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ENGLISH ONLY

REPORT

REGIONAL WORKSHOP ON MUNICIPAL SOLID WASTE MANAGEMENT

Convened by the

WESTERN PACIFIC REGIONAL CENTRE
FOR THE PROMOTION OF ENVIRONMENTAL PLANNING
AND APPLIED STUDIES
(PEPAS)

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NOTE

The views expressed in this report are those of the participants in the workshop and do not necessarily reflect the policies of the World Health Organization.

This report has been prepared by the Western Pacific Regional Centre for the Promotion of Environmental Planning and Applied Studies (PEPAS) for Governments of Member States in the Region and for the participants in the Regional Workshop on Municipal Solid Waste Management, held in Kuala Lumpur, Malaysia, from 26 February to 2 March 1990.

CONTENTS

1. INTRODUCTION

The Regional Workshop on Municipal Solid Waste Management was held at the WHO Western Pacific Regional Centre for the Promotion of Environmental Planning and Applied Studies (PEPAS) on the campus of the University of Agriculture, Malaysia (Universiti Pertanian Malaysia), Serdang, Selangor, Malaysia from 26 February to 2 March 1990.

The workshop was organized by WHO through its Special Programme on Technology Transfer funded by the Government of Japan. It was attended by 21 participants from 10 countries in the WHO Western Pacific Region and 5 participants from Indonesia and Thailand. The attendance of the Indonesian and Thai participants was funded by the World Bank. In addition, a representative of ESCAP (Economic and Social Commission for Asia and the Pacific), three staff of the World Bank, an observer from the International Reference Centre for Wastes Disposal and two observers from Malaysia representing the Ministry of Housing and Local Government and the University of Agriculture, Malaysia also attended the workshop. Two of the World Bank staff served as resource persons during the workshop.

A list of the participants, representatives, observers and secretariat members is presented in Annex 1.

2. OPENING SESSION

Following brief introductory remarks by Dr P. Guo, Director, PEPAS, the WHO Representative for Brunei Darussalam, Malaysia and Singapore, Dr L.R. Verstuyft, delivered a message on behalf of Dr S.T. Han, Regional Director, WHO Regional Office for the Western Pacific. The message stressed the importance of the workshop objectives and indicated the underlying reasons which led to its organization. The full text of the message is given in Annex 2.

Delivering the welcoming address, Professor Dr Syed Jalaludin Syed Salim, Deputy Vice-Chancellor of the University of Agriculture, Malaysia expressed the interest of the University in the subject matter of the workshop and wished all the participants a fruitful and pleasant stay in Malaysia.

Dr Guo, the Operational Officer for the workshop, thanked the Deputy Vice-Chancellor. He then introduced Dr H. Ogawa, the Co-operational Officer, who in turn introduced the consultants and resource persons and requested the participants to introduce themselves one by one.

3. OBJECTIVES

The objectives of the workshop were:

(a) to exchange information and experience regarding the development of national programmes for municipal solid waste management;

(b) to identify problems associated with municipal solid waste management in the countries/areas of the Region;

(c) to review draft criteria and guidelines for the formulation and implementation of national action plans; and

(d) to prepare work plans for the formulation and implementation of national action plans.

4. WORKSHOP PROGRAMME

The workshop agenda and list of documents distributed during the workshop including working papers and country reports are given in Annexes 3 and 4 respectively.

Copies of the country reports prepared by the participants and working papers prepared by WHO staff, consultants, the World Bank staff and participants were distributed. Copies of all the handouts are available on request from PEPAS. A summary of the country reports is given in Annex 5.

The opening session of the workshop was chaired by Dr Guo. The remaining sessions of the five-day workshop were chaired by Dr Ogawa. The working papers were presented by Dr Ogawa; Dr K. Sakurai, WHO consultant; Mr K. Sinha, WHO temporary adviser; Mr S. Arlosoroff and Dr C. Bartone, World Bank staff; and Mr J.Y. Ko, a participant from the Republic of Korea. Country reports were presented by the participants and discussions were held on each presentation.

A field visit to a landfill site in Malacca was organized in the morning of the third day to study the landfill operation and resource recycling activities. The afternoon of the third day and the whole of the fourth day were spent in group discussions for the preparation of a preliminary inception report on the formulation and implementation of a national action plan for solid waste management. Groups were formed in such a manner that nine participating countries without national solid waste management action plans were able to receive information and advice from three participating countries which have national solid waste management action plans.

The last day was spent on the presentation of preliminary inception reports by nine countries and the evaluation of the workshop. All the nine inception reports are available on request from PEPAS.

5. PRESENTATION OF PAPERS AND DISCUSSIONS

The first paper was presented by Dr Sakurai. In introducing the development of national action plans for municipal solid waste management, he reviewed the progress made in this aspect in the Western Pacific Region. He concluded his talk by enumerating the reasons that justify the formulation and implementation of national action plans.

His presentation was followed by a discussion centred on the effects of possible changes in socioeconomic conditions on design and operation of solid waste management services. Some participants expressed doubts as to whether the changes would be rapid enough to justify the use of capital-intensive systems in the near future.

The next speaker was Dr Ogawa who presented a paper on the activities carried out by PEPAS in the field of solid waste management. He said that in the past 11 years, PEPAS had carried out more than 20 activities and planned to develop future activities with emphasis on the enhancement of national government capabilities, improvement of solid waste management in small-to-medium-sized cities and towns, development of case studies, demonstration studies and guidance documents, and information exchange in the Region.

Dr Bartone's presentation was on the subject of investing in environmental improvement through solid waste management. Here Dr Bartone viewed the investment in municipal solid waste management as missed opportunities. This was due largely to lack of or insufficient attention given to building institutional capacity, lack of strategic planning, and failure to provide for safe disposal facilities, all of which have led to extensive delays in the execution of the solid waste improvement components and failure to achieve long-term improvement in solid waste management in terms of efficiency and environmental protection. Dr Bartone's paper also touched on World Bank's experience in financing municipal solid waste management improvement projects and also recommended a number of proposals which could lead to significant long-term improvement of solid waste management. Based on these recommendations, this paper focused on the need for research in several areas.

The second paper on World Bank activities was presented by Mr S. Arlosoroff, Manager, UNDP/World Bank East Asia and Pacific Regional Office for Water and Sanitation, who introduced to the participants the UNDP/World Bank Resource Recovery/Waste Management Programme. In his presentation, various recycling and resource recovery activities and disposal practices utilized in developing countries were discussed. In response to a question raised on the issue of organized scavenging, he pointed out that it would be beneficial to organize scavengers at disposal sites instead of eradicating them from these sites. Therefore, he

suggested that the participants study the possibility of utilizing scavengers in an organized manner to recover usable resources from refuse.

The rest of the session on the first day and the morning of the second day was devoted to the presentation of the individual country reports prepared by the participants. After each presentation, a question and answer period followed. The nature of the discussions indicated a keen interest among participants in exchanging information and experience and interacting with other participants.

Dr Sakurai presented his paper in two sessions on the second day. His first session dealt with the preparatory stage of the national solid waste management action plan formulation and implementation projects. In this presentation, he emphasized that lead agencies for these projects must be identified and conceptual frameworks and work plans must be prepared in the form of inception reports by those lead agencies.

In his second session, Dr Sakurai covered the methodologies for the formulation and implementation of action plans. To make plans practical and realistic and ensure the implementability of the resulting plans, he recommended the development and implementation of some model projects, together with the formulation of action plans. He also emphasized the importance of systematic evaluation and adjustment of plans.

The subsequent presentation was on the Malaysian Case Study for the Formulation and Implementation of the National Action Plan (ABC). Introductry remarks were made by Mr Lim Cheng Cheng Tatt, Director-General of Local Government Division, Ministry of Housing and Local Government, Malaysia, who presented a macro scenario of the solid waste management system in local authorities and the need for the Action Plan to address many of the problematic issues related to solid waste management. This was followed by Mr Sinha's presentation on the formulation process of the National Action Plan together with its contents including the programmes that are being implemented and the impact of the National Action Plan on solid waste management activities of the local authorities. Discussions on the Action Plan were held.

The second case study was presented by Mr Ko dealing with the formulation and implementation of the national plan of the Republic of Korea. He clarified the mechanism used and problems encountered in the formulation of the plan. His presentation was followed by a discussion on whether the inclusion of three components (domestic waste, nightsoil and industrial waste) is advisable or not.

6. EVALUATION OF THE WORKSHOP

All the 26 participants of the workshop replied that they were convinced of the necessity of a national solid waste management action plan. Successful examples of national plan development reported by the participants from Malaysia, Korea and Japan were found to be especially useful in convincing other participants.

Of the 26 participants, 22 thought that the workshop had provided sufficient guidance on how to formulate and implement a national solid waste management action plan. Many of them thought that guidelines were clear enough. However, four participants replied that more guidance would be required. Because of different situations prevailing in each country, they thought that guidance should be provided separately for each country.

Many emphasized that they would require, as follow-up activities, completion of inception reports from the preliminary inception reports prepared during the workshop, approval of inception reports by central governments and launching of national solid waste management action plan formulation projects through national workshops. To assist in these activities, they also indicated that completion and dissemination of guidelines by PEPAS would be highly necessary. Information exchange among participating countries on the topics of solid waste management, especially on national action plans, was considered to stimulate continuous efforts in developing national programmes. Participants considered that the information exchange could be carried out through establishment of an information exchange network or organization of a regional follow-up workshop by an international organization such as PEPAS.

7. SUMMARY SESSION

Dr Ogawa summarized the workshop by reviewing what had been achieved and what future action would be necessary. It was noted that in accordance with the objectives of the workshop, the participants had (a) exchanged information and experience regarding the national solid waste management programmes, and identified problems associated with solid waste management through presentation of, and discussion on country reports; (b) reviewed the draft guidelines for the formulation and implementation of national action plans for municipal solid waste management; and (c) prepared preliminary inception reports consisting of conceptual framework and work plan for the action plans.

He also identified future follow-up activities which included (a) completion of the inception reports and subsequently, the national action plans by the participants; (b) conduct of national workshops to promote the national action plans by the participants; (c) completion and dissemination of the guidelines for the formulation and implementation of the national action plans by PEPAS; (d) conduct of regional workshops to assess the progress of the formulation and implementation of the national action plans by PEPAS; and (e) establishment of a Regional information exchange network on solid waste management by PEPAS. The participants were generally supportive of these follow-up activities, and made additional suggestions to PEPAS to hold regional workshops on specific subjects, such as sanitary landfill, recycling and resource recovery, financial systems for solid waste management.

Dr Guo then delivered the closing remarks. He thanked the participants and resource persons for their active contribution to the success of the workshop.

He also urged the participants to share their experience with other countries in the Region and to use the services and facilities provided by PEPAS. He hoped that all participants, after returning to their respective countries, would take action to initiate the formulation and implementation of the national acton plans for municipal solid waste management. He wished the participants a pleasant and safe journey home and declared the workshop officially closed.

8. ACKNOWLEDGEMENTS

Special gratitude is extended to World Bank for providing financial support and resource persons for the workshop, and to the Government of Japan for financial assistance through the Special Programme on Technology Transfer.

Thanks and appreciation are expressed to the authorities of the University of Agriculture, Malaysia and the Ministry of Housing and Local Government, Malaysia for their assistance and cooperation in holding the workshop, and also to the Health Department and its staff of the Malacca Municipal Council for their efforts in making the field visit to the disposal site a great success.

ANNEX 1

LIST OF PARTICIPANTS, REPRESENTATIVES, OBSERVERS AND SECRETARIAT

	Participants	Designation and address
1.	Dr He Gongli	Research Associate Institute of Environmental Health and Engineering Chinese Academy of Preventive Medicine 29 Nan Wei Road Beijing People's Republic of China
2.	Mr Zhang Zhenshan	Engineer Department of City Construction Ministry of Construction BaiWan Zhuang Beijing People's Republic of China
3.	Dr Xu Guihua	Doctor in Charge Office of National Patriotic Health Campaign Committee 44 Hou Hai Bei Yan Beijing People's Republic of China
4.	Mr Uraia N. Lesu	Chief Health Inspector Ministry of Health Box 2223 Suva Fiji
5.	Mr David R. Chandra	Director Health Services Suva City Council P.O. Box 176 Suva Fiji
6.	Mr Budihardjo	Director of Cleanliness Department Dinas Kebersihan (DKI) J. Mandala V Cililitan Besar Jakarta Indonesia
7.	Mr Chaerulmukti	Chief of Planning and Programme Sub-Department Dinas Kebersihan (DKI) J. Mandala V Cililitan Besar Jakarta Indonesia

8.	Mr Budiman-Arif	Chief of Sub-Directorate of Solid Waste Management Directorate of Environmental Sanitation Directorate General of Human Settlement Department of Public Works J. Raden Patah I/i Jakarta Selatan Indonesia
9.	Mr Osamu Ikeda	Deputy Director for International Cooperation Minister's Secretariat Ministry of Health and Welfare 1-2-2 Kasumigaseki, Chiyoda-ku Tokyo 100 Japan
10.	Mr Makoto Saito	Sanitary Engineer and Senior Scientist Division of Sanitary Engineering Institute of Public Health Ministry of Health and Welfare 6-1 Shirokanedai 4 chome, Minato-ku Tokyo 108 Japan
11.	Dr Sayamang	Chief of Department of Hygiene and Epidemiology Ministry of Public Health Vientiane Lao People's Democratic Republic
12.	Dr Sengkeopaseuth Somsy	Project Manager of Water Supply and Environmental Sanitation Ministry of Public Health Vientiane Lao People's Democratic Republic
13.	Mr M. Sugunan Pillay	Chief Public Health Engineer Engineering Services Division Ministry of Health Block E, Jalan Dungun 50490 Kuala Lumpur Malaysia
14.	Mr Tan Hoo	Chief Hospital Engineer Engineering Services Division Ministry of Health Block E, Jalan Dungun 50490 Kuala Lumpur Malaysia

15.	Mr K. Rishyakaran	Director of Technical Unit Ministry of Housing and Local Government Levels 4 & 5, Block K Damansara Town Centre 50644 Kuala Lumpur Malaysia
16.	Mr Nelson Yano	Senior Health Inspector Department of Health P.O. Box 3991 Boroko Papua New Guinea
17.	Mr Kasen Bala	Engineer (Design) Solid Waste Management Lae City Authority P.O. Box 1333 Lae Papua New Guinea
18.	Mr Jose Salvador T. Passe, Jr	Head Solid Waste Management Assistance and Development Program Environmental Management Bureau 6th Floor, PHC Building East Avenue Quezon City Philippines
19.	Mr Gerardo S. Mogol	Sanitary Engineer Environmental Health Service Office of Public Health Services Department of Health San Lazaro Compound Sta.Cruz, Manila Philippines
20.	Mr Jae Young Ko	Director Technology Development Division Ministry of Environment 7-16 Sincheon-Dong Songpa-Gu Seoul Republic of Korea
21.	Mr Hyo-Sung Park	Deputy-Director Project Management Department Environmental Management Corporation 7-16 Sincheon-Dong Songpa-Gu Seoul Republic of Korea

22.	Mr Adisak Thongkaimook	Chief, Solid Waste Section Environmental Quality Standard Division Office of the National Environment Board 60/1 Soi Piboon Watana 7 Rama 6 Road, Bangkok 10400 Thailand
23.	Mr Vullop Pringphong	Chief, Infrastructure Subdivision Office of Urban Development Wang Sunantha Ratchasima Road, Dusit Bangkok 10300 Thailand
24.	Dr Supileo Foliaki	Director of Health Ministry of Health Nuku'alofa Tonga
25.	Mr Ngo Vi Cuong	Director Hanoi Sanitation Company 18 Cao Ba Quat Hanoi Socialist Republic of Viet Nam
26.	Dr Nguyen Huy Nga	Expert Ministry of Health Department of Hygiene and Environment 138A Giang Vo Hanoi Socialist Republic of Viet Nam

Representatives/Observers

1.	Dr Filemon A. Uriarte Jr	Regional Adviser on Environmental Management Divison of Industry Human Settlements and Environment Economic and Social Commission for Asia and the Pacific (ESCAP) United Nations Building Rajadamnern Avenue Bangkok 10200 Thailand
2.	Dr Carl R. Bartone	Senior Environmental Specialist Urban Development Division Infrastructure and Urban Development Department World Bank 1818 H St. N.W. Washington D.C. 20433 United States of America

3.	Mr Saul Arlosoroff	Manager UNDP/World Bank Regional Office for Water and Sanitation [East Asia and Pacific] RELC Building #08-809, 30 Orange Grove Road Singapore 1025 Singapore
4.	Dr Nasiman Sapari	Head Department of Environmental Science Faculty of Science and Environmental Studies University of Agriculture, Malaysia (UPM) 43400 UPM Serdang Selangor Darul Ehsan Malaysia
5.	Mr Werner Paul Meyer	Project Officer Solid Waste Management in Developing Countries International Reference Centre for Wastes Disposal/Swiss Federal Institute for Water Resources and Water Pollution Control (IRCWD/EAWAG) Ueberlandstrasse 133 CH-8600 Duebendorf Switzerland
6.	Mr Engku Azman T. Mat	Public Health Engineer Local Government Division Ministry of Housing and Local Government Levels 4 & 5, Block K Damansara Town Centre 50644 Kuala Lumpur Malaysia
7.	Dr Manida Unkulvasapaul	National Country Officer RAS/86/160 Bangkok Unit World Bank Regional Mission in Bangkok Udom Vidhya Building 5th Floor, 956 Rama IV Road Bangkok 10330 Thailand

Secretariat

1.	Dr Paul Guo	Director, PEPAS
2.	Dr Hisashi Ogawa	Environmental Systems Engineer, PEPAS
3.	Dr Vithya Pienvichitr	Regional Adviser, Environmental Health, WHO Regional Office for South-East Asia
4.	*Dr Kunitoshi Sakurai	WHO Consultant
5.	**Mr Kazal Sinha	WHO Temporary Adviser
6.	Mr Satya Sardana	Administrative Officer, PEPAS
7.	Ms Tan Yit May	Special Assistant, PEPAS

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ANNEX 2

INAUGURAL ADDRESS

Opening address by the WHO Representative on behalf of the Regional Director, WHO Regional Office for the Western Pacific

On behalf of Dr S.T. Han, WHO Regional Director for the Western Pacific Region, I am pleased to welcome you to this five-day Regional Workshop on Municipal Solid Waste Management. As Dr Han is unable to attend the opening of this workshop today, I wish to take this opportunity of reading his message and, at the same time, extending our best wishes to you.

As you are aware, the quality of the environment in many countries, particularly in urban areas, is rapidly deteriorating. Inadequate municipal solid waste management is certainly one of the major contributing factors to the degradation of environmental quality.

In most countries, local governments have authority and responsibility for planning and operating municipal solid waste management in their areas. Although substantial resources are spent each year, the provision of solid waste collection and disposal services by local governments is inadequate and not cost-effective. In order to improve the local governments' solid waste management services, proper guidance and support from the national government are urgently needed.

We have noted that only a few countries in the Western Pacific Region have developed national plans for municipal solid waste management, and programmes carried out by different national agencies are often not well coordinated. Given these observations, we have invited two or more participants from different agencies in each country to guide them in preparing work plans for the formulation of national action plans for municipal solid waste management. The workshop is also designed to transfer know-how from countries who have experience in developing national plans to those who do not have it.

We attach great importance to this workshop because we believe that, through strengthening national governments' capabilities in supporting local governments, municipal solid waste management practices will be improved. I am sure that the workshop will provide a useful forum to exchange information, experience and ideas about the development of national programmes for municipal solid waste management. It will also provide an opportunity to identify problems facing the countries in the Region. I urge you all to participate actively and wish you a fruitful week of discussions, as well as a pleasant stay in Malaysia.

Finally, I would like to say how much we appreciate the substantial support received from the World Bank and the Government of Japan in financing the workshop. Also, as our kind hosts, the Government of Malaysia and the University of Agriculture, Malaysia, have provided valuable support for the workshop, for which we are most grateful.

Thank you.

ANNEX 3

AGENDA

Monday, 26 February 1990

0900 - 0930	Introductory remarks Dr P. Guo, Director, PEPAS
	Opening speech Dr L.R. Verstuyft, WHO Representative for Brunei Darussalam, Malaysia and Singapore on behalf of the Regional Director
	Welcome address Professor Dr Syed Jalaludin Syed Salim, Deputy Vice-Chancellor, University of Agriculture, Malaysia
	Introduction of consultants H. Ogawa
0930 - 1000	Group photograph and coffee/tea break
1000 - 1010	Administrative briefing S. Sardana
1010 - 1030	Introduction of participants and workshop sessions H. Ogawa
1030 - 1100	Introduction to development of national action plans for municipal solid waste management K. Sakurai
1100 - 1120	Review of WHO(PEPAS) programmes on solid waste management H. Ogawa
1120 - 1200	Investing in environment improvements through municipal solid waste management C. Bartone
1200 - 1320	Lunch
1320 - 1400	The UNDP/World Bank Resource Recovery/Waste Management Programme S. Arlosoroff

1400 - 1440	Country reports - China (20 min.) Fiji (20 min.)
1440 - 1510	Coffee/tea break
1510 - 1700	Country reports - Indonesia (20 min.) Japan (50 min.) Lao P.D.R.(20 min.) Malaysia (20 min.)

Tuesday, 27 February 1990

0900 - 1000	Country reports - Papua New Guinea (20 min.) Philippines (20 min.) Republic of Korea(20 min.)
1000 - 1020	Coffee/tea break
1020 - 1120	Country reports - Thailand (20 min.) Tonga (20 min.) Viet Nam (20 min.)
1120 - 1200	Guidelines for the formulation and implementation of national solid waste management action plans K. Sakurai
1200 - 1330	Lunch
1330 - 1400	Guidelines for the formulation and implementation of national solid waste management action plans (Cont'd) K. Sakurai
1400 - 1500	Case study for the formulation and implementation of the Malaysian ABC plan K. Sinha
1500 - 1530	Coffee/tea break and ABC Auto-slide show
1530 - 1600	Case study for the formulation and implementation of the Malaysian ABC plan (Cont'd) K. Sinha

1600 - 1640	Case study for the formulation and implementation of the Korean national plan J.Y. Ko
1640 - 1700	Briefings on development of work plan and field trip K. Sakurai and K. Sinha

Wednesday, 28 February 1990

0730 - 1230	Field trip to landfill site in Malacca K. Sinha
1230 - 1330	Lunch
1330 - 1500	Development of framework for national action plans by each country Assisted by K. Sakurai, K. Sinha, H. Ogawa, C. Bartone, S. Arlosoroff and participants from Japan, Malaysia and the Republic of Korea
1500 - 1520	Coffee/tea break
1520 - 1700	Development of framework for national action plans by each country (Cont'd)

Thursday, 1 March 1990

0900 - 1020	Development of framework for national action plans by each country (Cont'd)
1020 - 1040	Coffee/tea break
1040 - 1220	Preparation of work plan by each country Assisted by K. Sakurai, K. Sinha, H. Ogawa, C. Bartone, S. Arlosoroff and participants from Japan, Malaysia and the Republic of Korea
1220 - 1330	Lunch
1330 - 1500	Preparation of work plan by each country (Cont'd)
1500 - 1520	Coffee/tea break

1520 - 1700	Preparation of work plan by each country (Cont'd)
Friday, 2 March 1990	
0900 - 1030	Presentation and discussion on work plans - China (30 min.) Fiji (30 min.) Indonesia (30 min.)
1030 - 1050	Coffee/tea break
1050 - 1220	Presentation and discussion on work plans - Lao P.D.R. (30 min.) Papua New Guinea (30 min.) Philippines (30 min.)
1220 - 1400	Lunch
1400 - 1530	Presentation and discussion on work plans - Thailand (30 min.) Tonga (30 min.) Viet Nam (30 min.)
1530 - 1600	Summary
1600 - 1620	Closing remarks Dr P. Guo
	Coffee/tea

ANNEX 4

LIST OF DOCUMENTS DISTRIBUTED DURING WORKSHOP

Working papers

WPR/RUD/PEPAS(1)/90.2	GUIDELINES FOR THE FORMULATION AND IMPLEMENTATION OF NATIONAL SOLID WASTE MANAGEMENT ACTION PLANS. By Dr Kunitoshi Sakurai.
WPR/RUD/PEPAS(1)/90.3	REVIEW OF WHO(PEPAS) PROGRAMMES ON SOLID WASTE MANAGEMENT. By Dr Hisashi Ogawa.
WPR/RUD/PEPAS(1)/90.4	INVESTING IN ENVIRONMENT IMPROVEMENTS THROUGH MUNICIPAL SOLID WASTE MANAGEMENT. By Dr Carl Bartone.
WPR/RUD/PEPAS(1)/90.5	THE UNDP/WORLD BANK RESOURCE RECOVERY/WASTE MANAGEMENT PROGRAMME. By Mr Saul Arlosoroff.
WPR/RUD/PEPAS(1)/90.6	CASE STUDY FOR THE FORMULATION AND IMPLEMENTATION OF THE MALAYSIAN ABC PLAN. By Mr Kazal Sinha.
WPR/RUD/PEPAS(1)/90.7	CASE STUDY FOR THE FORMULATION AND IMPLEMENTATION OF THE KOREAN NATIONAL PLAN. By Mr Jae Young Ko.

Country reports

WPR/RUD/PEPAS(1)INF./1	PEOPLE'S REPUBLIC OF CHINA. By Dr Xu Guihua, Mr Zhang Zhenhan and Dr He Gongli.
WPR/RUD/PEPAS(1)INF./2	FIJI. By Messrs David R. Chandra and Uraia Lesu.
WPR/RUD/PEPAS(1)INF./3 (Revised)	INDONESIA. By Messrs Budihardjo, Chaerulmulti and Budiman-Arif.
WPR/RUD/PEPAS(1)INF./4	JAPAN. By Messrs Osamu Ikeda and Makoto Saito.
WPR/RUD/PEPAS(1)INF./5	LAO PEOPLE'S DEMOCRATIC REPUBLIC. By Drs Sayamang and Somsy Sengkeopaseuth
WPR/RUD/PEPAS(1)INF./6	MALAYSIA. By Messrs M. Sugunan Pillay, Tan Hoo and K. Rishyakaran.
WPR/RUD/PEPAS(1)INF./7 (Revised)	PAPUA NEW GUINEA. By Mr Nelson Yano.
WPR/RUD/PEPAS(1)INF./7 (Addendum)	PAPUA NEW GUINEA. By Mr Kasen Bala - Discussion of municipal solid waste management "Matter in the wrong place".
WPR/RUD/PEPAS(1)INF./8	PHILIPPINES. By Messrs J. Salvador Passe, Jr and Gerardo S. Mogol.
WPR/RUD/PEPAS(1)INF./9	REPUBLIC OF KOREA. By Messrs Jae Young Ko and Hyo-Sung Park.

WPR/RUD/PEPAS(1)INF./10	THAILAND. By Messrs Adisak Thongkaimook and Vullop Pringphong.
WPR/RUD/PEPAS(1)INF./11	TONGA. By Dr Supileo Foliaki.
WPR/RUD/PEPAS(1)INF./12	SOCIALIST REPUBLIC OF VIET NAM. By Dr Nguyen Huy Nga and Mr Ngo Vi Cuong.

Others

WPR/RUD/PEPAS(1)INF./13	JAPANESE GOVERNMENT FOREIGN AID PROGRAMMES ON SOLID WASTE MANAGEMENT. By Dr Kunitoshi Sakurai, Mr Osamu Ikeda and Mr Makoto Saito
WPR/RUD/PEPAS(1)INF./14	NOTES ON THE PREPARATION OF PRELIMINARY INCEPTION REPORT FOR A NATIONAL SOLID WASTE MANAGEMENT ACTION PLAN
WPR/RUD/PEPAS(1)INF./15	INTERNATIONAL EXPERT GROUP SEMINAR ON POLICY RESPONSES TOWARDS IMPROVING SOLID WASTE MANAGEMENT IN ASIAN METROPOLIES, 16-21 OCTOBER 1989, KITAKYUSHU DECLARATION
WPR/RUD/PEPAS(1)INF./16	ACTION PLAN FOR A BEAUTIFUL AND CLEAN MALAYSIA (ABC). By the Technical Section, Local Government Division, Ministry of Housing and Local Government, Malaysia.
WPR/RUD/PEPAS(1)INF./17	PEOPLE'S LIVES AND REFUSE. By Environmental Department, Musashino City Council, Japan.

Publications

(1) MANAGEMENT OF SOLID WASTES IN DEVELOPING COUNTRIES. By Frank Flintoff, WHO/SEARO

(2) SOLID WASTE MANAGEMENT SELECTED TOPICS. Edited by Michael J. Suess, WHO/EURO

Note: Copies of the documents are available on request from PEPAS.

ANNEX 5

SUMMARY OF COUNTRY REPORTS

(1) People's Republic of China

The total area of the People's Republic of China is 9.6 million square kilometres and the population about 1 096 million. In China, management of refuse and nightsoil is handled by the Ministry of Construction; Ministry of Public Health; and the National Patriotic Health Campaign Committee and their local agencies, and their respective responsibilities are: construction of sanitary facilities, supervision of health conditions, and guidance for health-related activities. Solid waste management in cities is carried out by environmental sanitation agencies which are under the Ministry of Construction. Approximately 260 000 persons are working in the collection, haulage and disposal of 57 million tonnes per year of solid wastes generated by the 150 million urban population.

Regulations, technological policies and standards of environmental sanitation have been developed by the central government. Many researches have been conducted by more than 20 environmental health institutions while some univiersities now have courses on solid waste management. In addition, training activities have been carried out frequently in recent years in cooperation with WHO.

In spite of these efforts, the rate of sanitary treatment and disposal of solid waste is no more than 5%-10%. The quantity of municipal solid waste increases at a rate of 10% per year and the total amount is expected to reach 90 million tonnes per year by 2000.

(2) Fiji

Fiji comprises over 300 islands and islets with a total land area of 18 333 square kilometres and an estimated population at the end of 1989 of 727 104. The climate is tropical with an average temperature of 25°C.

Migration has been the most significant factor in the process of urbanization, and the 1986 census showed that 38.7% of the population lived in urban areas. The urbanization has resulted in overcrowding and insufficient provision of housing, water supply, sewerage and refuse collection and disposal services, threatening public health in urban areas.

The national agencies concerned with solid waste management are the Central Board of Health, the Directorate of Town and Country Planning, and the Ministry of Housing and Urban Development. The relevant legislation includes the Public Health Act, the Local Government Act and the Town Planning Act. Apart from these acts and subsidiary regulations, no documented national policy or objectives have been formulated.

There has been little national government input to municipal solid waste management. Only recently, an effort has been made to locate a suitable site and method of final disposal for the Suva City Council and neighbouring local authorities.

There is an urgent need to strengthen the functions of relevant national agencies with skilled personnel and expertise to formulate plans and strategies for municipal solid waste management.

(3) Indonesia

Indonesia is an archipelago of over 13 677 islands with a total land area of over 2 027 087 square kilometres and a population of about 175.6 million. Mortality and morbidity data show that 80% of all endemic diseases are waterborne-related but have been declining as a result of health improvement programmes.

Solid waste management is the responsibility of the Level II Local Government with the Central Government playing an advisory and regulatory role.

In small cities, the level of solid waste collection service is about 30% of urban areas where collection is mainly from commercial areas, markets and city centres. In other areas, the waste is handled individually by the people or community.

In Indonesia, collection is labour-intensive and the collection vehicles used are handcarts and different types of compactor vehicles depending on the area. In most cases, collection is done by handcarts which are then brought to a collection point where the refuse is transferred onto transportation vehicles while in other areas, the refuse is collected by handcarts, and transferred to a larger storage bin of a roll-on roll-off type which is then directly hauled to the disposal site.

Most of the solid waste is stored in plastic bins, concrete boxes, oil drums or plastic bags. These wastes are then transferred to disposal sites where open dumping is a common practice. In Bandung, Jakarta and Sevakarta, however, sanitary landfills are being applied while in Bogar and Denpasar, controlled tipping is being practised.

Solid waste management expenditure takes up about 5%-7% of the total municipal expenditure. The average cost of operation and maintenance is about US$1.40/capita/year. Due to its low priority and limited budget, the level of service has been poor.

The report also touches on the analysis of the existing solid waste management system in Indonesia and the efforts being made to formulate and implement national action plans to overcome solid waste management problems.

(4) Japan

Japan is an archipelago with a total land area of over 380 000 square kilometres and a population of about 123 million. Rapidly aging population is the most important social and economic problem.

The Ministry of Health and Welfare is responsible for solid waste management at the national level. The Ministry prepares plans for technical research and development and furnishes the necessary technical and financial assistance to municipal and prefecture governments. The

national government provides financial assistance to municipal governments for a portion of the construction cost of disposal facilities.

A total of 123 000 tonnes of municipal solid waste is generated daily from residential, commercial and other sources in Japan. The municipalities themselves collect 85% of this total amount of waste while the remaining is collected by private contractors. About 73% of the total municipal solid waste collected is incinerated and about 0.1%-0.2% composted while the rest is directly landfilled.

Recycling of cans, scrap metals, paper and bottles is carried out in many municipalities, and approximately 30% of incinerators in Japan recover and use waste heat, some of which generate electric power.

The main problems associated with solid waste management in Japan include handling of waste dry battery cells and locating of landfill sites.

(5) Lao People's Democratic Republic

The Lao People's Democratic Republic is a landlocked country with a land area of about 237 000 square kilometres and a population of 4.0 million. Its per capita GNP is US$156 per year.

At the national level, the municipal solid waste management is the responsibility of the community water supply and sanitation programme of the Ministry of Public Health. However, because of the very limited revenue of the nation and the existence of many other high priority tasks, the municipal solid waste management has been completely left in the hands of local governments without any assistance from the central government.

As such, even in the case of the capital city, Vientiane, only one-third of solid wastes generated is collected.

Along with the improvement of economic situation, municipal solid waste management will become more important and experts, budget and equipment will be required at national and local levels.

(6) Malaysia

Malaysia covers an area of 330 434 square kilometres and its total estimated population in 1989 is 17.4 million. Climatically, Malaysia belongs to an equatorial tropic with a high and uniform temperature.

The GNP of Malaysia is US$18 000 million with the per capita GNP amounting to US$1 300. Malaysia is predominantly an agricultural country although the manufacturing industries have rapidly been growing.

Various national government agencies are directly and indirectly responsible for solid waste management. The Technical Unit of the Local Government Division of the Ministry of Housing and Local Government acts as the focal point while the Department of Environment and the Ministry of Health are indirectly involved in solid waste management. In addition, the Economic Planning Unit and the Ministry of Finance at the national level are involved in the financing of solid waste management projects.

The Local Government Act of 1976 is the main legislation which makes local authorities responsible for all matters pertaining to solid waste and nightsoil management. The national policy and action plan for municipal solid waste management were formulated in 1988 as the Action Plan for a Beautiful and Clean Malaysia (ABC Plan). Several priority programmes in this action plan have been implemented since then.

(7) Papua New Guinea

Papua New Guinea occupies a land area of 463 840 square kilometres and is equatorial in climate. The country is rich in natural resources including gold, copper, lead, zinc, chrome and nickel.

Papua New Guinea is a growing nation with rapid urbanization taking place in population centres. It is in these urban centres that the environment is severely deteriorating because of inadequate solid waste management services.

The national agency responsible for solid waste management is the Department of Health. However, the Department's 1986-1990 National Health Plan did not include a section on solid waste management. The relevant laws governing solid waste management are the Public Health Act, the Environmental Planning Act and the Environmental Contaminants Act.

Other agencies involved in solid waste management at the national level include the Department of Environment and Conservation and the Department of Works. The Department of Environment and Conservation is responsible for protection of the environment and natural resources while the Departments of Works and Health provide guidance for the operational aspects of solid waste management

Except for two national workshops, there has been no noteworthy programme carried out by the national government. However, the Department of Health is currently preparing the policies of solid waste management programme to be included in the 1991-1995 National Health Plan.

(8) Philippines

The Philippines is an archipelago of 7 000 islands with a total land area of over 300 000 square kilometres and a population of about 60 million.

There is no national government agency which is responsible for overseeing the management of solid waste in the country. While there are legal issuances, no mechanism has been established to implement the intents and purposes of the said policies. A Presidential Task Force has been created to oversee waste management in the country. The Task Force conceptualized an integrated solid waste management plan for Metro Manila which is now in its initial stage of implementation. Monitoring and enforcement of solid waste management systems are carried out by the regional offices of the Department of Environment and Natural Resources, the Department of Health and the Environmental Management Bureau.

A solid waste management assistance and development programme has been implemented by the Environmental Management Bureau. The programme has

administered six major projects, including sanitary landfill development; resource recovery/recycling; biogas system; repair, maintenance and acquisition of refuse collection vehicles; and preparation of master plans. Another project that has been implemented is the Regional Cities Development Project (RCDP) where sanitary landfill sites are being developed in place of existing open dumps.

Sources of municipal solid waste are mainly household, commercial, street sweeping and agriculture while storage containers vary from metal bins to plastic pails, baskets and plastic bags.

Collection is either curbside or point collection. However, frequency of collection is determined by the volume of waste generated and availability of funds for collection. Final disposal sites are operated mainly by open dumping. Resource recovery/recycling is carried out by the private sector on an informal basis.

Insufficient funding, lack of systematic approaches and inadequate database are the major managerial problems of solid waste management in the country.

(9) Republic of Korea

Because of rapid urbanization and industrialization, the Republic of Korea is experiencing a drastic increase in the quantity of solid wastes generated by both domestic and industrial sources, some of which are hazardous. Per capita generation of domestic waste is quite high at the level of 2.17 kg/capita/day in 1988. This high generation rate is greatly due to the general use of coal briquette for heating and cooking purposes. Along with the rapid shift of energy sources, the characteristics of domestic waste is also changing.

Recently, solid waste management has started receiving greater attention in Korea because of the ever increasing refuse problems. The major problems are: (a) a rapid increase in waste amount; (b) lack of landfill site; (c) low investment on solid waste management facilities; and (d) outdated collection and transportation system. The Ministry of Environment (MOE) has set policies and goals to overcome these problems. The initiative of MOE includes the promulgation of the Waste Management Law which encourages separate collection of combustibles, non-combustibles and recyclables, and the construction of a large regional landfill in the metropolitan area. MOE is also encouraging the construction of incineration plants in large cities.

(10) Thailand

Thailand has a land area of about 513 115 square kilometres with a population of about 57.2 million.

At the national level, the National Environment Board is responsible for the development of policies and guidelines as well as training programmes for solid waste management while the Department of Health and the Department of Public Works are responsible for the operational aspects. The Public Health Division at the local government level is responsible for management and operations of solid waste collection and disposal services.

The rate of solid waste generation is about 0.66 kg/capita/day, and vegetable/putrescible and paper waste make up the largest portion of the total weight. Except for Bangkok Metropolis, solid waste collection is carried out by non-compaction type trucks or roll-on roll-off collection vehicles. Disposal sites in all parts of the country consist of open dumps. Resource recovery/recycling is informal.

Many studies concerning solid waste management in Bangkok and other cities have been carried out, but due to financial constraints, most of the recommended plans have not been implemented.

(11) Tonga

The total land area of the Kingdom of Tonga's 171 islands is 750 square kilometres, spread over 360 000 square kilometres of ocean. The climate is subtropical with the mean annual temperature of 23.7°C. The population of Tonga is estimated to be 94 500, inhabiting 36 islands. About 63 600 persons live in the main island, Tongatapu, of which 28 900 live in the nation's capital, Nuku'alofa. Rapid urbanization has taken place in Nuku'alofa with an annual population growth of 9.5% in the last five years.

The main legislation governing the management of solid wastes is the Refuse Disposal Act of 1936. The agency responsible for solid waste management is the Environmental Health Section of the Ministry of Health, which provides solid waste collection and disposal services in Nuku'alofa and Neiafu. In other urban or rural areas, no service is provided.

Except for a recent visit by a PEPAS staff member who assessed the solid waste management in Nuku'alofa, no study has been carried out on Tonga's solid waste management problems.

(12) Socialist Republic of Viet Nam

Viet Nam has a population of 64 million and a land area of 330 000 square kilometres. Its per capita GNP is US$160/year.

The national policy on solid waste management has been determined by the Law of Public Health Protection (1989). By this law, the Ministry of Health is responsible for sanitation inspection including solid waste management. Actual operation of solid waste management is carried out by sanitation companies created by the local people's committees in the case of large cities such as Hanoi, Ho Chi Minh City, Haiphong and Danang.

The municipal solid waste in Viet Nam has a high content of organic compostable matter. As such, composting is used as the processing method in Hanoi and Ho Chi Minh City. The government's intended strategy is to construct composting plants in and around the urban centres. As for the final disposal, a large part of the refuse is still being open-dumped.

The first national workshop on solid waste management was held in March 1989 in cooperation with WHO, which served to promote greater awareness of the importance of solid waste management. Based on the improved awareness, a task force involving relevant agencies will be created to initiate various solid waste management activities at the national level.