Environmental monitoring of different projects/industries through the Multipartite Monitoring Teams (MMTs).

ICM Solutions

A Small Venture in Environmental Monitoring Proves a Wise Investment in Batangas Province, Philippines

- The Provincial Government Environment and Natural Resource Office–Batangas Environmental Laboratory (PG-ENRO BEL) is the Philippines' first environmental monitoring laboratory operated by a local government. The PG-ENRO BEL experience has demonstrated that providing quality laboratory services to the local government and the private sector is not only feasible, but a necessary component of integrated coastal management.
- By continually improving its capacity as an environmental laboratory, the PG-ENRO BEL was able to offer services to a wider constituency, generating revenue to support its operation, as well as provide income to the Provincial Government.
- Environmental monitoring data are interpreted, packaged and disseminated to the Batangas Bay Region Environmental Protection Council on a regular basis. The information is used by the Council, an interagency, multisectoral coordinating mechanism, to pinpoint hotspots, identify management interventions, as well as evaluate the impact of management programs. The monitoring data are also employed as input to the Province's State of the Coasts (SOC) report. The SOC report is a tool used to guide medium- and long-term planning and investments in sustainable development of coastal areas.

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Context

With the establishment of the ICM program in 1994, the Province of Batangas became aware of the issues and challenges associated with pollution prevention and management. Prior to ICM, monitoring data were fragmented and inconsistent: data came from studies conducted by different academic institutions and private entities. There was no regular monitoring program in the Bay. This proved inadequate for determining the environmental conditions in the Bay, inputs into planning and decision making for development of the Bay, and benchmarks to compare changes that occur as a consequence of the developments and management interventions.

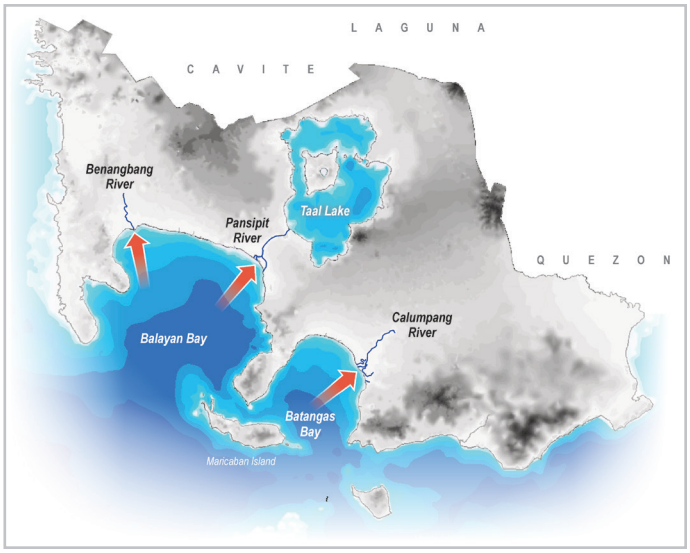

Figure 1. Focus areas of water quality monitoring program in Batangas Province.

With the assistance of scientists from the University of the Philippines–Marine Science Institute (UP–MSI), baseline environmental data for the Bay were acquired. The results of the environmental study showed that a potential health risk was imminent unless further assessment of pollution sources was undertaken, the extent of pollution determined, and the control measures instituted. While the main use of Batangas Bay was classified primarily for the propagation and growth of fish and other aquatic life, and not for contact recreation, beaches located on the western side of the Bay were being used for swimming and other body contact sports such as diving and snorkeling.

Institutionally, both a structure and an integrated monitoring platform were missing at that time. It was not until 1995, when the Provincial Government–Environment and Natural Resources Office (PG–ENRO) was created and became operational, that the blueprint for the PG–ENRO Batangas Environmental Laboratory (BEL) was developed.[1]

The ultimate target of monitoring and assessing changes in the coastal and marine environment was to improve the collective understanding of what's happening in the Bay and to link this information directly to management. It was imperative that the monitoring results be regularly communicated to a management authority if the program was to become relevant. The link to the management of the Bay became operative when the Batangas Bay Region Environmental Protection Council (BBREPC) was established.[2]

[1] PG-ENRO's primary mandate is to coordinate and integrate the implementation of management programs among the different stakeholders in Batangas. Its tasks include: (1) developing the operational plans and strategies for implementing environmental and natural resources programs and projects; (2) enforcing pollution control and environmental protection laws, rules and regulations; and (3) coordinating the ICM program implementation among various stakeholders.

[2] BBREPC is a forum for consultation and dialogue between the local government, national agencies, the private industries, academic institutions and NGOs on the planning, coordination, implementation and assessment of the province's Strategic Environmental Management Plan. It is chaired by the Governor of Batangas.

Solutions

1. Start small and scale up as confidence and awareness grows

BEL started its operation in a small refurbished building in 1998. An initial five-year Integrated Environmental Monitoring Program (IEMP) was designed for the Batangas Bay region to regularly assess the state of, and trends in, marine pollution and to ascertain what improvements have occurred as a result of pollution management interventions.

The primary concern was that an environmental monitoring program was costly. A strategy to create a collaborative monitoring program was explored including cost sharing and other financing instruments. The idea was to engage multiple partners in water sampling, data gathering, analysis and decisionmaking.

With the start of the monitoring program in 1998, PG-ENRO eventually secured partnerships with various institutions. PG-ENRO refurbished a small building to house the BEL, hired two chemists, and provided a budget for maintenance and operating expenses.

Batangas Marine Environmental Laboratory (BMEL) Building, 1998.

Unfortunately, the initial five-year strategy to sustain the marine pollution monitoring program lasted only for two years due to the lack of initiative and interest. Co-financing arrangements with the industries that were involved in the monitoring activities, as stipulated in their Environmental Compliance Certificates, were not fulfilled.

Due to financial constraints and lack of personnel, the BEL limited its monitoring program to eight stations instead of twenty-three stations as initially planned. The basis of selection of monitoring stations in Batangas Bay were the point and non-point sources of pollutants and within the mixing zone of industries operating within the Batangas Bay area.

To help establish increased capacity, BEL sought funds from the Department of Energy (DOE) through Energy Regulation 1-94A for the procurement of laboratory equipment. The DOE regulation stipulates that funds shall be set aside for community development per kilowatt hour generated by a power plant. In November 2002, the National Power Corporation and the Province of Batangas entered into a Memorandum of Agreement allocating PhP 5.25 M (US$ 101,000) for additional laboratory equipment.

The PG-ENRO BEL facility, 2008.

In 2003, the PG-ENRO laboratory through the BBREPC facilitated the approval of a provincial ordinance (No. 3-S. 2003) authorizing the imposition of fees for the services rendered by the BEL. The law allowed BEL to start charging fees for laboratory services provided to non-government entities.

On June 24, 2004, the Province re-inaugurated the BEL with upgraded facility and capabilities. Today, the BEL is housed in a two-storey facility with three full-time chemists and three laboratory technicians. The water quality monitoring program covers Batangas Bay, Balayan Bay and Pansipit River. Additional stations are tested in response to individual requests and complaints of pollution discharges.

2. Establish the value of environmental monitoring

The sharing of environmental monitoring data and information contributes to planning and decisionmaking. PG-ENRO BEL produces a quarterly report on the state of the region's water quality and submits it to the BBREPC. Special meetings are held quarterly to address emerging issues or emergencies. This regular monitoring provides the local government with timely information about water quality in the bay and contributing river systems. As such, it provides local government officials and other concerned stakeholders with ready access to information on trends and emerging issues with regard to water quality across the Province (fig. 2).

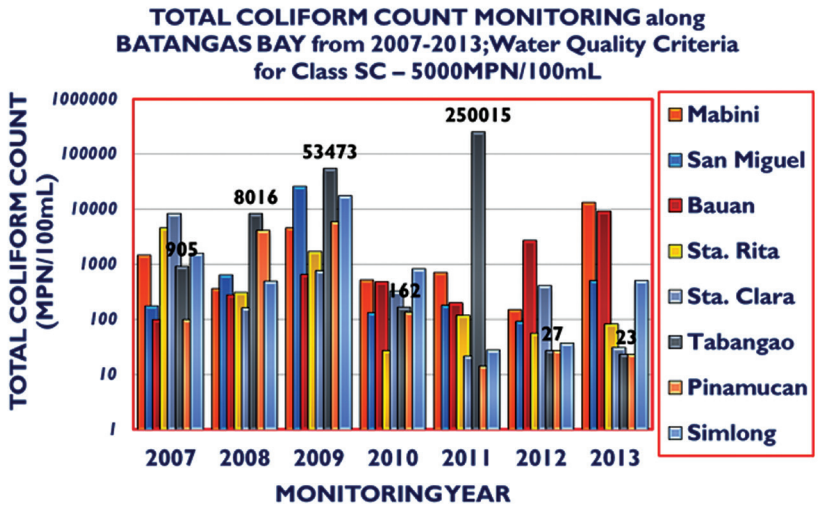

Figure 2. Water Quality Monitoring in Batangas Bay.

3. Link information directly to management

Monitoring data from BEL have been used to pinpoint hotspots and to identify necessary management interventions in Batangas. For example, the Batangas Province Environment Code (2012) requires all industries operating within the province to secure an Environmental Clearance (EC). The EC is issued by the PG-ENRO based upon sampling and analysis of the company's wastewater effluent, performed by the BEL. This approach has given the PG-ENRO the authority and capacity to monitor the compliance of different industries in accordance with applicable environmental laws, rules and regulations concerning pollution management.

Aside from EC monitoring, BEL also responds to pollution complaints. The results serve as evidence that some industries and establishments are discharging wastewater which does not conform to national water quality standards. The monitoring program has heightened the awareness local government executives about the importance of generating scientific data to measure water quality degradation and the likely source(s) of the problem. Most importantly, the monitoring program facilitates science-based management interventions, and evaluatuion of the effectiveness of those interventions.

BEL also became a third party laboratory and plays an active role in scaling up investments for ICM. For example, the DENR Protected Area Management Board designated Taal Lake as a Water Quality Management Area. As partner agency of the Batangas Province, the DENR tapped the services of BEL to help establish monitoring sites in lakes and river tributaries to Taal Lake.

Likewise, BEL partnered with DENR-Protected Area Wildlife and Coastal Zone Management in western and eastern Batangas to establish of monitoring sites for water quality assessment in four Marine Protected Areas in the province. The data generated served as reference to identify which areas are considered hot spots and need management intervention. Similarly, in the case of groundwater resources, monitoring data from BEL was used to build community awareness on the continuous degradation of groundwater quality. This has been the basis of launching watershed management initiatives and water recycling among local governments, national government agencies and the industrial sector.

Batangas Environment Laboratory staff conducting water quality sampling and analysis.

4. Get certified

Laboratory certification is a regulatory requirement for all testing laboratories operating in the Philippines. The Department of Environment and Natural Resources-Environmental Management Bureau (DENR-EMB) is the responsible regulating body in the country. A DENR-EMB certified laboratory is eligible to provide environmental data in connection with the national Environmental Impact Assessment System, environmental monitoring and research activities in support of relevant national regulations.

Over a period of three years, PG-ENRO BEL secured all the requirements for DENR-EMB laboratory certification from different agencies, including, for example, Hazardous Waste ID Registration (March 2006), the Environmental Compliance Certificatei (December 2007), the Certificate of Compliance to the Regulation of the Fire Code (October 2008), and the accreditation of a Pollution Control Officer (September 2008).

As a consequence, the DENR Certificate of Recognition, signed by the DENR Secretary, was issued in June 2009. It has since been renewed in 2013.

The PG-ENRO BEL has also been issued accreditation by the Department of Health (DOH) in July 2012 and on August 31, 2014, PG-ENRO BEL was awarded an international accreditation for Philippine National Standards ISO/ IEC 17025: 2005 (i.e., General requirements for the competence of testing and calibration laboratories).

Results

Replication and increased public awareness and participation

PG-ENRO BEL is now the technical arm of the Provincial Government of Batangas for providing scientific data on environmental quality of different bodies of water in the province. It operates as a DENR- and DOH-recognized laboratory that monitors not only freshwater and marine water quality but also air quality and groundwater resources in the province. To date, BEL has 28 ambient water and air quality parameters recognized by the DENR-EMB and is accredited by the DOH for bacteriological, physico-chemical, and heavy metals parameters. This contributes to improving the lives of Batangueños by providing information on access to safe drinking and recreational waters. The data generated regarding the quality of drinking water are used to inform the public whether the groundwater resources are potable and safe for drinking. If there are nonconforming results, a sanitary inspector of a local government unit informs the affected barangays or communities of the results and initiates treatment of the contaminated water.

Stronger partnerships with industries and the academe

The multisectoral collaboration among stakeholders within the Batangas ICM system has been enhanced as a result of the knowledge gained through the environmental monitoring program. There is now an appreciation of the changes in environmental trends and how the resource systems of Batangas are responding to development and management interventions.

The partnership with industries through participation in the quarterly meetings—wherein results of quarterly water quality monitoring are presented to members of the Batangas Coastal Resources Management Foundation (BCRMF)—has been strengthened. BCRMF is a nonprofit industry-based organization with a focus on harmonizing the environmental initiatives of member industries to implement upland and coastal management programs and projects which have positive impact on the surrounding communities.

Since the monitoring stations are in the vicinity of several industries within the Batangas Bay area, the monitoring results regularly flag selected industries on the status of ambient water quality. To date, all industries along the coast are conforming to environmental standards. In addition, BCRMF member industries have launched drainage, river and coastal cleanup programs in partnership with the local communities as part of their initiatives for environmental protection.

The academe is also a significant partner and client of BEL. BEL has accepted requests from members of the academe for assistance in their research projects in various water bodies in the province. Although the data are owned by the academe, they are accessible as reference material for PG-ENRO when needed. In addition, the academe conducts an Annual Research Forum wherein the concerned local governments and other stakeholders participate. The forum is a venue for the experts, affected communities, concerned local governments and regulatory bodies to discuss the results of research projects, the possible causes and the need for follow up actions.

Increasing revenue

Private sector clients have become a source of income for the laboratory. In 2012, the BEL was able to collect PhP 888,795.00 (US$ 21,000) from private customers and about PhP 211,260.00 (US$ 5,000) of this was spent for monitoring purposes. The amounts were based on the schedule of fees stipulated in Provincial Ordinance

No. 003 S. 2003. For 2013 and 2014, the collected revenue amounted to about PhP 1.7 million (US$ 40,000) and 1.44 million (US$32,500), respectively (fig. 3).

Aside from testing influents, effluents, and fresh and marine water samples for private customers with corresponding fees, BEL also is contracted by industry to monitor the quality of industrial wastewater being discharged in bays and rivers, as well as the quality of receiving bodies of water in the vicinity of industries' outfalls.

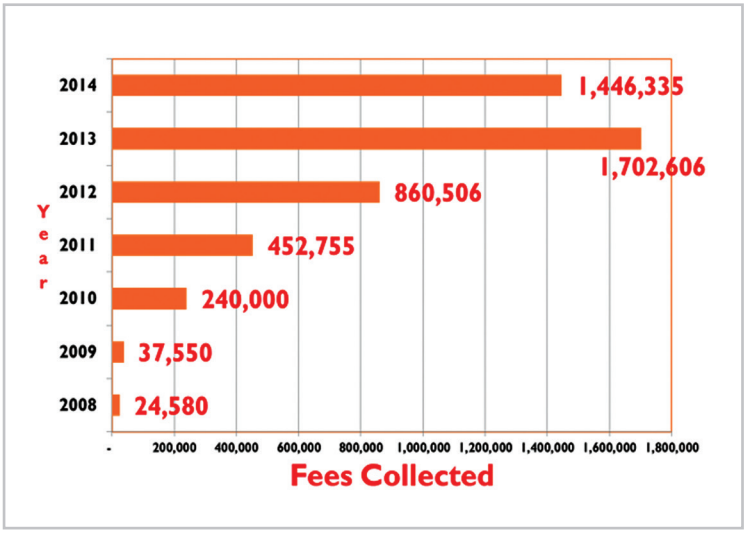

Figure 3. Total Fees Collected (2008 to 2014)

Lessons Learned

1. **Strengthen local capacity to measure conditions and trends in Batangas Bay.** Strengthening local capacity by providing an environmental monitoring laboratory as a service of a local government to pollution management ensures efficiency and confidence in project operation and implementation. In the case of Batangas, pollution control measures were established for identified sources of pollution, particularly for livestock raising enterprises. Also, PG-ENRO incorporated in the Batangas Province Environment Code (2012) the issuance of Environmental Clearance (EC) to all industries operating within the province. An EC is issued to the requesting party only after the conduct of sampling and analysis of the company's wastewater/sewage treatment plant discharges.

2. **Environmental monitoring improves governance.** Monitoring environmental changes is key to identifying appropriate policy and management interventions. For example, communities have been mobilized to do coastal clean-ups in Batangas in response to high coliform levels in analyzed water samples; residents were also directed to refrain from using the coastline as a dumping area for household and sanitary wastes.. The monitoring information facilitates direct linkages between scientific data, decision making and actions. It further strengthens community awareness and participation in management interventions. Enhancing public awareness and participation in all phases of the policy development, implementation and monitoring promotes perception change and ownership.

3. **Scientific information/advice at the local level improves efficiency and effectiveness of management interventions.** The monitoring data from the BEL program has contributed to better understanding of how the water bodies and associated resource systems are responding to development and management interventions in Batangas. This is particularly true in Calumpang River, which is the main tributary to Batangas Bay. The Calumpang

River acts as catchment basin for all domestic and livestock wastes coming from two cities and five municipalities. The conduct of a an extensive water qulaity monitoring program of the river, including microbiological, physico-chemical and heavy metal analyses, identified priority pollutants and potential sources of contamination. A major outcome of the monitoring activity was the inclusion of the Calumpang River clean-up as a priority of the Batangas Bay Rehabilitation Program.

4. Continual improvement and investments in excellence have elevated PG-ENRO BEL as an internationally recognized laboratory. BEL's success as an environmental monitoring laboratory did not come overnight. It was a painstaking, day-by-day, decisionmaking, learning, and performance evaluation process. PG-ENRO BEL staff remain committed to the provision of quality testing by continuously improving and expanding BEL services and maintaining compliance with the requirements of regulatory body and the Philippine National Standard ISO/IEC 17025:2005.

Keywords

Batangas, BEL, environmental laboratory, environmental monitoring, monitoring and evaluation, Batangas Province ICM program, user fees, laboratory fees, local policy

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