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Kitakyushu Initiative for a Clean Environment: Monitoring and Evaluation (M&E) System for Urban Environmental Management

Mushtaq Ahmed Memon* IGES

Hidefumi Imura Nagoya University / IGES

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1 Background

Urban population growth rates are higher in developing countries than the average national growth rates. Although most of the development agencies were undertaking rural development projects to improve the living standards in rural areas, the migration towards urban centers is a continuing phenomenon in the developing countries. Therefore, the realistic challenge for development agencies is not to halt the expansion of urban centers, but to address the challenges, including environmental issues, faced by the cities. International development initiatives are trying to help the developing countries to meet these challenges. However, it is comparatively a recent approach to assist the local governments in place of national governments, as these are directly responsible for most of the urban environmental services. Furthermore, there is a growing trend to make local authorities independent. Moreover, now decisions are being made on demand responsive approach (DRA), to only invest for meeting the real demand from the users.

United Nations Economic and Social Commission for Asia and Pacific (UN/ESCAP) in collaboration with Institute for Global Environmental Strategies (IGES) Japan launched Kitakyushu Initiative for a Clean Environment[1] during Ministerial Conference on Environment and Development (MCED) in year 2000. This Initiative is aimed to bring the cities (municipality governments) into a network to develop their capacities, by sharing the successful experiences by replicating the best and viable practices, to improve the urban environmental services in their respective cities. Municipalities require an appropriate monitoring and evaluation (M&E) system to improve the efficiency and effectiveness of the inputs and outputs for the environmental services like water supply, wastewater treatment, and solid waste management. A broader picture of this initiative is drawn in Fig. 1.

2 Design of M&E system

The earlier design of M&E systems gave an idea of creating parallel bodies, which were not a part of the project teams. Hence, most of the efforts by the project teams were made to please M&E teams rather than to put efforts for the real project goals. On the other hand, the latest participatory M&E (Coupal 2001, OESP 1997) has created confusion with unclear team and their role, and the action plan for achieving the objectives of M&E. To optimize the resources and to achieve the objectives of the M&E, a clear and viable M&E system is essentially required. For this, a clear distinction of monitoring and evaluation is essential to outline this M&E system, as the activities and objectives for monitoring may be different from the activities and objectives of evaluation. This difference can be clearly defined according to their scope, function, timing, and institutional design.

Scope: Deboeck and Kinsey (1980) describes monitoring as the timely gathering of information on project inputs, outputs, and the complimentary activities which could be critical to the attainment of the objectives of the project. However, the scope of monitoring varies from user to user, as ADB (1988) considers monitoring as the collection of factual evidence on all the aspects of a project's progress and effectiveness but not the interpretation of that evidence. On the contrary, evaluation is concerned with the

* Research Associate, Institute for Global Environmental Strategies (IGES), Kitakyushu Office, 3-9-30, Asano, Kokurakita-ku, Kitakyushu City 802-0001, Tel. 093-513-3711, Fax. 093-513-3712, Email: mushtaq@iges.or.jp

[1] For detailed pilot activities, successful practices, and networking activities, please visit the website of Kitakyushu Initiative for a Clean Environment http://www.iges.or.jp/kitakyushu

analysis and interpretation of the information collected through monitoring activities. Therefore, evaluation is the process to compare the impact of the project in the context of its relevance, efficiency, effectiveness, and impact between planned and the actual achievements.

Function: Bamberger and Hewitt (1987) suggest two functions of monitoring: 1) performance monitoring to assess the extent to which project resources are being used in accordance with the approved budget and timetable and whether the intended outputs are being produced in a timely and cost effective way, and 2) process monitoring to assess the efficiency and effectiveness of project implementation. On the other hand, the function of evaluation can be classified as an 'Audit' and a 'Management', where former helps to analyze critically the efficiency of inputs and impacts of outcomes with the targeted goals to get the answer of 'why' the results are different. Management function helps decision-makers for 'how' to improve future performance by avoiding present deficiencies. Moreover, Bamberger and Hewitt suggest two functions of evaluation: 1) impact evaluation to estimate net impacts for 'with' and 'without' project scenario, and 2) cost-effective analysis to compare alternative projects in-terms of producing same impacts with lowest possible costs.

TIMING: Monitoring is a continuous activity to be carries out during the implementation and operation phases; however, the results could be produced periodically (daily, weekly, or monthly progress reports etc.). Unlikely monitoring, the evaluation is to be commenced after a fixed planned time, or after completion of one phase; and/or some years after the completion of the project to evaluate the activities, performed during the specified period. Dorward (1988) suggests that evaluation could be mid-term process during an implementation phase; or it could be done at the end of an implementation of financing phase as a `terminal' evaluation; and/or an `ex post' evaluation could be performed at the end of project's life to se overall impact of the project. He also argues that on-going evaluation is an ambiguous term because it is a `cut-off' process not a continuous one like monitoring.

Institutional design: The monitoring is usually under the direct control of project management, as it has to serve their information needs. However, the evaluation requires an independent body with broad range of skills. However, recently the stakeholders' participation is being essentially sought for monitoring and evaluation activities. Stakeholder participation during the whole project cycle, from inception to evaluation, has changed the traditional institutional setup for monitoring and evaluation. This has also changed the role of 'question makers' to carry out M&E activities.

Planning for M&E system: Once the objectives, indicators, activities, milestones, and users are identified, it would easier to plan M&E system. First of all, monitoring should be induced in the organization in a way that it may not simply become a data collection activity with little support from those who are responsible for the project implementation and to receive the findings. Therefore, this should be given directly under the control of municipalities, who are responsible to provide environmental services. However, evaluation needs impartial findings and the independent unit may be established involving all the stakeholders and technical experts.

Nevertheless, for both M&E, the qualified people are essentially required to collect and analyze the data. In this regard, the building in-house capacity through on and off job trainings is an important factor rather than hiring the outside staff for such a purpose. The proper working environment and a good mix of incentives and accountability is required for motivation. The manager should be very smart person, as Deboeck and Kinsey suggest that the manager is the meeting point of the subjective experience of the field staff and the objective information of the monitoring.

Furthermore, timing and relevance are the crucial factors for the successful M&E activities, as delayed and/or ambiguous information would badly affect the decision-making costing enormous amount of the resources. All the stakeholders should be in a close and effective chain to collect and disseminate information at the right time and for the right purpose. Therefore, there is crucial need to establish management information system (MIS) and decision support systems (DSS) to make the flow of information fast and effective, as desirable information must reach the appropriate levels of decision-making, and the right time. Social sector projects, like environmental services, require more channels of

informal and interpersonal communications to collect and disseminate the information, which may not be effectively done through formal communication.

Based on this, we may develop an effective M&E system in accordance with the objectives of any urban environmental service. However, the environmental services vary from each other, for example solid waste management is different from water supply and waste water management, from each component of capacity development (Fig 1). Hence there should be clear indicators for M&E of each service. Some of the indicators are discussed below and that list of indicators could be improved depending on the intensity of M&E objectives.

3 M&E for Kitakyushu Initiative

This initiative is quite young and this initiative is trying to mix "learning from the successful practices" and "implementation of pilot activities" to generate the appropriate policy options for urban environmental governance in this region. Hence, M&E system is also being designed on the similar path and this will improve over the time and we will be able to make some good policy options by the next MCED in year 2005. For this M&E we are adapting the following path.

Pilot activity in Nonthaburi (Thailand): We discuss one of our pilot activities to explain the M&E system. This pilot activity is targeted to reduce solid waste by 20% by increasing recycling by 30% through community participation and effective solid waste management. This will help to improve health & hygiene of the communities resulting into improved productivity and availability of labor days, and also improvements in aesthetics resulting into increasing value for the real estate on the one hand. On the other hand, cost recovery and efficient solid waste management will improve the viability of this environmental service, which will reduce the subsidies from the local government budget resulting into more spending on the other environmental services.

Data on logical framework: After the conception of the pilot activity in a targeted city, a logical framework is required to monitor and evaluate the implementation phase and outcomes and impacts of the project. For this pilot activity, the main inputs are project preparation to be done by ESCAP & IGES, technical expertise to be provided by IGES, initial materials including bins and bags for recyclable materials to be bought from project funding (PF) by Nonthaburi Municipality, public awareness activities by the municipality, volunteers from the community as a result of public awareness, separation of normal solid waste and recyclable waste at source by the households as result of public awareness, and effective collection system by the municipality (Please see Table 1). It is always helpful to measure these inputs through a logical indicator system, as the simple measurement indicators are given for the inputs. The data collected during the implementation of the pilot activity will help to monitor the progress of inputs and evaluate if more inputs are required and when those inputs are required, and which agency or focus group is responsible for those inputs.

Output is the immediate reaction of the inputs in a project; hence, for this pilot activity, we can see that community participation resulting into availability of volunteers and separation of the waste at the source is the direct output of public awareness activities. Then the availability of bins and bags improve the disposal of the waste and recyclable materials by the households. The collection system, as an input, provides the regular collection of the waste and separation at source makes it possible to collect recyclable materials from the households. This regular collection system also improves the cost recovery from the households. Measurement indicators and the responsibilities or focus groups should be logical identified for the outputs also as similar to the inputs (Table 1).

Outputs generate the outcomes of the projects, as we can see that efficient and effective solid waste management with reduced costs per ton and increased collection rate is the first outcome of this project. Then, there are also earning from recyclable materials, which are being distributed equally between the drivers (collectors of the waste) and the community (for community works). The other outcome, which is the main objective of the pilot activity, is the reduced per capita solid waste. Overall it is also anticipated that the viability of solid waste management will be improved as per unit costs will be reduce and cost

recovery will be increased. All the outcomes can also be quantitatively and/or qualitatively measured from the focus group's point of view.

These outcomes lead towards the impact of the project as for this pilot activity we anticipate the improved health and hygienic conditions due to effective solid waste management. This can be measured as the reduced incidences of the sickness. Furthermore, the aesthetic view will also be improved and there will be a behavior shift in the households to manage their solid waste. The lower per capita solid waste will reduce the pressure on the final disposal and there will be costs savings in acquiring landfill areas and in spending on final treatment.

Finally, there will be some positive backward and forward linkages of this pilot activity. First of all the overall income of the households (and national income account) will be improved, as their will be lower medical costs and improved availability of human resources. Then, the decreased subsidies will help the municipality to increase the funding for the other environmental services. This will also help the municipality to increase the outreach and effectiveness of urban environmental services, which is an indicator of good environmental governance. Finally, the real estate value will be also increase.

Initial monitoring data: The data on the solid waste and recycling has been collected regularly. The first six months data is shown in Table 2 and Table 3 for two areas, under Nonthaburi Municipality, respectively. The data contains solid waste generation per day (in kilograms), recyclable materials per day (in kilograms), recycling rate as percentage of total solid waste, recycling materials per month (in kilogram) to be sold, and the monthly income from the recycling. In both of the villages, the trend is almost same, and solid waste is not increasing anymore and has started decreasing, as recyclable materials are increasing at a steady pace. This recycling has improved the income generation, which gives more motivation to the collectors (drivers and other staff on the collection vehicles), as they get half of the share. The communities also enjoy better living as other half of the income is being spent on the community related activities including street renovation and lightening and so on.

Initial evaluation: At the end of six months, the evaluation of the data suggests that solid waste per capita is started decreasing, which will lead towards reduced pressure on the final disposal. The recycling rate is increasing and has crossed 20%, where the target is 30% in one year. The other evaluation will be done, when the appropriate data, in accordance with the logical framework, will be made available.

4 Conclusion

Monitoring and Evaluation is the most important aspect for any project and program; however, if this has not been designed properly, in accordance with the project requirements and the objectives of M&E, then scarce resources will be wasted and the M&E results will be of little help. Therefore, a proper understanding of scope, function, timing, and institutional design is essential to plan M&E system. Furthermore, a simple logical framework with measurable indicator system can help to improve the efficiency and efficacy of M&E activities.

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Fig. 1 Capacity development for Urban Environmental Management

Urban Environmental Challenges	Institutional Strengthening	Public Awareness	Stakeholder Participation	Financial Mechanism	Policies and Regulations	Choice of Technology
Water Supply & Waste Water Management						
Solid Waste Management						
Industrial Pollution Management						
Energy related Pollution Management						
Transportation related Pollution Management						
Slums & land-use Management						
	Monitoring and Evaluation (M&E) System					

Table 1 Logical framework for solid waste management in Nonthaburi (Thailand)

	Type	Measurement Indicator	Agency/ Focus Group	Remarks
Input	1. Project preparation	Deadlines	ESCAP & IGES	
	2. Technical expertise	Person-months	IGES	
	3. Bins and bags	Number/households	Nonthaburi/PF	
	4. Public awareness	Target population, Workshops, posters	Nonthaburi/PF	
	5. Volunteers	Volunteer-days	Community	
	6. Separation at source	Percentage separation	Community	
	7. Collection system	Collection vehicles	Nonthaburi	
Output	1. Community participation	Number of meetings	Community & Nonthaburi	
	2. Proper disposal	Percentage of proper disposal	Community	
	3. Regular collection of SW	Collection (trips/week)	Nonthaburi	
	4. Separation of waste	Amount of recyclable materials	Community	
	5. Cost recovery	Charge system (in dollar term)	Nonthaburi	
Outcome	1. Efficient and effective solid waste management	Costs (dollars) of SWM and Collection rate (Percentage)	Nonthaburi	
	2. Earnings from recycling	Dollars	Community	
	3. Quantity of solid waste	Per capita solid waste	Nonthaburi	
	4. Viability of SWM	Costs vs. Cost recovery	Nonthaburi	
Impact	1. Improved health and Hygiene	Reduced number of sickness incidences	Community	
	2. Improved aesthetic view	Qualitative judgment	Community	
	3. Behavior shift	Qualitative judgment	Community	
	4. Final disposal of SW	Quantity of SW vs. landfill area	Community &	
	5. Stakeholder participation	Increased number of joint ventures/ decision-making	Nonthaburi	
Backward and Forward Linkages	1. Lower health costs	Monthly expenditures & share	Community	
	2. Human resources improvements	Quality (productivity) and quality (person-days available for labor)	Community & public accounts	
	3. Public finances for other services	Decreased rate of subsidies for SWM and overall budgeting	Nonthaburi	
	4. Urban environmental governance	Outreach and effectiveness of urban environmental services	Nonthaburi & Community	
	5. Real estate value	Dollars per unit (real estate)	Community	

Table 2 Phibulsongkram Village

Month	Solid waste (Kilograms/day) Average	Recyclable Materials (Kilograms/day) Average	Recycling rate (%) Average	Recyclable Materials (Kilograms/month) Average	Income (Bhat)
November 2001	1008	54.5	5.4	1635	344
December 2001	996	50.1	5.2	1554	438
January 2002	819	74.0	9.0	2222	358
February 2002	776	78.4	10.1	2196	428
March 2002	926	76.2	8.2	2362	788
April 2002	897	105.0	11.7	3160	866
May 2002	968	147.0	15.2	4558	988
June 2002	680	138.0	20.3	4147	993

Source: Nonthaburi Municipality

Table 3 Suan klang muang 3 Village

Month	Solid waste (Kilograms/day) Average	Recyclable Materials (Kilograms/day) Average	Recycling rate (%) Average	Recyclable Materials (Kilograms/month) Average	Income (Bhat)
November 2001	215	11.2	5.2	335	223
December 2001	215	10.1	4.8	311	260
January 2002	139	16.3	9.8	507	390
February 2002	173	20.2	11.6	565	420
March 2002	204	23.5	9.1	729	521
April 2002	150	20.2	13.4	607	577
May 2002	115	21.7	18.7	672	584
June 2002	151	36.2	24.0	1086	637

Source: Nonthaburi Municipality

Table 4 Evaluation of solid waste & recycling data

Month	Total Solid waste (Kilograms/day) Average	Solid waste per capita Average	Total Recyclable Materials (Kilograms/day) Average	Recycling rate (%) Average)
November 2001	1222	0.95	65.7	5.3
December 2001	1211	0.94	60.2	5.0
January 2002	958	0.75	90.3	9.4
February 2002	949	0.74	98.6	10.9
March 2002	1166	0.91	99.7	8.7
April 2002	1047	0.82	125.2	12.6
May 2002	1083	0.84	168.7	16.9
June 2002	831	0.65	174.2	22.1

Source: Nonthaburi Municipality