

CHAPTER 11 ACTION PLAN ON SOLID WASTE MANAGEMENT

11.1 Formulation of Action Plan on Solid Waste Management

11.1.1 Procedure for Formulation of Action Plan

The Study has been focusing on the study process including pilot project activities. In order to formulate Action Plans (A/Ps) on solid waste management, Draft Action Plans (DfA/Ps) were formulated in Phase 2. Based on lessons learned from the pilot projects in Phase 3 that address various components of solid waste management, the DfA/Ps were finalized as A/Ps on solid waste management.

A series of discussions was held at the Technical Working Group (TWG) meetings and respective T/F meetings of the five municipalities as part of the development process of the A/Ps. Decision-makers such as mayor, deputy mayor and chief executive officer (CEO) of each municipality participated in these meetings on an ad hoc basis. Since the participatory approaches were adopted in preparing the A/Ps, the A/Ps can be said to be as the outcomes of extended consultation participated in by a large number of stakeholders at the Public Hearings (P/Hs) and seminars. The inclusion of a logical framework, adoption of objectively verifiable indicators (OVIs) and identification of prioritized activities are also some of the important features of the Study. These procedures for formulation of the A/Ps were taken as part of capacity development as discussed below:

(1) Confirmation of Structure of A/P and its Preparation Steps

At the outset, the TWG members agreed to the basic structure and components of the A/P of each municipality as follows:

- Part I : Current Situation
- Part II : Future Framework
- Part III : Vision and Target
- Part IV : Action Plan (Approaches, Strategies, Necessary Activities, Implementation Schedule, Financial Plan)

Table 11.1-1 Structure of Action Plan

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| <p>Part I Current Situations</p> <ul style="list-style-type: none">1.1 Overview of municipality1.2 Solid waste generation (waste quantity and quality)1.3 Solid waste collection system1.4 Composting and recycling1.5 Final disposal1.6 Social aspect (public awareness, NGO/CBO, local community)1.7 Managerial aspect (organization, institution, human resource, financial conditions)1.8 Issues and constraints <p>Part II Future Framework</p> <ul style="list-style-type: none">2.1 Projection of future population2.2 Future generation of solid waste <p>Part III Vision and Target</p> <ul style="list-style-type: none">3.1 Vision3.2 Target <p>Part IV Action Plan</p> <ul style="list-style-type: none">4.1 Approaches and strategies4.2 Necessary activities (short, mid, and long-terms)<ul style="list-style-type: none">4.2.1 A: Improvement of Collection and Transportation4.2.2 B: Promotion of Waste Minimization4.2.3 C: Improvement of Solid Waste Disposal System4.2.4 D: Promotion of Public Participation and Behavior Change4.2.5 E: Organizational and Institutional Arrangement4.2.6 F: Others4.3 Implementation schedule of short-term activities4.4 Financial plan |
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The CKV Study Team also agreed to take the following steps to develop the A/Ps:

- 1st Step : **Review** of current situation of SWM, problem analysis, discussion of environmental and social consideration
- 2nd Step : **Setting** of future framework
- 3rd Step : **Setting** of vision and target
- 4th Step : **Consideration** of approaches, strategies and necessary activities to outline DfA/P
- 5th Step : **Consultation** of outline of DfA/P with the public
- 6th Step : **Preparation** of DfA/P
- 7th Step : **Revision** of DfA/P for finalization of A/P based on the lessons learned from the Pilot Projects
- 8th Step : **Preparation** of the A/P together with the Annual Work Plan

(2) Review of Current Situations of SWM

For formulation of the DfA/P, the JICA Study Team asked each municipality to review the current situation of SWM as the first step. The task given to each T/F members through the TWG members was to draft a report including overview of the municipality, solid waste generation (quantity and quality), collection and transportation (number of vehicles and heavy machines by type, collection area, collection ratio and amount, collection methods), composting and recycling activities (by municipality, community, NGOs/CBOs), final disposal system, social conditions, managerial and financial conditions. In the meantime,

the JICA Study Team also collected relevant existing data and information and conducted a series of field surveys, i.e. solid waste quantity and quality, time and motion study, recycling market, household behavior and attitude, and NGOs/CBOs. Through the discussions with the JICA Study Team while hearing and collecting data and also by receiving feedback of the results of the filed surveys, the T/F members reviewed their municipality's current situation of SWM and identified the issues and constraints on SWM. The grasped current situation, and identified issues and constraints were presented and discussed at the 1st P/H. Finally, the T/F members prepared their respective reports regarding the current situation of SWM introducing the opinions and ideas that arose at the 1st P/H and submitted them to the JICA Study Team.

(3) Setting of Future Framework

The second step taken was to set a future framework including the amount of solid waste generation as well as population projection. At the TWG meetings, the CKV Study Team members provided various data and ideas to set the future framework including waste generation units and past and future expected trends of the units and waste compositions. At that time, ward-wise population at present and in the future was discussed to consider the strategies regarding primary collection because some wards located at the edges of the urbanized areas of KMC and LSMC, especially some wards adjacent to KMC in MTM, were recognized as having population growth ratios relatively higher than that of the other wards. As a result of the discussions, the TWG members have set future population and the amount of solid waste generation of each municipality up to the Target Year (2015, 2072 of Nepalese year).

(4) Setting of Vision and Target

Following the above work, the TWG moved into setting a vision and target for each municipality. The JICA Study Team provided the TWG members with basic guidelines including some examples to do that. The provided guidelines are summarized as follows:

Table 11.1-2 Summary of Guidelines to Set Vision and Target

| Items | Summary of Guidelines |
|---------------|---|
| Vision | A vision, which is a picture of a future situation of solid waste management, should be set by discussions among the stakeholders and decided by a decision-maker (Mayor, Board). |
| Target | <p>Target should be quantitatively stated achievement for the short-term (2007) and mid-term (2010) as well as the target year (2015). The target should be presented in a form of objectively verifiable indicators (OVIs), which will be selected from the various fields of adequate solid waste management system. The solid waste collection ratio (or population ratio or area ratio receiving the collection service) and collection amount are suitable indicators as the target.</p> <p>The target can be set from the results of the scenario analysis. Its level may be dominated by the willingness of each municipality to tackle the issues and the possibility of waste collection ratio determined by the characteristics of each municipality. However, the target set may need to be revised if the necessary activities are an overload for the municipality in terms of financial and human resource aspects.</p> |

Source: JICA Study Team

All five municipalities have set visions aiming to become a “clean city”. BKM considered three alternatives of the vision at first and selected one when they finalized the A/P in Phase 3.

As for the target, all five municipalities adopted management ratio in terms of quantity as an OVI. Only BKM has adopted various indicators in addition to the management ratio, i.e. collection area, population receiving collection service and disposal ratio to a sanitary landfill site. During discussions of the targets, the JICA Study Team suggested that the amount of unmanaged waste should be reduced even though the amount of waste generation would increase in the future. For this, scenario analysis was conducted jointly to consider the target (see Chapter 9). Consequently, all municipalities’ targets have been set to reduce the amount of unmanaged waste as the JICA Study Team suggested.

(5) Consideration of Necessary Activities to Outline DfA/P

The 4th step taken was to consider approaches and strategies to achieve the target set. Corresponding to the approaches and strategies, necessary activities (measures) including required resources (human, equipment and facility), costs, responsible organization (person), time frame (implementation schedule) and evaluation were studied.

1) Consideration of Approaches and Strategies

In the same way as for the vision and target, the JICA Study Team provided necessary guidelines with the TWG members and the T/F members. The JICA Study Team suggested that the following six approaches could be applied commonly to the five municipalities.

- A. Improvement of Collection and Transportation
- B. Promotion of Waste Minimization
- C. Improvement of Final Disposal System
- D. Promotion of Public Participation and Behaviors Change
- E. Organizational and Institutional Arrangement
- F. Others

The JICA Study Team also suggested that strategies should be established for each approach to show clear directions to solve identified issues and constraints as a step to identify necessary activities. The main points suggested from the JICA Study Team were as follows:

- address issues (problems and constraints at present and in the future) one by one in the order of most to least serious in accordance with each approach
- develop countermeasures to cope with each issue, indicating possible directions to achieve the target
- examine possible alternatives as combinations of strategies if necessary and then select optimum ones

The crucial discussion points in establishing strategies among the TWG members as well as the T/F members were as follows:

- how attempts will be made for landfill and associated transportation issues (by suggested umbrella concept or others)

- how attempts will be made to waste minimization (by home composting, community composting, composting plant or others)
- whether attempts will be made to introduce garbage segregation system (at source) in the future
- whether attempts will be made to introduce (extend) private collection system

2) Consideration of Necessary Activities

Via the above procedures, necessary activities (concrete actions) were identified for each strategy by each TF together with the JICA Study Team. The following three key points were suggested by the JICA Study Team to take into consideration for the identification of activities.

- **Promotion:** activities to encourage normal day-to-day tasks and related current activities on solid waste management (e.g. more support to composting activities of NGOs/CBOs)
- **Improvement:** activities to improve the current activities without investment (e.g. modification of collection methods and transportation routes for making it more efficient)
- **Investment:** activities to improve the current activities with investment (e.g. development of a sanitary land-fill site)

In this context, the JICA Study Team provided each T/F with a format (see Table 11.1-3) for outlining necessary activities so that each T/F could allocate the activities in the short (2005-2007), mid (2008-2010) and long (2011-2015) terms.

Table 11.1-3 Provided Format for Outlining Necessary Activities

| Approaches | Strategies | Necessary Activities | | |
|--|------------|----------------------|----------|-----------|
| | | Short-term | Mid-term | Long-term |
| A. Improvement of Collection and Transportation | | | | |
| B. Promotion of Waste Minimization | | | | |
| C. Improvement of Final Disposal System | | | | |
| D. Promotion of Public Participation and Behavior Change | | | | |
| E. Organizational and Institutional Arrangement | | | | |
| F. Others | | | | |

A numbering was adopted to help to identify specific activities relating to different approaches (e.g. A-1, A-2, A-3 are all related to Approach A). This was used throughout A/P formulation for keeping track of changes made to the A/P as it progressed from a draft form to the final one.

In principle, measures against the current urgent problems were identified to be commenced soon as short-term activities. In addition, the activities to promote ongoing measures were also identified to be commenced as short-term ones because they do not need a long preparation time. On the other hand, measures against future problems or ones that need preparation for their implementation, such as institutional (law and regulation) setting were

allocated as mid and long-term activities. During the considerations, each municipality's idea of strategies and necessary activities was exchanged at the TWG meetings. Finally, the necessary activities, indicating when they will be implemented in the short, mid and long terms, were identified by the T/Fs themselves.

(6) Consultation of Outline of DfA/P with the Public

The T/F of each municipality organized the 2nd P/H to consult their draft outline of DfA/P with the public including ward-chairpersons and NGOs/CBOs. The T/F members explained the ideas including the results of the 1st P/H to the participants first and then opinions and ideas were exchanged. Group discussions focusing on specific issues were also held to discuss these issues intensively.

(7) Preparation of DfA/P

Considering the opinions and ideas raised at the 2nd P/H, each municipality's T/F revised the DfA/P which was outlined in the provided format. Based on this, the JICA Study Team has assisted in the preparation of tentative yearly implementation schedules of short-term activities with responsible organizations (departments, sections) and related organizations in accordance with the fiscal year in Nepal as shown in Table 11.1-4.

Table 11.1-4 Fiscal Year of Nepal

| Terms | Christian Year | Nepalese Fiscal Year |
|-----------------------------|---------------------------------------|---------------------------------------|
| Short-term (three years) | 2005 (July 16)/2006 (July 16) | 2062 (Shrawan) /2063 (Ashadh) |
| | 2006 (July 17)/2007 (July 16) | 2063 (Shrawan) /2064 (Ashadh) |
| | 2007 (July 17)/2008 (July 15) | 2064 (Shrawan) / 2065 (Ashadh) |
| Mid-term (three years) | 2008 (July 16)/2009 (July 15) | 2065 (Shrawan) /2066 (Ashadh) |
| | 2009 (July 16)/2010 (July 16) | 2066 (Shrawan) /2067 (Ashadh) |
| | 2010 (July 17)/2011 (July 16) | 2067 (Shrawan) / 2068 (Ashadh) |
| Long-term (four years) | 2011 (July 17)/2012 (July 15) | 2068 (Shrawan) /2069 (Ashadh) |
| | 2012 (July 16)/2013 (July 15) | 2069 (Shrawan) /2070 (Ashadh) |
| | 2013 (July 16)/2014 (July 16) | 2070 (Shrawan) /2071 (Ashadh) |
| | 2014 (July 17)/ 2015 (July 16) | 2071 (Shrawan) / 2072 (Ashadh) |

* Note: Dates of the Christian calendar change year-by-year in accordance with the Nepalese (Vikram) calendar. Shrawan: 4, Ashadh:3

In the schedule, the stage classification such as preparation, design, equipment procurement, construction, training and O&M was incorporated as detail activities.

(8) Revision of Draft Action Plan and Finalization of Action Plan

The CKV Study Team reviewed the DfA/Ps based on the results of final evaluation of the Pilot Projects and changed situations since the DfA/Ps were formulated such as shifting collection activities from day to night time. The DfA/Ps were revised reflecting the lessons learned drawn from the Pilot Projects (see Chapter 8) and finalized as the coming ten years

A/Ps with collaboration of the T/F members of each municipality and SWMRMC. The A/Ps are planned for authorization by respective boards of municipalities.

(9) Preparation of Annual Work Plan

Finally, for the actual implementation of the activities of the A/P, an annual work plan (AWP) of the coming Nepalese fiscal year of 2005/2006 (from Shrawan 2062 to Ashadh 2063) of each municipality and SWMRMC was prepared containing detail plan of operation of the activities, responsible persons, and necessary budget.

11.1.2 Basic Stream of Municipal Solid Waste for Formulation of Action Plan

The most elementary but indispensable capacity for planning the solid waste management is “**to understand the waste amount**” and “**to understand the waste stream**”. The former is to read how much waste was managed in the past, to measure that at the moment, and to predict that in future. Social conditions in the region such as population, economic growth or people’s life style, pattern of consumption are correlated closely with waste generation. Therefore such social factors were considered when municipalities analyzed the waste amount for their A/Ps.

Waste is the material that is inevitably generated by human activities and that should have its own destination at the end of its material life. The post consumed material life cycle, say, waste life cycle from where to where through what, was clarified as the waste stream. Only after setting up the waste stream, the waste-collection- transportation-disposal plan, or waste management facility and equipment plan can be drawn up appropriately.

Under the Umbrella Concept for the solid waste management in the Kathmandu Valley, there are some remarkable turning points up to the target year of 2015, but concentrated in short-term-and early mid-term, as shown below with the waste stream flow.

| | |
|------------------------|---|
| 2005/2006 (2062/2063): | Sisdol S/T-L/F will be fully operational (Zone A) Afadol tentative T/S will be operational (LSMC) Bagmati River dumping site will be closed |
| 2006/2007 (2063/2064): | Balaju T/S will be operational (KMC) Taikabu L/F will be operational (Zone B) |
| 2007/2008 (2064/2065): | Long-term L/F will be operational (Zone A) WPF (Phase 1) will be operational (Zone A) |

In the A/P of each municipality, the waste management ratio was set as the main target, and based on that target rate, the detail future waste quantity that will be managed in the various ways such as source reduction, collection, composting or final disposal was estimated respectively.

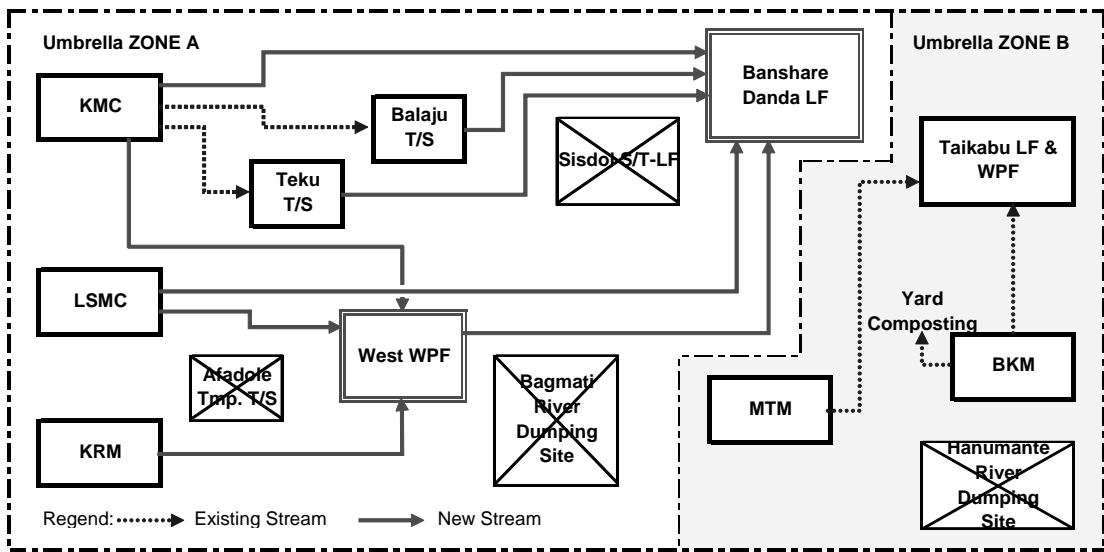


Figure 11.1-1 Future Solid Waste Stream (2015)

11.2 Action Plan of Kathmandu Metropolitan City

11.2.1 Vision and Target

The vision of KMC has been determined as “*Clean, Green Kathmandu City*”. As for the target, KMC have adopted management ratio in terms of quantity as an objectively verifiable indicator (OVI) aiming to reduce the amount of unmanaged waste as shown in Table 11.2-1.

Table 11.2-1 Target of KMC

| Present Situation | Targets | | |
|---|---|---|---|
| | Short-term | Mid-term | Long-term |
| | C: 2005/06 – 2007/08 | 2008/09 – 2010/11 | 2011/12 – 2014/15 |
| | N: 2062/63 – 2064/65 | 2065/66 – 2067/68 | 2067/68 – 2071/72 |
| Waste Management Ratio (Amount): 81% (250 t/d) | Waste Management Ratio (Amount): 89% (340 t/d) | Waste Management Ratio (Amount): 92% (410 t/d) | Waste Management Ratio (Amount): 95% (521 t/d) |

Source: KMC Task Force

11.2.2 Approaches, Strategies and Necessary Activities

The approaches, strategies and necessary activities established by KMC are shown in Table 11.2-2, while the implementation plan of short-term activities is shown in Table 11.2-3.

Table 11.2-2 Strategies and Necessary Activities (KMC)

| Approaches | Strategies | Necessary Activities | | |
|---|--|--|---|---|
| | | Short-term (2005/06-2007/08) | Mid-term (2008/09-2010/11) | Long-term (2011/12 – 2014/15) |
| | | (2062 Shrawan – 2065 Ashadh) | (2065 Shrawan – 2068 Ashadh) | (2068 Shrawan – 2072 Ashadh) |
| A: Improvement of Collection and Transportation | A-1: Establishment of efficient solid waste collection system (by private sector participation, and by KMC itself) | A-1-S1: Establishment of rules for private sector collection and its monitoring system | A-1-M1: Revision of rules for private sector collection and its monitoring system | A-1-L1: Revision of rules for private sector collection and its monitoring system |
| | | A-1-S2: Promotion of private sector participation in door to door collection for <u>25%</u> of households | A-1-M2: Promotion of private sector participation in door to door collection <u>40%</u> of households | A-1-L2: Promotion of private sector participation in door to door collection for <u>60%</u> of households |
| | | A-1-S3: Preparation of equipment replacement plan and pilot test for a few types of collection vehicles, and commencement of replacement of tractors (<u>for 25% collection</u>) | A-1-M3: Procurement of collection vehicle for replacing tractors (<u>for 50% collection</u>) | A-1-L3: Procurement of collection vehicle for replacing tractors (<u>for 100% collection</u>) |
| | | A-1-S4: Preparation of source separation and collection plan for introduction of waste processing facility | A-1-M4: Introduction of source separate collection for operation of waste processing facility | A-1-L4: Extension of source separate collection areas |
| | | A-1-S5: Introduction of recycling garbage bins to public/tourism areas (<u>1,000 bins per year</u>) | A-1-M5: Monitoring and maintenance of recycling garbage bins at public/tourism areas and extension them if necessary | A-1-L5: Monitoring and maintenance of recycling garbage bins at public/tourism areas and extension them if necessary. |
| | | A-1-S6: Introduction of GIS system for development of a ward and rout-wise collection plan A-1-S7: Improvement of collection and transportation system taking into consideration waste transportation to Sisdol landfill site | A-1-M6: Continuous improvement of collection and transportation system based on the ward and rout-wise collection plan | A-1-L6: Continuous improvement of collection and transportation system based on the ward and rout-wise collection plan |
| | A-2: Establishment of efficient waste transportation system (by transfer station, by direct transportation) | A-2-S1: Establishment of effective operation system for Teku transfer station | A-2-M1: Preparation of a few other transfer points (spots) and their land acquisition | A-2-L1: Commencement of operation of a few other transfer points (spots). |
| | | A-2-S2: Plan (design), construction and operation of Balaju transfer station (including necessary revision of primary collection route) | | |
| | | A-2-S3: Procurement of new direct and secondary transportation vehicles | A-2-M2: Procurement of new direct and secondary transportation vehicles | A-2-L2: Procurement/replacement of direct and secondary transportation vehicles. |
| | A-3: Establishment of appropriate maintenance system of equipment and facilities | A-3-S1: Renovation of existing mechanical workshop including replacement of old equipment and establishment of efficient parts stock system | A-3-M1: Procurement of necessary equipment for new types of collection and transportation vehicles including training | A-3-L1: Upgrading of mechanical workshops and extension of their service to the private sector. |
| | | A-3-S2: Preparation of new separated workshop for regular service in Teku | | |
| | A-4: Minimization of illegal open dumping activity | A-4-S1: Clean-up of illegal dumping areas with improvement of primary collection system (along the Bishnumati River) | A-4-M1: Clean-up of illegal dumping areas with improvement of primary collection system (along the Bishnumati River and other Rivers) | A-4-L1: Clean-up of illegal dumping areas with improvement of primary collection system (other areas). |
| | B. Promotion of Waste Minimization | B-1: Development of a central level waste processing facility (WPF) which can receive mixed waste (by private sector participation) | B-1-S1: Cooperation with SWMRMC to proceed development of a central level WPF (<u>50-100 t/d</u>) at appropriate place - Final site selection - Site surveys - Concept design - Feasibility study including market study - Land acquisition - EIA - Detail design - Construction - Others B-1-S2: Cooperation with SWMRMC for commencement of operation of WPF B-1-S3: Monitoring and evaluation of the operation of WPF by the private sector | B-1-M1: Expansion of WPF up to <u>200-300 t/d</u> B-1-M2: Monitoring and evaluation of the operation of WPF by the private sector B-1-M3: Assistance to private sector for necessary marketing and establishment of a national policy |

| Approaches | Strategies | Necessary Activities | | |
|--|---|--|--|--|
| | | Short-term (2005/06-2007/08) | Mid-term (2008/09-2010/11) | Long-term (2011/12 – 2014/15) |
| | | (2062 Shrawan – 2065 Ashadh) | (2065 Shrawan – 2068 Ashadh) | (2068 Shrawan – 2072 Ashadh) |
| | B-2: Promotion of home and community composting and recycling | B-2-S1: Review of the existing home and community composting and recycling activities B-2-S2: Production of home compost bins and home vermi-compost kits and their distribution B-2-S3: Operation of Community Recycling Center (CRC) in Ward 21 and its extension to other Wards (with support from NEREPA) | B-2-M1: Promotion of home bin or vermi-composting to reach total of <u>5,000 households</u> B-2-M2: Operation of community compost bins in several wards B-2-M3: Operation of CRCs in 18 Wards (50% of wards) | B-2-L1: Promotion of home bin or vermi-composting to reach total of <u>10,000 households</u> B-2-L2: Operation of at least one community compost bin in each ward B-2-L3: Operation of CRCs in all 35 Wards |
| | B-3: Operation and expansion of medium-scale vermi-composting | B-3-S1: Operation and expansion of medium-scale vermi-composting B-3-S2: Implementation of a sales campaign together with a marketing study | B-3-M1: Expansion of medium-scale vermi-composting B-3-M2: Marketing of compost as a salable product. | B-3-L1: Establishment of another medium-scale vermi composting facility B-3-L2: Marketing of compost as a salable product. |
| C. Improvement of Final Disposal System | C-1: Operation of sanitary landfill site | C-1-S1: Operation of Sisdol sanitary landfill site | C-1-M1: Operation of Sisdol sanitary landfill site including receive of rejects from WPF (30-40 t/day) | |
| | C-2: Development of long-term landfill site | C-2-S1: Conducting of survey for possible long-term landfill sites C-2-S2: Cooperation with SWMRMC to proceed establishment of a long-term landfill site - Site surveys - Concept design - Feasibility study - Land acquisition - EIA - Detail design - Construction - Others | C-2-M1: Continuous cooperation with SWMRMC to proceed establishment of the long-term landfill site C-2-M2: Cooperation with SWMRMC for commencement of operation of the long-term landfill site C-2-M3: Procurement of necessary heavy equipment for landfilling | C-2-L1: Operation of the long-term landfill site |
| | C-3: Appropriate closure of used landfill site | C-3-S1: Rehabilitation and landscaping works of the Bagmati (Balkhu) dumping site | C-3-M1: Continuous rehabilitation and landscaping works of the Bagmati (Balkhu) dumping site C-3-M2: Cooperation with SWMRMC for closure of Sisdol landfill site | C-3-L1: Cooperation with SWMRMC for closure of Sisdole Landfill site |
| D. Promotion of Public Participation and Behavior Change | D-1: Expansion of “BABA Program-children as effective agents of social changes” | D-1-S1: Establishment of 50 more Nature Clubs D-1-S2: Development of training packages on - Solid Waste Management - Greenery Promotion - Culture and Heritage Conservation - Communication - Nature club management D-1-S3: Training for Nature Clubs members on the above five areas D-1-S4: Regular interaction between Nature Clubs and local communities to reach out to society as a whole | D-1-M1: Establishment of 100 more Nature Clubs D-1-M2: Training for Nature Club members on the five areas of work D-1-M3: Regular interaction between Nature Clubs and surrounding communities to reach out to the society as a whole | D-1-L1: Establishment of 200 more Nature Clubs and reach 400 in total D-1-L2: Training for Nature Club members on the five areas of work D-1-L3: Regular interaction between Nature Clubs and surrounding communities to reach out to the society as a whole |
| | D-2: Support of community initiatives working with community groups, NGOs/CBOs and private sector | D-2-S1: Development of a database of community groups, NGOs/CBOs and private sector, and selection of the best ones for long term works D-2-S2: Review and evaluation of the existing Ward Environmental Committee (WEC) and formation of active WECs in 10 Wards D-2-S3: Provision of training on SWM and community mobilization for WECs D-2-S4: Provision of technical and financial assistance to best community initiatives of WECs D-2-S5: Provision of annual award to best WEC | D-2-M1: Formation of WECs in 20 more Wards D-2-M2: Implementation of regular interaction and exchange visits among WECs D-2-M3: Provision of technical and financial assistance to best community initiatives of WECs D-2-M4: Regular follow-up of WECs | D-2-L1: Provision of technical and financial assistance to best community initiatives of WECs D-2-L2: Implementation of regular interaction and exchange visits among WECs D-2-L3: Regular follow-up of the WECs |

| Approaches | Strategies | Necessary Activities | | |
|--|---|--|---|--|
| | | Short-term (2005/06-2007/08) | Mid-term (2008/09-2010/11) | Long-term (2011/12 – 2014/15) |
| | | (2062 Shrawan – 2065 Ashadh) | (2065 Shrawan – 2068 Ashadh) | (2068 Shrawan – 2072 Ashadh) |
| D- | D-3: Mobilization of City Volunteers (CVs) as a linkage between KMC and citizen | D-3-S1: Mobilization of City Volunteers (CVs) to support BABA program D-3-S2: Implementation of closed camps for capability building and raising team spirit of each batch D-3-S3: Mobilization of CVs in other programs such as promotion of household composting, research, and WEC activities D-3-S4: Recruiting and training of new batch of CVs every year | D-3-M1: Mobilization of CVs in other programs such as promotion of household composting, research, recycling, and WEC activities D-3-M2: Review the past batch and if demand is higher two batches can be managed | D-3-L1: Recruit new batch of 100 CVs every year from different academic backgrounds D-3-L2: Review the past batch and if demand is higher two batches can be managed |
| | D-4: Implementation of mass communication education programs | D-4-S1: Production of CMU's promotional materials (flyers, brochures, posters, stickers, etc.) D-4-S2: Setting up of hoarding boards on SWM in prime locations of the city D-4-S3: Setting up of self-explanatory displays on SWM at CMU, and other key locations for wider publicity D-4-S4: Regular featuring and reporting on SWM on TV program "Hamro Kathmandu" D-4-S5: Design and maintenance of the web page on SWM D-4-S6: Implementation of community exhibition and event regularly | D-4-M1: Setting up of displays and information on SWM as an environmental park in Teku transfer station D-4-M2: Hosting Web Site on SWM and update the site D-4-M3: Review and continuation of the other media campaign programs (same as short-term activities) | D-4-L1: Review and continue the media campaign programs |
| | 5: Strengthening of Community Mobilization Unit (CMU) | D-5-S1: Recruiting of a BABA coordinator D-5-S2: Recruiting of assistant level staff for administration D-5-S3: Provision of adequate office space, equipment and financial resources | D-5-M1: Upgrading of CMU with Environmental Information, Education and Communication Section D-5-M2: Provision of specialists' service in community mobilization, children's program, waste management, mass education, etc. | D-5-L1: Well established section in the department providing public services on environment management as a whole. |
| E Organizational and Institutional Arrangement | E-1: Rationalize organization and institution arrangements | E-1-S1: Implementation of the reorganization plan of the Environment Department | E-1-M-2: Transfer of PPP administrative matters to PPP Specialized Department within the Municipality. | E-1-L1: Monitor and regularly review organizational arrangements to correspond with changing institutional needs. |
| | E-2: Strengthening of management practices | E-2-S1: Establishment of a monitoring and evaluation system in alignment with the Action Plan E-2-S2: Mainstreaming of program-based budgeting system and expenditure monitoring for a more efficient use of resources E-2-S3: Improvement of information flow and management by encouraging regular coordination meetings and sharing of experiences | E-2-M1: Implementation of a mid-term evaluation on the progress of the Action Plan implementation E-2-M2: Continuous implementation of program-based budgeting system and expenditure monitoring E-2-M3: Continuous implementation of information flow and management by regular coordination meetings and sharing of experiences | E-2-L1: Implementation of a final evaluation on the results achieved from the Action Plan implementation E-2-L2: Continuous implementation of program-based budgeting system and expenditure monitoring E-2-L3: Continuous implementation of information flow and management by regular coordination meetings and sharing of experiences |
| | | E-2-S4: Introduction of systematic collection and analysis of SW data by database | E-2-M4: Continuous collection and analysis of SW data by database | E-2-L4: Continuous collection and analysis of SW data by database |
| E-3: Appropriate staffing arrangement | E-3-S1: Preparation of TORs for each unit delineating tasks and responsibilities to be undertaken during Action Plan implementation E-3-S2: Reassignment of necessary staff (Taking into consideration future human resource demands such as for facilities development) | E-3-M1: Establishment of a more effective staff performance evaluation system E-3-M2: Establishment of staffing system based to "assign the right person to the right position" using objective criteria such as staff performance evaluation. E-3-M3: Reassignment of necessary staff. (Taking into consideration future human resource demands such as for facilities development) | E-3-L1: Continuation of mid-term activities E-3-L2: Continuation of mid-term activities E-3-L3: Continuation of mid-term activities | |

| Approaches | Strategies | Necessary Activities | | |
|------------|--|--|---|--|
| | | Short-term (2005/06-2007/08) | Mid-term (2008/09-2010/11) | Long-term (2011/12 – 2014/15) |
| | | (2062 Shrawan – 2065 Ashadh) | (2065 Shrawan – 2068 Ashadh) | (2068 Shrawan – 2072 Ashadh) |
| | E-4: Strengthening institution to be systematic and sustainable | E-4-S1: Development of a staffing plan based on HRD program and its application E-4-S2: Assignment of a Learning Manager for HRD, and maintain an inventory of staff skills knowledge, and training history E-4-S3: Strengthening of knowledge-sharing mechanism and peer-training sessions for full utilization of existing human resources. | E-4-M1: Development of mid to long-term HRD program and its application in line with HRD program E-4-M2: Implementation of in-house training modules systematically designed for staff development E-4-M3: Appointment of full time human resource management staff within Environment Department | E-4-L1: HRD program regularized and opened to external partners for resource mobilization. |
| F. Others | F-1: Development of a medical waste management system | F-1-S1: Dissemination of Medical Waste Management Guidelines F-1-S2: Operation of a medical waste treatment facility at Teku F-1-S3: Procurement of additional equipment (autoclave) F-1-S4: Training for staff of KMC, private sector and medical institutions F-1-S5: Handing over the responsibility to the private sector for the operation F-1-S6: Monitoring & evaluation of the system | F-1-M1: Establishment of a central level medical waste treatment facility F-1-M2: Continue awareness programs F-1-M3: Continue monitoring & evaluation | F-1-L1: Continuous treatment of medical waste |
| | F-2: Development of a hazardous waste management system | | F-2-M1: Implementation of study on hazardous waste management | F-2-L1: Development of hazardous waste management system (Computers, Batteries, Industrial waste, etc.) |
| | F-3. Gradual and effective privatization with special consideration to the sweeper population. | F-3-S1: Review of working conditions of the sweeper population and provision of measures to improve their performance. F-3-S2: Regularize privatization procedures applying open bidding process F-3-S3: Establishment of regular coordination mechanisms with various private operators | F-3-M1: Increased coverage by private sector (Up to 50% of collection coverage, without any drastic decrease of sweeper population) | F-3-L1: Increased coverage by private sector. (Up to 60% of collection coverage, without drastic decrease of sweeper population) |

Source: KMC Task Force

Table 11.2-3 Implementation Schedule of Short-Term Activities (KMC)




| Strategies | Short-Term Activities | Responsible Department, Section (Unit) | Related Organizations (Department, Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | | |
|--|---|--|--|-------------|----|-----|--------------|-------------|----|-----|--------------|---|----|-------------|--------------|--|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) | |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh | |
| A-1: Establishment of efficient solid waste collection system (by private sector participation, and by KMC itself) | A-1-S1: Establishment of rules for private sector collection and its monitoring system | SWMS | private sector | | | | | | | | | | | | | |
| | A-1-S2: Promotion of private sector participation in door to door collection for 25% of households | SWMS | private sector | | | | | | | | | | | | | |
| | A-1-S3: Preparation of equipment replacement plan and pilot test for a few types of collection vehicles, and commencement of replacement of tractors (for 25% collection) | SWMS | Mechanical Sec. | | | | | | | | | | | | | |
| | A-1-S4: Preparation of source separation and collection plan for introduction of waste processing facility | SWMS | SWMRMC, CMU, NGO/CBO, private sector | | | | | | | | | | | | | |
| | A-1-S5: Introduction of recycling garbage bins to public/tourism areas (1,000 bins per year) | SWMS | Authorities regarding tourism | | | | | | | | | | | | | |
| | A-1-S6: Introduction of GIS system for development of a ward and rout-wise collection plan | SWMS | | | | | | | | | | | | | | |
| | A-1-S7 Improvement of collection and transportation system taking into consideration waste transportation to Sisdol landfill site | SWMS | Private Sector | | | | | | | | | | | | | |
| A-2: Establishment of efficient waste transportation system (by transfer station, by direct transportation) | A-2-S1: Establishment of effective operation system for Teku transfer station | SWMS | Mechanical Sec. | | | | | | | | | | | | | |
| | A-2-S2: Plan (design), construction and operation of Balaju transfer station (including necessary revision of primary collection route) | SWMS | Ward offices | | | | | | | | | | | | | |
| | A-2-S3: Procurement of new direct and secondary transportation vehicles | SWMS | Mechanical Sec. | | | | | | | | | ● Replacement of Multi Packer (phase 1) | | ● (phase 2) | | |
| | A-2-S4: Establishment of rules and system for transportation of waste from VDCs | SWMS | VDCs | | | | | | | | | | | | | |
| A-3: Establishment of appropriate maintenance system for equipment and facilities | A-3-S1: Renovation of existing mechanical workshop including replacement of old equipment and establishment of efficient parts stock system | Mechanical Sec. | SWMS, SWMRMC | | | | | | | | | | | | | |
| | A-3-S2: Preparation of new separated workshop for regular service in Teku | Mechanical Sec. | SWMS, SWMRMC | | | | | | | | | | | | | |
| A-4: Minimization of illegal open dumping activity | A-4-S1: Clean-up of illegal dumping areas with improvement of primary collection system (along the Bishnumati River) | SWMS | CMU, NGO/CBO | | | | | | | | | | | | | |

| Strategies | Short-Term Activities | Responsible Department, Section (Unit) | Related Organizations (Department, Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | | | |
|---|---|--|--|-------------|----|-----|--------------|-------------|----|-----|--------------|-------------|----|-----|--------------|--|--|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) | | |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh | | |
| B-1: Development of a central level waste processing facility (WPF) which can receive mixed waste (by private sector participation) | B-1-S1: Cooperation with SWMRMC to proceed development of a central level WPF (50-100 t/d) at appropriate place - Final site selection - Site surveys - Concept design - Feasibility study including market study - Land acquisition - EIA - Detail design - Construction - Others | SWMS | MOLD/SWMRMC, LSMC, KRM | | | | | | | | | | | | | | |
| | B-1-S2: Cooperation with SWMRMC for commencement of operation of WPF | SWMS | MOLD/SWMRMC, LSMC, KRM | | | | | | | | | | | | | | |
| | B-1-S3: Monitoring and evaluation of the operation of WPF by the private sector | SWMS | MOLD/SWMRMC, LSMC, KRM | | | | | | | | | | | | | | |
| B-2: Promotion of home and community composting and recycling | B-2-S1: Review of the existing home and community composting and recycling activities | SWMS (CMU) | NGO/CBO | | | | | | | | | | | | | | |
| | B-2-S2: Production of home compost bins and home vermi-compost kits and its distribution | SWMS (CMU) | NGO/CBO | | | | | | | | | | | | | | |
| | B-2-S3: Operation of Community Recycling Center (CRC) in Ward 21 and their extension to other Wards (with support from NEREPA) | SWMS (CMU) | NEREPA | | | | | | | | | | | | | | |
| B-3: Operation and expansion of medium-scale vermi-composting | B-3-S1: Operation and expansion of medium-scale vermi-composting | SWMS (CMU) | Tribhuvan University, NGP/CBO | | | | | | | | | | | | | | |
| | B-3-S2: Implementation of a sales campaign together with a marketing study | SWMS (CMU) | | | | | | | | | | | | | | | |
| C-1: Operation of sanitary landfill | C-1-S1: Operation of Sisdol sanitary landfill site | SWMS | SWMRMC, LSMC | | | | | | | | | | | | | | |
| C-2: Development of long-term landfill site | C-2-S1: Conducting of survey for possible long-term landfill sites | SWMS | SWMRMC, LSMC, KRM | | | | | | | | | | | | | | |
| | C-2-S2: Cooperation with SWMRMC to proceed establishment of a long-term landfill site - Site surveys - Concept design - Feasibility study - Land acquisition - EIA - Detail design - Construction - Others | SWMS | SWMRMC, LSMC, KRM | | | | | | | | | | | | | | |
| C-3: Appropriate closure of used landfill site | C-3-S1: Rehabilitation and landscaping works of the Bagmati (Balkhu) dumping site | SWMS | SWMRMC, LSMC, KRM | | | | | | | | | | | | | | |

| Strategies | Short-Term Activities | Responsible Department, Section (Unit) | Related Organizations (Department, Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | |
|---|---|--|--|-------------|----|-----|--------------|-------------|----|-----|--------------|-------------|----|-----|--------------|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh |
| D-1: Expansion of "BABA Program children as effective agents of social changes" | D-1-S1: Establishment of 50 more Nature Clubs | SWMS (CMU) | Nature Club coordinator (to be recruited), schools | | ■ | | | | ■ | | | | ■ | | |
| | D-1-S2: Development of training packages on - Solid Waste Management - Greenery Promotion - Culture and Heritage Conservation - Communication - Nature club management | SWMS (CMU) | Nature Club coordinator (to be recruited), schools | | ■ | | | | | | | | | | |
| | D-1-S3: Training for Nature Clubs members on the above five areas of works | SWMS (CMU) | Nature Club coordinator (to be recruited), schools | | | | | | | | | | | | |
| | D-1-S4: Regular interaction between Nature Clubs and local communities to reach out to society as a whole | SWMS (CMU) | Nature Club coordinator (to be recruited), schools | | | | | | | | | | | | |
| D-2: Support of community initiatives working with community groups, NGOs/CBOs and private sector | D-2-S1: Development of a database of community groups, NGOs/CBOs and private sector, and selection of the best ones to long- term work | SWMS (CMU) | | | ■ | | | | | | | | | | |
| | D-2-S2: Review and evaluation of the existing Ward Environmental Committee (WEC) and formation of active WECs in 10 Wards | SWMS (CMU) | Ward offices | ■ | ■ | | | | | | | | | | |
| | D-2-S3: Provision of training on SWM and community mobilization for WECs | SWMS (CMU) | | | | | | | | | | | | | |
| | D-2-S4: Provision of technical and financial assistance to best community initiatives of WECs | SWMS (CMU) | | | | | □ | | | □ | | | | | □ |
| | D-2-S5: Provision of annual award to best WEC | SWMS (CMU) | | | | | ● | | | ● | | | | | ● |
| D-3: Mobilization of City Volunteers (CVs) as a linkage between KMC and citizen | D-3-S1: Mobilization of City Volunteers (CVs) to support BABA program | SWMS (CMU) | | | | | | | | | | | | | |
| | D-3-S2: Implementation of closed camps for capability building and raising team spirit of each batch | SWMS (CMU) | | | ● | | ● | | ● | | ● | | ● | | ● |
| | D-3-S3: Mobilization of CVs in other programs such as promotion of household composting, research, and WEC activities | SWMS (CMU) | | | | | | | | | | | | | |
| | D-3-S4: Recruit and training of new batch of CVs every year. | SWMS (CMU) | | | | | | | | | | | | | |

| Strategies | Short-Term Activities | Responsible Department, Section (Unit) | Related Organizations (Department, Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | |
|--|--|--|--|-------------|----|-----|--------------|-------------|----|-----|--------------|-------------|----|-----|--------------|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh |
| D-4: Implementation of mass | D-4-S1: Production of CMU's promotional materials (flyers, brochures, posters, stickers, etc.) | SWMS (CMU) | | | | | | | | | | | | | |
| | D-4-S2: Setting up of hoarding boards on SWM in prime locations of the city. | SWMS (CMU) | NGO | | | | | | | | | | | | |
| | D-4-S3: Setting up of self-explanatory displays on SWM at CMU and other key locations for wider publicity. | SWMS (CMU) | Other sections in KMC | | | | | | | | | | | | |
| | D-4-S4: Regular featuring and reporting on SWM on TV program "Hamro Kathmandu" | SWMS (CMU) | NGO | | | | | | | | | | | | |
| | D-4-S5: Design and maintenance of the web page on SWM | SWMS (PMU) | | | | | | | | | | | | | |
| | D-4-S6: Implementation of community exhibition and events regularly | SWMS (CMU) | | | | ● ● | | ● | | ● | | ● | | ● | |
| D-5: Strengthening of CMU | D-5-S1: Recruiting of BABA coordinator | SWMS (CMU) | | | ● | | | | | | | | | | |
| | D-5-S2: Recruiting of assistant level staff for administration | SWMS (CMU) | | | ● | | | | | | | | | | |
| | D-5-S3: Provision of adequate office space, equipment and financial resources | SWMS (CMU) | | | | | | | | | | | | | |
| E-1: Rationalize organizational and institutional arrangements | E-1-S1: Implementation of the reorganization plan of the Environment Department | Environment Dept. | | | | | | | | | | | | | |
| E-2 Strengthening of management practices | E-2-S1: Establishment of a monitoring and evaluation system in alignment with the Action Plan | Environment Dept. | | | | | | | | | | | | | |
| | E-2-S2: Mainstreaming of program-based budgeting system and expenditure monitoring for a more efficient use of resources | Environment Dept. | | | | | | | | | | | | | |
| | E-2-S3: Improvement of information flow and management by encouraging regular coordination meetings and sharing of experiences | Environment Dept. | | | | | | | | | | | | | |
| | E-2-S4: Introduction of systematic collection and analysis of SW data by database | SWMS | | | | | | | | | | | | | |
| E-3: Appropriate staffing arrangement | E-3-S1: Preparation of TORs for each unit delineating tasks and responsibilities to be undertaken during Action Plan implementation | Environment Dept. | | | | | | | | | | | | | |
| | E-3-S2: Reassignment of necessary staff (Taking into consideration future human resource demands such as for facilities development) | Environment Dept. | | | | | | | | | | | | | |

| Strategies | Short-Term Activities | Responsible Department, Section (Unit) | Related Organizations (Department, Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | |
|--|---|--|--|-------------|----|-----|--------------|-------------|----|-----|--------------|-------------|----|-----|--------------|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh |
| E-4: Strengthening institution to be systematic and sustainable | E-4-S1: Development of a staffing plan based on HRD program and its application | Environment Dept. | | | | | | | | | | | | | |
| | E-4-S2: Assignment of a Learning Manager for HRD, and maintain an inventory of staff skills and knowledge, training history | Environment Dept. | | | | | | | | | | | | | |
| | E-4-S3: Strengthening of knowledge-sharing mechanism and peer-training sessions for full utilization of existing | Environment Dept. | | | | | | | | | | | | | |
| F-1: Development of a medical waste management system | F-1-S1: Dissemination of Medical Waste Management Guidelines | SWMS (SMWU, CMU) | SWMRMC, MOHP, Hospitals, Clinics | | | | | | | | | | | | |
| | F-1-S2: Operation of a medical waste treatment facility at Teku | SWMS (SWMU) | SWMRMC, MOHP, Hospitals, Clinics | | | | | | | | | | | | |
| | F-1-S3: Procurement of additional equipment (autoclave) | SWMS (SWMU) | SWMRMC, MOHP | | | | | | | | | | | | |
| | F-1-S4: Training for staff of KMC, private sector and medical institutions | SWMS (SWMU) | SWMRMC, MOHP | | | | | | | | | | | | |
| | F-1-S5: Handing over the responsibility to the private sector for the operation | SWMS (SWMU) | SWMRMC, MOHP, Private sector | | | | | | | | | | | | |
| | F-1-S6: Monitoring & evaluation of the System | SWMS (SWMU) | SWMRMC, MOHP, Private sector | | | | | | | | | | | | |
| F-3: Gradual and effective privatization with special consideration to the sweeper population. | F-3-S1: Review of working conditions of the sweeper population and provision of measures to improve their performance. | SWMS | | | | | | | | | | | | | |
| | F-3-S2: Regularize privatization procedures applying open bidding process | SWMS | | | | | | | | | | | | | |
| | F-2-S3: Establishment of regular coordination mechanisms with various private operators | SWMS | | | | | | | | | | | | | |

Legend
 : Continuous activity
 : Intermittent activity
 : Spot activity

SWMS : Solid Waste Management Section
 PMU : Planning and Monitoring Unit
 CMU : Community Mobilization Unit
 SWMU : Special Waste Management Unit

11.2.3 Financial Plan

As shown in Table 11.2-4, the total SWM cost for Action Plan implementation, summing up the current SWM cost and Action Plan cost, amounts to Rs 1,835 million over the period until the target year of 2015 (2072). On the other hand, total own revenue, summing up actual revenue and projected revenue increase, amounts to Rs 6,503 million. Thus, the ratio of total SWM cost to total own revenue result is 28%, which is slightly higher than the current ratio of 23%. Consequently, it is suggested that KMC bears the entire Action Plan cost to cope with growing demand for SWM services in the municipality.

**Table 11.2-4 Ratio of SWM Cost to Municipality Own Revenue (KMC)
(million Rs)**

| Items | 2005/0 2062/6 | 2006/0 2063/6 | 2007/0 2064/6 | 2008/0 2065/6 | 2009/1 2066/6 | 2010/1 2067/6 | 2011/1 2068/6 | 2012/1 2069/7 | 2013/1 2070/7 | 2014/1 2071/7 | Total |
|-------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------|
| I. Own Revenue | 559.2 | 594.8 | 632.6 | 660.8 | 692.5 | 694.0 | 683.6 | 673.1 | 662.6 | 652.2 | 6,505.3 |
| 1. Actual Revenue | 525.9 | 525.9 | 525.9 | 525.9 | 525.9 | 525.9 | 525.9 | 525.9 | 525.9 | 525.9 | 5,259.0 |
| 2. Projected Revenue Increase | 33.3 | 68.9 | 106.7 | 134.9 | 166.6 | 168.1 | 157.7 | 147.2 | 136.7 | 126.3 | 1,246.3 |
| II. SWM Cost | 174.1 | 209.3 | 179.5 | 173.9 | 208.5 | 182.8 | 173.4 | 183.0 | 178.8 | 171.7 | 1,835.1 |
| 1. Current SWM | 120.0 | 120.0 | 120.0 | 120.0 | 120.0 | 120.0 | 120.0 | 120.0 | 120.0 | 120.0 | 1,200.0 |
| 2. Action Plan | 54.1 | 89.3 | 59.5 | 53.9 | 88.5 | 62.8 | 53.4 | 63.0 | 58.8 | 51.7 | 635.1 |
| III. Ratio (= II/I) | 31% | 35% | 28% | 26% | 30% | 26% | 25% | 27% | 27% | 26% | 28% |

Note: 1) Actual revenue is the amount for FY2004/05 (2061/62) which is assumed to continue at the same amount, 2) Projected revenue increase consists of Local Development Fee, Gov. subsidy and Property Tax, 3) Current SWM cost is the cost presented in Chapter 3 which is assumed to continue at the same amount.

Source: JICA Study Team

11.3 Action Plan of Lalitpur Sub-Metropolitan City

11.3.1 Vision and Target

The vision of LSMC has been determined as *“Clean city through efficient management of waste collection on streets, public places and households [by the means of involvement of the private sector as much as possible to make the municipal resources sustainable in the long run and to make the city dwellers feel responsible and more aware for city cleanliness & environment, finally making them realize that there is a polluters pay principle]”*. As for the target, LSMC have adopted management ratio in terms of quantity as an OVI aiming to reduce the amount of unmanaged waste as shown in Table 11.3-1.

Table 11.3-1 Target of LSMC

| Present Situation | Target | | |
|---|--|--|--|
| | Short-term | Mid-term | Long-term |
| | C: 2005/06 – 2007/08 | 2008/09 – 2010/11 | 2011/12 – 2014/15 |
| | N: 2062/63 – 2064/65 | 2065/66 – 2067/68 | 2067/68 – 2071/72 |
| Waste Management Ratio (amount) : 70% (53 t/d) | Waste Management Ratio (amount) : 80 % (75 t/d) | Waste Management Ratio (amount) : 85 % (93 t/d) | Waste Management Ratio (amount) : 90% (122 t/d) |

Source: LSMC Task Force

11.3.2 Approaches, Strategies and Necessary Activities

The approaches, strategies and necessary activities established by LSMC are shown in Table 11.3-2, while the implementation schedule of the short-term activities is shown in Table 11.3-3.

Table 11.3-2 Strategies and Necessary Activities (LSMC)

| Approaches | Strategies | Necessary Activities | | |
|--|---|--|---|---|
| | | Short-term (2005/06-2007/08) | Mid-term (2008/09-2010/11) | Long-term (2011/12 – 2014/15) |
| | | (2062 Shrawan – 2065 Ashadh) | (2065 Shrawan – 2068 Ashadh) | (2068 Shrawan – 2072 Ashadh) |
| A. Improvement of Collection and Transportation | A-1: Promotion of private sector collection | A-1-S1: Review of existing policy of LSMC and establishment of strong bylaws (and rules) interacting with all stakeholders and its publication (focus on private sector involvement, paying system and assurance of municipal sweeper's job guarantee while handing over to private sector) A-1-S2: Preparation of standard TOR and agreement for PPP concept A-1-S3: Introduction of a new pilot project for waste collection from shops by private sector A-1-S4: Newly introduction of door to door collection for 25% houses at the outside the city core area by private sector (by the end of 2007) | A-1-M1: Revision of rules for private sector based on the short-term activities (from pilot projects). A-1-M2: Development of effective account system to control revenue from private sector to office A-1-M3: Expansion of pilot projects in other areas of city with correction of weakness. A-1-M4: 50 % door to door collection by private sector (Some municipal old vehicles to be handed over to private sector under leased TOR) A-1-M5: Preparation of a plan for private sector transportation (PPP as an alternative) | A-1-L1: Revision of rules for private sector based on the mid-term activities. A-1-L2: 70 % door to door collection by private sector A-1-L3: Initiation of transportation of collection points to transfer station by private sector |
| | A-2: Improvement of collection and transportation system | A-2-S1: Implementation of Time and Motion study A-2-S2: Introduction of new collection routes. A-2-S3: Implementation of transportation and maintenance cost analysis A-2-S4: Implementation of vehicle capacity analysis and plan for procurement of new vehicles | A-2-M1: Continuous review and improvement of collection and transportation system | A-2-L1: Continuous review and improvement of collection and transportation system |
| | A-3: Arrangement of a temporary transfer station | A-3-S1: Arrangement of a temporary transfer station (in Afadole) and commencement of temporary transferring | A-3-M1: Closure of the temporary transfer station | |
| B. Promotion of Waste Minimization | B-1: Development of a waste processing facility (WPF) | B-1-S1: Cooperation with SWMRMC and KMC for development of WPF (development, commencement of operation) | B-1-M1: Transportation of waste to WPF | |
| | B-2: Promotion of home composting activities | B-2-S1: Distribution of 1,200 home compost bins | B-2-M2: Distribution of 1,200 home compost bins | B-2-L1: Distribution of 1,200 home compost bins |
| | B-3 Promotion of 3Rs practices | B-3-S1: Promotion of 3Rs practices by local people | B-3-M1: Promotion of recycle centers at community level and individual level for minimization of waste at source. B-3-M2: Establishment of bulky waste recycling system by promoting establishment of second hand shops | B-3-L1: Establishment of recycle centers for 3Rs with PPP concept for waste pickers and promotion of plastic bag and paper recycling B-3-L2: Establishment of a medium-scale recycle centre near T/S. |
| C. Improvement of Final Disposal System | C-1: Operation of sanitary landfill site | C-1-S1: Operation of Sisdol LF with KMC C-1-S2: Cooperation with SWMRMC and KMC for development of long term landfill site C-1-S3: Closure of Bagmati dumping site | C-1-M1: Operation of Sisdol sanitary landfill site with KMC C-1-M2: Continuous coordination with SWMRC and KMC for development of long term landfill site | C-1-L1: Operation of long term landfill site |
| D. Promotion of Public Participation and Behavior Change | D-1: Implementation of mass communication and education | D-1-S1: Implementation of public awareness/education activities - Regular mechanism for awareness materials. Journal publication, drama, community interactions, reward, prize, visit, observation, establishment of SWM day. | D-1-M1: Continuous implementation of public awareness/education activities - Regular mechanism for awareness materials. Journal publication, drama, community interactions, reward, prize, visit, observation, establishment of SWM day. | D-1-L1: Continuous implementation of public awareness/education activities - Regular mechanism for awareness materials. Journal publication, drama, community interactions, reward, prize, visit, observation, establishment of SWM day. |
| | D-2: Formulation and mobilization of various groups for SWM | D-2-S1: Formation and mobilization of Ward Environment Conservation Committee (WECC) on a pilot basis D-2-S2: Formation and mobilization of Nature/Eco Clubs among children D-2-S3: Mobilization of youth as City Volunteers (CVs) D-2-S4: Strengthening of women groups for SWM | D-2-M1: Formation of 44 community groups in some wards for awareness raising and composting focusing on child education involving retired persons. Community development section will handle these groups | D-2-L1: Formation of 100 community groups in all wards for awareness raising and composting focusing on child education involving retired persons |

| Approaches | Strategies | Necessary Activities | | |
|---|--|---|--|---|
| | | Short-term (2005/06-2007/08) | Mid-term (2008/09-2010/11) | Long-term (2011/12 – 2014/15) |
| | | (2062 Shrawan – 2065 Ashadh) | (2065 Shrawan – 2068 Ashadh) | (2068 Shrawan – 2072 Ashadh) |
| E. Organizational and Institutional Arrangement | E-1: Implementation of HRD program | E-1-S1: Plan for HRD and monitoring including municipal staff/NGOs/CBOs/TLOs | E-1-M1: Proper available HRD management and monitoring. Establishment of motivating working environment. | E-1-L1: Establishment of HRD and Database Section in SWM division |
| | E-2-Preparation of annual work plan on SWM | E-2-S1: Announcement of SWM overall yearly plan of LSMC at beginning of each fiscal year. | E-2-M1: Announcement of SWM overall yearly plan of LSMC at beginning of each fiscal year. | E-2-L1: Announcement of SWM overall yearly plan of LSMC at beginning of each fiscal year. |
| | E-3: Clarification of responsibility and promotion of coordination between SWM relating divisions and sections | E-3-S1: Review of SWM organization (Environment Dept.) and appoint responsible persons as a focal point to coordinate all dimensions of SWM with motivating environment | E-3-M1: Review of responsibility overlaps and decision-making simplification. E-3-M2: Establishment of 24 hr hot line for receiving complains | |
| | E-4: Setting up tariff system | E-4-S1: Implementation of study on tariff system to introduce paying system | E-4-M1: Revision of effectiveness of paying system. Review of tariff. Make punishment system. | E-4-L1: “Enact Municipal SWM law” from national government. E-4-L2: Preparation of municipal ordinance E-4-L3: Dissemination of those laws and ordinance to public, TLOs and NGOs |
| | E-5: Management of solid waste database system | E-5-S1: Collection and arrangement of solid waste data in database E-5-S2: Implementation of waste quantity and quality survey twice a year (wet and dry seasons) | E-5-M1: Continuous arrangement of solid waste data by database system E-5-M2: Continuation of implementation of waste quantity and quality surveys twice a year (wet and dry seasons) | E-5-L1: Continuous arrangement of solid waste data by database system E-5-L2: Continuity of waste quantity and quality surveys twice a year (wet and dry seasons). |
| F. Others | F-1: Promotion of special waste management system | F-1-S1: Examination of medical waste treatment system | F-1-M1: Establishment of a common and centre level medical waste treatment facility (incinerator) | F-1-L1: Effective use of medical waste treatment system. |

Source: LSMC Task Force

Table 11.3-3 Implementation Schedule of Short-Term Activities (LSMC)

| Strategies | Short-Term Activities | Responsible Division and Section | Related Organizations (Division, Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | |
|---|---|----------------------------------|--|--------------------------------------|--------------------------------|------------------------------|--------------|-------------------|----|----------------|--------------|----------------|----|--------------|--------------|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh |
| A-1 Promotion of private sector collection | A-1-S1: Review of existing policy of LSMC and establishment of strong bylaws (and rules) interacting with all stakeholders and its publication (focus on private sector involvement, paying system and assurance of municipal sweeper's job guarantee while handing over to private sector) | Environment Sec. | private sector | █ | | | | | | | | | | | |
| | A-1-S2: Preparation of standard TOR and agreement for PPP concept | TDD | Environment Sec. private sector | █ | | ● Signing | | ● Signing | | | | ● Monitoring | | Monitoring ● | |
| | A-1-S3: Introduction of a new pilot project for waste collection from shops by private sector | Environment Sec. | NGOs | █ | | | | | | | | | | | |
| | A-1-S4: Newly introduction of door to door collection for 25% houses at the outside the city core area by private sector (by the end of 2007) | Environment Sec. | TDD, private sector | | | █ | | | | | | | | | |
| A-2 Improvement of collection and transportation system | A-2-S1: Implementation of Time and Motion study | Environment Sec. | | █ | | | | | | | | | | | |
| | A-2-S2: Introduction of new collection routes. | Environment Sec. | private sector | | | | █ | | | █ | | | | █ | |
| | A-2-S3: Implementation of transportation and maintenance cost analysis | Environment Sec. | SWMRMC | █ | | | | | | | | | | | |
| | A-2-S4: Implementation of vehicle capacity analysis and plan for procurement of new vehicles | Environment Sec. | SWMRMC | | | █ | | | | | | | | | |
| A-3 Arrangement of a temporary transfer station | A-3-S1: Arrangement of a temporary transfer station (in Afadole) and commencement of temporary transferring | PWD | Environment Sec., SWMRMC, Ward offices | Public consultation █ | Survey, Design, Budgeting █ | | | Construction █ | | Operation █ | | | | | |
| B-1 Development of a waste processing facility (WPF) | B-1-S1: Cooperation with SWMRMC and KMC for development of WPF | PWD | Environment Sec., SWMRMC, KMC, KRM | Planning, EIA, Land acquisition █ | | | | Construction █ | | | | Operation █ | | | |
| B-2 Promotion of home composting activities | B-2-S1: Distribution of 1,200 home composting bins | Environment Sec., CDS | PWD, NGOs/CBOs | █ | Training ● | Follow-up and reporting █ | | | | | | | | | |

| Strategies | Short-Term Activities | Responsible Division and Section | Related Organizations (Division, Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | | | |
|---|---|-------------------------------------|--|-------------|----|-----|--------------|-------------|----|-----|--------------|-------------|----|-----|--------------|---|--|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) | | |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh | | |
| B-3 Promotion of 3Rs practices | B-3-S1 Promotion of 3Rs practices by local people | CDS | Environment Sec. | | | | | | | | | | | | | | |
| C-1: Utilization of SLF | C-1-S1: Operation of Sisdol LF with KMC | PWD | Environment Sec., SWMRMC, KMC | | | | | | | | | | | | | | |
| | C-1-S2: Cooperation with SWMRMC and KMC for development of long term landfill site | PWD | Environment Sec., SWMRMC, KMC | | | | | | | | | | | | | | |
| | C-1-S3: Closure of Bagmati dumping site | PWD | Environment Sec., SWMRMC, KMC | | | | | | | | | | | | | | |
| D-1: Implementation of mass communication and education | D-1-S1: Implementation of public awareness/education activities - Regular mechanism for awareness materials. Journal publication, drama, community interactions, reward, prize, visit, observation, establishment of SWM day. | CDS | Environment Sec., mass media | | | | | | | | | | | | | | |
| D-2: Formulation and mobilization of various groups for SWM | D-2-S1: Formation and mobilization of Ward Environment Conservation Committee (WECC) on a pilot basis | CDS | Environment Section, ward offices, CBOs in LSMC | | | | | | | | | | | | | | |
| | D-2-S2: Formation and mobilization of Nature/Eco Clubs among children | CDS | Environment Section, City Level Project Planning Section, ward offices, NGOs | | | | | | | | | | | | | | |
| | D-2-S3: Mobilization of youth as City Volunteers (CVs) | CDS | Environment Section, ward offices, NGOs (resource persons) | | | | | | | | | | | | | | |
| | D-2-S4: Strengthening of women groups for SWM | CDS | Environment Section, ward offices, NGOs (resource persons) | | | | ● | | | | ● | | | | | ● | |
| E-1: Implementation of HRD program | E-1-S1: Plan for HRD and monitoring including municipal staff/NGOs/CBOs/TLOs | Task Force | | | | | | | | | | | | | | | |
| E-2 Preparation of Annual work plan on SWM | E-2-S1: Announcement of SWM overall yearly plan of LSMC at beginning of each fiscal year. | Task Force | | | | | | | | | | | | | | | |

| Strategies | Short-Term Activities | Responsible Division and Section | Related Organizations (Division, Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | | | | |
|---|--|-------------------------------------|--|-------------|----|----------|--------------|-------------|----|-----|--------------|-------------|----------|-----|--------------|--|----------|--|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) | | | |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh | | | |
| E-3: Clarification of responsibility and promotion of coordination of SWM relating sections | E-3-S1: Review of SWM organization (Environment Dept.) and appoint responsible persons as focal points to coordinate all dimensions of SWM with motivating environment | CEO | | | | | | | | | | | | | | | | |
| E-4: Setting up tariff system | E-4-S1: Implementation of study on tariff system to introduce paying system. | PWD | | | | | | | | | | | | | | | | |
| E-5: Establishment and management of solid waste database system | E-5-S1: Collection and arrangement of solid waste data in database | Environment Sec. | | | | | | | | | | | | | | | | |
| | E-5-S2: Implementation of waste quantity and quality survey twice a year (Summer and Winter) | Environment Sec. | | ● Survey | | ● Survey | | ● Survey | | | ● Survey | | ● Survey | | | | ● Survey | |
| F-1: Promotion of special waste management system | F-1-S1: Examination of medical waste treatment system | PWD | | | | | | | | | | | | | | | | |

Legend

| | |
|---|---------------------------|
| | : Continuous activities |
| | : Intermittent activities |
| ● | : Spot activities |

| | |
|-----|---------------------------------|
| PWD | : Public Works Division |
| TDD | : Town Development Division |
| CDS | : Community Development Section |

11.3.3 Financial Plan

As shown in Table 11.3-4, total SWM cost, summing up the current SWM cost and Action Plan cost, amounts to Rs 441 million over the period until the target year of 2015 (2072). On the other hand, total own revenue, summing up actual revenue and projected revenue increase, amounts to Rs 1,358 million. Thus, the ratio of total SWM cost to total own revenue result is 33%, which is higher than the current ratio of 20% but not very much higher when considering SWM being ranked as a priority service of the municipality. Consequently, it is suggested that LSMC bears the entire Action Plan cost to cope with growing demand for SWM service in the municipality.

**Table 11.3-4 Ratio of SWM Cost to Municipality Own Revenue (LSMC)
(million Rs)**

| Items | 2005/0 2062/6 | 2006/0 2063/6 | 2007/0 2064/6 | 2008/0 2065/6 | 2009/1 2066/6 | 2010/1 2067/6 | 2011/1 2068/6 | 2012/1 2069/7 | 2013/1 2070/7 | 2014/1 2071/7 | Total |
|-------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------|
| I. Own Revenue | 119.7 | 126.5 | 133.8 | 139.0 | 144.9 | 144.6 | 141.7 | 138.8 | 135.9 | 133.0 | 1,358.0 |
| 1. Actual Revenue | 113.4 | 113.4 | 113.4 | 113.4 | 113.4 | 113.4 | 113.4 | 113.4 | 113.4 | 113.4 | 1,134.0 |
| 2. Projected Revenue Increase | 6.3 | 13.1 | 20.4 | 25.6 | 31.5 | 31.2 | 28.3 | 25.4 | 22.5 | 19.6 | 224.0 |
| II. SWM Cost | 26.5 | 49.6 | 41.2 | 45.0 | 43.9 | 45.5 | 44.0 | 51.3 | 46.5 | 48.1 | 441.5 |
| 1. Current SWM | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 220.0 |
| 2. Action Plan | 4.5 | 27.6 | 19.2 | 23.0 | 21.9 | 23.5 | 22.0 | 29.3 | 24.5 | 26.1 | 221.5 |
| III. Ratio (= II/I) | 22% | 39% | 31% | 32% | 30% | 31% | 31% | 37% | 34% | 36% | 33% |

Note: 1) Actual revenue is the amount for FY2004/05 (2061/62) which is assumed to continue at the same amount, 2) Projected revenue increase consists of Local Development Fee, Gov. subsidy and Property Tax, 3) Current SWM cost is the cost presented in Chapter 3 which is assumed to continue at the same amount.

Source: JICA Study Team

11.4 Action Plan of Bhaktapur Municipality

11.4.1 Vision and Target

The vision of BKM has been determined as *"To support the promotion of Bhaktapur city as a tourist destination through better Solid Waste Management"* as a result of a series of discussions at the T/F meetings and public hearings. As for the target, BKM has adopted various indicators in addition to the management ratio, i.e. collection area, population receiving collection service and disposal ratio to a sanitary landfill site as shown in Table 11.4-1.

Table 11.4-1 Target of BKM

| Present Situation | Targets | | |
|---|---|---|---|
| | Short-term | Mid-term | Long-term |
| | C: 2005/06 – 2007/08 | 2008/09 – 2010/11 | 2011/12 – 2014/15 |
| | N: 2062/63 – 2064/65 | 2065/66 – 2067/68 | 2067/68 – 2071/72 |
| Waste Management Ratio (amount) : 75% (19 t/d) | Waste Management Ratio (amount) : 80% (25 t/d) | Waste Management Ratio (amount) : 85% (32 t/d) | Waste Management Ratio (amount) : 90% (42 t/d) |
| Collection Ratio (area) : 25% | Collection Ratio (area) : 35% | Collection Ratio (area) : 50% | Collection Ratio (area) : 65% |
| Population Served : 78% | Population Served : 82% | Population Served : 86% | Population Served : 90% |
| Disposal Ratio to Sanitary LF : 0% | Disposal Ratio to Sanitary LF : 0% | Disposal Ratio to Sanitary LF : 72 % | Disposal Ratio to Sanitary LF : 72% |

Source: BKM Task Force

11.4.2 Approaches, Strategies and Necessary Activities

The approaches, strategies and necessary activities established by BKM are shown in Table 11.4-2, while the implementation schedule of the short-term activities is shown in Table 11.4-3.

Table 11.4-2 Strategies and Necessary Activities (BKM)

| Approaches | Strategies | Necessary Activities | | |
|---|--|--|---|---|
| | | Short-term (2005/06-2007/08) | Mid-term (2008/09-2010/11) | Long-term (2011/12 – 2014/15) |
| | | (2062 Shrawan – 2065 Ashadh) | (2065 Shrawan – 2068 Ashadh) | (2068 Shrawan – 2072 Ashadh) |
| A: Improvement of Collection and Transportation | A-1: Revision of collection system | A-1-S1: Procurement of a garbage tipper and tricycles | A-1-M1: Revision of waste collection route and extension of collection service areas to new urban settlements out of the core area | A-1-L1: Continuation of mid-term activities A-1-L2: Operation of transfer station |
| | A-2: Promotion of source separated collection (by community mobilization) | A-2-S1: Promotion of source separation and collection of organic kitchen waste by formulating users groups at local household level A-2-S2: Promotion of source separation and collection from hotels and restaurants | A-2-M1: Promotion of source separation and collection of organic kitchen waste at source by formulating users groups at local level and facilitated, bound with terms and conditions by the Municipality | A-2-L1: Continuation of mid-term activities |
| B. Promotion of Waste Minimization | B-1: Improvement and extension of existing composting facility (inclusive of transfer station) | B-1-S1: Procurement of a 10 t/d capacity excavator or backhoe loader, and waste sorting device B-1-S2: Land acquisition of extension area B-1-S3: Infrastructure development (open trussed shade, garage, parking area, weighbridge, sorting area, screening area, etc.) | B-1-M1: Commencement of operation of extended municipal composting facility (Phase I) along with marketing of compost produced with informative packing system | B-1-L1: Commencement of operation of extended municipal composting facility (Phase II) along with marketing of compost produced with informative packing system |
| | B-2: Waste minimization by community mobilization (community based solutions towards SWM) | B-2-S1: Promotion of waste minimization by making people well known with various methods of waste reduction at sources (e.g. home compost bins and vermi-composting, gift and educational training tools for school children from waste) B-2-S2: Installation of small scale bins/container at or nearby open waste collection spots or nearby ward office for keeping unusable broken glass, bulbs, tube lights etc. which are nuisance to municipal compost, and monitoring and operation by the local people | B-2-M1: Continuation of short-term activities | B-2-L1: Continuation of mid-term activities |
| | B-3: Trial of community level composting | - | B-3-M1: Introduction of closed chamber composting in new urban settlements out of the core area on pilot basis (Tole/Ward Basis) by formulating users groups at local level | B-3-L1: Continuation of mid-term activities |
| C. Improvement of Final Disposal System | C-1: Development of sanitary landfill site | C-1-S1: Topographical survey and soil investigation C-1-S2: Completion of EIA procedure C-1-S3: Detail design of the site with mitigation measures as recommended by EIA study - including waste processing facility within the landfill site along with leachate treatment facility and buffer zone C-1-S4: Land acquisition and resettlement of the directly affected dwellers in and nearby the site C-1-S5: Construction of the access road | C-1-M1: Completion of the access road construction C-1-M2: Completion of the site construction (Phase I area) C-1-M3: Formulation of the Environmental Monitoring Committee for the regular/periodic monitoring of the site C-1-M4: Commencement of Operation & Management of the site (Phase I area) along with waste processing facility | C-1-L1: Completion of the site construction (Phase II area) C-2-L2: Commencement of Operation & Management of the site (Phase II area) along with waste processing facility C-1-L3: Follow up of the Environmental Monitoring Committee's Activities regularly and periodically for proper Operation & Management of the site |
| | C-2: Procurement of equipment and vehicles for the operation of the site | | C-2-M1: Procurement of heavy equipment (Garbage Tipper, Backhoe Loader, Roller, Mini -excavator, waste-sorting device, weighbridge, etc.) | |
| | C-3: Involvement of affected people in the development works of the site | C-3-S1: Establishment of local committee for social consensus for the development of the site C-3-S2: Consideration of community development works | C-3-M1: Implementation of community development works | C-3-L1: Continuous implementation of community development works |

| Approaches | Strategies | Necessary Activities | | |
|--|--|--|---|--|
| | | Short-term (2005/06-2007/08) | Mid-term (2008/09-2010/11) | Long-term (2011/12 – 2014/15) |
| | | (2062 Shrawan – 2065 Ashadh) | (2065 Shrawan – 2068 Ashadh) | (2068 Shrawan – 2072 Ashadh) |
| | C-4: Implementation of research study | C-4-S1: Implementation of research study to define the leachate quality of the dumped waste at the current dumping site & the past dumping site for comparative analysis (on contamination of natural water body by solid waste disposal & liquid waste) | C-4-M1: Continuation of short-term activities | |
| D. Raising of Public Participation and Behavior Change | D-1: Implementation of public awareness and education on SWM | D-1-S1: Development of training tools/materials for community participation | D-1-M1: Continuation of short-term activities | D-1-L1: Continuation of short-term activities |
| | | D-1-S2: Dissemination of information regarding SWM inclusive collection system (leaflets, brochures, calendars, advertisements in halls before starting of film show) | D-1-M2: Continuation of short-term activities | D-1-L2: Continuation of mid-term activities |
| | | D-1-S3: Implementation of mass communication and education program (distribution of stickers, posters, drama play, competition among children group-drama, original stage drama during Gaijatra festival, drawing wall paintings, cleansing at the local communities) | D-1-M3: Continuation of short-term activities | D-1-L3: Continuation of mid-term activities |
| | | | D-1-M4: Periodic orientation classes on community based SWM in various schools in BKM D-1-M5: Mass meeting and procession at least once a year on Environment Day (June 5) | D-1-L4: Periodic orientation classes on community based SWM in various schools in BKM D-1-L5: Mass meeting, procession at least once a year on Environment Day (June 5) |
| | D-2: Promotion of interpersonal communication and education on SWM | D-2-S1: Promotion of Interpersonal Communication and Education program with arrangement of agreement with NGO such as selection of target communities, orientation workshop, baseline information survey in regard to existing knowledge, attitude, practices on SWM, counselor training camp for youth, teachers who support children's activities on SWM at the targeted communities | D-2-M1: Continuation of short-term activities | D-2-L1: Continuation of mid-term activities |
| E. Organizational and Institutional Arrangement | E-1. Organizational restructuring and strengthening | E-1-S1: Implementation of training on SWM based on the TNA E-1-S2: Finalization of organizational restructuring for SWM | E-1-M1: Recruit desired manpower for long-term SLF for proper management & operation E-1-M2: Establishment of Mechanical Section (MS)/Subsection (MSS) | E-1-L1: Extension of Mechanical Workshop Facilities |
| | E-2: Management of solid waste data by database | E-2-S1: Collection of relating data for SWM E-2-S2: Arrangement of the collected data in the database | E-2-M1: Establishment of data collection system E-2-M2: Continuous solid waste data arrangement in the database | E-2-L1: Continuous solid waste data arrangement by database |
| F. Others | F-1: Delegation of authority to communities and private sector | F-1-S1: Involvement of CBOs in collection and transportation of organic waste from households, hotels & restaurants on pilot basis (on Tole/Ward basis) | F-1-M1: Involvement of CBOs in collection and transportation of organic waste from households, hotels and restaurants (on Tole/Ward basis) | F-1-L1: Involvement of CBOs in collection and transportation of organic waste from households, hotels and restaurants (on Tole/Ward basis) |
| | F-2: Optimization of management efficiency and establishment of cost-effective SWM | F-2-S1: Commencement of private sector participation in SWM on pilot basis with different approaches - Case I: Only street sweeping by community level workers - Case II: Door to Door service - Case III: Both I & II - Case IV: Collection of Organic Waste from Hotels & Restaurants - Case V: Collection, transportation & Sale of Recyclable/Reusable Waste | F-2-M1: Expansion of private sector participation in SWM | F-2-L1: Expansion of private sector participation in SWM with different approaches |

Table 11.4-3 Implementation Schedule of Short-Term Activities (BKM)

| Strategies | Short-Term Activities | Responsible Section | Related Organizations (Department, Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | |
|--|--|----------------------------------|--|-------------|----|--------------|--------------|-------------|----|--------------|--------------|-------------|----|-----------------|--------------|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh |
| A-1: Revision of collection system | A-1-S1: Procurement of a garbage tipper and tricycles | Environment Sec. | | | | | ● | | | | | | | Operation as TS | |
| A-2: Promotion of source separated collection (by community mobilization) | A-2-S1: Promotion of source separation and collection of organic kitchen waste by formulating users groups at local household level | Environment Sec. | Social Welfare Sec. | | | | | | | | | | | | |
| | A-2-S2: Promotion of source separation and collection from hotels and restaurants | Environment Sec. | Private sectors | | | | | | | | | | | | |
| B-1: Improvement and extension of existing composting facility (inclusive of transfer station) | B-1-S1: Procurement of a 10 t/d capacity excavator or backhoe loader, and waste sorting device | Environment Sec. | Physical Planning and Works Sec. | | ● | | | | | | | | | Operation | |
| | B-1-S2: Land acquisition | Physical Planning and Works Sec. | Environment Sec. | | | | | | | | | | | | |
| | B-1-S3: Infrastructure development (open trussed shade, garage, parking area, weighbridge, sorting area, screening area, etc.) | Physical Planning and Works Sec. | Environment Sec. | | | Construction | | | | | | | | Operation | |
| B-2: Waste minimization by community mobilization (Community based solutions towards SWM) | B-2-S1: Promotion of waste minimization by making people well known with various methods of waste reduction at sources (e.g., home compost bins and vermi-composting, gift and educational training tools for school children from waste) | Environment Sec. | Social Welfare Sec., NGO/CBO | | ● | ● | | | | | | | | | |
| | B-2-S2: Installation of small scale bins/container at or nearby open waste collection spots or nearby ward office for keeping unusable broken glass, bulbs, tube lights, etc. which are nuisance to municipal compost (on pilot basis), and monitoring and operation by the local people | Environment Sec. | Social Welfare Sec., Ward offices, NGO/CBO | | | | | | | Installation | | | | Operation | |
| C-1: Development of sanitary landfill site | C-1-S1: Topographical survey and soil investigation | Environment Sec. | Physical Planning and Works Sec., SWMRMC, MTM | | | | | | | | | | | | |
| | C-1-S2: Completion of EIA procedure | Environment Sec. | Physical Planning and Works Sec., SWMRMC, MTM | | | | | | | | | | | | |

| Strategies | Short-Term Activities | Responsible Section | Related Organizations (Department, Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | | |
|--|--|---|---|-------------|----|-----|--------------|-------------|----|-----------------|--------------|-------------|----|--------------|--------------|--|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) | |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh | |
| | C-1-S3: Detail design of the site with mitigation measures as recommended by EIA study - including waste processing facility within the landfill site along with leachate treatment facility and buffer zone | Physical Planning and Works Sec. | Environment Sec., SWMRMC, MTM | | | | | | | | | | | | | |
| | C-1-S4: Land acquisition and resettlement of the directly affected dwellers in and nearby the site | Physical Planning and Works Sec. | Environment Sec., SWMRMC, MTM | | | | | | | | | | | | | |
| | C-1-S5: Construction of the access road | Physical Planning and Works Sec. | Environment Sec., SWMRMC, MTM | | | | | | | Survey & Design | | | | Construction | | |
| C-3: Involvement of affected people in the development works of the site | C-3-S1: Establishment of local committee for social consensus for the development of the site | Environment Sec. | Physical Planning and Works Sec., SWMRMC, MTM | | | | | | | | | | | | | |
| | C-3-S2: Consideration of community development works | Environment Sec. | Physical Planning and Works Sec., SWMRMC, MTM | | | | | | | | | | | | | |
| C-4: Implementation of research study | C-4-S1: Implementation of research study to define the leachate quality of the dumped waste at the current dumping site & the past dumping site for comparative analysis (on contamination of natural water body by solid waste disposal & liquid waste) | Environment Sec. | Physical Planning and Works Sec., SWMRMC, MTM | | | | | | | | | | | | | |
| D-1: Implementation of public awareness and education on SWM | D-1-S1: Development of training tools/materials for community participation | Social Welfare & Sanitation Section (CMU) | Relevant sections or units in other municipalities such as CMU in KMC and CDS in LSMC | | | | | | | | | | | | | |
| | D-1-S2: Dissemination of information regarding SWM inclusive collection system (leaflets, brochures, calendars, advertisements in halls before starting of film show) | Social Welfare & Sanitation Section (CMU) | Ward offices, NGOs, CBOs | | | | | | | | | | | | | |
| | D-1-S3: Implementation of mass communication and education program (distribution of stickers & posters, drama play, competition among children group-drama, original stage drama during Gaijatra festival, drawing wall paintings, cleansing at the local communities) | Social Welfare & Sanitation Section (CMU) | Ward offices, Schools | | | | | | | | | | | | | |

| Strategies | Short-Term Activities | Responsible Section | Related Organizations (Department, Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | |
|--|---|---|--|-------------|----|-----|--------------|-------------|----|-----|--------------|-------------|----|-----|--------------|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh |
| D-2: Promotion of Interpersonal communication and education on SWM | D-2-S1: Promotion of Interpersonal Communication and Education program with arrangement of agreement with NGO such as selection of target communities, orientation workshop, baseline information survey in regard to existing knowledge, attitude & practices on SWM, counselor training camp for youth, teachers who support children's activities on SWM at the targeted communities | Social Welfare & Sanitation Section (CMU) | Ward Offices, NGOs, CBOs | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| E-1. Organizational restructuring and strengthening | E-1-S1: Implementation of training on SWM based on the TNA | Physical Planning and Works Sec. | | | | | | | | | | | | | |
| | E-1-S2: Finalization of organizational restructuring for SWM | CEO | | | | | | | | | | | | | |
| E-2: Management of solid waste data by database | E-2-S1: Collection of relating data for SWM | Environment Sec. | | | | | | | | | | | | | |
| | E-2-S2: Arrangement of the collected data in the database | Environment Sec. | | | | | | | | | | | | | |
| F-1: Delegation of authority to communities and private sector | F-1-S1: Involvement of CBOs in collection & transportation of organic waste from households, hotels & restaurants on pilot basis (on Toile/Ward basis) | Environment Sec. | CBOs | | | | | | | | | | | | |
| F-2: Optimization of management efficiency and establishment of cost-effective SWM | F-2-S1: Commencement of private sector participation in SWM on pilot basis | Environment Sec. | CBOs, NGOs, Private sectors | | | | | | | | | | | | |

Legend  : Continuous activities
 : Intermittent activities
 : Spot activities
 CMU: Community Mobilization Section

11.4.3 Financial Plan

As shown in Table 11.4-4, the total SWM cost, summing up current SWM cost and Action Plan cost, amounts to Rs 347 million over the period until the target year of 2015 (2072). On the other hand, total own revenue, summing up actual revenue and projected revenue increase, amounts to Rs 1,268 million. Thus, the ratio of total SWM cost to total own revenue result is 27%, which is higher than the current ratio of 12% but not very much higher if compared to the ratio of KMC and LSMC. Consequently, it is suggested that BKM bears the entire Action Plan cost by taking all means available, for instance by reducing other expenditure, applying for a subsidy from the Reserved Fund, etc.

**Table 11.4-4 Ratio of SWM Cost to Municipality Own Revenue (BKM)
(million Rs)**

| Items | 2005/0 2062/6 | 2006/0 2063/6 | 2007/0 2064/6 | 2008/0 2065/6 | 2009/1 2066/6 | 2010/1 2067/6 | 2011/1 2068/6 | 2012/1 2069/7 | 2013/1 2070/7 | 2014/1 2071/7 | Total |
|-------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|---------|
| I. Own Revenue | 127.3 | 128.1 | 129.0 | 128.9 | 129.0 | 128.4 | 126.6 | 125.4 | 124.5 | 121.4 | 1,268.7 |
| 1. Actual Revenue | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 1,265.0 |
| 2. Projected Revenue Increase | 0.8 | 1.6 | 2.5 | 2.4 | 2.5 | 1.9 | 0.1 | -1.1 | -2.0 | -5.1 | 3.7 |
| II. SWM Cost | 58.6 | 45.2 | 40.6 | 27.2 | 27.5 | 27.4 | 30.7 | 43.0 | 23.7 | 24.0 | 347.8 |
| 1. Current SWM | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 150.0 |
| 2. Action Plan | 43.6 | 30.2 | 25.6 | 12.2 | 12.5 | 12.4 | 15.7 | 28.0 | 8.7 | 9.0 | 197.8 |
| III. Ratio (= II/I) | 46% | 35% | 31% | 21% | 21% | 21% | 24% | 34% | 19% | 20% | 27% |

Note: 1) Actual revenue is the amount for FY2004/05 (2061/62) which is assumed to continue at the same amount, 2) Projected revenue increase consists of Local Development Fee, Gov. subsidy and Property Tax, 3) Current SWM cost is the cost presented in Chapter 3 which is assumed to continue at the same amount..

Source: JICA Study Team

11.5 Action Plan of Madhyapur Thimi Municipality

11.5.1 Vision and Target

The vision of MTM has been determined as “*Madhyapur Thimi City Co-existing with a Sound Environment and Organic Agriculture*”. As for the target, MTM have adopted management ratio in terms of quantity as an objectively verifiable indicator (OVI) aiming to reduce the amount of unmanaged waste as shown in Table 11.5-1.

Table 11.5-1 Target of MTM

| Present Situation | Targets | | |
|---|---|--|--|
| | Short-term | Mid-term | Long-term |
| | C: 2005/06 – 2007/08 | 2008/09 – 2010/11 | 2011/12 – 2014/15 |
| | N: 2062/63 – 2064/65 | 2065/66 – 2067/68 | 2067/68 – 2071/72 |
| Waste Management Ratio (amount) : 35% (5 t/d) | Waste Management Ratio (amount) : 40% (7 t/d) | Waste Management Ratio (amount) : 50% (11 t/d) | Waste Management Ratio (amount) : 70% (20 t/d) |

Source: MTM Task Force

11.5.2 Approaches, Strategies and Necessary Activities

The approaches, strategies and necessary activities established by MTM are shown in Table 11.5-2, while the implementation schedule of the short-term activities is shown in Table 11.5-3.

Table 11.5-2 Strategies and Necessary Activities (MTM)

| Approaches | Strategies | Necessary Activities | | |
|--|---|--|---|---|
| | | Short-term (2005/06-2007/08) | Mid-term (2008/09-2010/11) | Long-term (2011/12 – 2014/15) |
| | | (2062 Shrawan – 2065 Ashadh) | (2065 Shrawan – 2068 Ashadh) | (2068 Shrawan – 2072 Ashadh) |
| A. Improvement of Collection and Transportation System | A-1: Procurement of collection vehicles | A-1-S1: Procurement of collection vehicle(s) and assignment of a driver, collectors and loaders | A-1-M1: Procurement of collection vehicle(s) | A-1-L1: Procurement of collection vehicle(s) |
| | A-2: Extension of collection area | A-2-S1: Setting “depo (s)” at new collection areas | A-2-M1: Setting “depo (s)” at new collection areas | A-2-L1: Setting “depo (s)” at new collection areas |
| | A-3: Introduction of systematic private sector collection | A-3-S1: Preparation of guidelines for private sector collection | A-3-M1: Introduction of privatized collection system (Wards 15, 16 and 17) as pilot project | A-3-L1: Extension of privatized collection system to other Wards |
| B. Promotion of Waste Minimization | B-1: Promotion of separation at source | B-1-S1: Training of local people for separation at source | B-1-M1: Continuous training of local people for separation at source | B-1-L1: Continuous training of local people for separation at source |
| | B-2: Promotion of plastic recycling | B-2-S1: Providing of bags and metal strings (suiros) for separation at source | B-2-M1: Continuous provision of bags and metal strings (suiros) for separation at source | B-2-L1: Continuous providing of bags and metal strings (suiros) for separation at source |
| | B-3: Promotion of community (tole) composting | B-3-S1: Providing 25 compost drums for communities (toles) B-3-S2: Operating community composting | B-3-M1: Providing additional 25 compost drums for communities (toles) B-3-M2: Operating community composting | B-3-L1: Providing additional 25 compost drums for communities (toles) B-3-L2: Operating community composting |
| C. Improvement of Final Disposal System | C-1: Discourage of current dumping practices | C-1-S1: Identification and arrangement of a temporary landfill site | C-1-M1: Closure of the temporary landfill site | - |
| | C-2: Transportation of waste to Taikabu LF | C-2-S1: Conclusion of agreement with BKM for development and utilization of Taikabu LF | C-2-M1: Commencement of transportation of waste to Taikabu LF | C-2-L1: Continuous transportation of waste to Taikabu LF |
| D. Promotion of Public Participation and Behavior Change | D-1: Promotion of public awareness and education on SWM through mass communication and education | D-1-S1: Raising of public awareness through local radio (FM) and miking D-1-S2: Implementation of public events | D-1-M1: Raising of public awareness through local radio (FM) and miking D-1-M2: Implementation of public events | D-1-L1: Raising of public awareness through local radio (FM) and miking D-1-L2: Implementation of public events |
| | D-2: Promotion of public awareness and education on SWM through local level activities such as woman’s club and CBOs. | D-2-S1: Development of training tools and promotion materials for community participation D-2-S2: Formation and mobilization of Eco/Nature Clubs at schools. D-2-S3: Formation and mobilization and skills development of community groups for SWM D-2-S4: Implementation of community-based clean up program D-2-S5: Mobilization of youth as city volunteers for SWM | D-2-M1: Development of training tools and materials for community participation D-2-M2: Providing tools and package programs (e.g. incentives) for school children and clubs D-2-M3: Implementation of community-based clean up program | D-2-L1: Development of training tools and materials for community participation D-2-L2: Providing tools and package programs (e.g. incentives) for school children and clubs D-2-L3: Implementation of community-based clean up program |
| E. Organizational and Institutional Arrangement | E-1: Organizational and institutional restructuring, and strengthening | E-1-S1: Strengthening of SWM Sub-section | E-1-M1: Setting up separate Environment and Sanitation Section | |
| | E-2: Management of solid waste data by database | E-2-S1: Collection of relating data for SWM E-2-S2: Arrangement of the collected data in the database | E-2-M1: Continuous data arrangement in the database | E-2-L1: Continuous data arrangement in the database |

Source: MTM Task Force

Table 11.5-3 Implementation Schedules of Short-Term Activities (MTM)

| Strategies | Short-Term Activities | Responsible Section | Related Organizations (Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | | | |
|--|---|---------------------|---|-------------|----|-----|--------------|-------------|----|-----|--------------|-------------|----|-----|--------------|--|--|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) | | |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh | | |
| A-1: Procurement of collection vehicles | A-1-S1: Procurement of collection vehicle (s) and assignment of a driver, collectors, and loaders | PTS | | | | | | | | | | | | | | | |
| A-2 Extension collection area | A-2-S1: Setting “depo (s)” at new collection areas | PTS | Ward offices, Private sector | | | | | | | | | | | | | | |
| A-3 Introduction of systematic private sector collection | A-3-S1: Preparation of guidelines for private sector collection | PTS | Ward offices, Private sector | | | | | | | | | | | | | | |
| B-1 Promotion of separation at source | B-1-S1: Training of local people for separation at source | CDSS | NGOs/CBOs | | | | | | | | | | | | | | |
| B-2 Promotion of plastic recycling | B-2-S1: Providing of bags and metal strings (Suiros) for separation at source | CDSS | NGOs/CBOs | | | | | | | | | | | | | | |
| B-3 Promotion of community (tole) composting | B-3-S1: Providing 25 compost drums for communities (toles) | CDSS | NGOs/CBOs | | | | | | | | | | | | | | |
| | B-3-S2: Operating community composting | CDSS | NGOs/CBOs | | | | | | | | | | | | | | |
| C-1: Discourage of current dumping practices | C-1-S1: Identification and arrangement of a temporary landfill site | PTS | SWMRMC, BKM | | | | | | | | | | | | | | |
| C-2: Transportation of waste to Taikabu LF | C-2-S1: Conclusion of agreement with BKM for development and utilization of Taikabu LF | PTS | Legal Section, SWMRMC, BKM | | | | | | | | | | | | | | |
| D-1: Promotion of public awareness and education on SWM through mass communication and education | D-1-S1: Raising of public awareness through local radio (FM) and miking | CDSS | PTS | | | | | | | | | | | | | | |
| | D-1-S2: Implementation of public event | CDSS | Relevant sections or units in other municipalities such of CMU of KMC and CDS of LSMC | | | | | | | | | | | | | | |

| Strategies | Short-Term Activities | Responsible Section | Related Organizations (Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | | |
|---|---|---------------------|---|-------------|----|-----|--------------|-------------|----|-----|--------------|-------------|----|-----|--------------|--|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) | |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh | |
| D-2: Promotion of public awareness and education on SWM through local level activities such as woman's group and CBOs | D-2-S1: Development of training tools and promotion materials for community participation | CDSS | PTS, Ward offices, Schools | | | | | | | | | | | | | |
| | D-2-S2: Formation and mobilization of Eco/Nature Clubs at schools. | CDSS | | | | | | | | | | | | | | |
| | D-2-S3: Formation and mobilization and skills development of community groups | CDSS | | | | | | | | | | | | | | |
| | D-2-S4: Implementation of community-based clean up program | CDSS | | | | | | | | | | | | | | |
| | D-2-S5: Mobilization of youth as city volunteers for SWM | CDSS | | | | | | | | | | | | | | |
| E-1: Organizational and Institutional Restructuring, and Strengthening | E-1-S1: Strengthening of SWM Sub-section | Task Force | | ■ | | | | | | | | | | | | |
| E-2: Management of solid waste data by database | E-2-S1: Collection of relating data for SWM | PTS | | | | | | | | | | | | | | |
| | E-2-S2: Arrangement of the collected data in the database | PTS | | | | | | | | | | | | | | |

Legend
 ■ : Continuous activities
 □ : Intermittent activities
 ● : Spot activities

PTS : Planning and Technical Section
 CDSS : Community Development and Sanitation Section

11.5.3 Financial Plan

As shown in Table 11.5-4, the total SWM cost, summing up current SWM cost and Action Plan cost, amounts to Rs 73 million over the period until the target year of 2014/15 (2071/72). On the other hand, total own revenue, summing up actual revenue and projected revenue increase, amounts to Rs 195 million. Thus, the ratio of total SWM cost to total own revenue result is 37%, which is very much higher than the current ratio of 4%. However, obviously, the current ration ratio is too low if compared to other municipalities. Consequently, it is suggested that MTM bear the entire Action Plan cost by taking all means available, for instance by reducing other expenditure, applying for a subsidy from the Reserved Fund, etc. to cope with growing demand for SWM services.

**Table 11.5-4 Ratio of SWM Cost to Municipality Own Revenue (MTM)
(million Rs)**

| Items | २००५/०६ २०६२/६ | २००६/०७ २०६३/६ | २००७/०८ २०६४/६ | २००८/०९ २०६५/६ | २००९/१० २०६६/६ | २०१०/११ २०६७/६ | २०११/१२ २०६८/६ | २०१२/१३ २०६९/७ | २०१३/१४ २०७०/७ | २०१४/१५ २०७१/७ | Total |
|-------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------|
| I. Own Revenue | 18.2 | 19.1 | 20.0 | 20.5 | 21.0 | 20.8 | 20.0 | 19.4 | 19.0 | 17.5 | 195.4 |
| 1. Actual Revenue | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 174.0 |
| 2. Projected Revenue Increase | 0.8 | 1.7 | 2.6 | 3.1 | 3.6 | 3.4 | 2.6 | 2.0 | 1.6 | 0.1 | 21.4 |
| II. SWM Cost | 1.9 | 13.9 | 6.7 | 7.0 | 5.8 | 5.9 | 6.2 | 12.4 | 6.6 | 6.8 | 73.3 |
| 1. Current SWM | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 7.0 |
| 2. Action Plan | 1.2 | 13.2 | 6.0 | 6.3 | 5.1 | 5.2 | 5.5 | 11.7 | 5.9 | 6.1 | 66.3 |
| III. Ratio (= II/I) | 11% | 73% | 33% | 34% | 27% | 28% | 31% | 64% | 35% | 39% | 37% |

Note: 1) Actual revenue is the amount for FY 2004/05 which is assumed to continue at the same amount, 2) Projected revenue increase consists of Local Development Fee, Gov. subsidy and Property Tax, 3) Current SWM cost is the cost presented in Chapter 3 which is assumed to continue at the same amount.

Source: JICA Study Team

11.6 Action Plan of Kirtipur Municipality

11.6.1 Vision and Target

The vision of KRM has been determined as “*Neat, Clean, Pollution Free City, Kirtipur Municipality*”. As for the target, KRM have adopted collection ratio in terms of quantity as an objectively verifiable indicator (OVI) aiming to reduce the amount of uncollected waste as shown in Table 11.6-1.

Table 11.6-1 Target of KRM

| Present Situation | Targets | | |
|---|--|---|---|
| | Short-term | Mid-term | Long-term |
| | C: 2005/06 – 2007/08 | 2008/09 – 2010/11 | 2011/12 – 2014/15 |
| | N: 2062/63 – 2064/65 | 2065/66 – 2067/68 | 2067/68 – 2071/72 |
| Waste Management Ratio (amount) : 35 % (4 t/d) | Waste Management Ratio (amount) : 50% (7 t/day) | Waste Management Ratio (amount) : 70% (11 t/day) | Waste Management Ratio (amount) : 80% (15 t/day) |

Source: KRM Task Force

11.6.2 Approaches, Strategies and Necessary Activities

The approaches, strategies and necessary activities established by KRM are shown in Table 11.6-2, while the implementation schedule of short-term activities is shown in Table 11.6-3.

Table 11.6-2 Strategies and Necessary Activities (KRM)

| Approaches | Strategies | Necessary Activities | | |
|--|---|--|---|---|
| | | Short-term (2005/06-2007/08) | Mid-term (2008/09-2010/11) | Long-term (2011/12 – 2014/15) |
| | | (2062 Shrawan – 2065 Ashadh) | (2065 Shrawan – 2068 Ashadh) | (2068 Shrawan – 2072 Ashadh) |
| A. Improvement of Collection and Transportation System | A-1: Involvement of private sector for extension of collection area | A-1-S1: Preparation of agreements with private sector (NGOs/CBOs) and conclusion of the contracts (up to two parties) | A-1-M1: Increase of involvement of private sector (up to four parties) | A-1-L1: Continuation of mid-term activities |
| B. Promotion of Waste Minimization | B-1: Establishment of a community composting facility | B-1-S1: Selection and arrangement of land for a community composting facility | B-1-M1: Development of a community composting facility | B-1-L1: Expansion of the established community composting facility |
| | B-2: Promotion of home composting | B-2-S1: Promotion of home composting program (by providing bins, bags) | B-2-M1: Promotion of home composting program (by providing bins, bags) | B-2-L1: Continuation of mid-term activities |
| | B-3: Promotion of proper management of plastics | B-3-S1: Continuous implementation pilot bases separated collection of plastic bags (by providing wires (suirs), etc.) | B-3-M1: Expansion of target areas for separated collection of plastic bags | B-3-L1: Continuation of mid-term activities |
| C. Improvement of Final Disposal System | C-1: Transportation of the waste to the nearest transfer station | C-1-S1: Coordination with KMC for utilization of Teku transfer station | C-1-M1: Procurement of a vehicle for transportation of the collected waste C-1-M2: Transportation of the collected waste to the nearest transfer station | C-1-L1: Transportation of the collected waste to the nearest transfer station |
| D. Promotion of Public Participation and Behavior Change | D-1: Dissemination about SWM by education program | D-1-S1: Implementation of education program on SWM for school children and households (by promoting home composting, plastic bag separation, etc.) | D-1-M1: Continuation of short-term activities | D-1-L1 Continuation of midterm activities |
| E. Organizational and Institutional Arrangement | E-1: Establishment of SWM unit/section | E-1-S1: Establishment of a section (unit) on SWM | E-1-M1: Strengthening of SWM unit | E-1-L1: Establishment of SWM Section |
| | E-2: Implementation of HRD program | E-2-S1: Implementation of staff training on SWM and other related skills | E-2-M1: Implementation of staff training on SWM and other related skills | E-2-L1: Implementation of staff training on SWM and other related skills |
| | E-3: Management of solid waste data by database | E-3-S1: Collection of related data for SWM from private sector E-3-S2: Arrangement of the collected data in the database | E-3-M1: Establishment of data collection system from private sector E-3-M2: Continuous data arrangement in the database | E-3-L1: Continuous data arrangement in the database |
| F. Others | F-1: Coordination among all SWM stakeholders | F-1-S1: Coordination with SWMRMC, neighboring municipalities and NGOs/CBOs | F-1-M1: Continuation of short-term activities | F-1-L1: Continuation of mid-term activities |

Table 11.6-3 Implementation Schedule of Short-Term Activities (KRM)

| Strategies | Short-Term Activities | Responsible Section, Unit | Related Organizations (Section, NGO/CBO) | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | |
|---|--|-----------------------------|--|----------------------------------|--------------|---------------------|--------------|-------------|--------------|---------------------|--------------|-------------|--------------|---------------------|--------------|
| | | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) |
| | | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | |
| | | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh |
| A-1: Involvement of private sector for extension of collection area | A-1-S1: Preparation of agreements with private sector (NGOs/CBOs) and conclusion of the contracts (up to two parties) | PTS, SWMU | private sector | Preparation | | | | | | | | | | | |
| | | | | ● Signing | | | | ● Review | | | | ● Review | | | |
| | | | | | | | | | | | | | | | |
| B-1: Establishment of a community composting facility | B-1-S1: Selection and arrangement of land for a composting facility | PTS, SWMU | SWMRMC, KMC | Discussion and coordination with | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| B-2: Promotion of home composting | B-2-S1: Promotion of home composting program (by providing bins, bags) | PTS, SWMU | NGO/CBO | | | | | | | | | | | | |
| B-3: Promotion of proper management of plastics | B-3-S1: Continuous implementation separated collection of plastic bags (by providing wires (suiros), etc.) | SWMU | NGO/CBO | | | | ● Evaluation | | | | | | | | |
| C-1: Transportation of the waste to the nearest transfer station | C-1-S1: Coordination with KMC for utilization of Teku transfer station | CEO, PTS | | | | | | | | | | | | | |
| D-1: Dissemination about SWM by education program | D-1-S1: Implementation of education program on SWM for school children and households (by promoting home composting, plastic bag separation, etc.) | SWMU | NGOs/CBOs, ward offices, schools | | ● Exhibition | ● Clean up campaign | | | ● Exhibition | ● Clean up campaign | | | ● Exhibition | ● Clean up campaign | |
| E-1: Establishment of SWM unit/section | E-1-S1: Establishment of a section (unit) on SWM | Municipal Board, Task Force | | | | | | | | | | | | | |
| E-2: Implementation of HRD program | E-2-S1: Implementation of staff training on SWM and other related skills | PTS | | | HRD plan | | | | | | | | | | |
| E-3: Management of solid waste data by database | E-3-S1: Collection of related data for SWM from private sector | SWMU | | | | | | | | | | | | | |
| | E-3-S2: Arrangement of the collected data in the database | SWMU | | | | | | | | | | | | | |
| F-1: Coordination among all SWM stakeholders | F-1-S1: Coordination with SWMRMC, neighboring municipalities and NGOs/CBOs | CEO, T/F, SWMU | SWMRMC, KMC, LSMC, NGO/CBO | | | | | | | | | | | | |

Legend
 : Continuous activities
 : Intermittent activities
 : Spot activities
 PTS : Planning and Technical Section
 SWMU : Solid Waste Management Unit

11.6.3 Financial Plan

As shown in Table 11.6-4, the total SWM cost, summing up current SWM cost and Action Plan cost, amounts to Rs 22 million over the period until the target year of 2014/15 (2071/72). On the other hand, total own revenue, summing up actual revenue and projected revenue increase, amounts to Rs 189 million. Thus, the ratio of total SWM cost to total own revenue result is 12%, which is very much higher than the current ratio of 0.2%. However, obviously, the current ratio is too low because of privatization operated in core areas of the municipality. Consequently, it is suggested that KRM bears entire Action Plan cost by reducing other expenditures, applying for a subsidy from the Reserved Fund, etc.

**Table 11.6-4 Ratio of SWM Cost to Municipality Own Revenue (KRM)
(million Rs)**

| Items | 2005/0 2062/6 | 2006/0 2063/6 | 2007/0 2064/6 | 2008/0 2065/6 | 2009/1 2066/6 | 2010/1 2067/6 | 2011/1 2068/6 | 2012/1 2069/7 | 2013/1 2070/7 | 2014/1 2071/7 | Total |
|-------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------|
| I. Own Revenue | 18.3 | 19.1 | 19.9 | 20.2 | 20.5 | 20.1 | 19.2 | 18.2 | 17.2 | 16.3 | 189.1 |
| 1. Actual Revenue | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 176.0 |
| 2. Projected Revenue Increase | 0.7 | 1.5 | 2.3 | 2.6 | 2.9 | 2.5 | 1.6 | 0.6 | -0.4 | -1.3 | 13.1 |
| II. SWM Cost | 1.3 | 3.1 | 1.7 | 2.2 | 2.0 | 2.5 | 2.0 | 3.0 | 2.2 | 2.4 | 22.5 |
| 1. Current SWM | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 3.0 |
| 2. Action Plan | 1.0 | 2.8 | 1.4 | 1.9 | 1.7 | 2.2 | 1.7 | 2.7 | 1.9 | 2.1 | 19.5 |
| III. Ratio (= II/I) | 7% | 16% | 9% | 11% | 10% | 12% | 11% | 17% | 13% | 15% | 12% |

Note: 1) Actual revenue is the amount of FY 2004/05 which is assumed to continue at the same amount, 2) Projected revenue increase consists of Local Development Fee, Gov. subsidy and Property Tax, 3) Current SWM cost is the cost presented in Chapter 3 which is assumed to continue at the same amount.

Source: JICA Study Team

11.7 Action Plan of SWMRMC

11.7.1 Action Plan

In addition to each municipality, an A/P for SWMRMC has been prepared based on the suggestions by the JICA Study Team and discussions among the relevant organizations at the Board of SWMRMC as well as at the TWG meetings. Two kinds of A/Ps have been developed. One is for organizational and institutional arrangement so that SWMRMC could become a “Solid Waste Management Technical Center (tentative name)”, and the other is for actual implementation of necessary activities under the umbrella concept (development of sanitary landfill sites and waste processing plant in the Kathmandu Valley). The developed A/Ps are summarized in Table 11.7-1 and -2, while the implementation schedule of short-term activities is shown in Table 11.7-3.

Table 11.7-1 Action Plan of SWMRMC (for Organizational and Institutional Development)

| Related main issues to be tackled | Necessary Activities | | |
|---|--|---|---|
| | Short-term (2005/06-2007/08) (2062 Shrawan -2065 Ashadh) | Mid-term (2008/09-2010/11) (2065 Shrawan -2068 Ashadh) | Long-term (2011/12-2014/15) (2068 Shrawan -2072 Ashadh) |
| <ul style="list-style-type: none"> - Unclear demarcation of responsibilities between SWMRMC and Local Bodies (LBs) - Unclear relation with MOLD (status of SWMRMC) - Limited jurisdictional area (inside the Kathmandu Valley) - Lack of skilled manpower - Lack of equipment and facility | <p>S1: Clarification of demarcation between SWMRMC and Local Bodies by issuing a new policy and amendment of the Solid Waste Act</p> <p>S2: Clarification of legal status and change of jurisdictional area by amendment of the Act</p> <p>S3: Establishment of a strategic plan for SWMRMC (future organizational and institutional development plan)</p> <p>S4: Change of name and organization (such as setting up environmental section, training section, etc.)</p> <p>S5: Recruitment of skilled personnel and reservation of resource persons (inc. training)</p> <p>S6: Procurement of basic equipment (computer, software, etc.) and facility (including arrangement of office building, training room)</p> <p>S7: Implementation of Public Relations (PRs) activities (development of web-site and issues of newsletter, etc.)</p> <p>S8: Implementation of studies and research (waste minimization technology, final disposal sites selection) as part of training</p> | <p>M1: Continuous recruitment of skilled personnel and reservation of resource person (inc. training)</p> <p>M2: Continuous procurement of equipment and facility (mainly for training implementation)</p> <p>M3: Implementation of PRs activities (usage of web-site and issues of newsletter, etc.)</p> <p>M4: Starting training program to LBs and NGOs/CBOs</p> <p>M5: Preparation of a subsidy system to LBs (including setting up relevant section)</p> <p>M6: Preparation of public participation/community mobilization (including setting up relevant section)</p> <p>M7: Preparation of establishment of information network for SWM (including setting up relevant section)</p> <p>M8: Continuous implementation of study and research on waste minimization (as part of training)</p> <p>M9: Implementation of necessary support to LBs</p> | <p>L1: Continuous recruitment of skilled personnel and reservation of resource person (inc. training)</p> <p>L2: Continuous procurement of equipment and facility (mainly for information network)</p> <p>L3: Implementation of PRs activities (usage of web-site and issues of newsletter, etc.)</p> <p>L4: Implementation of training program to LBs and NGOs/CBOs</p> <p>L5: Implementation of a subsidy system</p> <p>L6: Implementation of public participation/community mobilization activities</p> <p>L7: Utilization of information network of SWM</p> <p>L8: Continuous implementation of study and research on waste minimization and final disposal</p> <p>L9: Implementation of necessary support to LBs</p> |

Table 11.7-2 Action Plan of SWMRMC (for SWM Facilities' Development)

| Related main issues to be tackled | Necessary Activities | | |
|--|--|---|---|
| | Short-term (2005/06-2007/08) (2062 Shrawan -2065 Ashadh) | Mid-term (2008/09-2010/11) (2065 Shrawan -2068 Ashadh) | Long-term (2011/12-2014/15) (2068 Shrawan -2072 Ashadh) |
| <ul style="list-style-type: none"> - Need of long-term sanitary landfill sites - Need of large scale waste processing plant - Safety closure of existing dumping sites and used landfill site | <p>S1: Development of Sisdol Short-term LF</p> <p>S1-1: Development of Sisdol LF Valley II (2005/06)</p> <p>S1-2: Handover Valley II to operator</p> <p>S1-3: Periodic environmental monitoring</p> <p>S2: Development of Waste Processing Plant (KMC, LSMC, KRM)</p> <p>S2-3: Land selection and assessment</p> <p>S2-4: Site investigation works</p> <p>S2-5: Land acquisition</p> <p>S2-6: Concept design and Feasibility study</p> <p>S2-7: EIA process</p> <p>S2-8: Detailed design</p> <p>S2-9: Landfill development of Phase I</p> <p>S2-10: Handover site to operator</p> <p>S2-11: Periodic environmental monitoring</p> <p>S3: Development of Long-term LF (KMC, LSMC, KRM)</p> <p>S3-1: Construction of access road</p> <p>S3-2: Identification of the capacity and service areas</p> <p>S3-3: Site investigation works</p> <p>S3-4: Land acquisition</p> <p>S3-5: Concept design</p> <p>S3-6: EIA process</p> <p>S3-7: Detailed design</p> <p>S3-8: Landfill development of Phase I</p> <p>S3-9: Handover site to operator</p> <p>S3-10: Periodic environmental monitoring</p> | <p>M1-1: Receiving Sisdol site from operators</p> <p>M1-2: Regular environmental monitoring of closed Sisdol site</p> <p>M1-3: Maintenance and repairs for closed Sisdol site</p> <p>M2-1: Periodic environmental monitoring</p> <p>M2-2: Development of Phase II</p> <p>M3-1: Periodic environmental monitoring</p> <p>M3-2: Development of Phase II</p> <p>M4-1: Regular environmental monitoring</p> | <p>L1-1: Regular environmental monitoring</p> <p>L1-2: Maintenance and repairs for closed Sisdol site</p> <p>L2-1: Periodic environmental monitoring</p> <p>L2-2: Development of Phase III</p> <p>L3-1: Periodic environmental monitoring</p> <p>L3-2: Development of Phase III</p> <p>L4-1: Regular environmental monitoring</p> |




| Related main issues to be tackled | Necessary Activities | | |
|-----------------------------------|--|---|--|
| | Short-term (2005/06-2007/08) (2062 Shrawan -2065 Ashadh) | Mid-term (2008/09-2010/11) (2065 Shrawan -2068 Ashadh) | Long-term (2011/12-2014/15) (2068 Shrawan -2072 Ashadh) |
| | <p>S4: Development of Long-term LF (BKM, MTM)</p> <p>S4-1: Site investigation works (EIA, Topography survey, Soil investigation)</p> <p>S4-2: Land acquisition</p> <p>S4-3: Detailed design</p> <p>S4-4: Development of Phase I</p> <p>S4-5: Handover Phase I to operator</p> <p>S4-6: Periodic environmental monitoring</p> <p>S5: Closure of Bagmati River dumping site</p> <p>S5-1: Design of Bagmati River dumping site closure plan</p> <p>S5-2: Implementation of Bagmati closure plan</p> <p>S5-3: Regular environmental monitoring</p> | | |

Table 11.7-3 Implementation Schedule of Short-Term Activities (SWMRMC)

| Strategies | Short-Term Activities | Related Organizations | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | | | | |
|--|--|----------------------------|-------------|----|-----|--------------|-------------|----|-----|--------------|-------------|----|-----|--------------|--|--|--|
| | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) | | | |
| | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | | | | |
| | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh | | | |
| Organizational and Institutional Arrangement | S1: Clarification of demarcation between SWMRMC and Local Bodies by issuing a new policy and amendment of the Solid Waste Act | MOLD, Related Local Bodies | | | | | | | | | | | | | | | |
| | S2: Clarification of legal status and change of jurisdictional area by amendment of the Act | MOLD | | | | | | | | | | | | | | | |
| | S3: Establishment of a strategic plan for SWMRMC (future organizational and institutional development plan) | MOLD | | | | | | | | | | | | | | | |
| | S4: Chang of name and organization (such as setting up environmental section, training section, etc.) | MOLD | | | | | | | | | | | | | | | |
| | S5: Recruitment of skilled personnel and reservation of resource persons (inc. training) | | | | | | | | | | | | | | | | |
| | S6: Procurement of basic equipment (computer, software, etc.) and facility (including arrangement of office building, training room) | | | | | | | | | | | | | | | | |
| | S7: Implementation of Public Relations (PRs) activities (Management of web-site and issues of newsletters, etc.) | | | | | | | | | | | | | | | | |
| | S8: Implementation of studies and researches (waste minimization technology, etc.) as part of training | MOAC, MOEST | | | | | | | | | | | | | | | |
| SWM Facilities' Development | S1: Development of Sisdol Short-term LF | KMC, LSMC, KRM | | | | | | | | | | | | | | | |
| | S1-1: Development of Sisdol LF Valley II | | | | | | | | | | | | | | | | |
| | S1-2: Handover Valley II to operator | | | | | | | | | | | | | | | | |
| | S1-3: Periodic environmental monitoring | | | | | | | | | | | | | | | | |
| | S2: Development of Waste Processing Facility (WPF) | KMC, LSMC, KRM | | | | | | | | | | | | | | | |
| | S2-1: Land selection | | | | | | | | | | | | | | | | |
| | S2-2: Site investigation works | | | | | | | | | | | | | | | | |
| | S2-3: Land acquisition | | | | | | | | | | | | | | | | |
| | S2-4: Concept design and feasibility study | | | | | | | | | | | | | | | | |
| | S2-5: EIA process | | | | | | | | | | | | | | | | |
| | S2-6: Detailed design | | | | | | | | | | | | | | | | |
| | S2-7: Development of Phase I | | | | | | | | | | | | | | | | |
| | S2-8: Handover site to operator | | | | | | | | | | | | | | | | |
| S2-9: Periodic environmental monitoring | | | | | | | | | | | | | | | | | |

| Strategies | Short-Term Activities | Related Organizations | 2005/2006 | | | | 2006/2007 | | | | 2007/2008 | | | | | | | | | |
|--|---|-----------------------|-------------|----|-----|--------------|-------------|----|-----|--------------|-------------|----|-----|--------------|--|--|--|--|--|--|
| | | | I (July 16) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 16) | I (July 17) | II | III | IV (July 15) | | | | | | |
| | | | 2062/2063 | | | | 2063/2064 | | | | 2064/2065 | | | | | | | | | |
| | | | Shrawan | | | Ashadh | Shrawan | | | Ashadh | Shrawan | | | Ashadh | | | | | | |
| SWM Facilities' Development | S3: Development of Long-term LF (KMC, LSMC, KRM) | KMC, LSMC, KRM | | | | | | | | | | | | | | | | | | |
| | S3-1: Construction of access road | | | | | | | | | | | | | | | | | | | |
| | S3-2: Identification of the capacity and service areas | | | | | | | | | | | | | | | | | | | |
| | S3-3: Site investigation works | | | | | | | | | | | | | | | | | | | |
| | S3-4: Land acquisition | | | | | | | | | | | | | | | | | | | |
| | S3-5: Concept design | | | | | | | | | | | | | | | | | | | |
| | S3-6: EIA process | | | | | | | | | | | | | | | | | | | |
| | S3-7: Detailed design (Basic design) | | | | | | | | | | | | | | | | | | | |
| | S3-8: Landfill development of Phase I | | | | | | | | | | | | | | | | | | | |
| | S3-9: Handover site to operator | | | | | | | | | | | | | | | | | | | |
| | S3-10: Periodic environmental monitoring | | | | | | | | | | | | | | | | | | | |
| | S4: Development of Long-term LF (BKM, MTM) | BKM, MTM | | | | | | | | | | | | | | | | | | |
| | S4-1: Site investigation works (EIA, Topography survey, Soil investigation) | | | | | | | | | | | | | | | | | | | |
| | S4-2: Land acquisition | | | | | | | | | | | | | | | | | | | |
| | S4-3: Detailed design | | | | | | | | | | | | | | | | | | | |
| | S4-4: Development of Phase I | | | | | | | | | | | | | | | | | | | |
| | S4-5: Handover Phase I to operator | | | | | | | | | | | | | | | | | | | |
| | S4-6: Periodic environmental monitoring | | | | | | | | | | | | | | | | | | | |
| | S5: Closure of Bagmati River dumping site | KMC, LSMC, KRM | | | | | | | | | | | | | | | | | | |
| | S5-1: Design of Bagmati River dumping site closure plan | | | | | | | | | | | | | | | | | | | |
| S5-2: Implementation of Bagmati closure plan | | | | | | | | | | | | | | | | | | | | |
| S5-3: Periodic environmental monitoring | | | | | | | | | | | | | | | | | | | | |

Legend

-  : Continuous work
-  : Periodic work
-  : Spot work

11.7.2 Financial Plan

SWMRMC as the Central Government is expected to be required to be burdened with necessary costs for development of landfills, transfer stations, waste processing facility (WPF) and closures of landfills. On the other hand, in principle, municipalities should bear the rest of the costs from their own revenues, that is, equipment procurement and incremental O&M costs.

Consequently, SWMRMC's financial burden is estimated at Rs 1,419 million in total as shown in Table 11.7-4 that consists of Rs 65 million for transfer stations, Rs 242 million for WPF and Rs 1,112 for landfills.

Table 11.7-4 Projected Facilities Development Costs to be borne by SWMRMC (million Rs)

| Area | Facility | 2005/0 2062/6 | 2006/0 2063/6 | 2007/0 2064/6 | 2008/0 2065/6 | 2009/1 2066/6 | 2010/1 2067/6 | 2011/1 2068/6 | 2012/1 2069/7 | 2013/1 2070/7 | 2014/1 2071/7 | Total |
|--------|--------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------|
| Zone A | T/S | 65.8 | | | | | | | | | | 65.8 |
| | WPF | 14.3 | 146.4 | | 41.9 | | | | 1.2 | | | 203.8 |
| | LF | 34.8 | 649.1 | 120.2 | 32.9 | 55.3 | | | | | | 892.4 |
| | Total | 114.9 | 795.5 | 120.2 | 74.8 | 55.3 | 0 | 0 | 1.2 | 0 | 0 | 1,162.0 |
| Zone B | T/S | | | | | | | | | | | 0 |
| | C/P | 38.2 | | | | | | | | | | 38.2 |
| | LF | 218.1 | 0.4 | 0.3 | | | | | | | | 218.8 |
| | Total | 256.3 | 0.4 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 257.0 |
| Total | T/S | 65.8 | | | | | | | | | | 65.8 |
| | WPF | 52.5 | 146.4 | | 41.9 | | | | 1.2 | | | 242.0 |
| | LF | 252.9 | 649.5 | 120.5 | 32.9 | 55.3 | | | | | | 1,111.2 |
| | Total | 371.2 | 795.9 | 120.5 | 74.8 | 55.3 | 0 | 0 | 1.2 | 0 | 0 | 1,419.0 |

Source: JICA Study Team

11.8 Monitoring and Evaluation Plan for Action Plans

The A/P is a long-term strategic plan to be implemented starting FY2005/06 (2062/63) to 2014/15 (2071/72). In order to ensure that the Action Plan is implemented in an effective and sustainable manner, monitoring and evaluation systems need to be put in place that bind together both individual and collective achievements of SWMRMC and the five municipalities. Such systems should be installed both at the municipal level, as well as the Valley level, in line with the institutional arrangements as discussed under the Umbrella Concept.

Ad hoc monitoring and to a lesser extent, evaluations have been attempted in the past among the municipalities and SWMRMC in different programs. However, to date, no monitoring and evaluation practices have been observed, aside from the Pilot Project activities under the Study, that adhere to the standard definitions of monitoring and evaluation as provided by the OECD Development Assistance Committee¹.

¹ OECD, Development Assistance Committee, *Glossary of Key Terms in Evaluation and Results Based Management*, Evaluation and Aid Effectiveness Series No. 6, 2002

- **Monitoring:** A continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds.
- **Evaluation:** The systematic and objective assessment of an on-going or completed project, program or policy, its design, implementation and results. The aim is to determine the relevance and fulfillment of objectives, development efficiency, effectiveness, impact and sustainability.

As it could be deduced from the definitions above, monitoring and evaluation need to be conducted in a systematic manner in order for them to be effective. They should also be based on objective information and data collected and recorded regularly to measure against predetermined indicator to assess progress.

In the case of the A/Ps on SWM, OVIs were identified with targets for the year 2015. Through the implementation of the A/Ps, collectively, the municipalities and SWMRMC will aim to increase the total solid waste management rate from the existing 76% to 93%. Each municipality's target, solid waste management ratio, is as specified within the respective A/Ps.

Monitoring: Monitoring of A/P implementation should be conducted at two levels. First, the solid waste management ratio should be calculated at individual municipalities, to measure the effectiveness of SWM activities as indicated in the targets of the respective A/Ps. It is suggested that each municipality's benchmark the target solid waste management ratio that they should achieve by the end of short, medium and long-term activities of the A/Ps. Every three or four years, the actual percentage of the solid waste management rate should be measured against the benchmarked target ratio to assess progress. In Figure 11.8-1, the A/P monitoring plan is presented based on the collective targets of the solid waste management ratio.

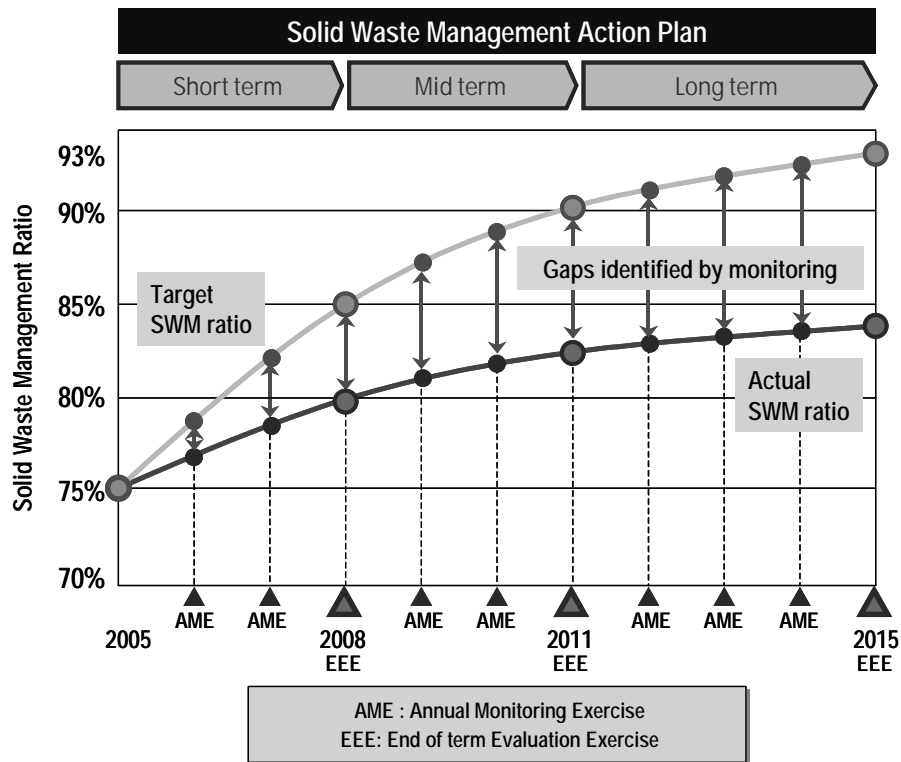


Figure 11.8-1 Monitoring Plan based on SWM Ratio

Source: JICA Study Team

The second level of monitoring of the A/Ps should be conducted when each municipality formulate their respective annual SWM workplans, which in fact is a breakdown of activities as identified for short, medium, and long term. Based on the existing policy priorities, availability of resources, influences from external factors, and lessons learned from the past implementation of activities, the contents of A/Ps themselves should be reviewed and modified. This process should allow enough flexibility so that the activities stipulated in the SWM A/Ps could be changed, dropped or added insofar as the overall effect on the SWM program would increase the solid waste management ratio. Furthermore, this exercise would serve to update the A/Ps so that it would enhance the relevance of the A/Ps for continued sustainability. The linkage between the Action Plan monitoring system and Annual Work Plan is as illustrated below in Figure 11.8-2.

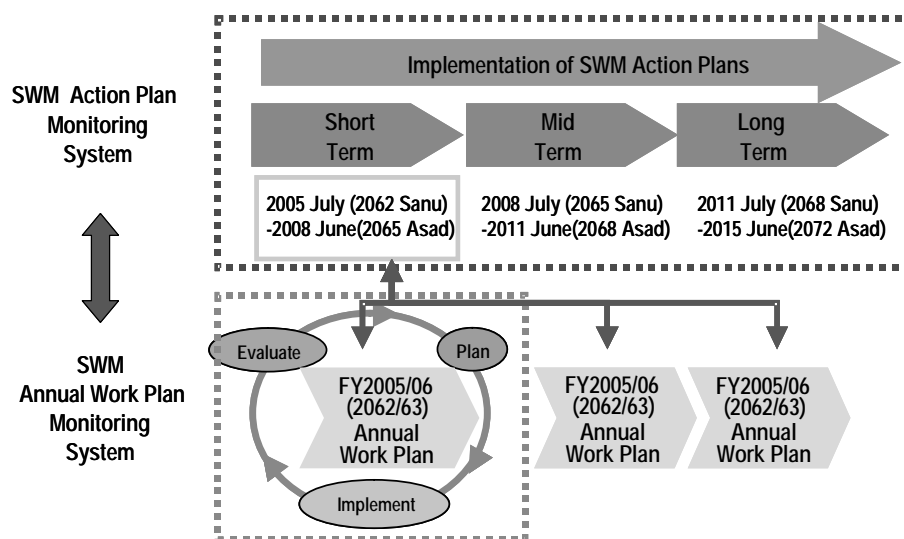


Figure 11.8-2 Linkage between Action Plan Monitoring System and Annual Work Plan

Source: JICA Study Team

For both levels of monitoring A/Ps, T/Fs of each municipality should be made the primary party responsible. Especially in regards to monitoring based on the given indicator, solid waste management ratio, all T/F members need to continue to build their capacities to collect and analyze SWM data in a timely manner, as initiated in the Pilot Project E of the Study. In addition, it is recommended that the results of the monitoring exercises, and any modifications made in the A/Ps should be reported to the inter-municipal TWG, chaired by SWMRMC, so that overall progress at the Kathmandu Valley level could be kept on track.

Evaluation: During the benchmarked years of 2008 and 2011 (see Figure 11.8-1), which are also the final fiscal years within short and mid terms, respectively, end of term evaluations are recommended to holistically review the A/Ps implementation from the perspectives such as relevance, effectiveness, efficiency, impact and sustainability of municipal activities. In 2015, the final evaluation should be conducted to examine whether the ultimate target of 93% solid waste management ratio was achieved, and to draw best practices and lessons learned for future SWM programs.

For the end of term evaluations, it is envisaged that a joint evaluation team be formed for each municipality among the representatives from municipal T/Fs, SWMRMC, and MOLD. The results of the evaluations should be disclosed and shared with other municipalities at TWG and other forums so that the major lessons learned and recommendations could be shared with a wider audience.

CHAPTER 12 PRELIMINARY EXAMINATION ON ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

The various activities planned in the Action Plans (A/Ps) surely contribute a great part to sanitary and hygiene improvement in the five municipalities as well as enhancement of beautification in the Kathmandu Valley. However, some activities would have the possibility to cause negative impact on the physical, biological, social and cultural environment.

In order to identify the likely impact that may be caused by the activities of A/Ps and to suggest the key points for examining environmental countermeasures and for a monitoring plan, a preliminary examination of environmental and social considerations based on the available secondary information was undertaken. The EIA and land acquisition systems in Nepal and related guidelines/requirements were also reviewed in order to contribute to the smooth implementation of further studies of environmental and social considerations.

12.1 EIA System of Nepal

12.1.1 Type and Scale of SWM-related Projects Requiring IEE/EIA

The legal framework of the EIA system in Nepal is basically composed of the Environmental Protection Act, 1997 (EPA) and the Environmental Protection Rules, 1997 (EPR). Article 3 of the EPR stipulates that a project proponent should conduct an IEE or EIA study before the commencement of project. Table 12.2-1 shows the project type and activity in the SWM sector for which the IEE/EIA is a prerequisite in accordance with the EPA and EPR.

Table 12.1-1 IEE/EIA Requirement on SWM Sector in Nepal

| Project Type and Activity | | Size/capacity requiring IEE | Size/capacity requiring EIA |
|---------------------------|---|--|---|
| 1 | SWM activities *1 | Population under service: 2,000-10,000 | Population under service: More than 10,000 |
| 2 | Landfill | Receiving waste: 100-1,000 ton/year | Receiving waste: More than 1,000 ton/year Population under service in urban area: More than 10,000 |
| 3 | Transfer station and resource recovery | Area: Not more than 3 ha | Area: More than 3 ha |
| 4 | Facility for selecting, picking, disposing, and recycling through chemical, mechanical or biological techniques | Area: Not more than 2 ha | Area: More than 2 ha |
| 5 | Compost plant | Area: 1-5 ha | Area: More than 5 ha |
| 6 | Construction of waste plant, recovery plant, landfill site, storing facility and treatment facility for hazardous waste | - | Any scale |
| 7 | Final disposal of infectious waste | - | Hospital, health center, etc.: More than 25 beds |
| 8 | Incinerating or recycling any lethal substances | - | Area: More than 1 ha |

Note *1: Although there is no legal definition in EPA/EPR in terms of SWM-related activities, it can be technically said to include waste collection, transportation, processing, final disposal and any combination of them, according to MOEST.

Source: Environmental Protection Act, 1997, and Environmental Protection Rules, 1997, HMG Nepal

12.1.2 IEE/EIA Processes of Nepal

According to the EPA and EPR, the project proponent should obtain the approval from the Ministry of Environment, Science and Technology (MOEST) in the case of EIA process, while from the concerned agency (superior ministry) in the case of IEE process, before project implementation. The general process in both cases is shown in Table 12.1-2 and the detail process flow of EIA is shown in Appendix 12.1.

Table 12.1-2 Overview of IEE/EIA Process in Nepal

| IEE Process | EIA Process |
|---|---|
| <ul style="list-style-type: none"> - Submission of TOR for IEE to concerned agency - Evaluation and approval of TOR by concerned agency - IEE study and draft IEE report preparation - 15-day public notice by proponent and opinions/suggestions from the public - Submission of IEE report to concerned agency - Evaluation and approval of IEE by concerned agency | <ul style="list-style-type: none"> - 15-day public notice by proponent and opinions/suggestions from the public - Submission of Scoping Report and TOR for EIA to MOEST through concerned agency - Evaluation and approval of TOR by MOEST - EIA study and draft EIA report preparation - Public hearing by proponent - Submission of EIA report to MOEST through concerned agency - 30-day public notice by MOEST and opinions/suggestions from the public - Evaluation and approval of EIA by MOEST |

Note: "Concerned agency" means basically MOLD in case of municipal SWM-related projects.

Source: JICA Study Team, referring to Environmental Protection Act, 1997 and Rules, 1997, HMG Nepal

12.1.3 EIA Guidelines for SWM Projects

SWMRMC developed EIA Guidelines for Solid Waste Management Projects in the municipalities of Nepal (SWMRMC EIA Guidelines) in 2004. Expected users of the guidelines are developers of SWM-related project such as municipalities including the technical supporters/consultants. The guidelines mainly cover the scope of municipal SWM and introduce the following technical and procedural content:

- Requirement of the IEE/EIA process and documents for SWM projects based on EPA, EPR and other legislation
- Technical and procedural introduction for screening, scoping and TOR preparation for SWM projects
- Technical methodology for i) understanding of environmental/social baseline conditions, ii) identification and prediction of environmental/social impacts, and iii) development of mitigation measures and management/monitoring plan.
- Methodology of public involvement not only into the IEE/EIA process but also into the whole project stage.

In the course of preparation of the guidelines, SWMRMC organized several consultative workshops inviting the various bodies. After finalizing, SWMRMC distributed the guidelines to all 58 municipalities in Nepal.

12.2 Land Acquisition and Resettlement Systems in Nepal

A legal framework on land acquisition and resettlement in Nepal is mainly formed by the Land Acquisition Act 1961 (amended in 1977) and Land Acquisition Rules 1969. The Act empowers the government to acquire any land on the payment of compensation for public purposes and works. The acquisition of and compensation for privately owned property are undertaken according to a formal procedure, consisting of i) initial procedure, ii) preliminary investigation process, iii) notice of acquisition, and iv) compensation. This framework is also applied to the property or other assets under the registered tenancy. The legal procedure of land acquisition and compensation in Nepal is shown in Appendix 12.1.

In the course of the land acquisition and compensation procedure, a compensation determination committee (CDC) is generally organized at district level involving a land administration/revenue office, the project proponent, and a representative of the district from the public. The CDC performs and supervises key activities or steps of the procedure, such as investigation of property/assets to be acquired and compensated, determination of compensation rate and amount, issuance of official notices.

According to the Act and Rules, the following should be taken into account when determining the compensation amount, prevailing or market price of the land, loss of standing crops, loss of structure such as a house, damage due to being compelled to shift their residence or business places.

There is no specific legislation on involuntary resettlement in Nepal. The resettlement or relocation due to public purposes or works is practically operated in the conceptual framework of land acquisition and compensation.

12.3 Consistency with the JICA Guidelines

JICA established former environmental guidelines on a sector-specific base in the early 1990s. As upstream decision making with integration of enough environmental and social considerations became important, JICA revised its guidelines and made a universal one to be applied to all of JICA's functions and duties. The Guidelines for Environmental and Social Considerations (JICA Guidelines) started to come into force from April 2004.

The JICA Guidelines aim at encouraging a recipient government to conduct appropriate environmental and social considerations in various stages of the study or project preparation, through making clear the responsibility and process to be taken by JICA and a necessary condition to be fulfilled by the recipient country. The adequate support and confirmation to be taken by JICA are also stipulated.

Although the JICA Guidelines are not considered to apply fully to the Study, it is necessary to understand their requirements and to verify consistency with the Nepalese system, toward the next steps for performing the A/Ps.

12.3.1 Requirements of JICA Guidelines

The major requirements to be fulfilled by the recipient country can be summarized as follows:

- Integration of environmental and social considerations into the planning of the project and decision-making process of its implementation
- Preparation of various EIA-related documents in official or familiar language in a host country as well as an understandable language and form for local people
- Openness of EIA-related documents and availability to access and copy at any time for stakeholders

The key points of the process on the environmental and social consideration in line with the JICA Guidelines are as follows:

- Categorization of each project to determine the requirement level for ensuring appropriate environmental and social considerations
- Examination of various impacts and measures on environmental and social aspects, including examination of multiple alternatives
- Information disclosure and consultation with stakeholders to have a social acceptability
- Appropriate consideration to be paid to socially vulnerable groups, to those subject to involuntary resettlement and indigenous peoples
- Monitoring after project implementation for confirmation of the effectiveness of measures and occurrence of unforeseen situations

12.3.2 Comparison and Verification between Nepalese System and JICA Guidelines

The table below shows the consistency of the Nepalese system and experience in SWM projects with the JICA Guidelines.

Table 12.3-1 Comparison between Nepalese EIA System and JICA Guidelines

| Requirements/key points of JICA Guidelines | Nepalese system and experience in SWM sector projects |
|--|--|
| Integration of environmental and social considerations into planning and decision-making process | <ul style="list-style-type: none"> - There is no system specific for the SWM sector. However, public involvement is provided by EPA/EPR in the scoping stage of EIA (15-day public notice) - SWMRMC EIA Guidelines point out the importance of stakeholder involvement from an early stage of project planning as much as possible. |
| Openness of EIA-related documents in understandable language | <ul style="list-style-type: none"> - EIA-related documents are basically prepared in English in order to make their content clear technically. At a practical level, a summarized document in the local language (Nepali) is usually prepared for public notice/hearing. |
| Categorization of the proposed project | <ul style="list-style-type: none"> - EPA/EPR provides criteria for categorization of the projects of various sectors including the SWM sector, based on the project type and scale. |
| Examination of various impacts and measures | <ul style="list-style-type: none"> - EPA/EPR provides the general scope for examination of impacts and measures, such as physical, biological and social-economic aspects. Alternative analysis is also considered in EPA/EPR. - SWMRMC EIA Guidelines cover the various environmental and social elements to be examined. Technical instruction for examining the impacts and measures is provided in line with the project type in the SWM sector. |
| Information disclosure and stakeholder consultation | <ul style="list-style-type: none"> - EPA/EPR stipulates that opportunities be provided to stakeholders especially for local communities/people (public notice, public hearing, etc.). - At a practical level, MOEST sometimes requests the project proponent to attach a letter from local communities or other key stakeholders, in order to show the general acceptance toward the project. - Recently there has been a tendency to organize a local coordination committee for LFS development in order not only to ensure the stakeholder involvement but also to have good mutual understanding. |
| Consideration for socially vulnerable groups, involuntary resettlement, etc. | <ul style="list-style-type: none"> - IEE/EIA covers the ethnicity, caste, poverty status, etc. as one of the socio-economic aspects. - There is no system specifically for involuntary resettlement. However, the legal system for land acquisition and compensation is enacted separately from the IEE/EIA system. |
| Monitoring after project implementation | <ul style="list-style-type: none"> - EPA/EPR stipulates that a monitoring plan be included in IEE/EIA. - SWMRMC EIA Guidelines provide the technical instruction for establishing the monitoring plan. |

Source: JICA Study Team, referring to Environmental Protection Act, 1997 and Rules, 1997 (HMG Nepal), and to EIA Guidelines for Solid Waste Management Project, SWMRMC, 2004.

Based on the above discussion, it can be said that the Nepalese EIA system as well as experience on environmental and social considerations in SWM-sector projects fulfill the JICA Guideline requirements more or less.

12.4 Result of Preliminary Screening

12.4.1 Target Activities of Preliminary Screening

Among various proposed activities in A/Ps, the activities associated with facility development are selected as the projects (activities) necessary for preliminary screening.

The activities relating to primary collection proposed in A/Ps are not discussed in this examination because the characteristics and factors affecting environmental and social impacts can be considered to be generally equivalent to the current ones. Other activities such as organizational/institutional arrangement, public awareness and so on were screened out, since no or negligible impact was expected to occur. In addition, a medical waste treatment facility was not selected either because the medical waste is not target waste of the Study although it may need IEE/EIA. Consequently, the activities as shown in Table 12.4-1 are examined as preliminary screening hereinafter.

Table 12.4-1 Target Activities for Preliminary Screening

| Municipalities | Target Activities based on the A/Ps | Activity Number |
|----------------|--|-----------------|
| KMC | Development of Balaju T/S | PS-1 |
| | Development of a waste processing facility (WPF) (specific site is not decided yet.) ^{*1} | PS-2 |
| | Development of long-term LF (Banchare Danda site in Okharpauwa) ^{*2} | PS-3 |
| LSMC | Development of Afadole temporary T/S | PS-4 |
| | Development of a waste processing facility (WPF) (specific site is not decided yet.) ^{*1} | PS-2 |
| | Development of long-term LF (Banchare Danda site in Okharpauwa) ^{*2} | PS-3 |
| BKM | Development of Taikabu LF | PS-5 |
| MTM | Arrangement of temporary LF (specific site is not decided yet.) | PS-6 |
| KRM | Development of a community composting facility (Specific site is not decided yet.) | PS-7 |

Note: *1: Both activities are the same under the umbrella concept

*2: Both activities are the same under the umbrella concept

Source: JICA Study Team

12.4.2 Examination Result

Based on the available data and information in terms of the existing environmental and social conditions in and around the areas of each target activity, a preliminary examination of the magnitude of impacts was conducted considering the expected characteristics of each activity. The environmental items to be examined were selected according to the new guideline of JICA, 2004. The results of the preliminary screening are summarized in Table 12.4-2, while the detail discussions of evaluation are attached in Appendix 12.2 including the suggested direction and approach for environmental management to be integrated into each activity.

Table 12.4-2 Summarized Results of Preliminary Screening

| Environmental Items | Activity Number | | | | | | |
|-----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | PS-1 | PS-2 | PS-3 | PS-4 | PS-5 | PS-6 | PS-7 |
| Air pollution | B | B | B | B | B | C | C |
| Water pollution | B | B | A | C | A | B | B |
| Soil pollution | C | C | B | C | B | C | C |
| Waste | _ ^{*1} | _ ^{*1} | _ ^{*1} | _ ^{*1} | _ ^{*1} | _ ^{*1} | _ ^{*1} |
| Noise and vibration | B | B | B | B | B | C | C |
| Ground subsidence | C | C | B | C | B | C | C |
| Offensive odor | A | A | A | A | A | A | A |
| Geographical features | C | C | A | C | B | C | C |
| Bottom sediment | C | C | C | C | C | B | C |
| Biota and ecosystem | C | U | B | C | B | C | C |

| Environmental Items | Activity Number | | | | | | |
|--|-----------------|------|------|------|------|------|------|
| | PS-1 | PS-2 | PS-3 | PS-4 | PS-5 | PS-6 | PS-7 |
| Water usage | C | C | B | C | A | C | C |
| Accidents | B | B | B | B | B | B | B |
| Global warming | C | C | C | C | C | C | C |
| Involuntary resettlement | C | B | B | C | U | B | B |
| Local economy such as employment and livelihood | B | B | B | B | B | B | B |
| Land use and utilization of local resource | C | B | B | C | A | B | B |
| Social institutions such as infrastructure and local decision-making process | C | C | C | C | C | C | C |
| Existing social infrastructures and services | C | C | C | C | C | C | C |
| The poor, indigenous of ethnic people | C | C | C | C | C | C | C |
| Misdistribution of benefit and damage | C | C | C | C | C | C | C |
| Local conflict of interests | A | A | B | A | A | A | A |
| Gender | C | C | C | C | C | C | C |
| Children's rights | C | C | C | C | C | C | C |
| Cultural heritage | C | U | C | C | C | U | U |
| Infectious diseases such as HIV/AIDS | B | B | B | B | B | B | B |
| Necessity of IEE or EIA | I | I | I | I | I | II | II |

Note: A: Relatively high magnitude of impact is expected.

B: Impact is expected, but its magnitude will not be quite as significant.

C: No or negligible impact is expected.

U: Magnitude of impact is unclear.

*1: The overall goal of the activities is to improve solid waste management.

*2: I: Legal IEE/EIA of Nepal is required. II: Requirement of legal IEE/EIA of Nepal depended on the scale and location.

Source: JICA Study Team

12.4.3 Other Noticeable Issues

(1) Social Acceptability for Facility Development

Considering the experience in Nepal regarding the construction and operation of SWM-related facilities, social conflict at local level often arises due to poor social acceptability. Adequate consultations among stakeholders are essential in principle to have an opportunity for good understandings on the project and to achieve social acceptance. However, due consideration should be also paid to particular conditions of Nepal society such as the common practice in discussion steps to have a decision making and social acceptance.

(2) Waste Pickers

It was found that currently waste pickers collect recyclable materials at Teku T/S and Bagmati River dumping site. The waste picking opportunities would be reduced from the following viewpoints.

- The platform contributes to efficient transfer through direct loading from primary collection vehicles to the secondary transportation vehicle, when full-scale operation starts with the arrival of transportation vehicles.
- When full-scale operation of Sisdol S/T-LF starts, the operation of Bagmati River dumping site will be drastically scaled down.
- Regarding the waste picking at LFSs such as Sisdol S/T-LF, Banchare Danda L/T-LF and Taikabu LF, restriction of waste picking activities is proposed for the effective and safe operation of the sites as well as for avoidance of possible health hazards for waste pickers. OSLSMCC has also insisted that waste picking activities not be allowed at

Sisdol S/T-LF.

Based on the above prediction, the following considerations should be paid to secure the opportunities of waste picking activities as much as possible.

- Regarding Teku T/S, the waste picking activities will still be able to be carried out in spite of the improvement of waste transfer, since the unloading of the waste on the ground cannot be avoided due to the limited availability of primary collection vehicle (tricycles, tractors, etc). Therefore, the current condition for waste picking is expected to be secured to some extent.
- After completion of Balaju T/S, an opportunity can be provided for waste pickers for the same reason as that of Teku T/S.
- As a planned WPF includes the resource recovery process as one of its major function, a probable mitigation against reducing the waste picking opportunities is to permit the pickers to collect the recyclable materials at the WPF.

Besides, it is necessary for municipalities concerned and SWMRMC to disseminate the information about the closure plan of Bagmati River dumping to waste pickers working there.

In addition to the above viewpoints to cope with reduction of the waste picking opportunities, the following considerations will be also essential in order to improve the working safety and to be aware of and improve the social status of waste pickers.

- The safety of operation of T/Ss and WPF is to be designed to reduce the risk of accidents on waste pickers due to improper operation of the heavy equipment or collection/transportation vehicles.
- One of the most serious issues which the waste pickers are facing is high risk of infection due to the mixed medical waste (infectious waste) the municipal solid waste. In this regard, a system of medical waste management should be urgently and properly developed in cooperation with the concerned bodies, in order to avoid the health hazard of infection on waste pickers. Awareness of the danger of medical wastes to the waste pickers is also urgently required.
- Neither the contribution of waste pickers to the reduction of waste nor their actual living and working conditions have been seriously recognized by stakeholders working in SWM such as municipal authorities, SWMRMC, NGO/CBO and communities. Therefore, advocacy will be necessary to open dialogue on issues never before discussed, fostering an enabling environment for designing and delivering appropriate responses to issues related to waste pickers.
- It is preferable to pursue strategic employment of the waste pickers as site workers at T/Ss, WPF, LFs or other SWM-related facilities and processes in the long run in order to incorporate the waste pickers as partners in SWM activities.

(3) Environmental and Social Considerations Discussed through the Stakeholder Involvement of the Study

Various opportunities were offered for stakeholder involvement in the Study, such as four or five public hearings (P/Hs) organized by each of the five municipalities in the course of A/P formulation, four seminars for sharing and discussing the outcomes of the Study and Pilot Projects.

The JICA Study Team and TWG members have provided the topics on environmental and social issues to the stakeholders by using the above opportunities. Reflecting the

undesirable status of the river dumping system in the Kathmandu Valley, the stakeholder discussion mainly concentrated on the final disposal planning and operation. Table 12.4-3 summarizes the major opinions and suggestions raised through the stakeholder discussions as well as the actions made by the Study corresponding to the opinions/suggestions.

Table 12.4-3 Major Opinions and Actions through the Stakeholder Involvement in the Study

| Opinions/suggestions from stakeholder | Actions by the Study |
|--|--|
| Importance of a comparative study in the final disposal planning from the environmental, social and financial viewpoints | The Study employed the alternative analysis of facility development plan under the umbrella concept, inclusive of the site selection among more than 20 candidate sites considering not only the technical/engineering issues but also environmental, social and financial issues. |
| Involvement of MTM into Taikabu LFS development | BKM now has an initiative to develop Taikabu LFS especially in the EIA process. However, under the umbrella concept, MTM is planned as a beneficiary of Taikabu LF with sharing of the necessary cost of operation. Based on this direction, BKM and MTM have already commenced the discussion on mutual coordination and cost sharing. |
| Study on the SWM-facility options such as a biogas plant and incinerators | Various options were conceived and discussed when examining the overall facility development plan under the umbrella concept. Finally a WPF associated with composting and resource recovery was proposed as the most applicable system for waste minimization, considering the waste characteristic in the Valley as well as the technical experiences and capability of Nepal. |
| Requirement of EIA for developing a compost plant | Recommendations are made in the Study on the necessity of IEE/EIA procedure under the Nepalese legal system based on the expected project scale. Attention is also drawn to the EIA Guidelines for SWM projects by SWMRMC, in which it is essential to conduct the IEE/EIA study. |
| Importance of leachate management in Sisdol LF | A leachate retention pond with aeration and a recirculation system was designed and equipped in the course of the Pilot Project at Sisdol LF. Clay liner was also designed and placed on the bottom of the landfill area. |
| Importance of coordination between the five municipalities and SWMRMC for Sisdol LF | An agreement was made among SWMRMC, KMC and LSMC regarding the operation of Sisdol LF in line with implementation of the pilot project. Good coordination between them is evident in carrying out the operation of the site. |
| Acceptance toward the Sisdol LF development and operation from the local communities | A local committee, OSLSMCC, was organized and involved regularly into Sisdol LF operation. During the operation phase of the site under the pilot project, good cooperation and mutual understanding between the site operators and the locals were realized including the achievement of the acceptance. In order to maintain the progress, it is proposed to have continuous considerations such as environmental monitoring and regular meeting among the committee, site operators and SWMRMC. |
| Practical design of Taikabu LFS development in a sanitary landfilling manner | The concept design of Taikabu LF was made under the Pilot Project of EIA practice in Takabu. The design was worked out referring to the experience and achievement of Sisdol LF pilot project in order to realize a technical practicability and applicability to the Taikabu LF case. |

Source: JICA Study Team

12.5 Necessary Actions to be Performed by the Nepalese Side

Based on the above discussion, the following are proposed for necessary actions to be performed by the Nepalese side for A/P implementation from the environmental and social viewpoints. Table 12.5-1 depicts the key and suggested issues proposed specifically for each major facility under A/Ps.

General issues proposed for Nepalese side:

- Official IEE or EIA stipulated in Nepalese legislation should be complied with according to the characteristics and scale of projects/activities
- Based on the past experience on the SWM-related projects in the Kathmandu Valley, it can be pointed out that social concerns and objections were often raised as a major local conflict in the projects' planning and implementation stage, and the projects sometimes encountered tough implementation, which would bring about sanitary or environmental aggravation in the Valley after all. Therefore, it is no doubt essential to have a continuous stakeholder involvement and discussion at the various stages of the A/Ps' activities in order to have mutual understanding and acceptance to achieve good practice, using the capability and skills obtained in the course of the Study.
- Environmental pollution especially of water quality and odor should be reduced as much as possible through mitigation measures, which are to be examined in every project stage. Where applicable, due consideration should be given at the planning stage, such as the site selection process, in order to avoid or minimize environmental pollution. Environmental monitoring is also essential to be incorporated into the projects' design and implementation.
- Every effort is to be made in the planning and designing stage to avoid or minimize involuntary resettlement and land acquisition due the projects/activities implementation. Wherever inevitable, appropriate compensation and rehabilitation support should be provided in line with Nepalese legal requirements.
- Due considerations should be given to the waste pickers as mentioned in the previous section.

Issues proposed for the Nepalese side specifically for each major facility:

Table 12.5-1 Key or Suggested Issues for Major Facilities Development

| Facilities | Key or suggested issues |
|---------------------------------|---|
| Balaju T/S | <ul style="list-style-type: none"> - IEE will be prerequisite according to Nepalese legislation. - It is suggested that access road maintenance, speed limit and heavy equipment maintenance be provided to reduce the impact of air pollution and noise. - In order to reduce the impact of odor, it is proposed to examine i) the effective unloading/loading work of waste handling, and ii) platform cleaning and drainage management. Regular or ad hoc observation of the odor condition is also suggested in and around the site. |
| Waste processing facility (WPF) | <ul style="list-style-type: none"> - EIA will be prerequisite according to Nepalese legislation. - It is suggested that access road maintenance, speed limit and heavy equipment maintenance be provided to reduce the impact of air pollution and noise. - It is suggested to install a drainage system associated with small-scale treatment against water pollution. - In order to reduce the impact of odor, it is proposed to examine i) appropriate location in the site selection process, ii) the house-structural design of the working yard, iii) installation of buffer zone, and iv) yard cleaning and drainage management. Regular or ad hoc observation of the odor condition is also suggested in and around the site. - After the site is determined, the impact on the ecosystem is to be identified, and |

| Facilities | Key or suggested issues |
|-----------------------|---|
| | <p>mitigation measures are to be examined if necessary.</p> <ul style="list-style-type: none"> - It is proposed to avoid the cultural heritage or religious areas as much as possible in the site selection process. |
| Banchare Danda L/T-LF | <ul style="list-style-type: none"> - EIA will be a prerequisite according to Nepalese legislation. - It is suggested that access road maintenance, speed limit and heavy equipment maintenance be provided to reduce the impact of air pollution and noise. - A gas ventilation system is to be planned and equipped in the landfill area for proper release of landfill gas. Regular monitoring of gas is also suggested. - A leachate control system is essential in order not to flow the leachate to outside of the site. A retention and recirculation facility associated with aeration of the leachate, which is functioning at Sisdol S/T-LF, is applicable and recommended. - In order to reduce the percolation of the leachate to the groundwater, it is recommended to install a liner system on the bottom of the landfill area. Geo-membrane placing is preferable when applicable, but when inapplicable clay liner is to be employed at least in the same manner as at Sisdol S/T-LF. - A peripheral drainage system is to be designed and equipped for isolation of storm water runoff from the outside of the site. - Regular monitoring of river water, groundwater and leachate is essential. - In order to reduce the impact of odor, it is proposed to carry out soil cover regularly. Regular or ad hoc observation of the odor condition is also suggested in and around the site. - River diversion work is a prerequisite with considering the river morphology and topography, hydrological condition, geological condition, etc. River bank protection will also be essential to avoid damage on the site due to bank erosion and flood. - The role of the local committee as well as consultation among developer, operators, and local communities are important to achieve good understanding and mutual acceptance for the project. |
| Afadole temporary T/S | <ul style="list-style-type: none"> - IEE will be a prerequisite according to Nepalese legislation. - It is suggested that access road maintenance, speed limit and heavy equipment maintenance be provided to reduce the impacts of air pollution and noise. - In order to reduce the negative impact of odor, it is proposed to examine the effective unloading/loading work of waste handling. Regular or ad hoc observation of odor condition is also suggested in and around the site. |
| Taikabu LF | <ul style="list-style-type: none"> - EIA will be a prerequisite according to Nepalese legislation. - It is suggested that access road maintenance, speed limit and heavy equipment maintenance be provided to reduce the impacts of air pollution and noise. - A gas ventilation system is to be planned and equipped in the landfill area for proper release of landfill gas. Regular monitoring of gas is also suggested. - A leachate control system is essential in order not to flow the leachate to outside of the site. A retention and recirculation facility associated with aeration of the leachate, which is functioning at Sisdol S/T-LF, is applicable and recommended. - In order to reduce the percolation of the leachate to the groundwater, it is recommended to install a liner system on the bottom of the landfill area. Geo-membrane placing is preferable when applicable, but when inapplicable clay liner is to be employed at least in the same manner as Sisdol S/T-LF. - A peripheral drainage system is to be designed and equipped for isolation of storm water runoff from the outside of the site. - Regular monitoring of river water, groundwater and leachate is essential. - In the process of site boundary delineation and project design, installation of a buffer zone is to be examined where applicable. - In order to reduce the impact of odor, it is proposed to carry out soil cover regularly. Regular or ad hoc observation of the odor condition is also suggested in and around the site. |
| MTM Temporary LF | <ul style="list-style-type: none"> - It should be confirmed to comply with the legal IEE/EIA requirement according to the project scale and location. - In order to reduce pollution of the water bodies including groundwater as much as possible, it is proposed i) to have more enhancement of transportation of the collected wastes to Teku T/S under cooperation with KMC, and ii) to cooperate with BKM and central government for developing Taikabu LF as early as possible. |

| Facilities | Key or suggested issues |
|-----------------------------------|--|
| | <ul style="list-style-type: none"> - In order to reduce the impact of odor, the most applicable approach is to select the site where the distance from the residential areas can be secured, since the site is not yet determined. Regular or ad hoc observation of the odor condition is also suggested in and around the site. - It is proposed to avoid cultural heritage or religious areas as much as possible in the site selection process. |
| KRM community compost plant | <ul style="list-style-type: none"> - It should be confirmed to comply with the legal IEE/EIA requirement according to the project scale and location. - Concrete placing on the working area will be suggested for reduction of groundwater pollution. A drainage system associated with small-scale treatment against water pollution is also to be considered as required. - In order to reduce the impact of odor, the most applicable approach is to select the site where the distance from the residential areas can be secured, since the site is not yet determined. Regular or ad hoc observation of the odor condition is also suggested in and around the site. - It is proposed to avoid cultural heritage or religious areas as much as possible in the site selection process. |

Source: JICA Study Team

CHAPTER 13 EVALUATION OF CAPACITY DEVELOPMENT OF THE STUDY

Since the Study is a ‘Capacity Development Type Study’ of which an important aim is to assist the capacity development for solid waste management (SWM) of the five municipalities and the Solid Waste Management and Resource Mobilization Center (SWMRMC), the study process, i.e. development process of the Action Plans (A/Ps) as well as pilot projects activities, has been emphasized. In this connection, the activities during the whole study period have been evaluated in terms of the capacity development.

13.1 Overall Evaluation of Capacity Development of the Study

Before the Study, the mutual cooperation toward an appropriate solid waste management among the five municipalities and SWMRMC could not always function well because of a lack of common crisis consciousness, infrequent communication and lack of technical knowledge and skills in addition to the existence of a kind of territorial imperative. However, through the Study, it can be set a highly valued that all concerned, especially the Technical Working Group (TWG) and Task Force (T/F) members, could stand up and work together under the Umbrella Concept. Such activities were not always carried out in a friendly atmosphere and sometimes participants worked themselves into a frenzy of passionate argument. This can show that the organizational capacity was developed in that more serious and essential communication was made because the points were clarified from the technical, financial, social and environmental aspects, though there is still something held back in their respective positions.

As an acronym of “CKV” has become quite popular among the five municipalities, SWMRMC/MOLD and other organizations concerned as it has been contributing to create a sense of unity towards “Clean City (*Sapha Sahar*)”. Not only TWG members or T/F members, but also other related organizations like NGOs, CBOs or private sector organizations, including local consultants, especially those involved in the Study, have been recognizing more and more about the “CKV Study: Clean Kathmandu Valley Study”. This is also the result of development of the social capacity that understands what solid waste management is and what we should do for solid waste management. A mascot, Asakaji, has also contributed to create this sense, although he faced some controversy problems in the initial stage.

For the technical aspect, the most developed part is the theoretical and practical experience with sanitary landfill together with semi-aerobic landfill. It can be said that all engineering staff amongst the TWG members now surely understand the concept and mechanism of a semi-aerobic landfill system. As participating in the waste quantity and quality and time and motion surveys and in the solid waste database establishment was able to improve the basic knowledge of SWM, some of the municipalities have started their own such surveys spontaneously.

In terms of human resource development, A/P formulation and a training series under the Pilot Projects have provided development. Also, presentation opportunities at a series of Public Hearings, Seminars and workshops have contributed to develop presentation and communication skills as well as to improve the understanding on technical aspects of SWM

for the members of TWG and T/F. Both domestic and overseas training including JICA Country Focus Training in Japan were quite effective for Nepalese counterparts to get to have new or different experiences through the training sessions and to keep the motivation for solid waste management. Furthermore, through those training tours, a sense of solidarity has arisen among the participants like members who share the same food bowl together.

By and large, capacity development for SWM of the relevant staff of the five municipalities and SWMRMC/MOLD has emerged through all of the activities under the Study, and is recognized as still progressing.

13.2 Evaluation of Individual Municipalities

13.2.1 Kathmandu Metropolitan City

As the largest municipality among the five, and with the most experience in SWM fields, KMC took the lead in many of the activities under the Study for other municipalities to follow. Similarly, individual capacities of its senior staff were the highest especially in terms of technical capacities, and many served as resource persons to other municipalities. With that in mind, it has been observed that the second-tier staff in the Environment Department of KMC, have not really developed their capacities to the extent that they could substitute for the senior staff in case of emergencies. For future capacity development programs, KMC should prioritize on providing second-tier staff with opportunities for training, which in turn will facilitate some delegation of responsibilities.

The technical capacity of KMC can be considered to be developed regarding the SWM-related facilities from the viewpoints of planning, design, and operation of a semi-aerobic landfill. Commencement of relatively long distance transportation to Sisdol S/T-LF as well as operation of the site and Teku T/S is providing the opportunities for KMC staff to examine their knowledge, which was only theoretical when learned through the workshops and the JICA Country Focused Training. Skills for teaching other staff regarding what has been learned/experienced have also been developed. The most remarkable point is that KMC has been changing its position from the leading municipality against SWMRMC to a municipality that positively struggles against the SWM problems in cooperation with SWMRMC and that other municipalities are recognizing giving its well experienced capacity. The quantitative data from weighbridges as the database is developed could dramatically change the existing solid waste data management system including the vehicle control.

The Community Mobilization Unit (CMU) of KMC has played a leading role in implementation of the areas of local level waste minimization activities as well as mass communication and education and community mobilization. Since it has sufficient experience through the Kathmandu Valley Mapping Project (KVMP) and USAID program, it was significantly useful for other municipalities to learn a variety of innovative activities and views from CMU. It is expected that CMU could take a lead in promoting a network for community mobilization even after the completion of the Study.

13.2.2 Lalitpur Sub-Metropolitan City

LSMC was considered to be the municipality with the greatest challenges in regards to coordinating their SWM related sections. From the beginning, LSMC T/F appeared to have struggled to get mobilized for activities implemented under the Study as well as in Pilot Projects. It was only after the Study started that it was discovered that the Community Development Section (CDS) had had substantial experience in conducting SWM related training.

To date, many changes have taken place. A genuine rapport appears to have developed among the three main key sections, Environment Section, Public Works Division and CDS, and more activities are being jointly implemented by the Environment Section and CDS. The T/F itself, after the definition of its Terms of Reference (TOR), has been the most systematically functioning among all five municipalities. The T/F was usually convened about once in every two weeks, and the member secretary maintains records of discussion for every meetings. The CEO also seems to be present in most of the sessions and actual decisions are taken related to the matter of SWM at the T/F and it has been acknowledged as such.

In LSMC, human resources in the Environment Section were developed well through the Study. However, at the municipality level as an organization, it might be said that the sense of municipality concern with SWM still needs to be developed because LSMC tends to depend on KMC for decision making related to the activities under the Umbrella Concept. In the case of facility operation, although technical knowledge and clear understanding of planning of SWM facilities and semi-aerobic sanitary landfill has been evaluated to be sufficient, it is suggested that LSMC should take a greater share of the Sisdol S/T-LF operation in close coordination with KMC.

It was observed that CDS has, during the Study, improved the level of knowledge and skills to organize the waste minimization by community mobilization as well as mass communication and education activities for SWM. Although it had limited activities related to SWM at the beginning of the Study, it has been able to carry out a number of SWM activities such as trainings, rallies, interactive meetings among women's groups, and sharing meetings among compost bin users, in addition to the Pilot Projects. The network with various NGOs, CBOs and schools has been gradually strengthened. The relatively high level of motivation among staff is attributed to the support provided by the Municipality.

13.2.3 Bhaktapur Municipality

Bhaktapur Municipality (BKM) was one of the municipalities where very high expectations existed with motivated staff, adequate financial and human resources, and strong leadership under a CEO with very high interest in SWM and the Study. However during the Pilot Projects implementation, it was observed that sometimes progress with activities was delayed due to various bottlenecks within the municipality and influences from outside the municipality. Although strong leadership like the current CEO is essential to the success of SWM Programs, the T/F must also be strengthened so that under any leadership, the municipality is systematically capable of carrying out its SWM services effectively.

The municipality had developed an organizational structure and staffing framework, which included recommendations on the restructuring of the solid waste management related

sections and sub-sections. This can be thought of a sign of capacity development. This restructuring exercise is expected to take precedence over all activities in FY2005/06 (2062¹) so that capacity development activities are able to target the appropriate staff and sections in a more effective manner.

In terms of collection and transportation, although the importance of source-separated collection for more efficient operation of the existing composting facility was recognized, it took time for BKM to introduce and implement this system with a very intimate but disclosed relationship with the public. This experience can be utilized when BKM extends the source-separated collection areas or introduces a new collection system in the municipality. In addition, BKM has been evaluated as having a clear understanding of a semi-aerobic landfill system. This is clear from that fact that it has a keen desire to apply this system to Taikabu LFS. BKM has recently encountered the situation of receiving opposition from local communities against Taikabu LFS development. However, this event was turned around to be a rather good opportunity for BKM to help the concentration and intensification toward acceptable planning of a LFS.

Although it took time to build a good relationship and share a common understanding of SWM among BKM, NGO and the target communities that did neither participate in community-based activities nor get used to working with external organizations, they have been able to facilitate acceptance by the people of the community and coordinate with other stakeholders.

13.2.4 Madhyapur Thimi Municipality

Madhyapur Thimi Municipality (MTM), at the beginning of the Study, appeared to have had very limited capacity with only two active members from the municipal staff in regards to SWM. Their strategy was dependent on composting chambers, and it was already evident from existing practice that it had low sustainability. Organizationally, SWM was a secondary function managed by the Community Development and Sanitation Section (CDSS), and aside from mobilization of CBOs for SWM, not much activity took place. However, the core group responsible for SWM has steadily grown, and participation from non-Task Force members has shown very positive results.

MTM is another municipality in which capacities appear to have increased substantially. First, under the Study, MTM initiated its first waste collection and transportation system. MTM, which had not had any waste transportation before, is now gaining some capacity for those SWM activities through harder work on their preparation. Second, since May 2005, MTM has embarked on Public Private Partnership (PPP) arrangements with four organizations, on a pilot basis. Third, MTM has still included community composting chambers within the A/P, however before the activities begin, the T/F is scheduled to conduct a study to analyze what the conditions for operation would be. What is meaningful here is that MTM, despite its limited resources, has diversified its approach to SWM, and this broader spectrum allows for the municipality to gain exposure and options to select an approach which is most effective and sustainable. As reflection of its higher prioritization of SWM, MTM also now has a SWM Sub-Section with a staff who was previously deputed to the ward office.

¹ Nepalese Year

In terms of technical aspects, MTM staff actively participated in the workshops on environmental and social considerations and discussed the benefits associated with the Taikabu LFS and MTM has finally decided to go to Taikabu to dispose of its waste together with BKM. However, MTM has not yet been involved sufficiently in the actual development activities of Taikabu LFS. Although the human resources of MTM are still unable to be shared for the development, it is necessary for MTM to participate in the Taikabu project by degrees through coordination with BKM as well as SWMRMC.

13.2.5 Kirtipur Municipality

Kirtipur Municipality (KRM) had been very strategic in the fact that it had adopted PPP arrangements with UNIQUE and NEPCO for its municipal SWM. In other words, KRM itself did not have to be burdened with any SWM matters as long as the partnership with the private sector organizations (PSOs) went smoothly.

With the start of operation at Sisdol S/T-LF and subsequent expected closure of Bagmati River dumping site, KRM needed to develop a new waste collection and transportation plan. Since the municipality has had little operational experience in SWM, there is hesitancy on its part to try to address this problem within its own resources, in spite of the fact that i) KRM had understood the benefits associated with semi-aerobic sanitary landfill, and ii) a decision to send the waste to Teku T/S for disposal had already been made under the coordination with KMC. However, it was a great outcome that KRM had officially set up a new SWM Unit under the Planning and Technical Section during the study period and effective activities of SWM by KRM themselves are expected through the new SWM Unit.

In terms of waste minimization, KRM has improved their capacity through participation in related workshops and study tour to composting facility in India, OJTs under the Pilot Project practice. As evidence, plastic separation collection activity is being done very well. KRM also has shown high interest in training and mass communication and education activities. Considering the time when KRM had no specific community-based SWM, it was a sign of progress that it organized the two-day exhibition, formed women's groups and mobilized youth groups for plastic separation. However, it was sometimes observed that it took time to make a decision, even for small-scale activities, and as a result, the implementation of these activities was behind the schedule. It is expected that KRM put the planned activities in AWP into the practice without such delay.

13.2.6 SWMRMC

The technical capacity of SWMRMC can be considered to be developed regarding the SWM-related facilities from the viewpoints of:

- Planning of SWM facilities especially on semi-aerobic sanitary landfill
- Addressing community concerns
- Coordination with other municipalities for planning and developing facilities

In the course of Sisdol S/T-LF development, SWMRMC has put much effort into sorting out the various interests and concerns of stakeholders, and finally it has successfully coordinated the Sisdol development and operation commencement, accompanied with understanding and cooperation from Okharpauwa Sanitary Landfill Site Main Coordination Committee

(OSLSMCC) as well as beneficiary municipalities. The experiences of this mutual agreement between not only municipalities and SWMRMC but also this OSLSMCC can be a very precious case for any local government in the world that is facing same troubles to manage a landfill site. SWMRMC has now become, an example, displaying its technical ability and experience in assisting BKM for development of Taikabu LFS. It should also be noted that besides the Study, SWMRMC developed EIA Guidelines for Solid Waste Management Projects and distributed it to 58 municipalities in the whole of Nepal by mobilizing university students.

Based on these understandings, SWMRMC has been evaluated to have an enough potential to play the role of a national center for providing technical skills and support in LFS development field. However, participation of SWMRMC in operation of the facilities has been found to be less significant, especially in the Sisdol landfill. Since SWMRMC has much technical knowledge and experience on LFS development, it is preferable that its leadership continues to be developed even after the facilities' development.

Other than landfill facilities, SWMRMC has also improved its capacity on waste minimization through participation in related workshops, study tour and OJTs in the Pilot Project practices. SWMRMC has actively participated in several training sessions and a series of sharing meetings as an advisor, although SWMRMC is not an implementing agency for public awareness and community mobilization. The basis for crossing border to conduct various activities including solid waste data management other than facility planning and development has been established.

CHAPTER 14 RECOMMENDATIONS

14.1 Recommendations on Implementation of Action Plans

For effective and steady implementation of the Action Plans (A/Ps), the following are recommended from the technical and operational and managerial aspects.

14.1.1 Recommendations on Technical Aspects

(1) Improvement of Collection and Transportation

- A ward-wised or route-wised detail improvement plan for effective solid waste collection should be developed by utilizing GIS maps and time and motion surveys.
- Especially in BKM, MTM and KRM where collection rates are relatively lower, clear maps should be prepared for extension of solid waste collection service areas in order to minimize unserved and insufficiently serviced areas.
- Appropriate operational time frame should be considered for unloading and loading practices at Teku T/S and transportation of waste to the Sisdol S/T-LFS by using arrival secondary transportation vehicles.
- For development of effective waste transportation, collection points and transfer station(s) should be located strategically. For this, an urban plan or urban traffic plan should be developed taking into consideration of the solid waste collection system.
- Collection zones should be defined clearly for private sectors collection in order to avoid any confusion among private sector operators and people.

(2) Promotion of Waste Minimization

- An authorized active working group (WG) should be organized to proceed with development of a WPF including private sector participation.
- Quality standards for compost products should be developed to secure the quality.
- Cooperation and information exchanges with farmers, District Agriculture Development Offices (DADOs) and relevant agricultural officers of VDCs should be continued to help increase of the demand for compost products.
- A social market should be promoted so that more recycled products are able to be sold at shops.
- Motivators should be appointed for effective monitoring and follow-up of home composting and recycling activities.
- The existing activities of recyclable waste pickers should be carefully secured when the A/Ps are going to be implemented.

(3) Improvement of Final Disposal System

- A regular coordination meeting among the concerned organizations should be held to discuss various issues of operation and management of the Sisdol S/T-LFS including sharing of responsibilities and costs and environmental protection.
- Through maintaining of a record of the operation of Sisdol S/T-LFS, further landfill technical skills should be examined and the knowledge gained from running the site and effects of semi-aerobic landfill should be spread widely.

- National technical standards for sanitary landfill to cover design requirements, appropriate local materials and resources for construction and facilities, landfill levels, acceptable leachate treatment standards, EIA study including environmental monitoring protocol, etc. should be prepared.
- SWMRMC EIA Guidelines should be carefully taken into consideration when facilities are planned and implemented.
- Illegal dumping practices should be minimized as soon as possible. For the temporary inevitable waste dumping, at least soil covering should be conducted in order to reduce environmental impact.

(4) Promotion of Public Participation and Behavior Change

- For Behavior Change Communication (BCC) approach, a mix use of mass communication, interpersonal communication and community mobilization should be applied in order to deliver and reinforce messages, information and skills regarding SWM.
- Public or environmental education for SWM should be regularly provided to a diversity of people as per the stages of behavior change. For this, it is recommended that “CKV week” be established on and around the environmental day, June 5, the memorial day of the first waste transportation to Sisdol S/T-LF so that each municipality can organize various public involvement activities.
- Community Mobilization Network (CoMoN) should be organized in order to provide interactive learning and sharing opportunities on the regular basis.
- It is recommended that various ways of partnership with qualified NGOs and CBOs be explored in the areas of public education and community mobilization in each municipality.

(5) Environmental and Social Considerations

- Official IEEs or EIAs stipulated in Nepalese legislation should be conducted with according to the characteristics and scale of projects or activities.
- There should be continuous stakeholder involvement in the various stages of the A/Ps’ implementation should be made in order to have mutual understandings and acceptance for achieving good practices.
- Environmental pollution especially of water quality and odor should be reduced as much as possible through mitigation measures, which are to be examined in every project stage. Environmental monitoring is also essential.
- Every effort is to be made to avoid or minimize involuntary resettlement and land acquisition in the planning and design stage wherever possible. If inevitable, appropriate compensation should be provided in line with Nepalese legal requirements.
- In order i) to prevent the increment of risk of health hazard in SWM-related activities, and ii) to reduce the risk of infectious health hazard on the waste pickers, systems to manage hazardous and medical wastes are to be established as soon as possible.

14.1.2 Recommendations on Operational and Managerial Aspects

(1) Organizational and Institutional Arrangement

Figure 14.1-1 shows common recommendations for enhancing organizational and institutional development among the five municipalities.

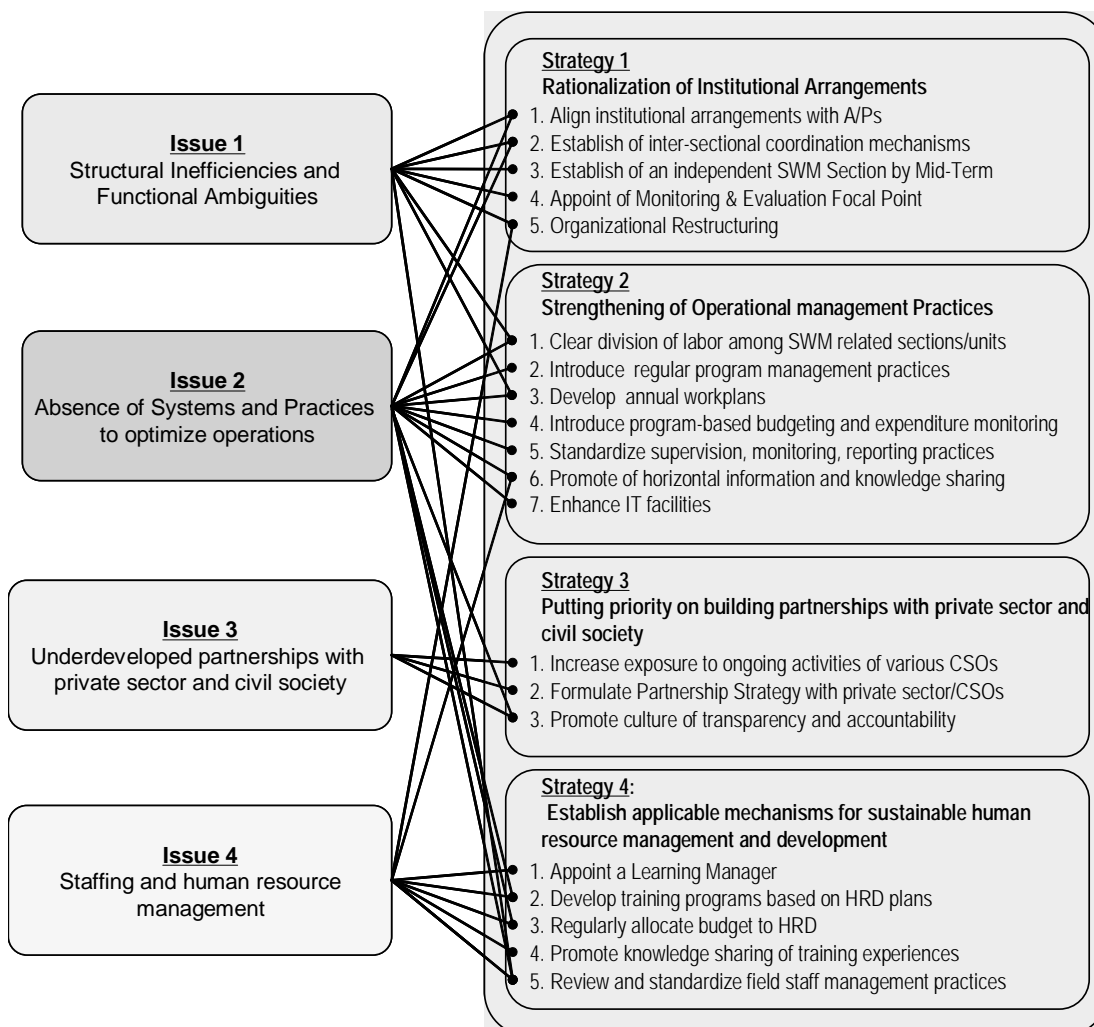


Figure 14.1-1 Organizational and Institutional Issues and Recommended Strategies

1) Rationalization of Institutional and Organizational Arrangement

- Institutional and organizational arrangement should be designed in a way that is in alignment with the various strategies and activities of the Action Plans.
- All municipalities, by the Mid-Term (FY2008/09 (2065/66¹)-FY2010/11 (2068/69)), should establish separately an independent SWM/Sanitation Section with appropriate staffing.
- Revised organizational structures that were supported by the Study should be processed for approval immediately by the Municipal Council.

¹ Nepalese Year

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- A monitoring and evaluation focal point should be appointed so that regular data collection and analysis could be conducted systematically and utilized for effective operational management.
- 2) Strengthening of Operation and Management Practices
- Operational management practice of planning, implementation, and monitoring and evaluation should be systematized to effectively carry out the planned activities of the A/Ps.
 - From the respective A/Ps, activities should be broken down into Annual Work Plans (AWPs) every year with enough budget and responsible staff assigned.
 - Program-based budgeting and expenditure monitoring should be introduced for more effective financial management and efficient use of resources.
 - Strengthening of information management systems (both paper-based and electronic based), should be activated so that relevant data is upstreamed to the managing officers for informed decision-making and planning.
 - Vertical and horizontal information and knowledge sharing through regular staff meetings and formal/informal seminars would be a key to garner a culture of transparency as well as to raise staff morale.
- 3) Promotion of Building Partnerships with Private Sectors and Communities
- Municipalities with less experience should increase their exposure to ongoing activities of various civil society actors (both private sector, NGOs and CBOs) to enhance understanding of the potential and limitations of approaches adopted by those actors.
 - A partnership strategy should be formulated with the Private Sector/Communities in the context of each municipality by examining areas where these actors have a comparative advantage vis-à-vis direct implementation by the municipality.
 - Municipalities should promote a culture of transparency and accountability that would encourage participation of private sector/communities in various stages of SWM program planning, implementation and evaluation.
- 4) Establishment of Applicable Mechanisms for Sustainable Human Resource Management and Development
- A learning manager, who develops and maintains an inventory of existing skills and knowledge, training history and job responsibilities of all staff within the section, should be appointed.
 - A sustainable amount of annual budget should be allocated to staff development programs for those who do not have access to external training opportunities.
 - Knowledge sharing of training experiences should be made mandatory to institutionalize the impact of training for the organization. For this, various training programs and materials on SWM should be compiled by each municipality.
 - Each municipality should make further efforts to ensure an enabling environment for trained staff through organizational strengthening and institutional development.

(2) Establishment of Sustainable SWM-related Data Management System

- By using weighbridges, the quantity of solid waste including transported waste to Teku T/S and Sisdol S/T-LF should be measured and recorded to manage both facilities effectively and to monitor the target of the A/Ps.
- Solid waste quantity and quality survey should be conducted periodically, twice a year in dry and wet seasons, every year in small scale and every three years in large-scale area.
- The database on solid waste management should be maintained appropriately as it will be utilized and the compiled data should be opened to the public.

14.1.3 Recommendations on Stakeholder Network

TWG meetings should be held regularly under the coordination of SWMRMC so that the five municipalities are able to cooperate for realizing the Umbrella Concept including sharing of responsibilities and costs for an Overall Facility Plan (OFP) and Overall Equipment Plan (OEP).

The good initiatives and best practices for SWM activities should be collected, compiled and published by SWMRMC together with the five municipalities so that the five municipalities are able to refer these practices each others.

As there is a need for strengthening the network with and among other stakeholders, including NGOs/CBOs, local consultants, colleges/universities, schools, local clubs and groups, line agencies and the mass media, regular sharing meetings among them should be organized for better and sustainable SWM.

Synergetic effects from the partnership with donors and international organizations including international NGOs working in the fields relating not only to solid waste management but also to organizational and institutional development of local bodies should be fully utilized.

14.2 Recommendations to Specific Solid Wastes

14.2.1 Recommendations to Industrial Waste Management

The amount of discharge of industrial waste seems to be minimal and issues of hazardous waste hardly exist. For the improvement of industrial waste management in the Kathmandu Valley, the following measures are recommended:

(1) Development of Practical Guideline for Industrial Waste Management

Comprehensive guideline for management of industrial waste including treatment and disposal should be developed by Ministry of Industry, Commerce and Supplies (MOICS) based on the Industrial Enterprise Act (1992). All the industries should manage industrial waste generated in their own premises properly based on polluter-pay-principle. The guideline may include following contents:

- Definition of industrial waste
- Methods for handling of industrial waste (treatment and disposal)
- Roles of institutions concerned and industries

- Record keeping of industrial waste

(2) Establishment of an Official Definition of Hazardous and Non-hazardous Industrial Wastes

Since Ministry of Environment, Science and Technology (MOEST) has overall responsibility for environmental protection and is mandated for the regulation and control of pollution including hazardous waste, it is recommended that MOEST should establish clear definition of hazardous and non hazardous industrial wastes legally. Responsibility for hazardous industrial waste management and that for non hazardous industrial waste management should be clarified and demarcated based on the definition.

(3) Promotion of Proper Handling of Industrial Waste

Each industry has a responsibility for separating generated waste and handling hazardous industrial waste. Types of hazardous industrial waste and the detailed methods for treatment and disposal should be described in the above guideline. General waste and detoxified hazardous industrial waste are collected and properly handled by the municipality.

(4) Promotion of Cleaner Production to Factories

Cleaner production is continuous application of an industrial preventive environmental strategy to processes, products and services to increase efficiency and to reduce risk to human and to environment, as defined by UNEP. Industries should implement activities of cleaner production, namely apply combination of environmental friendly techniques not only to prevent or minimize waste but also enhance productivity and profitability.

(5) Implementation of Awareness and Training Programs to Factories

Awareness and training program for administrative and technical staff should be implemented in order to let each industry manage industrial waste properly. The following programs should be implemented:

- Programs for different classes; managers, officers in charge of solid waste management, plant workers, sweepers by MOICS
- Implementation of training for recording of industrial waste by organization such as Institute of Environmental Management (IEM), a component of Environment Sector Programme Support (ESPS) of Danish International Development Agency (DANIDA).

14.2.2 Recommendations to Medical Waste Management

Although several guidelines have been issued for proper management and handling of medical waste, limited numbers of health care institutions are mixed with municipal solid waste. The infectious waste or dangerous/sharp waste are mixed with municipal solid waste. In particular, as the infectious medical waste is not allowed to be disposed of in the Sisdol S/T-LFS, the treatment of it is an urgent issue to be solved. For improvement of these conditions, it is recommended that the following measures should be taken urgently.

(1) Promotion of Obedience to National Health Care Waste Management Guidelines

Existing guidelines for medical waste management, such as the National Health Care Waste Management Guidelines (NHCWGM) prepared by National Health Research Council, should be applicable by all health care institutions (HCIs) for proper management of medical

waste. In particular, infectious waste and sharp objects should be handled properly according to the guidelines with proper equipment for different treatments according to types of medical waste.

(2) Establishment of a Centralized System for Treatment of Infectious Waste

A centralized system for incineration of infectious medical waste should be established especially for small-scale and financially poor institutions which can not procure or operate an incinerator or autoclave individually.

As for an incinerator which has been set up at Teku T/S for treatment of medical waste generated from small scale HCIs, it is necessary to upgrade the plant or move the location of the plant far from the residential area.

(3) Implementation of Awareness and Training Program in Hospitals and Clinics

Awareness and training program for proper management of medical waste should be implemented for both administrative and technical staff of HCIs. Because managing medical waste in accordance with “NHCWGMG” is a key point of solution for issues of medical waste. Handling infectious medical waste or sharp objects involve great risk for health and safety, all the staff should be trained how to avoid potential risks.

(4) Promotion of Source Segregation of Infectious Waste

Infectious medical waste and sharp objects such as used needles, blades and broken glass, are segregated to be incinerated or handled with care. For example, the medical waste should be segregated into that is suitable for incineration or that is not suitable. Sharp objects should be disinfected and stored in a puncture-proof red, and needles should be destroyed using a needle destroyer.

(5) Establishment of Relevant Act and Regulations

In addition to the above mentioned recommendations, act and regulations regarding medical waste management should be established with close coordination among MOHP, MOEST, SWMRMC and the municipalities.

14.2.3 Other Wastes

It is identified that agricultural waste is composted at paths between fields or vacant lands, and straws are burnt. However, there have been used vinyl sheets of plastic greenhouses disposed in some places. These disposed vinyl sheets should be collected and properly treated by the municipality.

Meanwhile, it is also identified that a plenty of construction wastes are disposed to vacant lands. Although most of the construction waste is bricks, which are not harmful, those waste also need to be handled (recycled or disposed properly) proper manners with a responsibility of constructors.

14.3 Monitoring and Follow-up Activities Planned in Phase 4

It is proposed that monitoring of the activities planned in the respective Annual Work Plans of FY2005/2006 (2062/63) of the five municipalities and SWMRMC and evaluate of its' progress be implemented in Phase 4 of the Study. It is also recommended that the follow-up of the activities, including environmental and social considerations, be implemented for its effective and steady implementation.

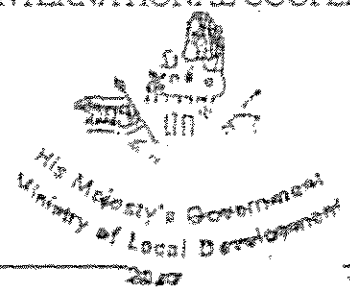
APPENDICES

- APPENDIX 1.1 Scope of Work for the Study
- APPENDIX 1.2 Member of the Study and Committees
- APPENDIX 2 Record of Public Hearings
- APPENDIX 3.1 List of Related Law and Regulation
- APPENDIX 3.2 Actual Fiscal Balance of Last 4 Years and Current Years' Budget (Five Municipalities)
- APPENDIX 5 Ward Maps of Five Municipalities
- APPENDIX 7 Training Needs Analysis (TNA)
- APPENDIX 8 Project Design Matrixes (PDMs) of the Pilot Projects
- APPENDIX 9 Ward Wise Population / Population Projection of Each Municipality
- APPENDIX 11.1 Solid Waste Stream Flow of Five Municipalities (Current and Future)
- APPENDIX 11.2 Projected Solid Waste Generation and Target Waste Management Quantity
- APPENDIX 11.3 Annual Work Plan of Fiscal Year of 2005/06 (2062/63) Proposed by Task Force (Five Municipalities and SWMRMC)
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APPENDIX 1.1

Scope of Work for the Study

SCOPE OF WORK
FOR
THE STUDY
ON
THE SOLID WASTE MANAGEMENT
FOR
THE KATHMANDU VALLEY
AGREED UPON BETWEEN
MINISTRY OF LOCAL DEVELOPMENT
AND
JAPAN INTERNATIONAL COOPERATION AGENCY



Kathmandu, September 12th, 2003

Surya Prasad Silwal
Under Secretary, Ministry of Local Development
Government of the Kingdom of Nepal

Isamu Yokota
Leader of the Preparatory Study Team
Japan International Cooperation Agency

Badri Nath Ghimire
Chief Executive Officer,
Bhaktapur Municipality

Ram Prasad Sharma
Chief Executive Officer,
Kathmandu Metropolitan City

Rishi Raj Acharya
Chief Executive Officer,
Kirtipur Municipality

Komal Prasad Kafle
Chief Executive Officer,
Lalitpur Sub-Metropolitan City

Keshab Silwal
Chief Executive Officer,
Thimi Municipality

AGF.

I. INTRODUCTION

In response to the official request of the Government of the Kingdom of Nepal (hereinafter referred to as "the Government of Nepal"), Government of Japan has decided to conduct a Master Plan Study on the Solid Waste Management for Kathmandu Valley (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of Nepal.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are as follows.

- (1) To formulate Action Plans on solid waste management (hereinafter referred to as "SWM") for each of the five major cities in the Kathmandu Valley, namely Kathmandu Metropolitan City, Lalitpur Sub-Metropolitan City, Bhaktapur Municipality, Thimi Municipality and Kirtipur Municipality.
- (2) To pursue technology transfer regarding SWM study and planning methods for the counterpart personnel

III. STUDY AREA

The study will cover the jurisdiction of the above five major cities in the Kathmandu Valley. However, proposed landfill site "Okharpauwa" and another alternative site(s) for landfill or an intermediate treatment facility will be covered as well.

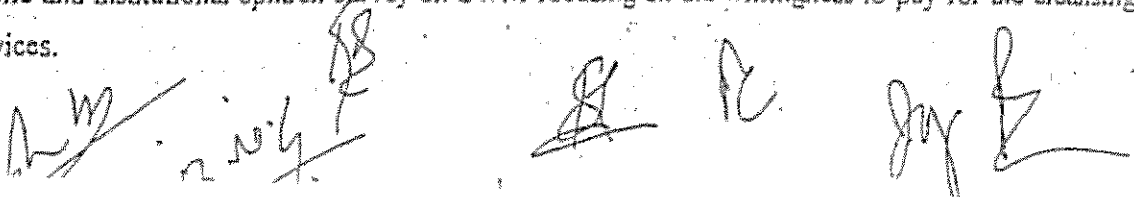
IV. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Scope of Work for the Study shall cover the following items:

1. Formulation of the Action Plan

Formulation of the Action Plan stage will include the following items:

- 1-1 Study of present conditions
 - i) Data collection and analysis of natural and socioeconomic conditions of the study area, and of relevant projects such as those included in regional development plans, etc.
 - ii) Collection and review of data and relevant reports on the SWM refer to solid waste discharge, storage, collection, intermediate treatment, reusing-recycling, final disposal, institution systems and privatization scheme.
 - iii) Study on volume of solid waste, composition and time-and-motion for collection improvement.
 - iv) Public and institutional opinion survey on SWM focusing on the willingness to pay for the cleansing services.



v) Examination of suitable site(s) for SWM facilities focusing on future final landfill site(s).

1-2 Establishment of a Planning Framework

- i) Determination of goals and target for the Action Plan.
- ii) Examination of the preconditions for the Action Plan such as those regarding the planning period, service area, population, future solid waste volume and composition, socioeconomic factors, service levels, etc.
- iii) Selection of suitable site(s) for SWM facilities.
- iv) Comparative analysis of alternative future technical system components
- v) Selection and determination of the best alternative based on comparative study on the combination of technical system components.

1-3 Formulation of the Action Plan

i) The Action Plan will include the following planning.

- i) Waste minimization methods
- ii) Solid waste discharge and storage system
- iii) Collection and transportation system
- iv) Reusing and recycling system
- v) Intermediate treatment system
- vi) Final disposal system
- vii) Administration and organization system
- viii) Legislation and enforcement system
- ix) Financial system
- x) Privatization scheme including involvement of NGOs, CBOs, and the private companies (CBOs means "Community Based Organizations")
- xi) Monitoring and evaluation system
- xii) Information management
- xiii) Human resource development
- xiv) Public education for SWM

2. Implementation of the Pilot Project

Implementation of Pilot Project stage includes the following items:

- 2-1 Identification of the top priority project(s)
- 2-2 Implementation of the Pilot Project(s)
- 2-3 Evaluation of Pilot Project(s)
- 2-4 Revision of the Action Plan

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Monitoring and Follow-Up of the Action Plan

Following the formulation of the Action Plan, working in closer cooperation with the Government of Nepal, JICA will assist and expedite the preparation to implement the proposed project(s) and program(s) in following manners.

1. To monitor the implementation progress of the program(s) and project(s) proposed in the Action Plan
2. To conduct a follow-up/secondary survey on issues which originate from the Action Plan

V. SCHEDULE OF THE STUDY

The Study will be carried out in accordance with the tentative schedule as attached in the Appendix. The schedule is tentative and subject to modification if such necessity should arise during the course of the Study and mutually agreed by both parties.

VI. REPORTS

JICA shall prepare and submit the following reports in English to the Government of Nepal.

1. Inception Report:

Twenty(20) copies at the commencement of the first work period in Nepal. This report will contain the schedule and methodology of the Study as well as the outline of the field survey.

2. Progress Report :

Twenty(20) copies about three (3) months after the commencement of the first work period in Nepal.

3. Interim Report:

Twenty(20) copies about eight (8) months after the commencement of the first work period in Nepal. This report will summarize the findings of the first stage of the Study and include the draft of the action plan and the guideline.

4. Draft Final Report:

Twenty(20) copies at the end of the last work period in Nepal. The Government of Nepal shall submit its comments within one (1) month after the receipt of the Draft Final Report.

5. Final Report:

Fourty (40) copies within one (1) month after the receipt of the comments on the Draft Final Report.

Keshab

B. N. G.

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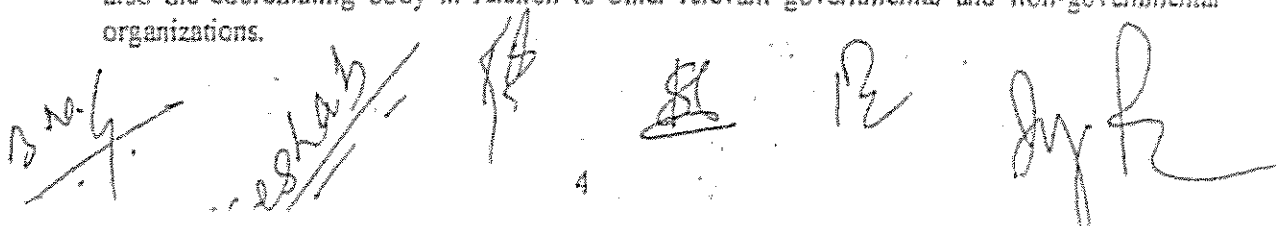
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VI. UNDERTAKINGS OF THE GOVERNMENT OF NEPAL

To facilitate the smooth conduct of the Study, The Government of Nepal shall take the following necessary measures:

- (1) To inform the members of the Team of any existing risk in the study area and take any measures deemed necessary to secure the safety of the Team,
- (2) To ensure the necessary entry permits for the Team to conduct field surveys in Nepal and exempt them from consular fees,
- (3) To exempt the members of the Team from taxes and duties, and any other charges on equipment, machinery and other materials brought into and out of Nepal for the conduct of the Study,
- (4) To exempt the members of the Team from Nepal income tax on their official emoluments in respect of their period of assignment in Nepal in connection with the conduct of the Study, but the Government of Nepal shall retain the right to take such emolument into account for the purpose of assessing the amount to be applied to income from other sources,
- (5) To provide necessary facilities to the Team for remittance as well as utilization of the funds introduced into Nepal from Japan in connection with the implementation of the Study
- (6) To secure permission for the Team to enter into private properties or restricted areas for the implementation of the Study
- (7) To provide the Team with medical services when needed but the expenses will be chargeable to the members of the Team,
- (8) To provide the Team with available data, maps and information necessary for the execution of the Study,
- (9) To make arrangements for the Team to take back to Japan the data, maps and materials connected with the Study, subject to the approved of the Government of Nepal, in order to prepare the reports,
- (10) To appoint counterpart personnel from each cities concerned to the Team during the study period,
- (11) To provide the Team with suitable office space with clerical service and necessary office equipment in each city,
- (12) To provide the Team with adequate means of local transports for official travels,
- (13) To indemnify any member of the Team in respect of damages arising from any legal action against him/her in relation to any act performed or omissions made in undertaking the Study except when the two Governments agree that such a member is guilty of gross negligence or willful misconduct and ,
- (14) To nominate Ministry of Local Development (Solid Waste Management & Resource Mobilization Centre), and 5 cities concerned to act as the counterpart agency for the Study and also the coordinating body in relation to other relevant governmental and non-governmental organizations.



VII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures:

1. To dispatch, at its own expense, study teams to Nepal, and
2. To pursue technology transfer to counterpart personnel in the course of the Study

IX. CONSULTATION

JICA and Ministry of Local Development (Solid Waste Management & Resource Mobilization Centre), and 5 cities concerned shall consult with each other in respect of any matter that may arise from or in connection with the Study.

Keslam

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B. A. G.

[Signature]

END

日程(案) TENTATIVE SCHEDULE

| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
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REPORTS; IC/R: Inception Report, P/R: Progress Report, ITR: Interim Report, DF/R: Draft Final Report, F/R: Final Report

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Monitoring and Follow-up

F/R

DF/R

IT/R

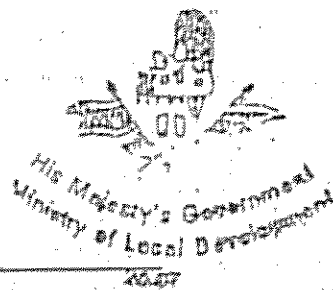
P/R

IC/R

MINUTES OF MEETING
ON
SCOPE OF WORK
FOR
THE STUDY
ON
THE SOLID WASTE MANAGEMENT
FOR
THE KATHMANDU VALLEY

AGREED UPON BETWEEN
MINISTRY OF LOCAL DEVELOPMENT
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Kathmandu, September 12th, 2003



Surya Prasad Silwal

Surya Prasad Silwal
Under Secretary, Ministry of Local Development
Government of the Kingdom of Nepal

B. N. Ghimire

Badri Nath Ghimire
Chief Executive Officer,
Bhaktapur Municipality

Rishi Raj Acharya

Rishi Raj Acharya
Chief Executive Officer,
Kirtipur Municipality

Keshab Silwal

Keshab Silwal
Chief Executive Officer,
Thimi Municipality

Isamu Yokota

Isamu Yokota
Leader of the Preparatory Study Team
Japan International Cooperation Agency

Ram Prasad Sharma

Ram Prasad Sharma
Chief Executive Officer,
Kathmandu Metropolitan City

Komal Prasad Kafle

Komal Prasad Kafle
Chief Executive Officer,
Lalitpur Sub-Metropolitan City

ACT

In response to the request of the Government of the Kingdom of Nepal (hereinafter referred to as "the Government of Nepal"), preparatory Study Team (hereinafter referred to as "the Team") was sent by Japan International Cooperation Agency (hereinafter referred to as "JICA") to discuss the Scope of Work for The Study on the Solid Waste Management for the Kathmandu Valley (hereinafter referred to as "the Study") with Ministry of Local Development (hereinafter referred to as MOLD) and the concerned officials of Government of Nepal.

During the stay in Nepal, the Team visited several sites related to Solid Waste Management and related organizations, and had a series of discussions with MOLD and the 5 cities concerned (Kathmandu Metropolitan City, Lalitpur Sub-Metropolitan City, Bhaktapur Municipality, Thimi Municipality and Kirtipur Municipality) about the Study. The main issues on the discussions regarding the Scope of Work are as follows:

1. TITLE

Both sides agreed that the title of the Study would be "The Solid Waste Management for the Kathmandu Valley" as described in the Scope of Work.

2. TARGET YEAR

Both sides have reached an agreement to set 2015 as a target year of the Action Plan.

3. STUDY AREA

In the Terms of Reference submitted from the MOLD and Kathmandu Metropolitan City, the study area was set within the jurisdiction of the 5 cities concerned. In addition to the above mentioned study area, both sides have also reached an agreement to include, as the study area, the proposed landfill site "Okharpauwa" and alternative sites for landfill and intermediate treatment facilities.

4. STUDY PERIOD

Both sides have agreed to set the study period at 18 months.

5. THE SOLID WASTE TO BE COVERED BY THE STUDY

Both sides have agreed that the solid waste to be covered is municipal waste (household waste, market waste, commercial waste, street sweeping waste and institutional waste) and non-hazardous medical waste. As for the hazardous medical waste and industrial waste, the study will propose general recommendations on how to properly handle the types of waste based on existing information.

6. IMPLEMENTING BODY OF THE INITIAL ENVIRONMENTAL EVALUATION (IEE) AND ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

The team has clarified that Initial Environmental Assessment (IEE) and Environmental Impact Assessment (EIA) is an assessment which should be conducted by the implementing agencies of the concerned projects. The team, who is not the implementing body of the proposed projects, therefore, will not conduct IEE, EIA, but will give advice to the Government of Nepal when it is necessary.

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7. IMPORTANT ASPECTS CONCERNING SOLID WASTE MANAGEMENT

1) Social aspects

The team has stressed the importance of social environmental aspects when formulating a master plan on Solid Waste Management. Issues related to waste have a close connection with the local community; local awareness to garbage, child labor, gender issues, and etc. The team, therefore, underscored the necessity of conducting basic surveys on issues mentioned above.

2) Utilization of Existing Solid Waste Management System

The team has stressed the importance of the utilization of the Existing Solid Waste Management System in Kathmandu Valley, including community based management, market based recycling programs, and private sector participation

3) Other Aspects

The team has also stressed the importance of other aspects, such as technical, engineering, managerial, institutional, and financial aspects mentioned in S/W, to achieve the objective of the development studies.

8. COUNTER PART'S FULL COMMITMENT TO THE STUDY

The team has explained that JICA Study's main characteristic is to conduct the survey in closer cooperation with the Counterpart Agency. Therefore, SWMRMC and 5 cities' full commitment is an indispensable condition to formulate an Action Plan.

9. MONITORING AND FOLLOW UP OF PREPARATORY STAGE OF THE PROPOSED PROGRAM(S) AND PROJECT(S) IN THE MASTER PLAN.

In order to secure the output of the Study, the team proposed, following the formulation of the master plan, to monitor and assist the preparatory stage for the implementation of proposed program(s) and project(s). The team has underlined that this monitoring and follow-up survey will be conducted, if the counterparts' commitment and their ownership were satisfactory during the study. Therefore, the final decision, whether to conduct a monitoring/follow-up, will be made at the final stage of the study, under article IX of the Scope of Works.

10. COOPERATION OF MOLD AND 5 CITIES CONCERNED

Government of Nepal has agreed that, a counterpart agency and a coordinating body in relation to other relevant governmental and non-governmental organizations, shall provide necessary cooperation for the study such as submission of data and information, permission for the field survey of the study team.

11. FORMULATION OF THE STEERING COMMITTEE

Government of Nepal has assured that, for the smooth implementation of the study and effective use of the study results, the steering committee to be organized at the commencement of the Study. The steering committee would be chaired by the Secretary of MOLD, and composed of representatives of organizations concerned, as follows;

- MOLD
- SWMRMC
- Bahktapur Municipality
- Kathmandu Metropolitan City

- Kirtipur Municipality
- Lalitpur Sub-Metropolitan City
- Thimi Municipality
- Ministry of Population and Environment
- Ministry of Physical Planning and Works

12. FORMULATION OF THE TECHNICAL WORKING GROUP

Government of Nepal has assured that for the smooth implementation of the study and effective use of the study results, the technical working group to be organized at the commencement of the Study. The Technical Working Group would be chaired by the General Manager of SWMRMC, and composed of staffs who are in charge of SWM in the organizations concerned, as follows;

- MOLD
- SWMRMC
- Bahktapur Municipality
- Kathmandu Metropolitan City
- Kirtipur Municipality
- Lalitpur Sub-Metropolitan City
- Thimi Municipality

13. TREATMENT OF LANDFILL SITE FOR KATHMANDU METROPOLITAN CITY

The team has expressed their concern on the feasibility of Okharpauwa landfill site, which has become a given condition, due to the Agreement made by MOLD, Kathmandu Metropolitan City and Luna Chemicals & Fertilizers Ltd., on formulating an Action Plan for Kathmandu Metropolitan City. Both sides agreed that JICA will not take any responsibility on the activity which will fall under the agreement mentioned above and to reserve their decision on Okarpauwa landfill site.

14. FULL TIME COUNTERPART STAFF TO THE STUDY

The Government of Nepal has proposed to submit two full time counterparts each from 5 cities and SWMRMC to the team at the commencement of the Study. The team has assured this proposal, and assured to exchange an official document on submission of the counterpart.

The list of attendants at discussion and signing of the Scope of Work is shown in Appendix 1.

END

APPENDIX 1.2

Member of the Study and Committees

APPENDIX 1.2 MEMBER OF THE STUDY AND COMMITTEES

CKV Study Team

Technical Working Group (Total 18 members)

As of July 20, 2005

| Organizations | Name | Designation / Organizational Position |
|---------------|--|---|
| MOLD | Mr. Babu Ram Gautam (Mr. Prem Raj Giri up to Nov, 2004) | Under Secretary |
| SWMRMC | Mr. Surya Man Shakya (Chairperson up to June 23, 2005) | Former General Manager |
| | Mr. Ashok Shahi (Chair person after June 24, 2005) | Acting General Manager |
| | Mr. Ram Sharan Maharjan | Civil Engineer |
| | Mr. Nirmal Darshan Acharya | Civil Engineer |
| KMC | Mr. Rajesh Manandhar | Chief, Solid Waste Management Section |
| | Mr. Kiran Ulak | Engineer, Solid Waste Management Section |
| | Mr. Purusotam Shakya | Chief, Mechanical Section |
| LSMC | Mr. Rudra Prasad Gautam | Chief, Public Works Division |
| | Mr. Pradeep Amatya | Chief, Environment and Sanitation Section |
| BKM | Mr. Laxman Kisiju | Chief, Planning and Technical Section |
| | Mr. Moti Bhakta Shrestha | Chief, Social Welfare & Sanitation Section |
| | Mr. Dinesh Rajbhandari | Sanitation Engineer, Planning and Technical Section |
| MTM | Mr. Satya Narayan Shah | Chief, Planning and Technical Section |
| | Ms. Krishna Kumari Shrestha | Assistant, Community Development and Sanitation Section |
| | Mr. Surendra Shrestha | Junior Engineer, Planning and Technical Section |
| KRM | Mr. Anuj Pradhan | Chief, Solid Waste Management Unit |
| | Mr. Gyan Bazra Maharjan | Assistant, Solid Waste Management Unit/Accounting |

Task Force (Total 54 members)

As of July 20, 2005

| Organizations | Name | Designation / Organizational Position |
|------------------------|---|--|
| SWMRMC (8) | Mr. Surya Man Shakya (Up to June 23, 2005) | Former General Manager |
| | Mr. Ashok Shahi | Acting General Manager |
| | Mr. Ram Sharan Maharjan | Civil Engineer |
| | Mr. Nirmal Darshan Acharya | Civil Engineer |
| | Mr. Lal Bahadur Karki | Account Officer |
| | Mr. Topa Ram Acharya | Administration Officer |
| | Mr. Ashok Ratna Tuladhar | Consultant Engineer |
| | Dr. Nawa Raj Khatiwada | Environmental Engineer, SchEMS |
| KMC (15) | Mr. Indra Man Suwal | Head, Environment Department |
| | Mr. Rajesh Manandhar | Chief, Solid Waste Management Section |
| | Mr. Kiran Ulak | Engineer, Solid Waste Management Section |
| | Mr. Purusotam Shakya | Chief, Mechanical Section |
| | Ms. Shriju Pradhan | Community Mobilization Unit |
| | Ms. Sanu Maiya Maharjan | Community Mobilization Unit |
| | Mr. Deepak Kansakar | Engineer, Solid Waste Management Section |
| | Mr. Krishna P. Kafle | Department of Mines and Geology |
| | Mr. Puskar L. Shrestha | LIUD (NGO) |
| | Mr. Basu Upreti | Kathmandu Mahanagar SWM Services |
| | Mr. Padma S. Joshi | IOE/TU |
| | Mr. Shirish Singh | ENPHO (NGO) |
| | Mr. Prakash M. Sharma | PROPUBLIC |
| Mr. Drona Raj Ghimire | Nefeej | |
| Mr. Shankar Raj Kandel | Head, International Cooperation and Coordination Department | |

| Organizations | Name | Designation / Organizational Position |
|---------------|-------------------------------|---|
| LSMC (8) | Mr. Komal Prashad Kafle | CEO |
| | Mr. Rudra Prasad Gautam | Chief, Public Works Division |
| | Mr. Pradeep Amatya | Section Chief, Environment and Sanitation Section |
| | Mr. Prabin Shrestha | Division Chief, Town Development Division |
| | Mr. Mukunda Ranjit | Overseer, Environment Section |
| | Mr. Ashok Shrestha | Division Chief, Administrative Division |
| | Ms. Laxmi Prasad Rajbhandari | Section Chief, Community Development Section |
| | Ms. Sabina Maharjan | Community Development Section |
| BKM (9) | Mr. Badrinath Ghimire | CEO |
| | Mr. Laxman Kisiju | Chief, Planning and Technical Section |
| | Mr. Moti Bhakta Shrestha | Chief, Social Welfare & Sanitation Section |
| | Mr. Dinesh Rajbhandari | Sanitation Engineer, Planning and Technical Section |
| | Mr. Dilip Kumar Suwal | Chief, Sanitation Sub-section |
| | Mr. Krishna Prashad Suwal | Assistant, Social Welfare & Sanitation Section |
| | Mr. Revid Kusma | Chief, Store Sub-section |
| | Ms. Ambika Dhauvadel | Chief, Administration Section |
| | Ms. Ratnamaya Shrestha | Chief, Financial Section |
| MTM (8) | Mr. Satya Narayan Shah | Chief, Planning and Technical Section |
| | Ms. Krishna Kumari Shrestha | Assistant, Community Development and Sanitation Section |
| | Mr. Tulsi Bhakta Tako | Section Chief, Community Development and Sanitation Section |
| | Mr. Surendra Shrestha | Junior Engineer, Planning and Technical Section |
| | Mr. Shiva Man Shrestha | Policy Management / Lawyer |
| | Mr. Kai Prashad Waije | Architect/ Urban Planner |
| | Ms. Shanti Karanjit | Environmentalist |
| | Mr. Krishna Sundar Thapamagar | Sub Accountant, Account Section |
| KRM (6) | Mr. Bal Krishna Maharajan | Chief, Planning and Technical Section |
| | Mr. Anuj Pradhan | Assistant, Planning and Technical Section |
| | Mr. Gyan Bazra Maharjan | Assistant, Solid Waste Management/Accounting |
| | Mr. Krishna Bhola Maharjan | Junior Engineer, Planning and Technical Section |
| | Mr. Sanu Babu Pariyar | Account Officer, Administration Section |
| | Mr. Swodesh Maharjan | Unique Group (NGO) |

JICA Study Team (Total 10 members)

As of July 20, 2005

| Name | Assignment |
|-----------------------------|--|
| Mr. Toshiyuki Ujii | Team Leader / Solid Waste Management Policy |
| Mr. Mahmoud Riad | Facility Plan |
| Mr. Shungo Soeda | Collection & Transportation / Recycling System (1) |
| Mr. Kiyoshi Shimizu | Recycling System (2) / Hazardous Waste |
| Mr. Satoshi Higashinakagawa | Equipment Procurement Plan |
| Mr. Norihiko Inoue | Environment |
| Ms. Toshiko Shimada | Public Participation / Social Consideration (Public Relations (1)) |
| Ms. Minako Nakatani | Institutional and Organizational Strengthening/ Human Resources Development |
| Mr. Noboru Osakabe | Financial Analysis |
| Ms. Sachiko Suswa | Public Participation / Social Consideration (2) / Coordinator (Public Relations (2)) |

Committee

Steering Committee Members

As of July 20, 2005

| Organizations | Name | Position |
|---|----------------------------|--|
| MOLD | Mr. Som Lal Subedi | Joint Secretary |
| MOLD, Environmental Management Section of Municipal Management Division (as member secretary) | Mr. Babu Ram Gautam | Under Secretary, Chief of Environmental Management Section |
| SWMRMC | Mr. Surya Man Shakya | General Manager |
| KMC | Mr. Hem Sharma Pokharel | CEO |
| LSMC | Mr. Komal P. Kafle | CEO |
| BKM | Mr. Badri Nath Ghimire | CEO |
| MTM | Mr. Bhuwan Prasad Bista | CEO |
| KRM | Mr. Naresh Regmi | CEO |
| Ministry of Environment, Science and Technology | * | |
| Ministry of Physical Planning and Works | Mr. Hari Ram Koirala | Joint Secretary |
| Ministry of Industry, Commerce and Supplies | Mr. Baikuntha Bd. Adhikari | Department of Industry, director |
| Ministry of Education and Sports | Mr. Narayan Pd. Kafle | Under Secretary |
| Ministry of Agriculture and Cooperative | Ms. Bidya Pandey | Horticulture Development Officer |
| Ministry of Health and Population | Dr. Bishnu Prasad Pandit | Chief Specialist, Curative Division |

Note:*Because of restructuring of Ministry of Population and Environment, this position is now vacant.

JICA Advisory Committee

As of July 20, 2005

| Name | Position |
|------------------|---|
| Dr. Isamu Yokota | Professor, Graduate School of Nutritional and Environmental Sciences, University of Shizuoka |
| Dr. Ayako Tanaka | Professor, Pharmacist, Department of Civil Engineering, Faculty of Engineering, Fukuoka University |
| Mr. Akio Kubota | Assistant Chief, Environmental Development Section, Citizen and Environment Department, Matsumoto City Corporation, Nagano Prefecture |

APPENDIX 2

Record of Public Hearings

APPENDIX 2 RECORD OF PUBLIC HEARINGS

Public Hearings (P/Hs) were carried out by each municipality as follows:

At the 1st P/H held in the middle of March, 2004, the members of Task Force (T/F) made presentations regarding the overview of the Study and the current situation of SWM and a variety of activities undertaken by Municipality. After these presentations by T/F, the participants discussed various issues related to SWM indicated below. The comments and opinions were taken into consideration by each municipality to analyze the current situation of SWM in the process of formulating Draft Action Plans (DfA/Ps).

Table A 2-1 Date, Participants and Discussion Items of the 1st P/H

| Municipality | Date/Time/Venue | Number and Main Participants | Discussion Items |
|--------------|---|--|--|
| KMC | March 11, 2004 10:00-14:00 Meeting Hall in Bagh Durbar | 90 participants; Mayor, Deputy mayor, Ward chairpersons, NGOs/CBOs, Private sectors, Intellectuals, Media/Journalists | Participants were divided into six groups namely, 1) awareness, 2) management, 3) medical waste, 4) recycling and composting, 5) privatization, 6) rule and regulation. Many solutions including awareness campaign or punishment system were suggested. |
| LSMC | March 14, 2004 10:00-16:00 LSMC Office Hall | 71 participants; Mayor, Deputy mayor, Ward chairpersons, NGOs/CBOs, Intellectuals, Journalists | Participants were divided into four groups namely, 1) awareness, 2) management, 3) recycling and composting, and 4) public involvement. One of the causes of the problems is lack of awareness or education. |
| BKM | March 7, 2004 13:00-17:00 BCIC* Meeting Hall | 57 participants; Deputy mayor, Ward chairpersons, Advisors, Hospitals, NGOs/CBOs, | Participants divided into three groups by topic wise discussed 1) source separation, 2) recycle and composting, and 3) public involvement. One of the key issues is dissemination of information on SWM activities. |
| MTM | March 5, 2004 13:00-16:00 MTM Meeting Room | 28 participants; Mayor, Deputy mayor, Ward chairpersons, Intellectuals, NGOs | Each participant addressed his/her opinions. Not only about effective composting system but also the necessity of mobilization of local community groups was discussed. |
| KRM | March 5, 2004 7:30-11:00 Phect Hall | 29 participants; Deputy mayor, Ward chairperson, NGOs/ CBOs | Participants divided into three groups discussed the problems, causes, solutions for each issue. Life style to use a lot of plastic bags was also addressed as one of the causes |

Note *: Bhaktapur Chamber of Industry and Commerce
Source: JICA Study Team

At the 2nd P/H held in the middle of May, 2004, the members of T/F made presentations regarding vision, target, approaches, strategies and necessary activities as preliminary ideas of DfA/P. After these presentations by T/F, the participants discussed various aspects of SWM and gave comments and suggestions. These comments and opinions were taken into consideration by each municipality to formulate the DfA/P.

Table A 2-2 Date, Participants and Discussion Items of the 2nd P/H

| Municipality | Date/Time/Venue | Participants | Discussion Items |
|--------------|---|---|--|
| KMC | May 17, 2004 11:00-14:00 City Hall | 30 participants; Mayor, NGOs/CBOs, Private sectors, Media/ Journalists | Among the discussion session, the problems of irregular service of the door to door collection or the problems of no proper division of responsibilities between KMC and private sector were pointed out. |
| LSMC | May 14, 2004 10:00-15:00 LDTA* Hall | 70 participants; Ward chairperson, Intellectuals, NGOs CBOs | Participants categorized four issues namely, 1) collection, transportation and landfill site, 2) promotion of waste minimization, 3) public awareness, and 4) organizational and institutional management. They discussed the suggestion to the DfA/P and proposed to introduce 3R approach or awareness campaigns including documentary programs or primary school level curriculum, etc. |
| BKM | May 2, 2004 13:0-16:00 BKM Meeting Room | 50 participants; CEO, Ward chairpersons, NGOs/ CBOs, Advisors | During the discussion session, participants proposed the reuse system of plastics and glasses, privatization of compost plant in order to make the system more efficient, or involvement of VDCs to the DfA/P |
| MTM | May 15, 2004 10:00-15:00 Hospital Hall | 53 participants; Mayor, Deputy mayor, Ward chairpersons, NGOs/ CBOs, Residents | Participants categorized four issues namely, 1) collection, transportation and landfill site, 2) promotion of waste minimization, 3) public awareness, and 4) final disposal manner. They discussed the suggestion to the DfA/P and pointed out the necessity of the disposal site, formulation of the supervisory committee, or public awareness programs etc. |

Note: KRM couldn't hold 2nd P/H because of unavoidable circumstances

* Local Development Training Academy

Source: JICA Study Team

The 3rd P/H was held in August and September 2004 to brief about the progress of the Study activities including Pilot Projects launched in each of five municipalities in July 2004. The T/F members and each Focal Point of Pilot Projects took initiatives in organizing and facilitating the 3rd P/H. During the discussion session, the participants actively discussed how to carry out the Pilot Project activities effectively.

Table A 2-3 Date, Participants and Discussion Items of the 3rd P/H

| Municipality | Date/Time/Venue | Participants | Discussion Items |
|--------------|---|--|---|
| KMC | Sept. 21, 2004 10:00-13:00 KMC Office in Sundhara | 75 participants; Ward Environment Committee members, NGOs/CBOs, reporters, Students | The main topics discussed were- 1) Teku T/S Pilot Project, 2) Sisdol LFS Pilot Project, 3) community based composting Pilot Project, and 4) primary collection and transportation. |
| LSMC | August 16, 2004 10:30-15:00 LDTA Hall | 60 participants; Former Mayor, Ward chairpersons, NGOs/ CBOs, Women's groups | During the discussion session, suggestions for waste minimization program or public awareness were mentioned. Some participants requested to make more chance for NGO/CBO to participate in the SWM activities. |

| Municipality | Date/Time/Venue | Participants | Discussion Items |
|--------------|--|---|--|
| BKM | August 23, 2004 11:00-15:00 BCIC* Meeting Hall | 73 participants; CEO, Residents from model areas for separation collection project (Ward 14, 15, 17) | After explanation of separation collection project including formation of nature clubs by TWG, the group coordinators of each model ward were selected who has a responsibility to form the core group in each ward. |
| MTM | August 23, 2004 10:30-15:00 Ward Office | 13 participants; Former Mayor, Former Deputy mayor, Ward chairpersons, NGOs/CBOs | Main discussion items were 1) proposed collection and transportation system 2) wall painting (location) and 3) public events (location and contents). |
| KRM | August 24, 2004 8:00-10:00 KRM Meeting Room | 30 participants; CEO, NGOs/CBOs, Youth groups from target area of plastic separation project (Ward 1, 5, 14) | Participants discussed plastic separation project in order to make more effective. Problem related to difficulty of selling plastic to a buyer was also pointed out. |

Note *: Bhaktapur Chamber of Industry and Commerce
Source: JICA Study Team

The 4th P/H was held in February and March, 2005 to share the progress of Pilot Projects. The each Focal Point of Pilot Projects reported the current progress and achievement of various activities. The feedback and lessons learned from the Country Focused Training in Japan held on December 2004 were also shared with the participants. The participants of P/H were very interested in each component of Pilot Projects and provided various comments and suggestions for further improvement of Pilot Projects. Besides Pilot Projects, the current problems related to SWM in each municipality were also discussed among the participants.

Table A 2-4 Date, Participants and Discussion Items of the 4th P/H

| Municipality | Date/Time/Venue | Participants | Discussion Items |
|--------------|--|--|--|
| KMC | March 7, 2005 10:30-13:00 KMC Office in Sundhara | 75 participants Ward Environment Committee members, NGOs/CBOs, University Students, Journalists, Media | The main Pilot Projects explained were 1) Teku T/S, 2) Sisdol LFS, 3) Community based composting, and 4) Mass communication. During the discussion session, participants focused on not only Pilot Projects but also new collection system ordered by government*. |
| LSMC | February 10, 2005 11:30-14:00 LSMC Office | 20 participants CEO, Ward representatives, NGOs/ CBOs, Women's groups | During the discussion session, participants mainly focused on new collection system ordered by government. |
| MTM | February 15, 2005 12:30-14:00 Ward Office | 13 participants Former Mayor, Former Deputy Mayor, NGOs/ CBOs | Main discussion items were 1) proposed collection and transportation system under Pilot Project and 2) sweeping system in MTM. |
| KRM | March 2, 2005 15:30-17:30 KRM Office | 23 participants NGOs/ CBOs, University Students, Youth groups from target area of plastic separation project, Journalists | Participants mainly discussed plastic separation Pilot Project and also how to apply 3R concept to Kirtipur efficiently. |

Note: BKM couldn't hold 4th P/H because of unavoidable circumstances

* On February 9, 2005, the Government ordered that waste collection and transportation should be finished by 7 a.m.

Source: JICA Study Team

The 5th P/H was held in July and August, 2005 to share the results of final evaluation of Pilot Projects and summary of finalized Action Plans. The each Focal Point of Pilot Projects reported the results, achievement and lesson learned of various activities. In addition to the Pilot Project, the participants seemed to be interested in future activities after the Study in consideration of lesson learned from the Pilot Project, sustainability and feasibility.

Table A 2-5 Date, Participants and Discussion Items of the 5th P/H

| Municipality | Date/Time/Venue | Participants | Discussion Items |
|--------------|---|---|--|
| KMC | August 4, 2005 10:30-13:00 KMC Office in Sundhara | 70 participants NGOs/ CBOs, Ward representatives, University, Scrap dealers, Journalists, Media | The main Pilot Projects explained were 1) Operation of Sisdol S/T-LF, 2) Waste minimization at local level and 3) Mass communication. During the discussion session, various questions including the problem of current collection system, PPP policy, Medical waste management after full operation of Sisdol were asked by participants. |
| BKM | July 6, 2005 13:00-16:00 Arniko Meeting Hall | 70 participants CEO, Local people from Tathali ¹ , Local Development Officer, Nature Club members, University, NGOs/ CBOs, etc. | After TWG members explained five different Pilot Projects briefly by using slides, Nature Club members presented their activities. During discussion, local people from Tathali expressed their opposition to Taikabu LFS and request BKM staff to visit the site and then discuss. |
| MTM | July 12, 2005 11:00-14:00 Ward Office | 17 participants Local community, NGOs/ CBOs | TWG members presented 1) Collection and transportation activities, 2) Mass communication activities and 3) Contents of Action Plan on SWM. Main topics for discussion is collection and transportation activities and its sustainability. |
| KRM | July 8, 2005 8:00-10:00 KRM Office | 15 participants NGOs/ CBOs, Youth groups from target area of plastic separation project, Journalists | After the Focal Point explained the Pilot Project of plastic separation and contents of Action Plan, participant discussed mainly possibility of expansion of target area and how to sustain the project with lack of human resource in KRM. |

Note: LSMC hasn't hold 5th P/H yet because of unavoidable circumstances

¹: Taikabu proposed LFS is located in Tathali VDC.

Source: JICA Study Team

APPENDIX 3.1

List of Related Law and Regulation

APPENDIX 3.1 LIST OF RELATED LAW AND REGULATION

| Year | Name | SWM sections |
|------|---|---|
| 1987 | Solid Waste Management Act | <ul style="list-style-type: none"> ▪ <u>Section 3, clause 3.1</u>: SWMRMC is authorized to make all arrangements in regard to solid waste storage, collection, transfer, disposal and resource recovery activities. ▪ <u>Section 3, clause 3.2.1</u>: SWMRMC is authorized to collect fees from beneficiaries of its services. Also, SWMRMC is allowed to sell resources from the solid waste collected (e.g. compost, bio-gas, etc.) ▪ <u>Section 4, clause 4.4</u>: SWMRMC 's authority over all solid waste collected in garbage dump sites, skips, containers, etc. and waste collected in the course of cleaning is established. ▪ <u>Clause 5.2</u>: SWMRMC is authorized to impose and collect fines in cases of the breach of listed prohibitions. ▪ <u>Clause 5.4</u>: authorizes SWMRMC to collect service charges and other fines in the manner prescribed by law for recovery of other Government dues. ▪ <u>Clause 7.3.1</u>: SWMRMC can collect service charge from people from their service areas. |
| 1991 | Labor Act | <ul style="list-style-type: none"> ▪ Management of establishments would need to make certain arrangements such as the removal of waste accumulation during production process, and prevention of accumulation of dust, fume, vapor and other materials, which would adversely affect health of workers. |
| 1992 | Municipality Act | <ul style="list-style-type: none"> ▪ <u>Section 4, clause 2</u>: Municipality is made responsible to clean streets. Clause 12.1.5: It is also responsible to the dispose off waste collected in streets, lanes ▪ <u>Section 6, clause 20.2.e</u>: Municipality is authorized to generate income from sale of waste, dead animals, etc. ▪ <u>Section 6, clause 22.8</u>: the municipality is empowered to impress not more than 50% of roof-top tax from people who have been benefited by its activities in regard to SWM. ▪ <u>Clause 23</u>: Municipality is authorized to collect octroi duties from exports of all kinds of goods except daily necessities. |
| 1992 | Industrial Enterprise Act | <ul style="list-style-type: none"> ▪ Industrial license is required if the establishments' production activities that are related to, or adversely affect public health and environment. ▪ Provides basis for industries to be punished for non-compliance with conditions required under the license. |
| 1993 | Environmental Policy & Action Plan | <ul style="list-style-type: none"> ▪ Recommends that wards be responsible for collection of waste and delivery to a central point for collection by municipality, which would then ensure safe final disposal." |
| 1996 | Solid Waste Management National Policy | <ul style="list-style-type: none"> ▪ A separate unit concerning sanitation works should be established in each municipality and VDC responsible for collection, site management, transportation, and final disposal of SW. ▪ Need for improving capacity of local governments to manage SW (but stops short of giving local governments full responsibility for managing the waste) ▪ Promote privatization and involvement of NGOs and social organizations ▪ To mobilize solid waste as a resource through recycling and processing ▪ Government create a new central institution and that local authorities are to manage the waste in coordination with this central agency responsible for: <ul style="list-style-type: none"> - Select site for final disposal of the solid waste, conduct EIA and assist local bodies in the final disposal works of SW <u>as per necessity</u> - Develop concept of minimization of waste - Develop skilled manpower to carryout SWM works - Prepare appropriate criteria for the management of solid wastes on the basis of quantity of and waste quality. <ul style="list-style-type: none"> - Develop SWM technology suitable to local conditions - Monitoring and evaluation of various SWM activities |

| Year | Name | SWM sections |
|-----------|---|--|
| 1997 | Environment Protection Act and Rules | <ul style="list-style-type: none"> ▪ General prohibition of pollution that cause significant adverse impacts on the environment or likely to be hazardous to public life and health. ▪ Retains the right for HMG to frame rules in particular to management and transportation of waste (not yet existing) ▪ SWM Proposals require IEE when: <ol style="list-style-type: none"> 1. Waste management activities to be undertaken with the objective of providing services to a population ranging between (2,000~10,000) 2. Land filling with 100 to 1000 tons of waste a year 3. Activities relating to transfer stations and resource recovery areas not more than 3 hectares 4. Selecting, picking, disposing and recycling of waste through chemical, mechanical or biological techniques in an area of not more than 2 hectares 5. Activities relating to compost plants in an area ranging between 1~5 hectares 6. Operation of sewerage schemes ▪ SWM Proposal require EIA when: <ol style="list-style-type: none"> 1. Waste management activities to be undertaken with the objective of providing services to a population of more than 10,000 2. Land filling with more than 1000 tons of waste per year. 3. Activities relating to transfer stations and resource recovery areas of more than 3 hectares 4. Selecting, picking, disposing and recycling of waste through chemical, mechanical or biological techniques in an area of more than 2 hectares. 5. Activities relating to compost plants in an area of more than 5 hectares. 6. Burying of waste emitted from an urban area with a population of at least 10,000. 7. Construction activities (e.g. waste plant, waste recovery plant, site for filling/accumulating/burying waste, storing site, treatment facility) relating to hazardous waste in any scale. |
| 1999 | Local Self-Governance Act | <ul style="list-style-type: none"> ▪ Ward committees responsible for the disposal of waste, keeping wards clean, and for sanitation. ▪ Municipality responsible for the collection, transportation and disposal waste. ▪ Allows Municipality to impose service charge for solid waste management ▪ Allows Municipality to charge penalty of up to 15,000 rupees for dumping waste in a non-designated area for waste |
| 2001-2006 | 10th National 5 Year Plan | <ul style="list-style-type: none"> ▪ “Priority will be given to the infrastructure development for building a long-term landfill site on the Okharpauwa-Banchare hill.” ▪ “Other municipalities will be encouraged in formulating and implementing appropriate program on solid waste management” (30.4, 9) |
| 2002 | National Health Care Waste Management Guidelines | <ul style="list-style-type: none"> ▪ Health Care Waste Definition: includes all the generated by health care institutions, research facilities and laboratories. It means any waste, which is generated during diagnosis, treatment, or immunization of human beings or animals or in research activities thereto or in the production or testing of biologicals, and other categories. ▪ Each health care institution should develop a Waste Management Policy, outlining the accountabilities and responsibilities of appropriate staff, and a Waste Management Plan. ▪ Each health care institution must establish “Waste Management Committee” with implementation responsibilities of the Waste Management Policy and Plan. ▪ Health care institutions have the responsibility to ensure that its wastes are transported and treated appropriately before disposal. Health care institutions must determine mechanisms in monitoring contractors for waste transportation and disposal. |

APPENDIX 3.2

Actual Fiscal Balance of Last 4 Years and Current Years' Budget (Five Municipalities)

APPENDIX 3.2 ACTUAL FISCAL BALANCE OF LAST 4 YEARS AND CURRENT YEARS' BUDGET (FIVE MUNICIPALITIES)

1. Kathmandu Metropolitan City

a. Actual Fiscal Balance and Budget

(million Rs)

| Items | | | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 | |
|----------------------|---------------------------------------|----------------------|-----------|-----------|-----------|-----------|-----------|---------|
| | | | (2057/58) | (2058/59) | (2059/60) | (2060/61) | (2061/62) | |
| | | | Actual | Actual | Actual | Actual | Budget | |
| Opening Balance | | | 61.8 | 0 | 0 | 0 | 0 | |
| Revenue | Tax | Local Develop. Fee | 235.1 | 266.2 | 239.2 | 237.5 | 259.6 | |
| | | Property Tax | 0.3 | 108.0 | 71.2 | 62.7 | 114.5 | |
| | | Professional Tax | 10.1 | 16.1 | 22.4 | 18.1 | 49.0 | |
| | | Others | 52.7 | 11.6 | 10.7 | 0.4 | 0.4 | |
| | Total | | 298.2 | 401.9 | 343.5 | 318.7 | 423.5 | |
| | Fees/Charges & Others | Services Fee | 13.5 | 15.5 | 33.2 | 43.5 | 74.1 | |
| | | Building Permit | 57.6 | 56.4 | 113.8 | 122.7 | 150.0 | |
| | | Others | 24.9 | 42.9 | 38.6 | 41.0 | 135.6 | |
| | Total | | 96.0 | 114.8 | 185.6 | 207.2 | 359.7 | |
| | Grants | | | 12.6 | 14.0 | 1.8 | 27.6 | 726.9 |
| Debt | | | 0 | 0 | 0 | 0 | 0 | |
| Total of Revenue | | | 406.8 | 530.7 | 530.9 | 553.5 | 1,510.1 | |
| Expen- -diture | Current | Personnel Expenses | 137.8 | 148.2 | 150.7 | 150.6 | 82.6 | |
| | | Repair & Maintenance | 7.9 | 6.8 | 16.0 | 0 | 0 | |
| | | Fuel | 18.7 | 20.6 | 21.3 | 0 | 0 | |
| | | Others | 47.3 | 67.9 | 49.6 | 136.2 | 190.8 | |
| | Total | | 211.7 | 243.5 | 237.6 | 286.8 | 273.4 | |
| | Social Prog./Infrastructure Services* | | | 14.8 | 11.8 | 100.7 | 266.3 | 1,173.3 |
| | Capital | Vehicles | 5.9 | 0.3 | - | 2.7 | 0.9 | |
| | | Machinery & Equip. | 1.2 | 0.4 | 0.3 | 13.6 | 24.2 | |
| | | Land/Building | 29.4 | 35.1 | 4.4 | 4.0 | 7.2 | |
| | | Other Development | 112.9 | 193.6 | 0 | 0 | 0- | |
| | | Others | 0.3 | 1.5 | 0.1 | 6.1 | 3.6 | |
| | Total | | 149.7 | 230.9 | 4.8 | 26.4 | 35.9 | |
| | Debt Payment | | | 30.4 | 29.4 | 30.8 | 0 | 27.5 |
| Total of Expenditure | | | 406.6 | 515.6 | 373.9 | 579.5 | 1,510.1 | |
| Closing Balance | | | 62.0 | 15.1 | 157.0 | -26.0 | 0 | |

Note: 1) Opening balance is not equal to previous closing balance because of inconsistency between budget balance and outstanding bank account due to account system, 2) * Item of Infrastructure Services is added as a new category from 2002/03.

Source: Information from UDLE of GTZ and Budget Report of KMC

b. Other Indicators

| Items | 2000/01 (2057/58) | 2001/02 (2058/59) | 2002/03 (2059/60) | 2003/04 (2060/61) | 2004/05 (2061/62) |
|------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Population (2001 census) | - | 671,846 | - | - | - |
| No. of KMC office staff | 2,148 | 2,238 | - | - | - |
| No. of SWM staff | - | 1,400 | - | - | - |
| Revenue /capita (Rs) | - | 790 | - | - | - |
| Revenue / KMC office staff (Rs) | 189,000 | 237,000 | - | - | - |
| Estimated SWM expenditure (Rs 000) | - | 141,000 | - | - | 155,354 |
| SWM expenditure/capita (Rs) | - | 210 | - | - | - |
| | - | (US\$3) | - | - | - |
| SWM expenditure/ SWM staff (Rs) | - | 100,000 | - | - | - |

Source: Information from UDLE of GTZ, Presentation data of KMC, and Budget Report of KMC

2. Lalitpur Sub-Metropolitan City

a. Actual Fiscal Balance and Budget

(million Rs)

| Items | | | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 | |
|-------------------|--------------------------|----------------------|-----------|-----------|-----------|-----------|-----------|-------|
| | | | (2057/58) | (2058/59) | (2059/60) | (2060/61) | (2061/62) | |
| | | | Actual | Actual | Actual | Actual | Budget | |
| Opening Balance | | | 19.8 | 29.6 | - | 0 | 19.1 | |
| Revenue | Tax | Local Develop. Fee | 52.4 | 56.8 | 52.4 | 52.4 | 52.4 | |
| | | Property Tax | 3.8 | 20.5 | 10.4 | 11.7 | 16.5 | |
| | | Professional Tax | 1.4 | 2.4 | 2.2 | 2.2 | 3.0 | |
| | | Others | 3.7 | 3.0 | 2.2 | 2.3 | 2.9 | |
| | | Total | 61.3 | 82.7 | 67.2 | 68.6 | 74.8 | |
| | Fees/Charges & Others | Services Fee | 20.6 | 10.3 | 7.5 | 12.9 | 21.5 | |
| | | Building Permit | 8.6 | 15.3 | 16.6 | 15.8 | 25.0 | |
| | | Others | 6.3 | 9.8 | 9.0 | 16.1 | 15.5 | |
| | Total | 35.5 | 35.4 | 33.1 | 44.8 | 62.0 | | |
| | Grants | | | 6.8 | 0.8 | 2.0 | 2.1 | 3.6 |
| | Debt | | | 0 | 0 | 0 | 0 | 22.0 |
| | Total of Revenue | | | 103.6 | 118.9 | 102.3 | 115.5 | 162.4 |
| Expen- -diture | Current | Personnel Expenses | 36.1 | 37.9 | 39.1 | 44.2 | 49.1 | |
| | | Repair & Maintenance | 0.6 | 0.8 | 1.0 | 1.0 | 2.0 | |
| | | Fuel | 4.4 | 4.0 | 4.6 | 4.6 | 10.4 | |
| | | Others | 13.7 | 22.7 | 12.5 | 12.6 | 13.4 | |
| | | Total | 54.8 | 65.5 | 57.3 | 62.4 | 74.9 | |
| | Social Program | | | 3.2 | 2.1 | 0.8 | 5.7 | 10.7 |
| | Capital | Vehicles | 0 | 0 | 0.8 | 1.7 | 0.3 | |
| | | Machinery & Equip. | 1.0 | 0 | 0.8 | 1.5 | 2.0 | |
| | | Land/Building | 0 | 0.6 | 0.1 | 0 | 6.6 | |
| | | Other Development | 32.1 | 53.1 | 36.0 | 49.0 | 83.0 | |
| | | Others | 2.3 | 2.1 | 0.4 | 0.4 | 1.9 | |
| | Total | 35.4 | 55.8 | 38.1 | 52.7 | 93.9 | | |
| | Debt Payment | | | 1.1 | 2.1 | 0 | 0.2 | 2.0 |
| | Total of Expenditure | | | 94.5 | 125.5 | 96.2 | 121.0 | 181.5 |
| Closing Balance | | | 28.9 | 23.0 | 6.1 | -5.5 | 0 | |

Note: Opening balance is not equal to previous closing balance because of inconsistency between budget balance and outstanding bank account due to account system

Source: Information from UDLE of GTZ and Budget Report of LSMC

b. Other Indicators

| Items | 2000/01 (2057/58) | 2001/02 (2058/59) | 2002/03 (2059/60) | 2003/04 (2060/61) | 2004/05 (2061/62) |
|------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Population (2001 census) | - | 162,991 | - | - | - |
| No. of LSMC office staff | 555 | 555 | - | - | - |
| No. of SWM staff | - | - | 202 | - | - |
| Revenue /capita (Rs) | - | 730 | - | - | - |
| Revenue / LSMC office staff (Rs) | 187,000 | 214,000 | - | - | - |
| Estimated SWM expenditure (Rs 000) | - | - | 22,117 | - | 24,600 |
| SWM expenditure/capita (Rs) | - | - | 136 | - | - |
| | - | - | (US\$2) | - | - |
| SWM expenditures/ SWM staff (Rs) | - | - | 109,000 | - | - |

Source: Information from UDLE of GTZ, Presentation data of LSMC, and Budget Report of LSMC

3. Bhaktapur Municipality

a. Actual Fiscal Balance and Budget

(million Rs)

| Items | | | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 | |
|-------------------|-----------------------|----------------------|-----------|-----------|-----------|-----------|-----------|-------|
| | | | (2057/58) | (2058/59) | (2059/60) | (2060/61) | (2061/62) | |
| | | | Actual | Actual | Actual | Actual | Budget | |
| Opening Balance | | | 12.3 | 38.0 | 34.9 | 18.8 | 23.9 | |
| Revenue | Tax | Local Develop. Fee | 21.3 | 23.1 | 21.4 | 21.4 | 21.4 | |
| | | Property Tax | - | 0.3 | 0.3 | 0.6 | 0.6 | |
| | | Professional Tax | 1.4 | 1.6 | 1.5 | 2.4 | 2.7 | |
| | | Others | 2.4 | 1.1 | 1.6 | 0.4 | 0.7 | |
| | | Total | 25.1 | 26.1 | 24.8 | 24.8 | 25.4 | |
| | Fees/Charges & Others | Services Fee | 80.4 | 54.4 | 44.1 | 65.3 | 68.3 | |
| | | Building Permit | 1.4 | 1.8 | 1.6 | 0.5 | 0.8 | |
| | | Others | 5.5 | 35.8 | 26.3 | 35.9 | 51.4 | |
| | Total | | | 87.3 | 92.0 | 72.0 | 101.7 | 120.5 |
| | Grants | | | 0.5 | 0 | 0.4 | 1.5 | 9.7 |
| Debt | | | 0 | 0 | 0 | 0 | 0 | |
| Total of Revenue | | | 112.9 | 118.1 | 97.2 | 128.0 | 155.6 | |
| Expen- -diture | Current | Personnel Expenses | 19.3 | 20.2 | 18.7 | 17.4 | 22.4 | |
| | | Repair & Maintenance | 1.0 | 0.9 | 1.0 | 0.9 | 1.5 | |
| | | Fuel | 1.1 | 0.9 | 0.9 | 1.2 | 1.3 | |
| | | Others | 7.6 | 7.4 | 4.5 | 7.2 | 8.8 | |
| | | Total | 29.0 | 29.4 | 25.1 | 26.7 | 34.0 | |
| | Social Program | | | 13.3 | 16.0 | 48.0 | 68.9 | 105.1 |
| | Capital | Vehicles | 0.8 | - | 0 | 0.1 | 0.1 | |
| | | Machinery & Equip. | 0.6 | 1.9 | 0 | 0 | 0.3 | |
| | | Land/Building | 0 | 1.4 | 30.1 | 3.8 | 12.5 | |
| | | Other Development | 49.6 | 70.2 | 10.1 | 21.3 | 22.2 | |
| | | Others | 0.2 | 1.2 | 0 | 0.2 | 1.8 | |
| | Total | | | 51.2 | 74.8 | 40.2 | 25.4 | 36.9 |
| | Debt Payment | | | 0 | 0 | 0 | 1.8 | 3.4 |
| | Total of Expenditure | | | 93.5 | 120.2 | 113.3 | 122.9 | 179.5 |
| Closing Balance | | | 31.7 | 35.9 | 18.8 | 23.9 | 0 | |

Note: Opening balance is not equal to previous closing balance because of inconsistency between budget balance and outstanding bank account due to account system

Source: Information from UDLE of GTZ and Budget Report of BKM

b. Other Indicators

| Items | 2000/01 (2057/58) | 2001/02 (2058/59) | 2002/03 (2059/60) | 2003/04 (2060/61) | 2004/05 (2061/62) |
|------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Population (2001 census) | - | 72,543 | - | - | - |
| No. of BKM office staff | 447 | 430 | - | - | - |
| No. of SWM staff | - | - | 212 | - | - |
| Revenue /capita (Rs) | - | 1,630 | - | - | - |
| Revenue / BKM office staff (Rs) | 253,000 | 275,000 | - | - | - |
| Estimated SWM expenditure (Rs 000) | 13,315 | 14,854 | 14,867 | 14,851 | 19,700 |
| SWM expenditure/capita (Rs) | - | 205 | - | - | - |
| | - | (US\$2.9) | - | - | - |
| SWM expenditures/SWM staff (Rs) | - | - | 70,000 | - | - |

Source: Information from UDLE of GTZ, Presentation data of BKM, and Budget Report of BKM

4. Madhyapur Thimi Municipality

a. Actual Fiscal Balance and Budget

(million Rs)

| Items | | | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 | |
|----------------------|--------------------------|----------------------|-----------|-----------|-----------|-----------|-----------|------|
| | | | (2057/58) | (2058/59) | (2059/60) | (2060/61) | (2061/62) | |
| | | | Actual | Actual | Actual | Actual | Budget | |
| Opening Balance | | | 9.6 | 0.5 | 5.8 | 12.8 | 11.8 | |
| Revenue | Tax | Local Develop Fee | 12.0 | 12.9 | 11.9 | 11.9 | 11.9 | |
| | | Property Tax | - | 1.4 | 1.0 | 1.1 | 1.3 | |
| | | Professional Tax | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | |
| | | Others | 0.7 | 0.1 | 0.1 | 0.1 | 0.2 | |
| | Total | | 12.9 | 14.6 | 13.2 | 13.3 | 13.7 | |
| | Fees/Charges & Others | Services Fee | 0.1 | 2.1 | 1.1 | 0.3 | 1.8 | |
| | | Building Permit | 0.6 | 1.4 | 2.6 | 2.4 | 3.2 | |
| | | Others | 1.2 | 0.9 | 3.3 | 1.4 | 3.2 | |
| | Total | | 1.9 | 4.4 | 7.0 | 4.1 | 8.2 | |
| | Grants | | | 1.7 | 2.4 | 2.5 | 5.5 | 12.4 |
| Debt | | | 0 | 0 | 0 | 1.8 | 0 | |
| Total of Revenue | | | 16.5 | 21.4 | 22.7 | 24.7 | 34.3 | |
| Expen- -diture | Current | Personnel Expenses | 5.0 | 5.5 | 4.6 | 5.1 | 5.4 | |
| | | Repair & Maintenance | 0.3 | 0.4 | 0.6 | 0.5 | 0.5 | |
| | | Fuel | 0.3 | 0.5 | 0.3 | 0.4 | 0.5 | |
| | | Others | 2.2 | 3.8 | 4.1 | 2.1 | 2.3 | |
| | Total | | 7.8 | 10.2 | 9.6 | 8.1 | 8.7 | |
| | Social Program | | | 1.7 | 2.2 | 2.0 | 1.8 | 5.9 |
| | Capital | Vehicles | 0 | 0 | 0 | 0.2 | 0.5 | |
| | | Machinery & Equip. | 1.0 | 0 | 0.5 | 0 | 0 | |
| | | Land/Building | 0 | 0.7 | 0 | 0 | 0 | |
| | | Other Development | 12.1 | 7.6 | 2.9 | 5.5 | 15.8 | |
| | | Others | 0 | 0 | 0.1 | 5.1 | 15.2 | |
| | Total | | 13.1 | 8.3 | 3.5 | 10.8 | 31.5 | |
| | Debt Payment | | | 0 | 0 | 0 | 0 | 0 |
| Total of Expenditure | | | 22.6 | 20.7 | 15.1 | 20.8 | 46.1 | |
| Closing Balance | | | 48.7 | 12.0 | 13.4 | 16.7 | 0 | |

Note: Opening balance is not equal to previous closing balance because of inconsistency between budget balance and outstanding bank account due to account system

Source: Information from UDLE of GTZ and Budget Report of MTM

b. Other Indicators

| Items | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|------------------------------------|-----------|-----------|-----------|-----------|-----------|
| | (2057/58) | (2058/59) | (2059/60) | (2060/61) | (2061/62) |
| Population (2001 census) | - | 47,751 | - | - | - |
| No. of MTM office staff | 78 | 83 | 83 | - | - |
| No. of SWM staff | - | - | - | 22 | - |
| Revenue of MTM /capita (Rs) | - | 450 | - | - | - |
| Revenue / MTM office staff (Rs) | 212,000 | 258,000 | 273,000 | - | - |
| Estimated SWM expenditure (Rs 000) | 250 | 650 | 300 | 550 | 1,500 |
| SWM expenditures/ capita (Rs) | - | 14 | - | - | - |
| | - | (US\$0.2) | - | - | - |
| SWM expenditures/staff (Rs) | - | - | - | - | - |

Source: Information from UDLE of GTZ, Presentation data of MTM, and Budget Report of MTM

5. Kirtipur Municipality

a. Actual Fiscal Balance and Budget

(million Rs)

| Items | | | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 | |
|----------------------|--------------------------|----------------------|-----------|-----------|-----------|-----------|-----------|------|
| | | | (2057/58) | (2058/59) | (2059/60) | (2060/61) | (2061/62) | |
| | | | Actual | Actual | Actual | Actual | Budget | |
| Opening Balance | | | - | 0.4 | 0.2 | 3.6 | 4.4 | |
| Revenue | Tax | Local Develop. Fee | 11.4 | 13.9 | 11.9 | 11.9 | 13.7 | |
| | | Property Tax | 0 | 1.0 | 1.0 | 1.0 | 1.1 | |
| | | Professional Tax | 0.2 | 0.3 | 0.2 | 0.2 | 0.3 | |
| | | Others | 1.8 | 0.8 | 0.8 | 0.9 | 1.0 | |
| | Total | | 13.4 | 16.0 | 13.9 | 14.0 | 16.1 | |
| | Fees/Charges & Others | Services Fee | 0.1 | 0.1 | 0.2 | 0.3 | 0.7 | |
| | | Building Permit | 0 | 0.6 | 0.8 | 2.2 | 2.2 | |
| | | Others | 1.0 | 0.6 | 0.8 | 1.1 | 1.1 | |
| | Total | | 1.1 | 1.3 | 1.8 | 3.6 | 4.0 | |
| | Grants | | | 2.2 | 3.1 | 1.7 | 6.6 | 16.2 |
| Debt | | | 0 | 0 | 0 | 0 | 0 | |
| Total of Revenue | | | 16.7 | 20.4 | 17.4 | 24.2 | 36.3 | |
| Expen- -diture | Current | Personnel Expenses | 4.1 | 4.4 | 3.6 | 4.8 | 6.6 | |
| | | Repair & Maintenance | 0.3 | 0.8 | 0.3 | 0.3 | 0.4 | |
| | | Fuel | 0.4 | 0.8 | 0.3 | 0.6 | 0.5 | |
| | | Others | 1.9 | 2.1 | 1.1 | 1.6 | 2.1 | |
| | Total | | 6.7 | 8.1 | 5.3 | 7.3 | 9.6 | |
| | Social Program | | | 1.7 | 2.3 | 1.6 | 0.7 | 1.5 |
| | Capital | Vehicles | 0.7 | 0 | 0.1 | 0 | 0.1 | |
| | | Machinery & Equip. | 0.1 | - | - | 0.1 | 0.1 | |
| | | Land/Building | 0.5 | 0.1 | 0 | | 0 | |
| | | Other Development | 6.9 | 10.0 | 5.3 | 10.8 | 15.4 | |
| | | Others | - | - | - | 4.4 | 14.0 | |
| | Total | | 8.2 | 10.1 | 5.4 | 15.3 | 29.6 | |
| | Debt Payment | | | 0 | 0 | 0 | 0 | 0 |
| Total of Expenditure | | | 16.6 | 20.5 | 12.3 | 23.3 | 40.7 | |
| Closing Balance | | | 0.1 | 0.3 | 5.3 | 4.5 | 0 | |

Note: Opening balance is not equal to previous closing balance because of inconsistency between budget balance and outstanding bank account due to account system

Source: Information from UDLE of GTZ and Budget Report of KRM

b. Other Indicators

| Items | 2000/01 (2057/58) | 2001/02 (2058/59) | 2002/03 (2059/60) | 2003/04 (2060/61) | 2004/05 (2061/62) |
|------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Population (2001 census) | - | 40,835 | - | - | - |
| No. of KRM office staff | 85 | 77 | - | - | - |
| No. of SWM staff | - | - | - | - | - |
| Revenue of KRM /capita (Rs) | - | 500 | - | - | - |
| Revenue / KRM office staff (Rs) | 196,000 | 265,000 | - | - | - |
| Estimated SWM expenditure (Rs 000) | 168 | 298 | 147 | 154 | 650 |
| SWM expenditure/capita (Rs) | - | 7 | - | - | - |
| | - | (US\$0.1) | - | - | - |
| SWM expenditures/SWM staff (Rs) | - | - | - | - | - |

Source: Information from UDLE of GTZ, Presentation data of KRM, and Budget Report of KRM