

Industry and Local Community Involvement in Land-based Pollution Management in Batam, Indonesia

Project Summary

Batam Island covers an area of 1,570.35km² and is bordered by the Singapore Straits to the North, the Bintan Utara Sub-District in the East, the Senayang Sub-District in the South, and Moro Sub-District in the West. Batam is located at a crossroads of international trade and is considered a major centre of economic development in Indonesia. Significant increases in investment across all sectors but particularly in commerce, industry, tourism, and real estate has occurred as a consequence of its proximity to Singapore and has resulted in negative impacts on the environment and resources.



Signboard for the Batam Pilot Activity

The objectives of the pilot activity on land-based pollution management at Batam were to: promote SUPER, PROPER and Cleaner Production (CP) systems in Batam City; evaluate the social acceptability and cost effectiveness of small-scale community sewage treatment systems; and to promote co-operation and increase awareness among the Government, Civil society and Industries regarding the problem of land-based pollution at Batam. The activities planned to achieve these outcomes included: compilation and collection of baseline data and information for management purposes; establishment of facilities for the management of domestic liquid and solid wastes; securing compliance of the Industrial

sector in reducing heavy metal content of discharges; and capacity and public awareness building.

Issues and Challenges

Coastal and marine habitats and the environment of Batam city as a whole have degradation as a consequence of increased population and demands on marine resources of residents following achievement of higher living standards. This has led to overexploitation of resources, increase of domestic and industrial wastes, and physical destruction of coastal habitats. The major land-based pollution problem in coastal waters adjacent to the City is contamination from heavy metals, nutrients, and e-coli bacteria.

In terms of pollution management, the Agency for Market and Sanitation of Batam City is responsible for the management of domestic waste. Usually, domestic solid waste from markets and the settlements in Batam are dumped in temporary sites prior to composting, burial or, burning. The Environment Impact Management Agency (Bapedalda) is in overall charge of environmental management with responsibilities for monitoring, control and supervision of natural resource use and environmental impact analysis.



Domestic solid waste from coastal villages often results in marine litter problems

The key challenges *Bapedalda* has faced in addressing these issues relate to: (1) lack of compliance of industries with regulations pertaining to the monitoring and management of activities in accordance with EIA systems; (2) lack of awareness within coastal villages

with respect to environmental health and sanitation, and the disposal of sanitary and domestic wastes directly into coastal waters. Through the implementation of the pilot activity, a multi-sectoral management board was established to oversee project activities aimed at addressing these challenges. It is anticipated that this management board will be maintained beyond the life of the project. This body was not only responsible for the co-ordination of the pilot activity but also integrated the work of related entities in the planning and implementation of activities for the sustainable development of the entire city.



Coastal industries and shipping are the major source of heavy metal contamination in Batam

Achieving Compliance of the Industrial Sector with SUPER and PROPER Programmes in Batam City

The pilot activity worked with Industry in Batam to promote the adoption of the SUPER and PROPER programmes of Indonesia that were introduced in 2002 to reduce heavy metals discharged from industry. Through activities executed by the pilot project, awareness of industrial sector enterprises regarding waste management has improved significantly and compliance in reducing the heavy metal content of waste water has been enhanced. At the end of 2007 a total of 79 large industrial operations had signed Compliance Letters obligating them to report the results of environmental monitoring and management to *Bapedalda*.

This was largely achieved through capacity building activities aimed at improving the management of

industrial liquid and solid wastes. These included seminars for industry, local government officers, and local community groups on the heavy metal contamination of coastal waters, sediments, and fish in the Batam area and the associated risks to human health. Agreed actions to ensure the long-term maintenance of the project outcomes include: regular assessment of the environmental performance of industrial operations by *Bapedalda* (e.g. sea water quality monitoring and regular review of compliance documentation); regular seminars on the SUPER and PROPER programmes and training for stakeholders; monitoring discharge and sea water quality by industry; and regular reporting of environment performance to local and national government agencies.

Testing Small-Scale Community Sewage Treatment Systems

A village outside Batam City was selected for trialling a communal septic system and management of the solid wastes. Solid wastes management involved organising waste collection, storage and treatment at the village. Two hundred plastic rubbish bins were provided for collection of solid wastes separated into organic wet materials and non-organic dry wastes. The organic wastes were collected at a waste management site and used to produce around 300 – 400kg of compost are produced per month. The product is used as fertiliser in the village and provides an additional source of income. Non-organic waste is transported for disposal at the solid waste dump site of the city.



Construction of a communal septic tank in Tanjung Riau Village

The project worked closely with the community to address environment problems caused by domestic waste. Villagers were involved from the outset in the planning, design, construction, and maintenance of a communal septic tank system. Ten systems of communal septic tanks were installed each providing for the needs of 8-10 families. One third of the households are now connected to such systems and plans are in hand to replicate this system elsewhere.

The activities in domestic waste management have not only improved sanitary conditions in the village but have also proved helpful in enhancing awareness and generating support from the local community for environment management. The management board has encouraged replication of the practices in domestic waste management in Tanjung Riau village as part of the policy of environment management of the city. The project worked with Batam City Government to include funds for the continued management of domestic liquid and solid wastes in their recurrent budget. It is also anticipated that maintenance of the system can in part be financed via income from the sale of compost.



Production of compost from domestic organic waste provides an additional source of income to coastal households

Development of an Environmental Quality Database and GIS

The database on environment status and management in Batam city has been developed to include all data obtained from surveys and monitoring undertaken by the environment sector during recent years, and also data collected through the monitoring programme of the

industry parks. This database is a useful tool for managing the environment of Batam, particularly in terms of: verifying changes in environment state; and assessing the effectiveness of the SUPER and PROPER programmes in reducing the heavy metal content of waste water discharged from industrial enterprises. It has also been used as part of capacity building exercises, with stakeholders from industrial enterprises and government trained in its use.

Potential for Replication

The potential for replicating activities to promote the SUPER and PROPER programme within the industrial sector is high. The simple methodology adopted by the project both in involving industry and local communities in addressing land-based pollution can be easily transferred to other areas of Indonesia. Involvement of industrial enterprises in environment management in Batam serves as a good example for wider dissemination and adoption.

The scope of the pilot activity in improving domestic waste management of approximately one third of the households in one village of the island, will likely not enable the impacts of the activity on the environmental state of coastal waters and sediments of Batam Island to be easily identified. This limitation was identified at the beginning of the project, although it is envisaged that the model adopted for solid and domestic waste management at the Tanjung Riau village will be up-scaled to the whole of island level by the Batam City Government. The experience at Tanjung Riau is that solid wastes can be used to generate income for the community if managed properly. This provides a positive example for use in encouraging other villages to establish similar systems.

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