

Sustainable Waste Management through International Cooperation: Review of Comprehensive Waste Management Technique 2 Training Course

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Abstract

Borderless effect of environmental disaster and health infection caused by improper waste handling had caused deterioration of natural resources. The negative impact can be seen especially in developing countries who still seek for suitable approach in managing solid waste management effectively. International cooperation through cross-cultural technology transfer of waste management methods and techniques have been framed as one possible role of developed country can offer to developing countries to reduce the impact of waste management globally. The purpose of this study is to analyze the technical transferability factor of cross-cultural training course, referencing the course built up syllabus, but will primarily focus on participant country report and action plan to determine the beneficial level.

Keywords: International Cooperation, Sustainability, Technical Transferability.

1. Introduction

Solid Waste Management (SWM) has seen as part of global concern for sustainability and overflows national boundaries in term of problems and possible solution (Fagan et al., 2001). Due to improper SWM, waste has become one of pollution source that had caused diverse environment impact as well as detrimental towards human health and safety. The impact of pollution on eco-cycle and health infection due to waste handling process can be seen especially in developing countries. Developing countries facing great challenges in handling SWM where integrated SWM concept almost invisible compared to developed countries. Vast amount of financial resources allocated for handling solid waste management but had failed to lead to improvement. However, without clear implementation policy, proper technique and knowledgeable manpower, sustainable solid waste management is hard to achieve. Thus educating local manpower with appropriate resource would enhance their ability in handling waste management and could be an alternative approach to increase the efficiency of current system.

Developed countries involvement in international cooperation have played major role in assisting developing countries through technology transfer has seen as important contribution to reduce environmental impact globally. Cross-cultural skills of expatriates and good interpersonal relation generally may be the route to solving environmental and organizational problems (Konopacki, 1990). By establishing the link over country boundaries, have been providing

chance for developed country to share their expertise. Good interpersonal relation have been supporting by generating improvement program bridging communities towards international cooperation.

Japan has been in donor country position during Showa 30s and starts assisting its neighboring countries in 1954 began with technical training program in Japan and dispatch Japanese experts to developing countries in following year (Hashizume, 2004). JICA (Japan International Cooperation Agency) is the responsible agency to implement technical cooperation and one of its fundamental human resource development programs are technical training program for overseas participants. The objectives of training program for overseas participant are to enable developing countries to pursue their own sustainable socioeconomic by human resources development and to contribute to promotion of mutual understanding and friendship (JICA, 2007). In contrast to others, technical training program enables more mobile and direct assistance. By conducting training program in Japan, would allow observation of new techniques available, enhance possibility to transfer Japan's experience at large and create opportunity for ideas exchange with colleagues from other countries who facing similar issues.

This paper attempts to assess the transferability of Japan experience, knowledge and techniques to developing countries pertaining to waste management through reviewing training course title Comprehensive Waste Management Technique 2 extended from Official Development Assistance (ODA).

2. Comprehensive Waste Management Technique Course Background

2.1. Aim and Target Participant

Developed as one of JICA fundamental technical cooperation activities for developing countries, Comprehensive Waste Management Technique Course was started in 1996 and was conducted in two-phase term (five years per phase) until 2005. The course continued entering third phase started from 2006 with title revised to Comprehensive Waste Management Technique 2. Hiroshima Prefecture Government, Hiroshima International Center and JICA Chugoku International Center are the joined cooperation of entrusted stakeholders who responsible in implementing the training course .

The aim of this course is to educate participant with knowledge and technique through course participation, practical and observation from waste management method and technique practiced in Japan to improve their ability to conduct their task effectively. This course was designed for technical officers from developing country who have more than three years experience in charge of solid waste management in national or local government and being nominated by their own government. JICA annually announce list of courses to be organized and each developing country will nominate their candidates through local JICA office or Embassy of Japan. Three main stakeholders who organizing the training course, Hiroshima Prefecture Government, Hiroshima International Center and JICA Chugoku International Center will conduct screening process of candidate selection.

2.2 Course Outline

Each stakeholder's roles were individually divided. Hiroshima Prefecture Government has the overall responsibility for the training course and will ensured the course conducted accordingly. They specifically responsible to create training schedule arrangement for lecturer selection, textbook, equipment and training facilities arrangement, to conduct study tours and enforce technical training. JICA Chugoku International Center is obligates to create course outline, arrangement for training supervisor, textbook, equipment and facilities arrangement, to train for report creation, review meeting and presentation, to grant allowance to participant and to assist participant during their stay in Japan. Hiroshima International Center contributes in processing training expenses of participants during their stay in Japan.

Course outlines designed by JICA Chugoku International Center meet three main features of JICA's Technical

Training Program. As summarized in Figure 1, at Initiation Stage, each participant get chance to gained knowledge from other participants experience and exchange of ideas during issue analysis workshop, country report presentation and overview sessions. Each participant required to give brief explanation on waste management system status in their country as well as related issue and cause they are facing. During Observation Stage, curriculum subject for every stage of waste management were arrange and participant will have chance to attend lectures, involve in practical, direct observation and have detail discussion. Information gained from classes conducted will allow participants to seek for techniques and idea which new to their countries and consider the transferability for implementation in their respective countries.

Meanwhile, in Pre-evaluation Stage, course progress was monitored through self-motivating group training and feedback session, which conducted in between classes. These sessions gave participants opportunity to choose, examine and review most relevant topic they have concerned most and obtain detail knowledge about it. Information gained will be summarized into Action Plan and to be elaborate as participant final report in accomplishing their task. During Evaluation Stage, each participant is required to present their Action Plan for final guidance and recommendations from lectures and other participation to ensure successful in implementing their ideas in respective countries.

Final features of technical training program are at Implementation Stage, to be conducted by participants upon returned to their home country. Participants are required to report to their responsible organization and pursue with Action Plan implementation. This approach is viewed as relevance application to transmit Japan's experience to other nation when it directly contributes to solve local problems.

2.3 Course Curriculum

In order to organize the course in most effective matter during 13 weeks of course duration, course curriculum was divided into Progress Monitoring and Waste Management Elements. Progress Monitoring section consist of Introduction and Review & Conclusion while Waste Management Elements were divided to 8 units of Overview, Waste Management Policy, Landfill Disposal Technique, Collection and Transportation, Waste Treatment Technique, Environment Education and Awareness, Environmental Management and Global Environment Countermeasures. Summarized course scheduled, can be found in Table 1.

Course curriculums were conducted in four different styles of Lecture, Practice, Observation and Discussion approaches. Approaches and volume (hour) were oriented according to detail subject and objectives. For each subjects, printed textbooks were prepared and distributed to all participants. Lectures or instructor for each subject are experts belong to various training institution from universities, prefecture government, municipal government, JICA expert, technology center, private sector as well as NGO and NPO counselors.

3. Methodology

JICA has adopted the Five Evaluation Criteria (Relevance, Effectiveness, Efficiency, Impact and Sustainability) proposed in 1991 by Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD). This paper applied the same evaluation method as evaluation methodology. Focus will be given at assessing the relevance of course contents in meeting participant needs, whether the objective were accomplish effectively, if the course conducted efficiently, the impact degree of course output and how sustainable the implementation of the training course. Researcher had emphasized the evaluation scope from the viewpoint of transferability of technical knowledge and skills.

Evaluation was performed on qualitative and quantitative data. Collected mainly through interview and discussion, qualitative data helps researcher to understand participant perception. Quantitative data sources of

information mainly collected from secondary data. Respondents were selected among participants, implementer stakeholders and lecturers. There is limitation for overtime evaluation of the training course. The evaluation assessed one year training data without comparing the previous training data. Each participant performance was make use in evaluating the training course performance.

4. Results and Discussion

4.1 Relevance

In most developing countries, solid waste management processes are allocated under local government responsibility. However, weak policy implementation, lack of budget allocation and insufficient technical support had reduced organization efficiency. In order to implement sustainable solid waste management in developing countries, there is a need to equip local manpower with latest knowledge and technology to enhance capabilities and increase possibility of effective task implementation. This can be realized by adopting experience of developed countries, which have been proved successful.

Hence, this training course is considered relevance to developing countries need based on viewpoint of educate participant with knowledge and technique through course participation, practical and observation from waste management method and technique practiced in Japan. Selection of technical officer as the target group was relevant in that they are the one who hold responsibility in government and directly dealing with SWM related matters. Input resources had been appropriately use and course curriculum were design relevance to participant need by introducing Management Policy, Treatment Technique, Education Awareness and Global Countermeasures aspects. Through involvement in conducting the training course, had benefited JICA in building its international cooperation related to SWM issues which not only have regional but impact in global scale. As such, SWM can be considered parallel to JICA concerned areas and relevant to its priorities.

4.2 Effectiveness

To determine the effectiveness of this training course in meeting its objectives, Issue Analysis Sheet from every 12 participants were summarized for analysis. In Issue Analysis Sheet, participants were required to list out most important issue their having, the possible causes, related matter they have learned during the course and list of proposal to be implemented in respective country. Those items should be listed according to process terminology of Collection and Transportation, Intermediate Treatment, Final Disposal, Environmental Education and Awareness and Environmental Management.

Findings showed that the training course was successful in clarifying SWM issues facing by participants countries. Almost all participants having similar problem in their respective country and they had also pointed out similar range of knowledge gained during the course. This had proved that the training course had achieved its objectives of addressing issue and cause of SWM in participant countries. The course was also effective in meeting its objectives of understand the role and concrete methods of environmental management in SWM. Several countries that facing problem on irregular collection had learned that with some basic research and method adjustment they might be able to overcome their issues. Participants had determined that their role enhance by their ability to demonstrate their task with simplification done on SWM handling method.

The effectiveness of this course can be further described as it successfully accomplished its objectives in providing participant with technique and skills by understanding techniques used in Japan. This was observed through knowledge that participant gained from collection and transportation course session where most of participant had suggested Time and Motion Method is relevance to be implemented in their country.

Thus, from these perspectives, it is clear that this training course conducted effectively in providing participant with technique and skills towards enhancing their ability to demonstrate their task in their respective countries. Technical transferability was also proven by participant interest in applying Japan techniques with modification based on local need.

4.3 Efficiency

The training course was realized by combination of stakeholders' involvement, course structure and course support facilities. With this strong background, the training course was able to achieve its aims in transferring the attained knowledge and techniques in the training to participants' respective countries. Thus, the efficiency of the training course was identified by evaluating contribution of stakeholders, course curriculum structure and course support facilities which defined as input indicators. Resource utilization and measures of assistance of input indicators were elaborated correspond to output indicators.

It can be conclude that there was efficient resources utilization between three main stakeholders as roles clearly divided with individual task apportionment. This collaboration had also contributed in extended coverage areas of SWM process. Operational weakness was invisible and there were operational link at management level. Recommendation from Hiroshima City Government on study tours arrangement had help participant in creating their training report. For example, study tours to incineration plant and sanitary landfill sites gave opportunity for participant to observe technologies and pick up the pro and cons to consider implementation in their countries.

The efficient course structure had also contributed to the course success. Course curriculums were conducted in four different styles of Lecture, Practice, Observation and Discussion approaches. Technical and education session were held with combination of lecturer, practice and observation training approach which significantly helped in the transfer of knowledge and skills. This training course was conducted efficiently with involvement from various trainers. Lectures or instructor for each subject were experts belong to various training institution from universities, prefecture government, municipal government, JICA expert, technology center, private sector as well as NGO and NPO counselors. The efficiency of involvement from various lectures with different background had wider participant perspective in handling SWM issues from different point of view.

Training course support facilities of guidance, tutorials, initiatives and care for participants were prevalent and provided in timely. The equipment provided was appropriate for this training course. For each subjects, printed textbooks were prepared and distributed to all participants. The textbook was prepared in English and make referable with printed lecture unit and conducted date. Additional pamphlets and lecture materials were translated to English and distributed before lecture session started. Capability and cooperation of lectures and officers involve were above sufficient level. Even almost all lectures are Japanese and most lectures conducted in Japanese, clear translation from JICE officer had smoothened the lecture session. Detail curriculum of training course had been announced in advance complete with lecture subjects, objective, training method and volume had gave sufficient time for participant to prepare and set expectation towards the training course.

Therefore, the combination of stakeholders' involvement, course structure and course support facilities were efficient and parallel to the course goals. As a result of experience exchange among participants and course instructors, possibility of technical transfer can be observed and behavior changes in participants were visible.

4.4 Impact Degree

In assessing the impact of this training course, Action Plan prepared by participants was simplify and summarized and used as analysis tools for clear evaluation. The purpose of Action Plan is to show the direction set forth by the output of the course and participant are expected to initiate positive changes in their duties upon return to their

countries (JICA, 2007). Standard format were given with several principles to include; background and objective were initiated, information acquired from the course use as reference, target group and area where action plan is designed to affect were choose, expected result were listed, several recommendation were made by proposing activities and task assignments while foreseeable challenge predicted as areas of considerations.

However, there is limitation for this research in interpreted the impact of this training course. Researcher had to exclude the enforcement status of the Action Plan. Due to the time limitation, participants were not able to reach for interview to ascertain the progress of Action Plan implementation in their country. Related data was not available from course implementer, neither JICA nor Hiroshima City Government, as participants have no obligation to update the status of their Action Plan implementation. Researcher had to admit it was difficult to ensure precision evaluation of the training course without adequate assessment of technical transferability during ongoing implementation. Assuming there might be technical changes adapting to local situation, which impact the output of the training course, it was left out as one of impact assessment areas highlighted to course implementer for future improvement consideration. Therefore, impact assessment will only analyze the similarity and differences in Action Plan of each participant emphasizing on the possibility of transferring technique and measures gained from the training course.

From findings, it can be conclude that the impact of output degree from this course training were varies among participants. Participants proposal show trend of alternative solution with high form of technology transfer. As a measures for final disposal issues for example, majority of participants agree that The Fukuoka Method is adaptable as alternative techniques to be transfer to their country with local material, affordable cost and excellent leachate control mechanism. Time and Motion Method was also considered as relevance and have high possibility to be implement in developing countries to resolve high collection cost problem and Polluter Pays Principle should be impose as solution for efficient waste management.

This training course had impacted participant on behavior changes, which increase their awareness on reducing waste at source and improve their attitude towards public participation. To reduce burden in waste collection and treatment stage, most participants intended to put more effort in implementing 3R (Reduce, Reuse, Recycling) Concept. From Japan experience participants had learned that waste reduction at early stage by promoting waste separation at source, home based compost as well as enhancing resident awareness and education contribute to the success. Even though the training only targeting on technical staff, action plan was designed to impacted wider community involvement while realizing action plan implementation.

However, there is also a technology pointed out to have low transferability potential and considered impossible to implement by participants. High cost technologies (waste treatment facilities incineration plant) and high maintenance skills (waste water treatment Johkaso) would not be suitable to promote in developing countries that is facing budget constraint and human resources issues.

4.5 Sustainability

This training course had initiated an important international cooperation to reduce global impact of environment issues caused by unsustainable solid waste management. As indicated in previous section, this training course entered its twelve years implementation in 2007. Along three phase of course implementation, participants were selected from 7 world continents of Asia, Middle East, Central & South America, Africa, Oceania and Europe. Almost 47% of participants were from Asian countries, 34% from Central and South America, 6% from Africa, 5% from Middle East, 3% from Europe and 2% from Oceania. As the training positively impact participant countries, it have to be sustained for short term and long term operational implementation.

Considering the current situation of solid waste management in most developing countries, still there are low tendency of improvement and there are high needs for international support. Thus, it is anticipated that this

training course will have continuous demand from developing countries. To meet participants' countries expectation, consistency in combination of stakeholders' involvement, course structure and course support facilities would provide essential conditions for short-term sustainability.

On the other hand, although international cooperation had link to effective intervention, dependency on cross border training need to be reduce in time. Therefore, long-term sustainability of the training course contents should be put into option. One of the focuses is extending the training course towards direct implementation in developing countries itself. Transferred technique and measures from developing countries will phase localization stage of simplification for adaptation. Extending the course aims to wider target group will availing them of the available local resources.

5. Conclusion

Entering the third Phase of implementation, Comprehensive Waste Management Technique 2 has been major information source for developing countries to cope with the rapid changing of global environmental problems. Learning from developed country experiences would guide developing countries in addressing their key policy issues and seek for most adequate solution methods that meet their local resource ability as well as budget allocation. Meanwhile, exposure to other developing countries experience would provide good empirical case study as assumptions to maximize the achievement level.

Therefore, researchers would like to raise several recommendations points for future improvement possibilities. Upon designing the course syllabus for every new session, the review of issue analysis sheet from participants should be considered to determine the intended needs of developing countries. Even though there were different priorities among participant country that might drive different interest and expectation towards the course, it is necessary to contemplate the syllabus to extend the transferability rate of technical knowledge and skills.

From management point of view, the feasibility of action plan implementation result is necessary to clarify the effects of the training course are fully demonstrated. However, since it is not possible for the course organizer to monitor the establishment of action plan in each participant's country, the affiliated organization where participant required to report to, should take initiative updating quarterly progress of the Action Plan progress for course organizers perusal.

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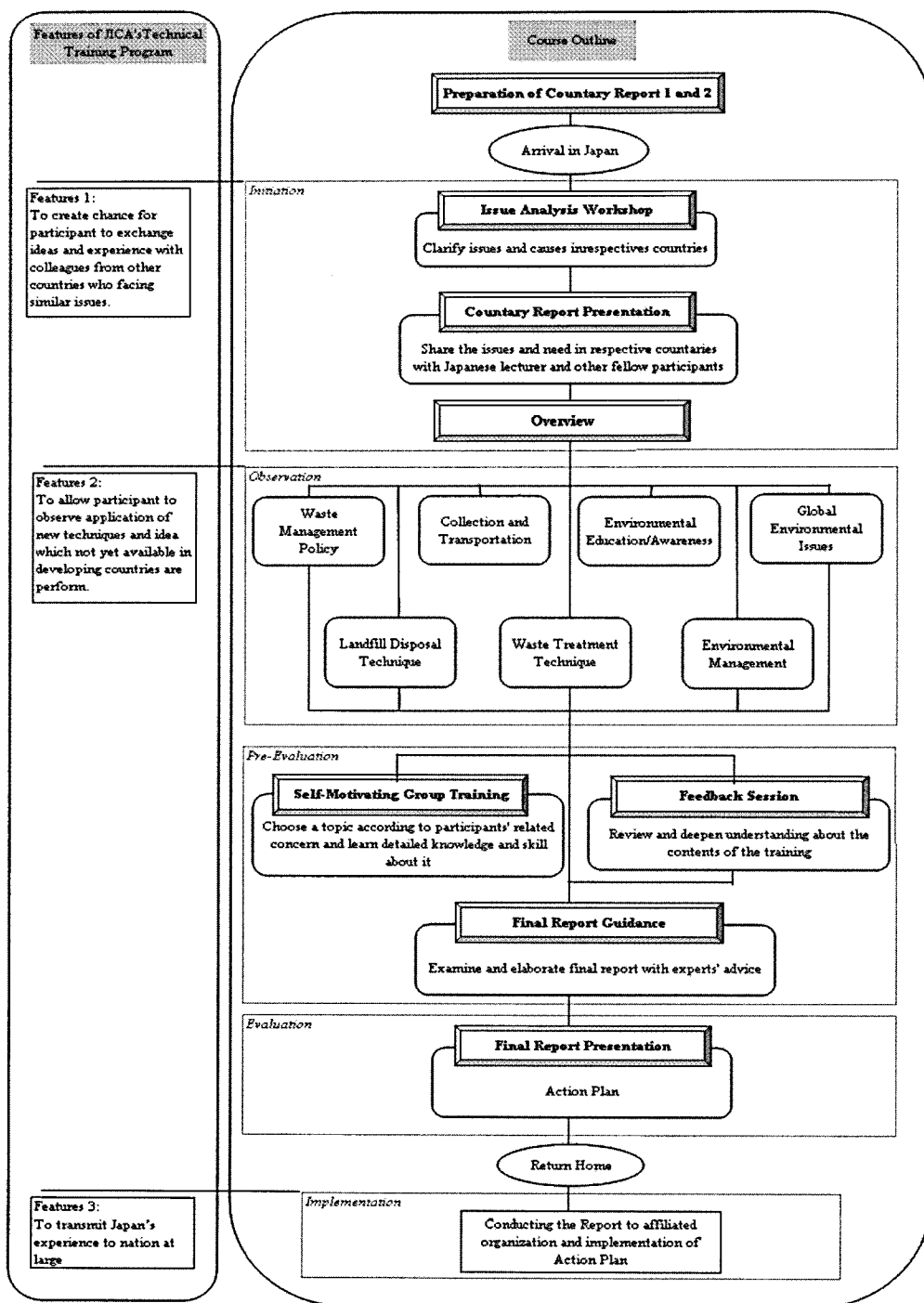


Figure 1: Training Course Outline

Table 1: Training Course Schedule

May-07

W1	W2	W3	W4
Arrival & Orientation	<u>Unit 1</u> Introduction & Analysis	Japanese Course	<u>Unit 1</u> <u>Unit 2</u> Introduction: Overview Country Report <u>Unit 6</u> <u>Unit 4</u> Waste Treatment Landfill Disposal Technique Technique

Jun-07

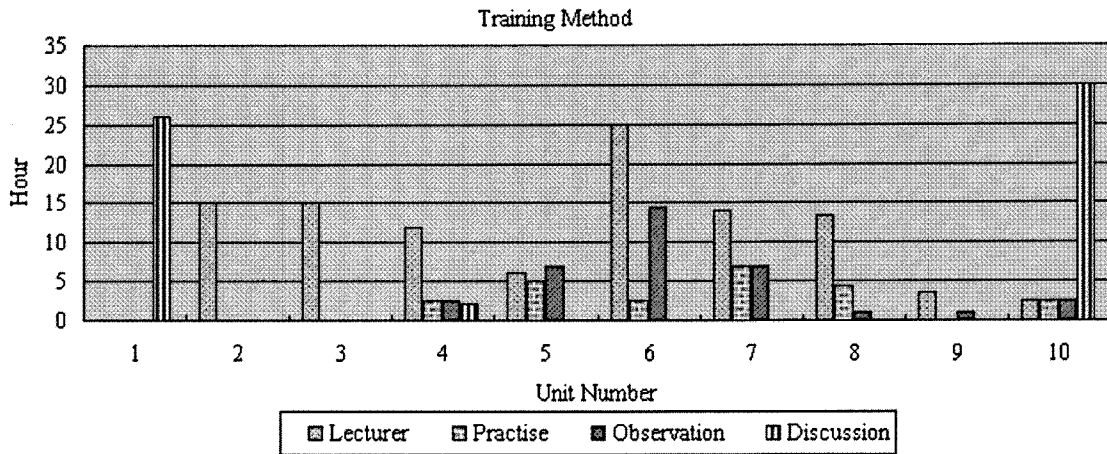
W1	W2	W3	W4
Landfill Disposal Technique	<u>Unit 10</u> Review & Conclusion	<u>Unit 2</u> Overview	<u>Unit 3</u> <u>Unit 5</u> Waste Management Collection & Policy Transportation
	<u>Unit 6</u> Waste Treatment Technique	<u>Unit 3</u> Waste Management Policy	

Jul-07

W1	W2	W3	W4
<u>Unit 8</u> Environmental Management	<u>Unit 7</u> Environmental Education Awareness	<u>Unit 8</u> Environmental Management	<u>Unit 7</u> Environmental Education Awareness
<u>Unit 10</u> Review & Conclusion		<u>Unit 10</u> Review & Conclusion	<u>Unit 8</u> Environmental Management
<u>Unit 6</u> Waste Treatment Technique	<u>Unit 7</u> Environmental Education Awareness	<u>Unit 6</u> Waste Treatment Technique	<u>Unit 9</u> Global Environment Measures
		<u>Unit 9</u> Global Environment Measures	<u>Unit 6</u> Waste Treatment Technique
			<u>Unit 8</u> Environmental Management
			<u>Unit 9</u> Global Environment Measures

Aug-07

W1		
<u>Unit 7</u> Environmental Education Awareness	<u>Unit 10</u> Conclusion: Country Report	Closing & Outbound
<u>Unit 6</u> Waste Treatment Technique		



Unit : Hour

Unit No	Unit Description	Lecturer	Practise	Observation	Discussion	Total
1	Intro : Issue Analysis & Country report	0	0	0	26	26
2	Overview	15	0	0	0	15
3	Waste Management Policy	15	0	0	0	15
4	Landfill Disposal Technique	12	2.5	2.5	2	19
5	Collection and Transportation	6	5	7	0	18
6	Waste Treatment Technique	25	2.5	14.5	0	42
7	Environmental Education/Awareness	14	7	7	0	28
8	Environmental Management	13.5	4.5	1	0	19
9	Global Environment Countermeasures	3.5	0	1	0	4.5
10	Review & Conclusion	2.5	2.5	2.5	30	37.5
Total Hour		106.5	24	35.5	58	224
Percentage		47.5%	10.7%	15.8%	25.9%	100.0%

Figure 2: Training Course Curriculum Method and Volume