

Developing Indonesian Coastal Areas as Sustainable Tourism Destinations – A Replicable Integrated Engineering Model for Exemplary Waste Management

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Industry Academia Partnership Programme

Duration of project: 18 months

Partner Country: Indonesia

OBJECTIVES OF THE PROJECT

ITB, LSBU and LPTT are collaborating with CLEAR Community to deliver a world-standard integrated waste management engineering model as an exemplar solution for Indonesia. We identified Batu Karas, a coastal village in Pangandaran, West Java as our case study area, where CLEAR has been working for several years with the community to research and apply waste and environment solutions.

The three main objectives of the project were to:

1. Bring together experts from UK and Indonesia to deliver a world-standard integrated waste management engineering model that can act as exemplar for other areas and local communities across Indonesia.
 2. Provide practical, simple and deliverable waste management solutions to equip Tourism Destinations in Indonesia to develop with greater sustainability.
 3. Increase understanding amongst academia, industry and the wider public regarding the latest technological solutions for affordable community-scale waste and recycling treatment in Indonesia and identify the potential actions required to further improve apply those technologies.
- This project exchange has enabled all the above objectives to be successfully met.

ACTIVITIES UNDERTAKEN

The IAPP activities in Batu Karas, Pangandaran successfully brought together experts from the UK and Indonesia to deliver a world-standard integrated waste management engineering model in the form of a Framework which offers flexibility in its guidance and can act as an exemplar and guidance tool for other areas and local communities across Indonesia.

The initial Waste Strategy Workshop event in May 2017 in Batu Karas, Pangandaran was well attended, with representatives from ITB and LSBU teams, LPTT, CLEAR Community, Ministry of Tourism, local community members, experts from the UK and other part of Indonesia, the local youth club, policy makers (which also includes Head of Region, District and Village levels). Around 50 people attended the 3 days workshop. The workshop explored context, challenges and technical options for solid waste management in the local area and related it to the sustainable tourism programme ITB have in the Pangandaran region.



At the end of the workshop, the team felt that it was crucial to deliver a hands on experience for the local community through a mentoring programme in order to educate and assist the local community in Batu Karas towards implementing the waste management practice. This was an additional programme of activity beyond the initial objectives. Five mentoring visits were carried out between September 2017-February 2018, each one between 3 and 5 days with numerous meetings and activities.



The mentoring sessions included awareness of the need for waste separation and how to implement a waste bank programme. It also provided good practice examples and delivered a simple and deliverable waste management solutions which tied in well with the Sustainable Tourism strategies for Pangandaran area.

Throughout the activities, it became increasingly clear that solid waste management must come from both bottom up and top to bottom approaches in order to be successful.

During the final dissemination workshop in Batu Karas (May 2018), there were a number of keypoints we increased our understanding of, including: 1. The awareness of local community toward the importance of waste management must be started from their own houses (eq. separation of organic and non-organic waste from the beginning); 2. The challenge surrounding readiness of infrastructure for composting and recycling facilities; 3. The need for local businesses as well as the tourists to be fully on-board and aware with the recycling activities; 4. The differing degrees of support from local authorities (region, district, up to village level)

Our team's IAPP activities have culminated in the production of the CLEARIN Framework, a model which can help empower any Indonesian Coastal Community to deliver an exemplary waste management infrastructure.

IMPACTS AND OUTCOMES

This collaboration brought together academic researchers from ITB (Indonesia) and LSBU (UK), with industry partners LPTT, and the community of Batu Karas, a coastal tourism area in Pangandaran, Indonesia. Together, we worked to address the impact of coastal pollution on tourism in Indonesia whilst engineering innovative waste management solutions at the same time.

On the community level, the workshop and mentoring activities helped raise awareness of waste minimisation, separation and recycling to the local community in Batu Karas Village, which in return will result in waste reduction to landfill, which has a major positive impacts on climate change as well as reduction of plastic pollution to land and oceans. The workshop and mentoring activities have also brought various community groups and representatives closer together and more united in relation to addressing waste management. Early intervention also means that reuse activities are maximised. This bottom up approach has raised positive publicity of the area as a successful sustainable tourism area which leads to further support from the Local and Regional Authorities.

For the arts and crafts businesses, there exists further potential of turning the recycled and/or reusable materials into sustainable products that they can then sell to improve the economy of the area further.

This industry and academic partnership allowed for cross fertilisation of ideas where the industry partners able to bring experience and practical application to the team and for them to get access to cutting-edge research from the academia in return. The engagement with the academia is also highly valued as it enables charitable work from CLEAR Community as an NGO to be up-scaled and shared more widely than would otherwise be possible. The partnership also allowed LPTT to develop a prototype of a small-scale pyrolysis machine and they have been able to access academic research that identifies ways to improve it further.

The first project proved to be a catalyst for a follow up: Integrated Waste Management Facilities for Coastal Indonesia at three scales level (village, district and region), where it strengthens initial work by drawing on additional expertise from industry through new partners Atelier 10, Clear Community and Mantra.

The second project enabled collaborators to expand their range of environmental technologies whilst addressing sustainability concerns at different scales. This has involved bringing in Building Information Modelling (BIM) approaches that integrate design, construction and operation which has been especially useful for negotiating different social and economic context. One of the results has been research into the use of drones for engineering and surveying techniques in coastal regions. We have also explore the possibility of using Bamboo as a sustainable local building materials to be utilised for the waste treatment building structure.

So far we have produced three main reports and guidance notes to share the best-practices and lesson learned from this research, including a Framework model which has potential to be implemented widely in villages across Indonesia. A total of 150 attendees have also participated in the initiation workshop in Batu Karas, Indonesia (May 2017), the final dissemination workshops in London, UK (March 2018) and the final dissemination workshops in Batu Karas, Indonesia (May 2018). From the second project, there will be at least 50 students and researchers from both countries to be trained in BIM software in January 2019.

By creating partnership that values creativity, innovation and knowledge sharing, we have ensured that the educational benefits of the project have been widespread. Students at all levels in both academic institutions have also gained direct experience of industrial-scale problem solving within an international, multi-disciplinary context.

We have also developed a set of case studies that provide insights to solid waste management techniques to realise the development of sustainable tourism. Seminars, training sessions and international workshops have been organised to support education and international networking. Some of these have been and will be hosted and supported by local industry partners. We are also planning to publish our lesson learned from this project on a number of peer reviewed journals. Community mentoring has been used to raise awareness on the ground in Batu Karas.

Meanwhile, dissemination workshops in London and Bandung helped to raise the profile of work with academic colleagues and a wider range of industry professionals. More are planned for the future as part of the second project.

FUTURE PLANS

- For both institutions to develop innovation hubs and centres for excellence that can be used as a living laboratory.
- To replicate the findings of this research into action to support other neighbouring villages and coastal areas in Indonesia, involving SMEs from the arts and crafts industry as well as the product engineering design to enhance the potential of turning recycled/reusable materials into new products that is marketable and profitable to enhance the economy of the area.
- To support the implementation and evolution and promotion of the CLEARIN Framework model to help enable improved waste management in villages across Indonesia, starting with the Pangandaran region.
- To develop students and staff mobility for both institutions, potential joint-degree programmes, exchange of PhD students, Co-supervise PhD, and wider industry and professional institutions' engagement.

We hope that we will be able to achieve the above in five years time through this collaboration.