approach and

expected results of the SWAP project.

2. STATE OF THE ART OF SOLID WASTE MANAGEMENT EDUCATION IN VIETNAM, THAILAND AND CAMBODIA

Solid Waste Management (SWM) is a problem, which includes political, socioeconomic, environmental and institutional aspects. The knowledge about the environmental issues among different generations in developing countries contribute to ecological issues and lead to an unsustainable development, with negativ consequences for low-income countries. Environmental education is more than the unidirectional transfer of information for Adorin et al. (2020). It is “[...] enhancing environmental attitudes, awareness, knowledge, and skills for an affirmative environmental action”. Through the support of formal education and awareness, SWM can be sustained (Debrah et al., 2021). As part of the project's initial phase, the courses offered by the HEIs from Cambodia, Thailand and Vietnam has been identified through a survey. To ensure that the project aligns with their needs, gaps in the education on SWM has been identified and all the investigated courses are related to solid waste management. However, the HIEs have similar courses to be updated and new courses to develop. The degree course had been divided in Bachelor (BSc), Master (MSc), and Technical and Vocational Educational and Training (TVET) programs. Further, the findings reveal several key points:

- Most surveyed universities offer SWM programs at an academic level. The courses are more popular at the bachelor's level compared to the master's level. However, inadequate equipment is hindering the fulfilment of students' needs.
- Insufficient investment and attention from learners is investigated for non-academic SWM training programs in the partner universities. These programs require significant development and investment to address its shortcomings.
- Furthermore, HEIs should enhance their students' capacity through internship programs in the private sector or NGOs related to waste management.
- The university courses should be updated and officially approved at the university level.

2.1 Challenges in Municipal Solid Waste Management addressed by the project

In addition to the education on SWM, the project addresses the challenges in Household Solid Waste Management in Vietnam, Cambodia, and Thailand. The project has identified the following problems that need to be addressed in order to manage household waste synchronously, effectively, and safely:

- Lack of data on SWM in the partner countries, such as waste generation, illegal dumping, and total recycled waste volumes.
- Limited knowledge among residents about correct waste sorting methods, leading to improper waste disposal practices.
- Limited awareness from industries to manage and store their waste, including the integration of industrial waste and general waste.
- Lack of facilities for the treatment, recycling, and disposal of hazardous waste.
- Technological and infrastructure deficiencies in waste classification, collection and transportation, and waste transfer stations.
- Small-scale recycling facilities and outdated recycling technologies that hinder the production of high-quality recycling products.

The challenges in waste management and the gaps in teaching about waste management form the

foundation of the project and its goals. Further explained will be the methodological approach to building capacity, the project objectives, and the expected results.

3. PROJECT OBJECTIVES

The major objective of the project is to develop new training and teaching programs that address the issue of sustainable solid waste management and integrate technical education with training sessions focused on start-up businesses in the field of solid waste management. The project also aims to implement inclusion measures and policies for the informal sector, involving this target group in safer and healthier work practices and introducing them to newly developed Technical Vocational and Educational Training (TVET) products. The TVET products, focused on sustainable solid waste management, will be taught in a newly established "Training Hubs for Sustainable Solid Waste Management and Policies". The training hubs will be physical spaces, where trainings can be conducted. The project also aims to establish sustainable synergies and links with stakeholders in the private sector to fulfill their need for specialized personnel in handling post-consumer material, addressing training needs, and enhancing the employability of university graduates. Additionally, the project seeks to endorse continuous cooperation and exchange of expertise as well as good practices between the Southeast Asian region, the EU, and Southeast Asian HEIs. Lastly, the project aims to disseminate project results and sustainability concepts in the field of solid waste management to the public and society, involving school students and their relatives in the dissemination process.

3.1 Methodological approach of the project to build capacity

The methodological approach in the project involves conducting a needs analysis at the level of the partner countries and their respective institutions. This analysis is guided by measurable indicators, such as the number of courses that match the needs of the waste management private sector. Figure 1 illustrates the structure of the methodological approach.

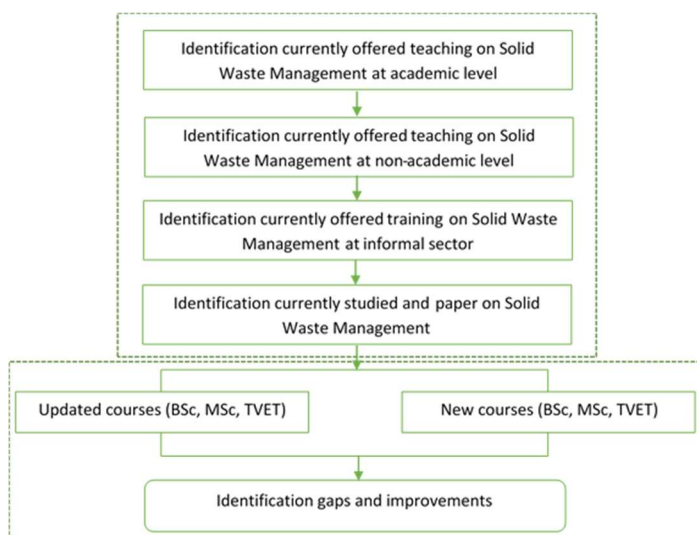


Figure 1. Methodological approach

To fulfill the aims and specific objectives of the SWAP project, the working methodology is organized into four major activities:

- a) Mapping the current situation of higher education institutions in the waste management, including their educational offerings and their relevant needs, relationships with relevant needs and local institutions operating in the sector.
- b) Improving the quality of the educational products and integrating topics of sustainability and

- business creation to increase the entrepreneurship and employability of graduates in the sector.
- c) Providing HEIs with new tools, governance models, educational strategies, and policies to modernize learning systems.
 - d) Managing the overall project to ensure its successful implementation, meeting quality standards, and promoting awareness among young students.

4. EXPECTED RESULTS

The major expected results of the project include:

- Increasing the knowledge level of university staff in sustainable solid waste management and the quality of courses offered by the partner country universities.
- Building capacities at different educational levels by developing specialized courses and training programs with sustainable governance.
- Introducing new academic and TVET products to lecturers, teachers, and trainers, addressing pressing topics in waste management, such as health and environmental risks, waste treatment processes, landfill control, and circular economy.
- Providing trainees with practical experiences in the Training Hubs established by the project, sustainably governed by local institutions, universities, training providers, and companies in cooperation.
- Making all educational outcomes accessible through an Open Online Learning Management System.
- Improving the entrepreneurship and employability of graduates and enhancing the knowledge, competence, and skills of informal workers.
- Increasing the capacity of waste participants and companies to address technical, environmental, and socio-economic issues related to solid waste management and valorization.
- Creating a long-lasting partnership between universities and countries.
- Substantially increasing environmental and waste management awareness.

5. SUMMARY

In conclusion, the SWAP project aims to enhance capacity building in the field of solid waste management in Vietnam, Thailand, and Cambodia. By addressing the challenges in waste management and education, the project seeks to strengthen higher education, vocational training, and informal worker training. The workshop will provide detailed insights into the current state of education on solid waste management, challenges in municipal solid waste management, and the structure, objectives, and expected results of the SWAP project.

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