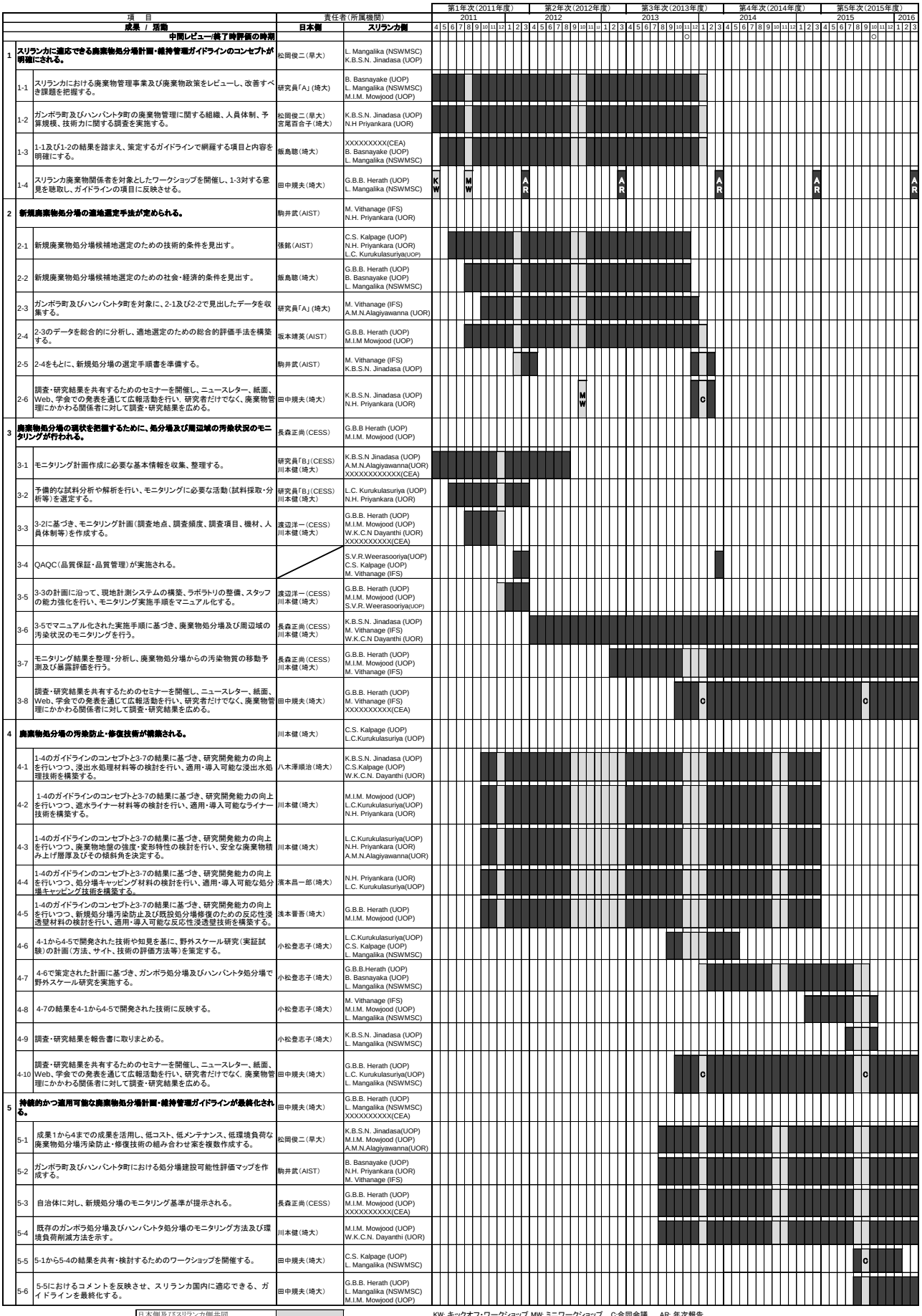
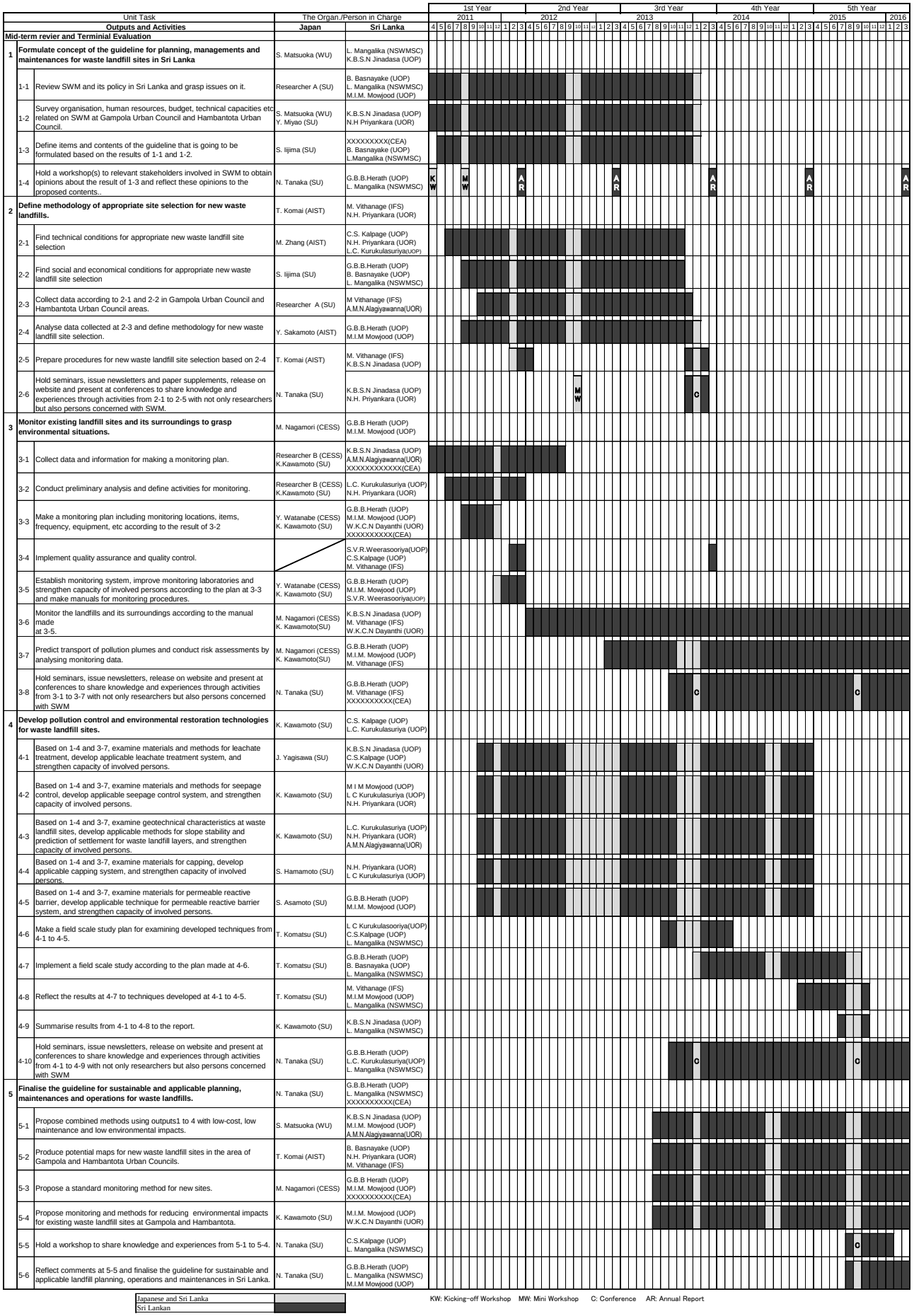
２．詳細活動計画（暫定版）



	項目 / 成果 / 活動		責任者（所属機関） 日本側	スリランカ側
		中間レビュー/終了時評価の時期		
1	**スリランカに適応できる廃棄物処分場計画・維持管理ガイドラインのコンセプトが明確にされる。**		松岡俊二（早大）	L. Mangalika (NSWMSC) K.B.S.N. Jinadasa (UOP)
	1-1	スリランカにおける廃棄物管理事業及び廃棄物政策をレビューし、改善すべき課題を把握する。	研究員「A」(埼大)	B. Basnayake (UOP) L. Mangalika (NSWMSC) M.I.M. Mowjood (UOP)
	1-2	ガンボラ町及びハンバントタ町の廃棄物管理に関する組織、人員体制、予算規模、技術力に関する調査を実施する。	松岡俊二（早大） 宮尾百合子（埼大）	K.B.S.N. Jinadasa (UOP) N.H Priyankara (UOR)
	1-3	1-1及び1-2の結果を踏まえ、策定するガイドラインで網羅する項目と内容を明確にする。	飯島聡（埼大）	XXXXXXXXX(CEA) B. Basnayake (UOP) L. Mangalika (NSWMSC)
	1-4	スリランカ廃棄物関係者を対象としたワークショップを開催し、1-3対する意見を聴取し、ガイドラインの項目に反映させる。	田中規夫（埼大）	G.B.B. Herath (UOP) L. Mangalika (NSWMSC)
2	**新規廃棄物処分場の適地選定手法が定められる。**		駒井武（AIST）	M. Vithanage (IFS) N.H. Priyankara (UOR)
	2-1	新規廃棄物処分場候補地選定のための技術的条件を見出す。	張銘（AIST）	C.S. Kalpage (UOP) N.H. Priyankara (UOR) L.C. Kurukulasuriya(UOP)
	2-2	新規廃棄物処分場候補地選定のための社会・経済的条件を見出す。	飯島聡（埼大）	G.B.B. Herath (UOP) B. Basnayake (UOP) L. Mangalika (NSWMSC)
	2-3	ガンボラ町及びハンバントタ町を対象に、2-1及び2-2で見出したデータを収集する。	研究員「A」(埼大)	M. Vithanage (IFS) A.M.N.Alagiyawanna (UOR)
	2-4	2-3のデータを総合的に分析し、適地選定のための総合的評価手法を構築する。	坂本靖英（AIST）	G.B.B. Herath (UOP) M.I.M Mowjood (UOP)
	2-5	2-4をもとに、新規処分場の選定手順書を準備する。	駒井武（AIST）	M. Vithanage (IFS) K.B.S.N. Jinadasa (UOP)
	2-6	調査・研究結果を共有するためのセミナーを開催し、ニュースレター、紙面、Web、学会での発表を通じて広報活動を行い、研究者だけでなく、廃棄物管理にかかわる関係者に対して調査・研究結果を広める。	田中規夫（埼大）	K.B.S.N. Jinadasa (UOP) N.H. Priyankara (UOR)
3	**廃棄物処分場の現状を把握するために、処分場及び周辺域の汚染状況のモニタリングが行われる。**		長森正尚（CESS）	G.B.B Herath (UOP) M.I.M. Mowjood (UOP)
	3-1	モニタリング計画作成に必要な基本情報を収集、整理する。	研究員「B」(CESS) 川本健（埼大）	K.B.S.N Jinadasa (UOP) A.M.N.Alagiyawanna(UOR) XXXXXXXXXXX(CEA)
	3-2	予備的な試料分析や解析を行い、モニタリングに必要な活動（試料採取・分析等）を選定する。	研究員「B」(CESS) 川本健（埼大）	L.C. Kurukulasuriya (UOP) N.H. Priyankara (UOR)
	3-3	3-2に基づき、モニタリング計画（調査地点、調査頻度、調査項目、機材、人員体制等）を作成する。	渡辺洋一（CESS） 川本健（埼大）	G.B.B. Herath (UOP) M.I.M. Mowjood (UOP) W.K.C.N Dayanthi (UOR) XXXXXXXXXX(CEA)
	3-4	QAQC（品質保証・品質管理）が実施される。		S.V.R.Weerasooriya(UOP) C.S. Kalpage (UOP) M. Vithanage (IFS)
	3-5	3-3の計画に沿って、現地計測システムの構築、ラボラトリの整備、スタッフの能力強化を行い、モニタリング実施手順をマニュアル化する。	渡辺洋一（CESS） 川本健（埼大）	G.B.B. Herath (UOP) M.I.M. Mowjood (UOP) S.V.R.Weerasooriya(UOP)
	3-6	3-5でマニュアル化された実施手順に基づき、廃棄物処分場及び周辺域の汚染状況のモニタリングを行う。	長森正尚（CESS） 川本健（埼大）	K.B.S.N. Jinadasa (UOP) M. Vithanage (IFS) W.K.C.N Dayanthi (UOR)
	3-7	モニタリング結果を整理・分析し、廃棄物処分場からの汚染物質の移動予測及び暴露評価を行う。	長森正尚（CESS） 川本健（埼大）	G.B.B. Herath (UOP) M.I.M. Mowjood (UOP) M. Vithanage (IFS)
	3-8	調査・研究結果を共有するためのセミナーを開催し、ニュースレター、紙面、Web、学会での発表を通じて広報活動を行い、研究者だけでなく、廃棄物管理にかかわる関係者に対して調査・研究結果を広める。	田中規夫（埼大）	G.B.B. Herath (UOP) M. Vithanage (IFS) XXXXXXXXXX(CEA)
4	**廃棄物処分場の汚染防止・修復技術が構築される。**		川本健（埼大）	C.S. Kalpage (UOP) L.C.Kurukulasuriya (UOP)
	4-1	1-4のガイドラインのコンセプトと3-7の結果に基づき、研究開発能力の向上を行いつつ、浸出水処理材料等の検討を行い、適用・導入可能な浸出水処理技術を構築する。	八木澤順治（埼大）	K.B.S.N. Jinadasa (UOP) C.S.Kalpage (UOP) W.K.C.N. Dayanthi (UOR)
	4-2	1-4のガイドラインのコンセプトと3-7の結果に基づき、研究開発能力の向上を行いつつ、遮水ライナー材料等の検討を行い、適用・導入可能なライナー技術を構築する。	川本健（埼大）	M.I.M. Mowjood (UOP) L.C.Kurukulasuriya(UOP) N.H. Priyankara (UOR)
	4-3	1-4のガイドラインのコンセプトと3-7の結果に基づき、研究開発能力の向上を行いつつ、廃棄物地盤の強度・変形特性の検討を行い、安全な廃棄物積み上げ層厚及びその傾斜角を決定する。	川本健（埼大）	L.C.Kurukulasuriya(UOP) N.H. Priyankara (UOR) A.M.N.Alagiyawanna(UOR)
	4-4	1-4のガイドラインのコンセプトと3-7の結果に基づき、研究開発能力の向上を行いつつ、処分場キャッピング材料の検討を行い、適用・導入可能な処分場キャッピング技術を構築する。	濱本昌一郎（埼大）	N.H. Priyankara (UOR) L.C. Kurukulasuriya(UOP)
	4-5	1-4のガイドラインのコンセプトと3-7の結果に基づき、研究開発能力の向上を行いつつ、新規処分場汚染防止及び既設処分場修復のための反応性浸透壁材料の検討を行い、適用・導入可能な反応性浸透壁技術を構築する。	浅本晋吾（埼大）	G.B.B. Herath (UOP) M.I.M. Mowjood (UOP)
	4-6	4-1から4-5で開発された技術や知見を基に、野外スケール研究（実証試験）の計画（方法、サイト、技術の評価方法等）を策定する。	小松登志子（埼大）	L.C.Kurukulasuriya(UOP) C.S. Kalpage (UOP) L. Mangalika (NSWMSC)
	4-7	4-6で策定された計画に基づき、ガンボラ処分場及びハンバントタ処分場で野外スケール研究を実施する。	小松登志子（埼大）	G.B.B.Herath (UOP) B. Basnayaka (UOP) L. Mangalika (NSWMSC)
	4-8	4-7の結果を4-1から4-5で開発された技術に反映する。	小松登志子（埼大）	M. Vithanage (IFS) M.I.M. Mowjood (UOP) L. Mangalika (NSWMSC)
	4-9	調査・研究結果を報告書に取りまとめる。	小松登志子（埼大）	K.B.S.N. Jinadasa (UOP) L. Mangalika (NSWMSC)
	4-10	調査・研究結果を共有するためのセミナーを開催し、ニュースレター、紙面、Web、学会での発表を通じて広報活動を行い、研究者だけでなく、廃棄物管理にかかわる関係者に対して調査・研究結果を広める。	田中規夫（埼大）	G.B.B. Herath (UOP) L.C. Kurukulasuriya(UOP) L. Mangalika (NSWMSC)
5	**持続的かつ適用可能な廃棄物処分場計画・維持管理ガイドラインが最終化される。**		田中規夫（埼大）	G.B.B. Herath (UOP) L. Mangalika (NSWMSC) XXXXXXXXXX(CEA)
	5-1	成果1から4までの成果を活用し、低コスト、低メンテナンス、低環境負荷な廃棄物処分場汚染防止・修復技術の組み合わせ案を複数作成する。	松岡俊二（早大）	K.B.S.N. Jinadasa(UOP) M.I.M. Mowjood (UOP) A.M.N.Alagiyawanna(UOR)
	5-2	ガンボラ町及びハンバントタ町における処分場建設可能性評価マップを作成する。	駒井武（AIST）	B. Basnayake (UOP) N.H. Priyankara (UOR) M. Vithanage (IFS)
	5-3	自治体に対し、新規処分場のモニタリング基準が提示される。	長森正尚（CESS）	G.B.B. Herath (UOP) M.I.M. Mowjood (UOP) XXXXXXXXXX(CEA)
	5-4	既存のガンボラ処分場及びハンバントタ処分場のモニタリング方法及び環境負荷削減方法を示す。	川本健（埼大）	M.I.M. Mowjood (UOP) W.K.C.N. Dayanthi (UOR)
	5-5	5-1から5-4の結果を共有・検討するためのワークショップを開催する。	田中規夫（埼大）	C.S. Kalpage (UOP) L. Mangalika (NSWMSC)
	5-6	5-5におけるコメントを反映させ、スリランカ国内に適応できる、ガイドラインを最終化する。	田中規夫（埼大）	G.B.B. Herath (UOP) L. Mangalika (NSWMSC) M.I.M. Mowjood (UOP)

KW: キックオフ・ワークショップ MW: ミニワークショップ　C:合同会議　AR: 年次報告



Unit Task		The Organ./Person in Charge	
Outputs and Activities		**Japan**	**Sri Lanka**
Mid-term revier and Terminial Evaluation			
1	**Formulate concept of the guideline for planning, managements and maintenances for waste landfill sites in Sri Lanka**	S. Matsuoka (WU)	L. Mangalika (NSWMSC) K.B.S.N Jinadasa (UOP)
	1-1 Review SWM and its policy in Sri Lanka and grasp issues on it.	Researcher A (SU)	B. Basnayake (UOP) L. Mangalika (NSWMSC) M.I.M. Mowjood (UOP)
	1-2 Survey organisation, human resources, budget, technical capacities etc related on SWM at Gampola Urban Council and Hambantota Urban Council.	S. Matsuoka (WU) Y. Miyao (SU)	K.B.S.N Jinadasa (UOP) N.H Priyankara (UOR)
	1-3 Define items and contents of the guideline that is going to be formulated based on the results of 1-1 and 1-2.	S. Iijima (SU)	XXXXXXXXX(CEA) B. Basnayake (UOP) L.Mangalika (NSWMSC)
	1-4 Hold a workshop(s) to relevant stakeholders involved in SWM to obtain opinions about the result of 1-3 and reflect these opinions to the proposed contents..	N. Tanaka (SU)	G.B.B.Herath (UOP) L. Mangalika (NSWMSC)
2	**Define methodology of appropriate site selection for new waste landfills.**	T. Komai (AIST)	M. Vithanage (IFS) N.H. Priyankara (UOR)
	2-1 Find technical conditions for appropriate new waste landfill site selection	M. Zhang (AIST)	C.S. Kalpage (UOP) N.H. Priyankara (UOR) L.C. Kurukulasuriya(UOP)
	2-2 Find social and economical conditions for appropriate new waste landfill site selection	S. Iijima (SU)	G.B.B.Herath (UOP) B. Basnayake (UOP) L. Mangalika (NSWMSC)
	2-3 Collect data according to 2-1 and 2-2 in Gampola Urban Council and Hambantota Urban Council areas.	Researcher A (SU)	M Vithanage (IFS) A.M.N.Alagiyawanna(UOR)
	2-4 Analyse data collected at 2-3 and define methodology for new waste landfill site selection.	Y. Sakamoto (AIST)	G.B.B.Herath (UOP) M.I.M Mowjood (UOP)
	2-5 Prepare procedures for new waste landfill site selection based on 2-4	T. Komai (AIST)	M. Vithanage (IFS) K.B.S.N Jinadasa (UOP)
	2-6 Hold seminars, issue newsletters and paper supplements, release on website and present at conferences to share knowledge and experiences through activities from 2-1 to 2-5 with not only researchers but also persons concerned with SWM.	N. Tanaka (SU)	K.B.S.N Jinadasa (UOP) N.H. Priyankara (UOR)
3	**Monitor existing landfill sites and its surroundings to grasp environmental situations.**	M. Nagamori (CESS)	G.B.B Herath (UOP) M.I.M. Mowjood (UOP)
	3-1 Collect data and information for making a monitoring plan.	Researcher B (CESS) K.Kawamoto (SU)	K.B.S.N Jinadasa (UOP) A.M.N.Alagiyawanna(UOR) XXXXXXXXXXX(CEA)
	3-2 Conduct preliminary analysis and define activities for monitoring.	Researcher B (CESS) K.Kawamoto (SU)	L.C. Kurukulasuriya (UOP) N.H. Priyankara (UOR)
	3-3 Make a monitoring plan including monitoring locations, items, frequency, equipment, etc according to the result of 3-2	Y. Watanabe (CESS) K. Kawamoto (SU)	G.B.B.Herath (UOP) M.I.M. Mowjood (UOP) W.K.C.N Dayanthi (UOR) XXXXXXXXXX(CEA)
	3-4 Implement quality assurance and quality control.		S.V.R.Weerasooriya(UOP) C.S.Kalpage (UOP) M. Vithanage (IFS)
	3-5 Establish monitoring system, improve monitoring laboratories and strengthen capacity of involved persons according to the plan at 3-3 and make manuals for monitoring procedures.	Y. Watanabe (CESS) K. Kawamoto (SU)	G.B.B.Herath (UOP) M.I.M. Mowjood (UOP) S.V.R. Weerasooriya(UOP)
	3-6 Monitor the landfills and its surroundings according to the manual made at 3-5.	M. Nagamori (CESS) K. Kawamoto(SU)	K.B.S.N Jinadasa (UOP) M. Vithanage (IFS) W.K.C.N Dayanthi (UOR)
	3-7 Predict transport of pollution plumes and conduct risk assessments by analysing monitoring data.	M. Nagamori (CESS) K. Kawamoto(SU)	G.B.B.Herath (UOP) M.I.M. Mowjood (UOP) M. Vithanage (IFS)
	3-8 Hold seminars, issue newsletters, release on website and present at conferences to share knowledge and experiences through activities from 3-1 to 3-7 with not only researchers but also persons concerned with SWM	N. Tanaka (SU)	G.B.B.Herath (UOP) M. Vithanage (IFS) XXXXXXXXXX(CEA)
4	**Develop pollution control and environmental restoration technologies for waste landfill sites.**	K. Kawamoto (SU)	C.S. Kalpage (UOP) L.C. Kurukulasuriya (UOP)
	4-1 Based on 1-4 and 3-7, examine materials and methods for leachate treatment, develop applicable leachate treatment system, and strengthen capacity of involved persons.	J. Yagisawa (SU)	K.B.S.N Jinadasa (UOP) C.S.Kalpage (UOP) W.K.C.N Dayanthi (UOR)
	4-2 Based on 1-4 and 3-7, examine materials and methods for seepage control, develop applicable seepage control system, and strengthen capacity of involved persons.	K. Kawamoto (SU)	M I M Mowjood (UOP) L C Kurukulasuriya (UOP) N.H. Priyankara (UOR)
	4-3 Based on 1-4 and 3-7, examine geotechnical characteristics at waste landfill sites, develop applicable methods for slope stability and prediction of settlement for waste landfill layers, and strengthen capacity of involved persons.	K. Kawamoto (SU)	L.C. Kurukulasuriya (UOP) N.H. Priyankara (UOR) A.M.N.Alagiyawanna(UOR)
	4-4 Based on 1-4 and 3-7, examine materials for capping, develop applicable capping system, and strengthen capacity of involved persons.	S. Hamamoto (SU)	N.H. Priyankara (UOR) L C Kurukulasuriya (UOP)
	4-5 Based on 1-4 and 3-7, examine materials for permeable reactive barrier, develop applicable technique for permeable reactive barrier system, and strengthen capacity of involved persons.	S. Asamoto (SU)	G.B.B.Herath (UOP) M.I.M. Mowjood (UOP)
	4-6 Make a field scale study plan for examining developed techniques from 4-1 to 4-5.	T. Komatsu (SU)	L C Kurukulasooriya(UOP) C.S.Kalpage (UOP) L. Mangalika (NSWMSC)
	4-7 Implement a field scale study according to the plan made at 4-6.	T. Komatsu (SU)	G.B.B.Herath (UOP) B. Basnayaka (UOP) L. Mangalika (NSWMSC)
	4-8 Reflect the results at 4-7 to techniques developed at 4-1 to 4-5.	T. Komatsu (SU)	M. Vithanage (IFS) M.I.M Mowjood (UOP) L. Mangalika (NSWMSC)
	4-9 Summarise results from 4-1 to 4-8 to the report.	K. Kawamoto (SU)	K.B.S.N Jinadasa (UOP) L. Mangalika (NSWMSC)
	4-10 Hold seminars, issue newsletters, release on website and present at conferences to share knowledge and experiences through activities from 4-1 to 4-9 with not only researchers but also persons concerned with SWM	N. Tanaka (SU)	G.B.B.Herath (UOP) L.C. Kurukulasuriya(UOP) L. Mangalika (NSWMSC)
5	**Finalise the guideline for sustainable and applicable planning, maintenances and operations for waste landfills.**	N. Tanaka (SU)	G.B.B.Herath (UOP) L. Mangalika (NSWMSC) XXXXXXXXXX(CEA)
	5-1 Propose combined methods using outputs1 to 4 with low-cost, low maintenance and low environmental impacts.	S. Matsuoka (WU)	K.B.S.N Jinadasa (UOP) M.I.M. Mowjood (UOP) A.M.N.Alagiyawanna(UOR)
	5-2 Produce potential maps for new waste landfill sites in the area of Gampola and Hambantota Urban Councils.	T. Komai (AIST)	B. Basnayake (UOP) N.H. Priyankara (UOR) M. Vithanage (IFS)
	5-3 Propose a standard monitoring method for new sites.	M. Nagamori (CESS)	G.B.B Herath (UOP) M.I.M. Mowjood (UOP) XXXXXXXXXX(CEA)
	5-4 Propose monitoring and methods for reducing environmental impacts for existing waste landfill sites at Gampola and Hambantota.	K. Kawamoto (SU)	M.I.M. Mowjood (UOP) W.K.C.N Dayanthi (UOR)
	5-5 Hold a workshop to share knowledge and experiences from 5-1 to 5-4.	N. Tanaka (SU)	C.S.Kalpage (UOP) L. Mangalika (NSWMSC)
	5-6 Reflect comments at 5-5 and finalise the guideline for sustainable and applicable landfill planning, operations and maintenances in Sri Lanka.	N. Tanaka (SU)	G.B.B.Herath (UOP) L. Mangalika (NSWMSC) M.I.M Mowjood (UOP)

Japanese and Sri Lanka
Sri Lankan

KW: Kicking-off Workshop MW: Mini Workshop C: Conference AR: Annual Report

MINUTES OF MEETINGS
BETWEEN JAPANESE DETAILED PLANNING SURVEY TEAM
AND AUTHORITIES CONCERNED OF
THE GOVERNMENT OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
ON JAPANESE TECHNICAL COOPERATION FOR
THE PROJECT FOR DEVELOPMENT OF POLLUTION CONTROL AND ENVIRONMENTAL RESTORATION TECHNOLOGIES OF WASTE LANDFILL SITES TAKING INTO ACCOUNT GEOGRAPHICAL CHARACTERISTICS IN SRI LANKA

The Japanese Detailed Planning Survey Team (hereinafter referred to as "the Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Kazuya SUZUKI, visited the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "Sri Lanka") from 28 September to 15 October, 2010 for the purpose of clarifying the framework of the technical cooperation for the project for development of pollution control and environmental restoration technologies of waste landfill sites taking into account geographical characteristics in Sri Lanka (hereinafter referred to as "the Project").

During its stay in Sri Lanka, the Team exchanged views and had a series of discussions with the Sri Lankan authorities concerned with respect to desirable measures to be taken by JICA and the Government of Sri Lanka for the successful implementation of the Project.

As a result of the discussions, the Team and Sri Lankan authorities concerned agreed on the matters referred to in the document attached hereto.

Colombo, 14 October 2010

Mr. Kazuya Suzuki Leader, Japanese Detailed Planning Survey Team Japan International Cooperation Agency (JICA)	Prof. S. B. Weerakoon Dean Faculty of Engineering, University of Peradeniya	Mr. D.P. Hettiarachchi, Additional Secretary, Ministry of Local Government & Provincial Councils
Mr. J.H.J. Jayamaha Director General Department of External Resources, Ministry of Finance and Planning	Dr. Sunil Jayantha Nawaratne Secretary Ministry of Higher Education	Dr. R.H.S. Samaratunga Secretary Ministry of Environment

ATTACHED DOCUMENT

I. TITLE OF PROJECT

Both sides agreed that the title of the Project will be "the Project for development of pollution control and environmental restoration technologies of waste landfill sites taking into account geographical characteristics in Sri Lanka".

II. RECORD OF DISCUSSIONS

The Record of Discussions (hereinafter referred to as "R/D"), which stipulates the framework of the Project, will be finalized and signed by the representatives of the Government of Sri Lanka and JICA Sri Lanka Office after notification of approval of implementation of the Project by Sri Lankan authorities concerned and JICA Headquarters. Both sides agreed that it is desirable that the R/D be signed as soon as possible after the signing of these Minutes of Meetings.

Both sides agreed on the provisional R/D shown in ANNEX A.

III. TENTATIVE PLAN OF OPERATION

The tentative Plan of Operation (hereinafter referred to as "PO") for the whole project period is shown in ANNEX B. The activities of the Project are subject to change within the scope of the R/D with mutual consultation when necessity arises in the course of implementation of the Project.

IV. TERMS OF COOPERATION

The duration of the technical cooperation for the Project will be five (5) years.

V. SATREPS

Both sides confirmed that the Project is implemented under the "Science and Technology Research Partnership for Sustainable Development (SATREPS)"* promoted by JICA and Japan Science and Technology Agency (hereinafter referred to as "JST ") in collaboration.

JICA will take necessary measures for the technical cooperation such as dispatch of Japanese experts, provision of equipment and training of personnel, and other supports related to the Project in Sri Lanka. JST will support the Japanese research institute/researchers for the project activities in Japan.

* "Science and Technology Research Partnership for Sustainable Development" aims to develop new technology and its applications for tackling global issues, and also aims to enhance the capacity development of researchers and research institutes in both countries.

VI. MACHINERY AND EQUIPMENT

Both sides agreed that University of Peradeniya (hereinafter referred to as "UOP"), University of Ruhuna (hereinafter referred to as "UOR") and Institute of Fundamental Studies (hereinafter referred to as "IFS") would take necessary measures to pay taxes for procured machineries and

equipments for the Project by providing necessary budgetary provision for the Ministry of Higher Education in consultation with Department of National Budget of Ministry of Finance and Planning.

UOP, UOR and IFS agreed to take necessary measures for proper maintenance of the machinery and equipment provided by JICA.

VII. FIELD MONITORING AND EXPERIMENT IMPLEMENTATION SITES

Both sides agreed that the Field Monitoring and Experiment under the Project will be implemented at two (2) sites, Gampola landfill site and Hambantota landfill site. Scale and period of the field experiment will be decided at the Mid-term review based on the result of research and development activities until mid-term review and budgetary situation.

VIII. PARTICIPATING INSTITUTIONS

UOP will be the main counterpart institution, and UOP shall be responsible for supervising its research team which consists of UOP, the National Solid Waste Management Support Center (NSWMSC), UOR, IFS and Central Environmental Authority (hereinafter referred to as "CEA") to comply with this Project. Institute for Environmental Science and Technology in Saitama University (IEST) shall be responsible for supervising its team which consists of IEST, Center for Environmental Science in Saitama (CESS), National Advanced Industrial Science and Technology (AIST), and Waseda University.

IX. OTHERS

1. Both sides agreed that the research institutes in Japan and Sri Lanka should reach an agreement to execute the collaborative research in accordance with the Master Plan of the Project. The agreed document (e.g. Collaborative Research Agreement) should contain the following items*;

a. Objective and Plan
b. Implementation
c. Confidentiality and Intellectual Property Rights
d. Publication
e. Liability
f. Accommodation of the Research Environment
g. Dispute Resolution
h. Duration of the Agreement
i. Compliance with Laws and Regulations

*The items described on the document are subject to change according to the contents of the research.

2. Both sides agreed that the local cost of the Project, including counterpart staff salary, their domestic travelling expenses and allowance, office facilities, will be borne by the Sri Lankan side. JICA will bear the cost of dispatching experts, expenses of JICA experts' activities, cost of training of counterparts in Japan, allowance and traveling expenses of research assistants, and provision of necessary and prioritized equipment.

3. List of counterpart personnel and administrative personnel as shown in ANNEX IV of ANNEX A will be finalized before signing of the R/D.

ANNEX A DRAFT RECORD OF DISCUSSIONS

ANNEX B TENTATIVE PLAN OF OPERATION

ANNEX A

DRAFT RECORD OF DISCUSSIONS BETWEEN JAPAN INTERNATIONAL COOPERATION AGENCY AND AUTHORITIES CONCERNED OF THE GOVERNMENT OFTHE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA ON JAPANESE TECHNICAL COOPERATION FOR THE PROJECT FOR DEVELOPMENT OF POLLUTION CONTROL AND ENVIRONMENTAL RESTORATION TECHNOLOGIES OF WASTE LANDFILL SITES TAKING INTO ACCOUNT GEOGRAPHICAL CHARACTERISTICS IN SRI LANKA

Japan International Cooperation Agency (hereinafter to as "JICA") had a series of discussions through JICA office in the Democratic Socialist Republic of Sri Lanka (hereinafter to as "Sri Lanka") with the Sri Lankan authorities concerned with respect to desirable measures to be taken by JICA and authorities concerned of the Government of Sri Lanka for the successful implementation of the Project for development of pollution control and environmental restoration technologies of waste landfill sites taking into account geographical characteristics in Sri Lanka (hereinafter referred to as "the Project") in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of Sri Lanka signed on 12 October 2005 (hereinafter to as "the Agreement").

As a result of the discussions, JICA and the Sri Lankan authorities concerned agreed on the matters referred to in the document attached hereto.

Colombo, XX XX 201X

Mr. Akira Shimura Chief Representative Sri Lanka Office Japan International Cooperation Agency (JICA)	Prof. S. B. S. Abayakoon Vice Chancellor University of Peradeniya	Dr. Y. D. Nihal Jayathilaka Secretary Ministry of Local Government & Provincial Councils
Ms.D.Chrishanthi W.Hapugoda Director Department of External Resources, Ministry of Finance and Planning	Dr. Sunil Jayantha Nawaratne Secretary Ministry of Higher Education	Dr. R.H.S. Samaratunga Secretary Ministry of Environment

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN JICA AND THE GOVERNMENT OF SRI LANKA

1. The Government of Sri Lanka (hereinafter to as "GOSL") shall implement the project titled "the Project for development of pollution control and environmental restoration technologies of waste landfill sites taking into account geographical characteristics in Sri Lanka" in cooperation with JICA in accordance with the Agreement.

2. The Project shall be implemented in accordance with the Master Plan and the Plan of Operation which are given in Annex I.

II. MEASURES TO BE TAKEN BY JICA

In accordance with the laws and regulations in force in Japan and the provisions of Article III of the Agreement, JICA, as the executing agency for technical cooperation by the Government of Japan, shall take, at its own expense, the following measures according to the normal procedures of its technical cooperation scheme.

1. DISPATCH OF JAPANESE EXPERTS

   JICA shall provide the services of the Japanese experts as listed in Annex II. The provision of Article V of the Agreement will be applied to the above-mentioned experts.

2. PROVISION OF MACHINERY AND EQUIPMENT

   JICA shall provide such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in Annex III. The provision of Article VII of the Agreement will be applied to the Equipment.

3. TRAINING OF SRI LANKAN PERSONNEL IN JAPAN

   JICA shall receive the Sri Lankan personnel connected with the Project for technical training in Japan.

III. MEASURES TO BE TAKEN BY THE GOVERNMENT OF SRI LANKA

1. GOSL shall take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of Japanese technical cooperation, through full and active involvement in the Project by all related authorities, beneficiary groups and institutions.

2. GOSL shall ensure that the technologies and knowledge acquired by the Sri Lankan nationals as a result of the Japanese technical cooperation will contribute to the economic and social development of Sri Lanka.

3. In accordance with the provisions of Article V, VI, VII-2 of the Agreement, GOSL shall grant in Sri Lankan privileges, exemptions and benefits to the Japanese experts referred to in Annex II and their families.

4. In accordance with the provision of Article VII-1 of the Agreement, GOSL shall take the measures necessary to receive and use the Equipment provided by JICA under Annex III and equipment, machinery and materials carried in by the Japanese experts referred to in Annex II. GOSL shall take necessary measures to ensure that the knowledge and experience acquired by the Sri Lankan personnel from technical training in Japan will be utilized effectively in the implementation of the Project.

5. In accordance with the provision of Article V-1(2)(b) of the Agreement, GOSL shall provide the services of Sri Lankan counterpart personnel and administrative personnel as listed in Annex IV.

6. In accordance with the provision of Article V-1(2)(a) of the Agreement, GOSL shall provide the buildings and facilities as listed in Annex V.

7. In accordance with the laws and regulations in force in Sri Lanka, GOSL shall take necessary measures at its own expense to supply or replace machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided by JICA under Article II-2 above.

8. In accordance with the laws and regulations in force in Sri Lanka, GOSL shall take necessary measures to meet the running expenses necessary for the implementation of the Project.

IV. ADMINISTRATION OF THE PROJECT

1. The University of Peradeniya (hereinafter to as "UOP") shall be the Responsible Agency of the Project.

2. The following organizations shall be the Implementing Agencies of the Project;

(1) Sri Lankan side

a. University of Peradeniya (UOP)
b. National Solid Waste Management Support Center (NSWMSC)
c. University of Ruhuna (UOR)
d. Institute of Fundamental Studies, Kandy (IFS)
e. Central Environmental Authority (CEA)

(2) Japanese side

a. Saitama University
b. Center for Environmental Science in Saitama (CESS)
c. National Advanced Industrial Science and Technology (AIST)
d. Waseda University

3. The Vice-Chancellor, UOP shall be the chairperson to the Joint Coordinating Committee of the Project.

4. Dean, Faculty of Engineering of UOP, as the Project Director, shall bear overall responsibility for the administration and implementation of the Project.

5. The Team Leader appointed by Dean, Faculty of Engineering, UOP, as the Project Manager, shall be responsible for the managerial and technical matters of the Project.

6. The Japanese experts team leader will provide necessary recommendations and advice to the Project Director and the Project Manager on any matters pertaining to the implementation of the Project.

7. The Japanese experts will give necessary guidance and advice to the Sri Lankan counterpart personnel on scientific and technical matters pertaining to the implementation of the Project.

8. For the effective and successful implementation of technical cooperation for the Project, a Joint Coordinating Committee will be established whose functions and composition are described in Annex VI.

V. JOINT REVIEW AND EVALUATION

Mid-term Review and Evaluation of the Project will be conducted jointly by JICA and the Sri Lankan authorities concerned, at the middle and during the last six months of the cooperation term in order to examine the level of achievement. In this regard, JST may join Mid-term Review and Terminal Evaluation.

VI. CLAIMS AGAINST JAPANESE EXPERTS

In accordance with the provision of Article VI of the Agreement, GOSL undertakes to bear claims, if any arises, against the Japanese experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in Sri Lanka except for those arising from the willful misconduct or gross negligence of the Japanese experts.

VII. MUTUAL CONSULTATION

There shall be mutual consultation between JICA and GOSL on any major issues arising from, or in connection with this Attached Document.

VIII. MEASURES TO PROMOTE UNDERSTANDING OF AND SUPPORT FOR THE PROJECT

For the purpose of promoting support for the Project among the people of Sri Lanka, GOSL shall take appropriate measures to make the Project widely known to the people of Sri Lanka.

IX. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be five (5) years from 2011 to 2016.

ANNEX I	MASTER PLAN AND PLAN OF OPERATION
ANNEX II	LIST OF JAPANESE EXPERTS
ANNEX III	LIST OF MACHINERY AND EQUIPMENT
ANNEX IV	LIST OF COUNTERPART PERSSONNEL AND ADMINISTRATIVE PERSONNEL
ANNEX V	LIST OF BUILDINGS AND FACILITIES
ANNEX VI	JOINT COORDINATING COMMITTEE

ANNEX I-1 MASTER PLAN

This Master Plan (M/P) will be reviewed and revised, when necessity arises in the course of implementation of the Project. Especially, indicators of M/P will be determined within one year after starting the Project.

1. Project Purpose

Strengthen research and development capacities on environmental monitoring, pollution control and environmental restoration technologies at waste landfill sites in Sri Lanka

Indicators (tentative)

The guideline for sustainable and applicable designs, operation and management at landfills is proposed to Ministry of Local Government and Provincial Councils and Ministry of Environment.

2. Output and Activities

(1) Formulate concept of the guideline for planning, managements and maintenances for waste landfill sites in Sri Lanka

Indicators (tentative)

1.1. Issues on waste management are indentified at local municipalities and capacity assessment on waste management is implemented to municipalities.

1.2. Summary of contents for the guideline is made and recognized by relevant stakeholders involved in solid waste management (SWM).

Activities

1-1 Review SWM and its policy in Sri Lanka and grasp issues on it.

1-2 Survey organisation, human resources, budget, technical capacities etc related on SWM at Gampola Urban Council and Hambantota Urban Council.

1-3 Define items and contents of the guideline that is going to be formulated based on the results of 1-1 and 1-2.

1-4 Hold a workshop(s) to relevant stakeholders involved in SWM to obtain opinions about the result of 1-3 and reflect these opinions to the proposed contents..

(2) Define methodology of appropriate site selection for new waste landfills.

Indicators (tentative)

2.1. Manual with required items and tools for new waste landfill site selection is prepared and recognized by people concerned on waste management.

Activities

2-1 Find technical conditions for appropriate new waste landfill site selection.

2-2 Find social and economical conditions for appropriate new waste landfill site selection.

2-3 Collect data according to 2-1 and 2-2 in Gampola Urban Council and Hambantota Urban Council areas.

2-4 Analyse data collected at 2-3 and define methodology for new waste landfill site selection.

2-5 Prepare procedures for new waste landfill site selection based on 2-4

2-6 Hold seminars, issue newsletters, paper supplements, release on website and present at conferences to share knowledge and experiences through activities from 2-1 to 2-5 with not only researchers but also persons concerned with SWM.

(3) Monitor existing landfill sites and its surroundings to grasp environmental situations.

Indicators (tentative)

3.1. Peer review papers related to identification of Pollution characteristics and its seasonal fluctuation are accepted and published in local and international journal(s) including at least one international journal. .

3.2. At least two review papers related to identification of Pollution characteristics and its seasonal fluctuation are accepted and published in conference proceeding at international conference(s).

3.3. Proper observation reports are made available at each site.

3.4. Summarized documents are uploaded in public domains periodically.

3.5. Procedures and reports on Quality Assurance and Quality Control are made available.

Activities

3-1 Collect data and information for making a monitoring plan.

3-2 Conduct preliminary analysis and define activities for monitoring.

3-3 Make a monitoring plan including monitoring locations, items, frequency, equipment, etc according to the result of 3-2.

3-4 Implement quality assurance and quality control.

3-5 Establish monitoring system, improve monitoring laboratories and strengthen capacity of involved persons according to the plan at 3-3 and make manuals for monitoring procedures.

3-6 Monitor the landfills and its surroundings according to the manual made at 3-5.

3-7 Predict transport of pollution plumes and conduct risk assessments by analysing monitoring data.

3-8 Hold seminars, issue newsletters, paper supplements, release on website and present at conferences to share knowledge and experiences through activities from 3-1 to 3-7 with not only researchers but also persons concerned with SWM.

(4) Develop pollution control and environmental restoration technologies for waste landfill sites.

Indicators (tentative)

4.1. Peer review papers related to pollution control and environmental restoration technologies for waste landfill sites are accepted and published in local and international journal(s) including at

least four international journals. .

4.2. At least five review papers related to pollution control and environmental restoration technologies for waste landfill sites are accepted and published in conference proceeding at international conference(s).

4.3. Model field scale treatment units are demonstrated.

4.4. Summary reports on pollution control and remediation at waste landfills are made available.

Activities

4-1 Based on 1-4 and 3-7, examine materials and methods for leachate treatment, develop applicable leachate treatment system, and strengthen capacity of involved persons.

4-2 Based on 1-4 and 3-7, examine materials and methods for seepage control, develop applicable seepage control system, and strengthen capacity of involved persons.

4-3 Based on 1-4 and 3-7, examine geotechnical characteristics at waste landfill sites, develop applicable methods for slope stability and prediction of settlement for waste landfill layers, and strengthen capacity of involved persons.

4-4 Based on 1-4 and 3-7, examine materials for capping, develop applicable capping system, and strengthen capacity of involved persons..

4-5 Based on 1-4 and 3-7, examine materials for permeable reactive barrier, develop applicable technique for permeable reactive barrier system, and strengthen capacity of involved persons..

4-6 Make a field scale study plan for examining developed techniques from 4-1 to 4-5.

4-7 Implement a field scale study according to the plan made at 4-6.

4-8 Reflect the results at 4-7 to techniques developed at 4-1 to 4-5.

4-9 Summarise results from 4-1 to 4-8 to the report.

4-10 Hold seminars, issue newsletters, paper supplements, release on website and present at conferences to share knowledge and experiences through activities from 4-1 to 4-9 with not only researchers but also persons concerned with SWM

(5) Finalise the guideline for sustainable and applicable planning, maintenances and operations for waste landfills.

Indicators (tentative)

5.1. Potential maps for new waste landfill site are made in Gampola and Hambantota Urban Councils.

5.2 Standard monitoring method is made for Local Governments and CEA

5.3 The guideline for sustainable and applicable designs, operation and management at waste landfills is finalized.

Activities

5-1 Propose combined methods using output 1 to 4 with low-cost, low maintenance and low environmental impacts.

5-2 Produce potential maps for new waste landfill sites in the areas of Gampola and Hambantota

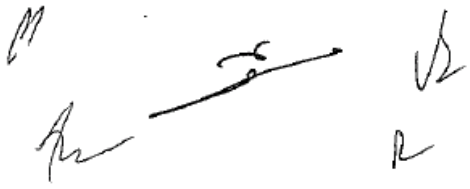
Urban Councils.

5-3 Propose a standard monitoring method for new sites.

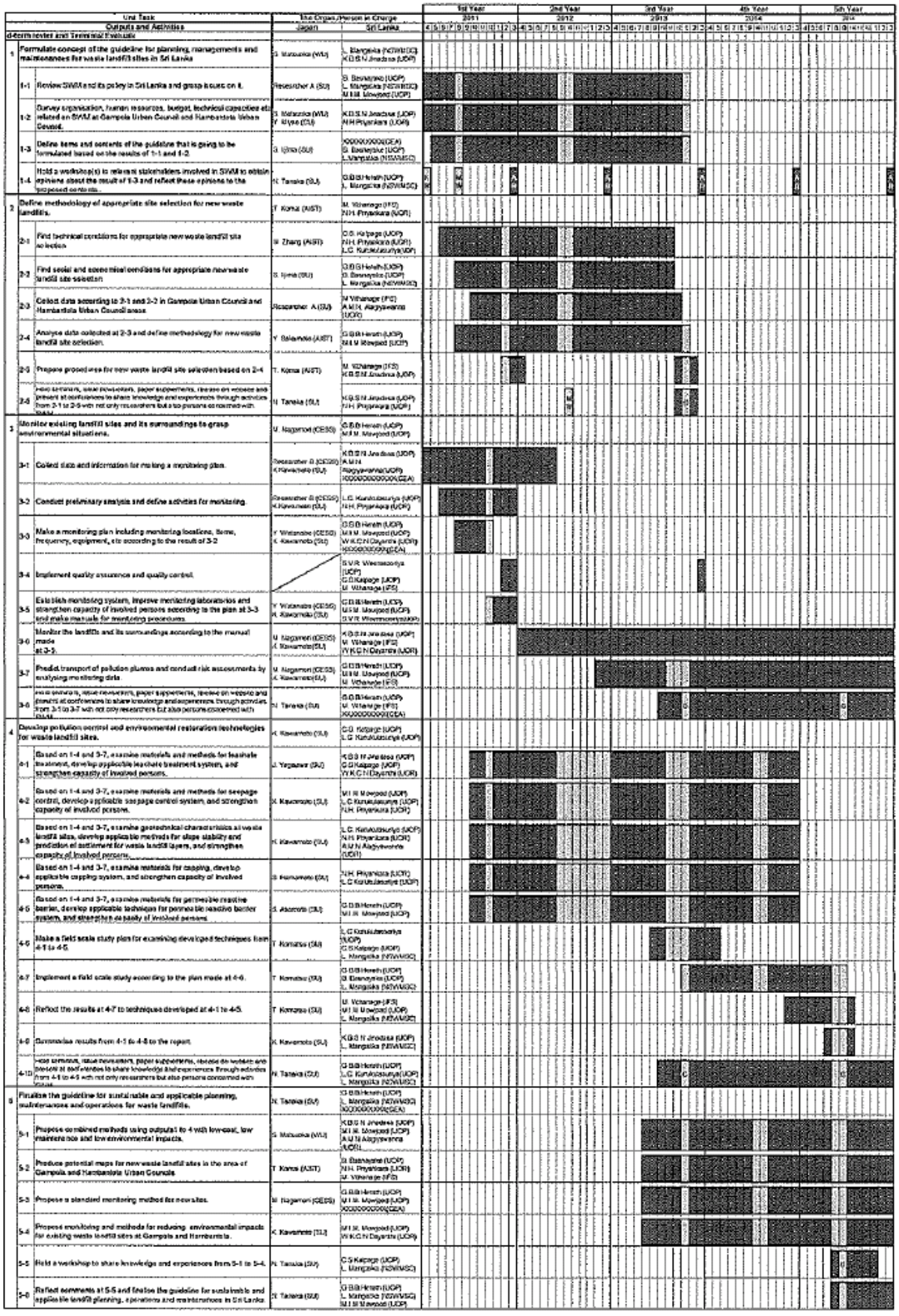
5-4 Propose monitoring and methods for reducing environmental impacts for existing waste landfill sites at Gampola and Hambantota.

5-5 Hold a workshop to share knowledge and experiences from 5-1 to 5-4.

5-6 Reflect comments at 5-5 and finalise the guideline for sustainable and applicable landfill planning, operations and maintenances in Sri Lanka.



ANNEX I-2 PLAN OF OPERATION



ANNEX II LIST OF JAPANESE EXPERTS

Dispatch of the Japanese Experts Team for the Project

1. Long-term expert

The long-term expert, who will be in charge of the following fields, will be dispatched;

1) Project Coordinator

2. Short-term experts

The short-term experts, who will take part in the Project as listed below, will be dispatched several times a year during the project period.

At the beginning or each Japanese fiscal year (JFY), JICA will provide the plan of dispatched short-term expert for coming JFY.

1) Dr. Norio Tanaka, Saitama University (Leader)
2) Dr. Ken Kawamoto, Saitama University (Sub-leader, Remediation)
3) Dr. Toshiko Komatsu, Saitama University (Remediation)
4) Dr. Junji Yagisawa, Saitama University (Remediation)
5) Dr. Shingo Asamoto, Saitama University (Remediation)
6) Dr. Shoichiro Hamamoto, Saitama University (Remediation)
7) Dr. Satoshi Iijima, Saitama University (Social benefit)
8) Dr. Yuriko Miyao, Saitama University (Social benefit)
9) Researcher 'A', Saitama University (Remediation)
10) Dr. Masanao Nagamori, CESS (Sub-leader, Monitoring)
11) Dr. Youichi Watanabe, CESS (Monitoring)
12) Researcher 'B', CESS (Monitoring)
13) Dr. Takeshi Komai, AIST (Monitoring)
14) Dr. Ming Zhang, AIST (Remediation)
15) Dr. Yasuhide Sakamoto, AIST (Remediation)
16) Dr. Shunji Matsuoka, Waseda University (Sub-leader, Social benefit)

The dispatch schedule is mentioned on Annex I, Plan of Operation.

3. Sri Lankan Research Assistant

1) Research Assistants for monitoring and data analysis at UOP, 18 months×3 persons
2) Research Assistants for field scale study and modeling at UOP, 18 months×3 persons
3) Research Assistants for monitoring and data analysis at UOR, 18 months×3 persons
4) Research Assistants for field scale study and modeling at UOR, 18 months×3 persons
5) Research Assistants for social benefits, 18 months×3 persons

ANNEX III LIST OF MACHINERY AND EQUIPMENT

Equipment, machinery, instruments, tools and materials are necessary for the Project as below:

	Quantity	Output	Maintenance Responsibility	
1. Field Instruments/Equipments				
Portable GPR/TEM/Resistivity meter	1	3	UOP	
Portable UV-Vis spectrophotometer	1	3.4	UOR	
In-situ dry bulk density meter	1	4	UOP	
Weather station and data logger	2	3	UOP	UOR
Field vehicles	2	2.3.4	UOP	UOR
2. Laboratory Instruments/Equipments				
Atomic absorption Spectrophotometer (AAS) and Hollow Cathode Lamps	1	3	UOP	
Scanning Electron Microscope (SEM)	1	3.4	IFS	
UV/Vis Spectrophotometer	1	3.4	UOP	
CN analyzer	1	3.4	UOP	
Dewpoint soil moisture meter	1	3.4	UOP	
Rowe cell apparatus	1	4	UOR	
Centrifuge / ultracentrifuge	1	3.4	UOP	
Constant temperature shaker	1	3	UOP	
Distilled water plant	1	3.4	UOP	
Muffle furnace	1	3.4	UOP	
Auto titrator	2	3.4	IFS	UOP
Fume cupboard with water. Electricity and storage facility	1	3.4	UOP	
Uninterrupted power supply (UPS for the laboratory)	1	3.4	UOP	
High-performance triaxial compression system for waste samples	2	4	UOP	UOR
Refrigerators	2	3.4	UOP	UOR
Split-type air conditioner (for the laboratory)	2	3.4	UOP	UOP
Microwave digesting system	1	3.4	UOP	
High-performance simple shear test system	2	4	UOP	UOR
Pressure plate apparatus	1	4	UOP	
3. Other				
Multimedia Projectors	1	1.2.3.4	UOP	
Groundwater reactive transport modeling software	1	3.4	UOP	
Software for geotechnical studies	1	4	UOP	
Software for hydrological modeling	1	3.4	UOP	
Desktop for RA	2	2.3.4	UOP	UOR
Color Printers	2	1.2.3.4	UOP	UOR
Digital Cameras with accessories	2	3.4	UOP	UOR
Laptop for filed data collection and modeling	3	2.3.4	UOP2	UOR

Additional equipments necessary for the Project should be discussed after starting the Project, if needed.

ANNEX IV LIST OF COUNTERPART PERSONNEL AND ADMINISTRATIVE PERSONNEL

No	Project Position	Position / Name	Organization	Related Output
1	Chairperson	Vice Chancellor (Prof. S B S Abayakoon)	UOP	
2	Project Director	The Dean, FoE (Prof. S B Weerakoon)	UOP	
3	Project Manager	Dr. G B B Herath	UOP	**1,2,3,4,5**
4	Representative of NSWMSC/Core member	Ms. L. Mangalika	NSWMSC	**1,2,4,5**
5	Representative of CEA	To be decided	CEA	
6	Representative of MoFP	Ms. D.C.W. Hapugoda	MoFP	
7	Representative of GUC	To be Decided	GUC	
8	Representative of HUC	Mr. H.A. Sisira Rohana	HUC	
9	Adviser	Prof. S B Weerakoon	UOP	
10	Core Member	Prof. Ben Basnayake	UOP	**1,2,4,5**
11	Core Member	Dr. M.I.M. Mowjood	UOP	**1,2,3,4,5**
12	Core Member	Dr. L.C. Kurukulasuriya	UOP	**2,3,4,**
13	Core Member	Dr. C.S. Kalpage	UOP	**2,3,4,5**
14	Core Member	Dr. K.B.S.N. Jinadasa	UOP	**1,2,3,4,5**
15	Member	Ms. P Weerakoon	UOP/Civil	
16	Member	Dr. L W Galagedera	UOP/Agri	
17	Member	Dr. D G G P Karunaratne	UOP/Chem	
18	Member	Dr. S V R Weerasooriya	UOP/Science	
19	Member	Ms. S.M.W.T.P.K Ariyarathne	UOP/Chem	
20	Core Member	Dr. A.M.N. Alagiyawanna	UOR	**1,2,4,5**
21	Core Member	Dr. N.H. Priyankara	UOR	**1,2,3,4,5**
22	Core Member	Dr. W.K.C.N. Dayanthi	UOR	**3,4,5**
24	Adviser	Prof. C B Dissanayake	IFS	
25	Core Member	Dr. M Vithanage	IFS	**1,2,3,4,5**
27	Member	Dr. Sanjaya Ratnayake	CEA	
29	Advisor	Mr. S L Attanayake	NWS&DB	
30	Member	Dr. S.K.Weragoda	NWS&DB	
31	Advisor	Mr.R.P.Samarakkody	WMA (WP)	
32	Research Fellow	To be Decided		
33	Lab Supervisor	To be Decided		
34	Administrative Officer	To be Decided		
35	Secretary	To be Decided		

ANNEX V LIST OF BUILDINGS AND FACILITIES

1. The building and facilities those are necessary for the performance of duties by the Japanese Experts, and the office spaces located at Faculty of Engineering, University of Peradeniya and Faculty of Engineering, University of Ruhuna.
2. Field monitoring and experiment implementation sites at Gampola and Hambantota.
3. Facilities such as electricity, water, sewerage system, telephones, internet and furniture necessary for the Project activities, and operational expenses for utilities.
4. Other facilities mutually agree upon as necessary.

ANNEX VI JOINT COORDINATING COMMITTEE

1. Functions

A Joint Coordinating Committee (JCC) will be organized. The committee meeting will be held at least once a year and whenever need arises.

The functions of the Committee are as follows;

(1) To supervise the annual work plan of the Project in line with the Plan of Operation.

(2) To review the annual and overall progress of the Project and to evaluate the accomplishment of the annual targets and achievement of the objectives.

(3) To find out proper ways and means for solution of the major issues arising from or in connection with the Project.

2. Composition of the Committee

(1) Chairperson: Vice Chancellor, University of Peradeniya (UOP)

(2) Members

a. Sri Lankan Side

- Project Director
- Project Manager
- Representative(s) of University of Peradeniya (UOP)
- Representative(s) of University of Ruhuna (UOR)
- Representative(s) of Ministry of Local Government & Provincial Councils (MoLGPC)
- Representative(s) of Department of External Resources (ERD)
- Representative(s) of Ministry of Higher Education (MoHE)
- Representative(s) of Ministry of Environment (MoE)
- Representative(s) of Central Environmental Authority (CEA)
- Representative(s) of Gampola Urban Council (GUC)
- Representative(s) of Hambantota Urban Council (HUC)

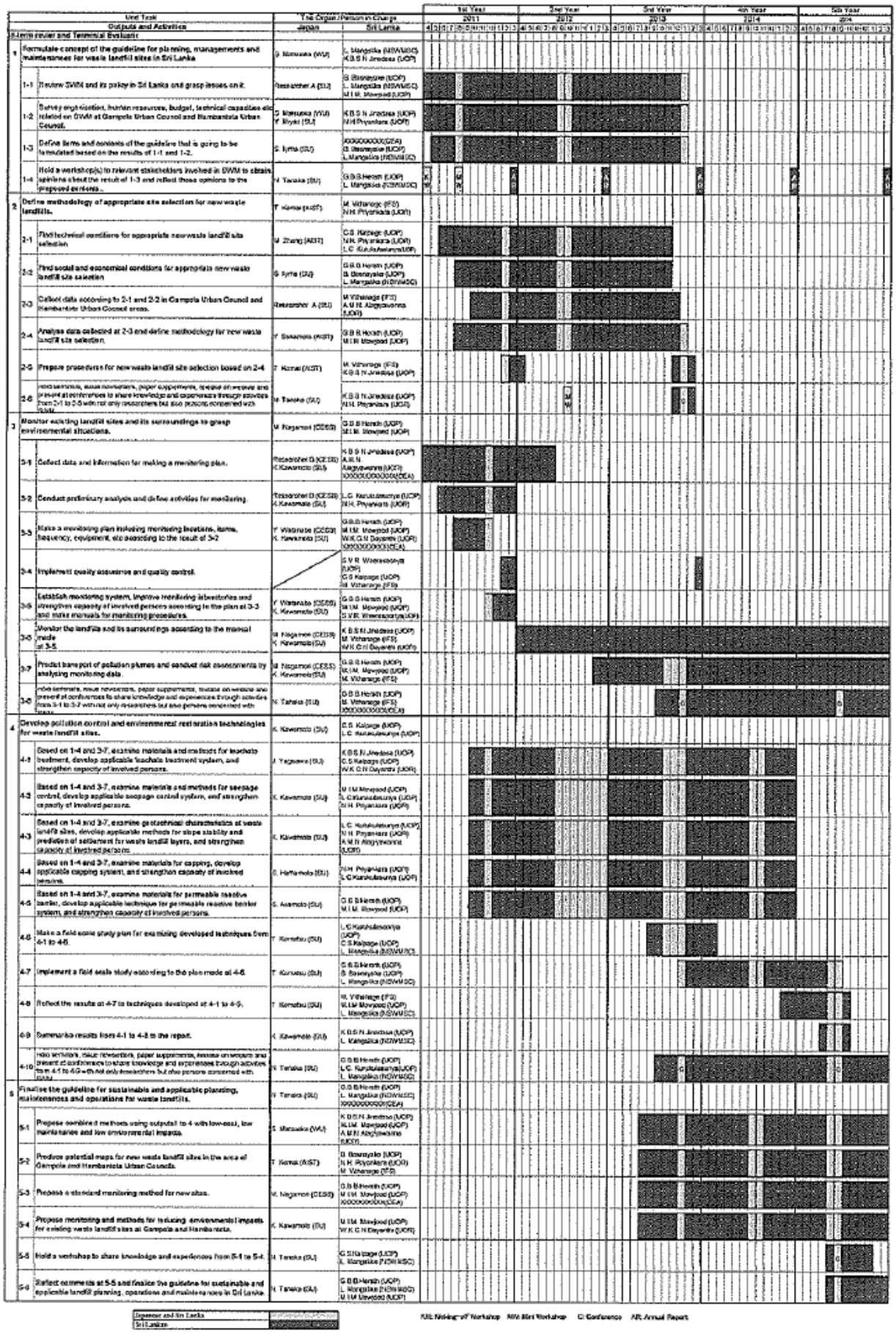
b. Japanese Side

- Representative(s) of JICA Sri Lanka Office
- Project Leader
- Other Japanese experts
- Member(s) of missions dispatched by JICA

c. Observer(s)

- Representative(s) of Japan Science and Technology Agency (JST)
- Official(s) of the Embassy of Japan who may attend the JCC as observer
- Other official(s) of appointed by the Project Leader / Project Manager who may attend JCC as observers

ANNEX B TENTATIVE PLAN OF OPERATION



3.1 Questions for Prof. Nayana Alagiyawanna in University of Ruhuna

1) What are the roles of University of Ruhuna in the project?
   - **Investigate the social and environmental pollution risks associated with open dumping in Hambantota waste dumping site**
   - **Develop cost effective waste management system using locally available material**

2) What is your key expectation from this project?

   - **Develop a set of guide lines to the waste management system in Sri Lanka.**

3) The representative counterpart would be Department of Civil engineering in University of Peradeniya. Have you ever implemented research works or project in the area of environmental management including waste management with them? If yes, please describe in detail.

   No

4) Have you ever implemented research works or project in the area of environmental management including waste management with governmental organisations? If yes, please describe in detail.
   Yes
   - **"Galle district health care waste management project"-Funded by World Bank. Project was carried out by the Department of Civil and Environmental Engineering, University of Ruhuna with the help of Teaching Hospital, Galle.**
   - **Undergraduate projected titled "Analysis of quality and characteristics of Municipal Solid Waste in Galle City", with the help of Municipal Council- Galle.**
   - **Undergraduate Mini Project on "Solid Waste Management Activities" – in all pradeshiya shaba's in Galle district**

5) Do any other donors currently support your university in the area of environmental management? If yes, please describe in detail.
   No

6) What inputs are available in terms of human resources to implement this project? Please describe in detail such as number of researchers and their names, assignment plan etc.

   - **Dr. A.M.N. Alagiyawanna – Geotechnical Engineering**
   - **Dr. N.H. Priyankara – Geotechnical Engineering**
   - **Dr. W.K.C.N. Dayanthi – Environmental Engineering**
   - **Dr. P.I.A. Gomes - Environmental Engineering**

   } **Core Members**

- **Research Associate 1 – Basically assign for geotechnical related works (liner, capping)**
- **Research Associate 2 - Basically assign for environmental related works (study on ground water contamination etc.)**

  Both Research Associates are expected to assign after project started.

7) Please identify required monitoring equipment for this project and categorise these into items which can be used, items which are required repairs, and items which are required newly-purchasing.

Available Equipments

- **Test sieves and sieve shaker**
- **Casagrande's apparatus**
- **Costant head and Falling head permeability apparatus**
- **Hand augers**
- **Jar test apparatus**
- **Magnetic stirrer**
- **Gas Chromatograph**
- **Digestion apparatus**

Equipments to be repaired

- **Stress Path**
- **Triaxial apparatus – 3 Nos.**
- **Direct shear apparatus – 2 Nos.**
- **Oedometer test apparatus – 3 Nos.**
- **Digestion apparatus**
- **Gas Chromatograph**
- **Fume cupboards**
- **Jar test apparatus**
- **Turbidimeter**
- **Colony counter**
- **Magnetic stirrer**
- **DO meter**
- **Incubator (20^0C)**
- **Drying oven**
- **Distilled water plant**
- **Electronic Analytical Balances**
- **UV Visible Spectrophotometer**
- **Incubator (37^0C)**
- **Incubator (44^0C)**
- **pH meter**
- **De-ionizer**
- **Salt meter**

- **Photometer (Portable)**
- **Autoclave**
- **Vacuum filtration apparatus**
- **Muffle furnace**
- **BOD Track Apparatus**
- **Water bath**
- **Bio Safety Cabinet**

New equipments required

- **Field Vehicle**
- **High performance Simple Shear machine**
- **High performance Triaxial machine**
- **Rowcell apparatus**
- **Boring machine with all accessories**
- **Water level indicator**
- **Vane shear apparatus**
- **Hydrometer Sedimentation Cylinders – 2 Nos.**
- **Data Loggers (data acquisition system)**
- **Pore pressure transducers**
- **Displacement gauges**
- **Note Book for field data collection**
- **Colour printer**
- **UPS for high performance machines – 2 Nos.**
- **Distillation Apparatus (steam or kjeldhal)**
- **Gas Chromatograph (GC)**
- **Gas Chromatograph or Gas Analyzer**
- **TOC Analyzer**
- **Atomic Absorption Spectrophotometer**
- **Iron Chromatograph**
- **Multi Parameter Analyzer**

8) The running cost for this project such as your travel allowance and expenses etc, would be borne by you. Can you allocate these in your budget?

Yes

9) This project is planned to implement a pilot study at Hambantota Landfill site. Are there any concerned matters that will be the risk of halting the project? If yes, please describe in detail.

As Hambantota is a rapid developing area, this may be very useful for Hambantota urban council.

We had few rounds of talks with Hambantota Mayor and he agreed to allocate a land close to the current dumping site for the Pilot Project.

10) Please feel free to give your comments and suggestions on the project designs, implementing strategies and other issues related to the project.

- **It is very important to educate the general public about waste management**
- **Political support on implementation of this kind of project is essential. Without any political support, it is really difficult to implement the results of this project.**
- **By conducting workshops and seminars, we expect to educate the local politicians about the guidelines (final outcome of this project) of waste management.**

3.2 Questions for Dr. Meththika Vitanage in Institute of Fundamental Studies

1) What are the roles of Institute of Fundamental Studies in the project?

Support the team for the project activities with IFS expertise on soil, leachate and groundwater monitoring and analysis, development of materials for leachate treatment, disseminate knowledge and finally develop guidelines for sustainable management of waste dumping sites in Sri Lanka.

2) What is your key expectation from this project?

Capacity building through research

3) The representative counterpart would be Department of Civil engineering in University of Peradeniya. Have you ever implemented research works or project in the area of environmental management including waste management with them? If yes, please describe in detail.

We did not have any particular research however, we have helped on analysis of water and leachate samples for heavy metals and nutrients for their Undergraduate students research

4) Have you ever implemented research works or project in the area of environmental management including waste management with governmental organisations? If yes, please describe in detail.

No

5) Do any other donors currently support in the area of environmental management? If yes, please describe in detail.

We collaborate with the University of Copenhagen, Denmark on one Masters Student's research project on looking at the effect of climate change on groundwater in the coastal zone of Sri Lanka

6) What inputs are available in terms of human resources to implement this project? Please describe in detail such as number of researchers and their names, assignment plan etc.

Name	Assignment
Dr. Meththika Vithanage	**Support designing a methodology for new waste landfill site selection, analysis, monitoring, disseminate knowledge, give expertise on**
Mr. I.P.L.Jayarathna	**Development of materials for leachate treatment**
Ms. A.U. Rajapaksha	**Support analysis and monitoring**
Mr. Mahesh Kulatunge	**Maintain and service bulky equipments**
Mr. Anura Herath	**Maintain and service portable equipments**

7) Please identify required monitoring equipment for this project and categorise these into items which can be used, items which are required repairs, and items which are required newly-purchasing.

Equipments can be used

COD digester

Atomic absorption spectrophotometer

Autotitrator

Centrifuge

Ball mill

FTIR

UV-visible spectrometers

Ultracentrifuge

Temperature controlled magnetic stirrer

pH meter

EC meter

Digital balance

Items required repair

ICP-MS
XRD
XRF
EPMA
Liquid Scintillation Counter
XRD, XRF sample preparation equipments
GC-MS
DTA
NMR
Fluorophotometer

New purchase

CHN analyzer
Gas detectors and flow meters
Water leveller
Scanning Electron Microscope
Portable GPR/TEM for geophysics
Microwave digester
Autotitrator
Water bath shaker
ORP meter

8) The running cost for this project such as your travel allowance and expenses etc, would be borne by you. Can you allocate these in your budget?

Yes

9) This project is planned to implement a pilot study at Gohagoda and Hambantota Landfill sites. Are there any concerned matters that will be the risk of halting the project? If yes, please describe in detail.

No

10) Please feel free to give your comments and suggestions on the project designs, implementing strategies and other issues related to the project.

3.3 Questions for Ms. L. Mangalika at National Solid Waste Management Support Centre

1) Can you briefly summarise your role on waste management in Sri Lanka?

I am the Director of National solid Waste Management Support Center (NSWMSC) established under the Ministry of Local Government and Provincial Councils. This Organisation has been entrusted the National Policy and Strategy and their implementation in line with the subject on Solid waste Management. Therefore the center (NSWMSC) works as the pivotal agency which handles all policy, technical and financial matters related to the SWM in local government leading to a better environment and social health

2) Can you briefly summarise issues and its countermeasures on waste management in Sri Lanka?

Issues	Counter measures
1. Lack of Proper attention in implementation of the National Policy and Strategy on SWM	**1) The proper coordination and direction of policy implementation with National, Provincial and Local level Authorities. Encourage provincial policy building and implementation as well as providing necessary feedback upwards and downwards to improve the national and provincial policies on SWM. A wider consultation with all stake holders, National Policy will be updated timely by aiming the current issues of the subject.**
2. No sufficient legal provisions has been provided and weak enactment procedure	**2) Provide necessary amendments to the governing legislation of Las by enhancing the provisions to enact necessary by – laws in the area of SW, Env and Health and encourage the provincial authorities to pass necessary standard by – laws on SWM and monitoring the implementation and adopting of such By- Laws by the LAs**
3. Lack of awareness and active contribution by the civil society	**3) Aware the civil society through media, best practises available etc.**
4. Non availability of sufficient and proper land for final disposal	**4) Identify and reserve proper sites for land fill by the National and Provincial level.**
5. Lack of Research and Development and technology transferred towards the practical implementation	**5) Make a good coordinating net work among researches and implementing organisations and assist to apply the research findings to model projects or existing projects.**

6. Lack of Appropriate Technology in Provincial and Local Government staff on SWM	**6) Arrange the capacity upgrading programme in National and Provincial level.**

3) What is your key expectation from this project?

1) Conduct an effective research for the Pollution Control and site Specific Remediation Technique at Waste Dumping Sites in Sri Lanka
2) Preparation of Guidelines applicable to Final Disposal Sites
3) Establish successful model projects by using the research findings

4) How are you going to commit to the project? And what inputs are available to the project?

1) NSWMSC will be given the leadership and coordination for preparation of Guidelines and their implementation
2) Provide Assistance to coordinate the Researches and Provincial and Local Authorities
3) Lead the implementation of pilot projects with the consultation of Researches and JICA etc Institutional and management capacity of the NSWMSC and Provincial Authorities will be provided.

5) How will you ensure the work of the staff those who will be involved with the project?
(e.g. issues an assignment letter to the project; include in their TOR the duties related to the project etc.)

This will be discussed and decided after finalisation of the projects and its content.

6) Have you ever implemented research works or project in the area of environmental management including waste management with academic organisations? If yes, please describe in detail.

No.

7) Do any other donors currently support in the area of environmental management including waste management? If yes, please describe in detail.

Yes. JICA.
Capacity upgrading project of NSWMSC (CUP_NSWMSC) provide technical expertise by a team of specialist on SWM. The Main concentration was regularisation of waste disposal of waste environmental friendly manner by stream lining the generation and collection systems of urban

waste management.

8) The running cost for this project such as your travel allowance and expenses etc, would be borne by you. Can you allocate these in your budget?

As the Government Budget for year 2011 has been already finalised and hence these costs are would not be borne by the Ministry.

9) This project is planned to be implement a pilot study at Gohagoda and Hambantota Landfill sites. Are there any concerned matters that will be the risk of halting the project? If yes, please describe in detail.

Yes.
Research and Rehabilitation of Gohagoda land Fill site has already been handed over to a company named Eco tech by the Kandy Municipal Councils. Therefore Ministry is in opinion that it is suitable to include any other convenient Land fill in place of Gohagoda site.
It also recommended that to further consultation with Kandy Municipal Council and make a decision in this concern

10) Please feel free to give your comments and suggestions on the project designs, implementing strategies and other issues related to the project.

I consider that this project is an very important project as far as National priorities in relation to Env and Sanitation in Sri Lanka is concern. Although various researches have been carried out on SWM, this sector has not been properly addressed.
Therefore I firmly believe that the proposed project by doing a research with following model projects will be very widely effect to the local government sector for eradicating the existing issues on SWM.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