第４章　プロジェクトの評価

第 4 章　プロジェクトの評価

4-1　事業実施のための前提条件

事業実施のための前提条件として、「ス」国による地雷・不発弾（UXO）探査／除去の実施の他、建設許可の取得、整地工事、電気・給水管の敷設工事と取り口の確保、工事用道路および仮設ヤードの確保の必要がある。

4-2　プロジェクト全体計画達成のために必要な相手方投入（負担）事項

本事業では、適切な大学環境の整備のために、施設・機材及びほ場の整備を行う。よって、本事業で整備する施設・機材及びほ場を活用し、効果を発現・持続するためには、以下の相手方投入（負担）事項が必要である。

- 入学定員数の増員およびその予算の確保
- 教員の増員と学位レベルの向上
- 実験・実習を取り入れ、現地の農業事情に即した教科内容の絞り込み（必要であれば学科の再編成や拡充も必要）と農学基礎科目の充実
- 研究機能強化を図るための教員の研究能力の向上
- 実験・演習科目の質的向上のための教員（博士号取得者あるいは修士号取得者）の増員
- 施設・機材・ほ場管理に必要な職員の確保
- 研究機能の向上と維持のための継続的な研究費（消耗品、試薬品の保持）の確保

4-3　外部条件

本事業では、ジャフナ大学農学部における施設・機材、研究・実習ほ場の整備を実施することにより、北部乾燥地域における農畜産分野の効率的かつ効果的な研究及び人材育成を図ることをプロジェクト目標とし、同地域における農畜産分野の生産性向上に寄与することを上位目標としている。よって、プロジェクトの効果を発現・持続するためには、ジャフナ大学農学部が位置するキリノッチ周辺において、紛争が再発せず、経済の急激な悪化や産業のニーズの劇的な変化等が起きず、大学の運営が継続される必要がある。

4-4　プロジェクトの評価

4-4-1　妥当性

本プロジェクトは、ジャフナ大学農学部において研究棟、加工実習棟、研究・実習ほ場等の施設を整備することにより、北部乾燥地における農畜産分野の効率的・効果的な研究・人材育成を図り、同地域における農畜産分野の生産性向上に寄与することをプロジェクト目標とし、農業を通じて北部州の

地域経済が活性化することを上位目標としている。よって、プロジェクトの裨益対象は北部州住民（約105 万人）全体である。

さらに、本プロジェクトの実施は、『対スリランカ民主社会主義共和国国別援助方針』における重点分野である「後発開発地域の開発支援」に合致し、『紛争影響地域生産性回復プログラム』における「紛争影響地における帰還民を対象とした生計向上支援」による乾燥地農業の向上支援等に寄与するものである。

また、環境社会面において、本プロジェクトの実施における負の影響はなく、我が国の無償資金協力の制度により、プロジェクトを実施することが可能であると考えられる。

上記の状況より、本プロジェクトの実施は妥当性があると言える。

4-4-2　有効性

(1)　定量的効果

表 4-1　定量的効果と成果指標

指標名	基準値 （2014 年度実績値）	目標値（2021 年度） 【事業完成 3 年後】
農学部学部生数及び大学院生数（名）	学部生：280 大学院：14	学部生：480 大学院：30
農学部教員数（名）	24	43
学生及び教員による北部乾燥地域農業の生産性向上に関する研究論文数（査読あり）（本/年）	12	24
学生による圃場での農場実習（時間/年）	0	105
学外向け（農業関係機関の職員、農業普及員や民間関係者）研修実施回数（回/年）	2	6

出典：調査団

(2)　定性的効果

① 学生による実践的な知識・技術の習得。
② 教員の研究能力の向上による、北部乾燥地域における農畜産分野の生産性向上に資する実践的な内容を使った研究の実施。
③ 研修等を受けた農業関係機関の職員、農業普及員や民間関係者の専門知識向上を通じた、北部乾燥地域における農畜産分野の生産性向上。

資　　料

資　料

現地調査（2015 年 5 月 6 日から 2015 年 6 月 5 日）

名前	担当	所属
鈴木　和哉	総括	JICA　農村開発部　次長兼農業・農村開発第一グループ長
林　将幸	無償計画	JICA　資金協力業務部　実施監理第三課　主任調査役
佐々　優子	業務主任／建築計画(農業高等教育）1	株式会社オリエンタルコンサルタンツグローバル
宮武　一弘	副業務主任／建築計画(農業高等教育）2 ／自然条件調査1	株式会社オリエンタルコンサルタンツグローバル
新田　知生	建築設計／自然条件調査2	株式会社オリエンタルコンサルタンツグローバル
吉野　治伸	研究・農業資機材計画	株式会社アールコンサルタンツ
パチャキル　バビル	農業教育・研究（作物）	株式会社オリエンタルコンサルタンツグローバル（東京農業大学）
鎌形　亜土	施設･設備計画／運営維持管理	株式会社オリエンタルコンサルタンツグローバル
矢野　大悟	ほ場整備計画	株式会社オリエンタルコンサルタンツグローバル
石川　晴久	施工計画／積算（施設）	株式会社オリエンタルコンサルタンツグローバル
高橋　洋	調達計画／積算（機材）	株式会社アールコンサルタンツ

概略設計概要説明調査（2015 年 11 月 25 日から 2015 年 12 月 5 日）

名前	担当	所属
平　知子	総括	JICA　農村開発部　農村開発第一グループ　第一チーム　課長
大城　華	協力企画	JICA　農村開発部　農村開発第一グループ　第一チーム
佐々　優子	業務主任／建築計画(農業高等教育）1	株式会社オリエンタルコンサルタンツグローバル
宮武　一弘	副業務主任／建築計画(農業高等教育）2 ／自然条件調査1	株式会社オリエンタルコンサルタンツグローバル
新田　知生	建築設計／自然条件調査2	株式会社オリエンタルコンサルタンツグローバル
吉野　治伸	研究・農業資機材計画	株式会社アールコンサルタンツ

現地調査（2015年5月6日から6月5日）

	Date		JICAミッション	業務主任／建築計画（農業高等教育）1	副業務主任／建築計画（農業高等教育）2／自然条件調査1	建築設計／自然条件調査2	研究・農業資機材計画	農業教育・研究（作物）	施設・設備計画／運営維持管理	ほ場整備計画	施工計画／積算（施設）	調達計画／積算（機材）
			鈴木（団長）、林（無償計画）	佐々	宮武	新田	吉野	パチャキル	鎌形	矢野	石川	高橋
1	2015/5/6	水		NRT→(SIN)→CMB *@コロンボ*						NRT→(SIN)→CMB *@コロンボ*		
2	2015/5/7	木		コロンボ ⇒キリノッチ（移動） 協議（ジャフナ大学農学部） *@キリノッチ*						コロンボ ⇒キリノッチ（移動） 協議（ジャフナ大学農学部） @キリノッチ		
3	2015/5/8	金		サイト調査、協議（ジャフナ大学農学部） *@キリノッチ*						サイト調査、協議（ジャフナ大学農学部） @キリノッチ		
4	2015/5/9	土		サイト調査（農学部） *@キリノッチ*						サイト調査（農学部） @キリノッチ		
5	2015/5/10	日	NRT→CMB *@コロンボ*	キリノッチ ⇒ コロンボ（移動） *@コロンボ*		書類整理 *@キリノッチ*				書類整理 @キリノッチ		
6	2015/5/11	月	8:30 JICAスリランカ事務所打合せ 10:00 在日本大使館表敬 11:30 財務省協議 14:00 高等教育省協議 15:00 移動（コロンボ→キャンディー）	JICAミッションと同じ @キリノッチ		協議（ジャフナ大学農学部）。建設事情調査 キリノッチ =>キャンディー @キャンディー			NRT→(SIN)→CMB *@コロンボ*	協議（ジャフナ大学農学部）。建設事情調査 キリノッチ =>キャンディー *@キャンディー*		
7	2015/5/12	火	8:30 ペラデニア大学調査 14:00 移動（キャンディー → ジャフナ）	ペラデニア大学調査 キャンディー ⇒ ジャフナ *@ジャフナ*				NRT→(SIN)→CMB *@コロンボ*	コロンボ ⇒ キャンディー ペラデニア大学調査 キャンディー ⇒ ジャフナ *@ジャフナ*	ペラデニア大学調査 キャンディー ⇒ ジャフナ @ジャフナ	NRT→(SIN)→CMB *@コロンボ*	
8	2015/5/13	水	8:00 ジャフナ大学協議 10:30 Provincial Director of Animal Health and Production協議 11:30 Provincial Director of Agriculture協議 13:30 District Secretary協議（キリノッチ） 15:00 Provincial Director of Irrigation協議（キリノッチ） 16:00 District Director of Animal Production and Health協議（キリノッチ）	JICAミッションと同じ @キリノッチ		サイト調査（ジャフナ大学農学部） *@キリノッチ*	業務主任と同じ *@キリノッチ*	コロンボ ⇒キリノッチ *@キリノッチ*	サイト調査（ジャフナ大学農学部） @キリノッチ		コロンボ ⇒キリノッチ *@キリノッチ*	
9	2015/5/14	木	9:00 ジャフナ大学協議 － キックオフミーティング 15:00 コメ研究機関調査	JICAミッションと同じ @キリノッチ		サイト調査（ジャフナ大学農学部） @キリノッチ	業務主任と同じ *@キリノッチ*	サイト調査（ジャフナ大学農学部） *@キリノッチ*			建設事情調査 *@キリノッチ*	
10	2015/5/15	金	9:00 ジャフナ大学協議（キリノッチ） － M/D 協議 16:15 ジャフナ大学協議（ジャフナ） － M/D協議	JICAミッションと同じ @キリノッチ		建設事情調査 *@キリノッチ*	業務主任と同じ *@キリノッチ*	農業教育調査 *@キリノッチ*	施設調査 *@キリノッチ*	ほ場調査 *@キリノッチ*	建設事情調査 @キリノッチ	
11	2015/5/16	土	10:00 ペラデニア大学調査（Mahailluppallamaキャンパス） 13:00 CIC農場調査(ペラデニア) 15:00 移動（ペラデニア→コロンボ）	JICAミッションと同じ @コロンボ		サイト調査、団内協議 @キリノッチ	業務主任と同じ *@コロンボ*	サイト調査、団内協議 @キリノッチ	サイト調査、団内協議 *@キリノッチ*			

現地調査（2015年5月6日から6月5日）

	Date		JICAミッション	業務主任／建築計画（農業高等教育）1	副業務主任／建築計画（農業高等教育）2／自然条件調査1	建築設計／自然条件調査2	研究・農業資機材計画	農業教育・研究（作物）	施設・設備計画／運営維持管理	ほ場整備計画	施工計画／積算（施設）	調達計画／積算（機材）
			鈴木（団長）、林（無償計画）	佐々	宮武	新田	吉野	パチャキル	鎌形	矢野	石川	高橋
12	2015/5/17	日	書類整理	書類整理 *@コロンボ*		書類整理 *@キリノッチ*	書類整理 @コロンボ	書類整理 @キリノッチ				NRT→(SIN)→CMB *@コロンボ*
13	2015/5/18	月	14:00-14:30 ERD協議 15:00-18:00 高等教育省協議 － M/D協議	JICAミッションと同じ @コロンボ		ジャフナ大学協議（各学科） *@キリノッチ*	業務主任と同じ @コロンボ	ジャフナ大学協議（各学科） @キリノッチ	スリランカ電話局、水道局協議 *@キリノッチ*	ジャフナ大学協議（各学科） @キリノッチ	ジャフナ大学協議（各学科） @キリノッチ	業務主任と同じ @コロンボ
14	2015/5/19	火	12:00-12:30 ERD 15:00-16:00 高等教育省協議 M/D署名 17:00 JICAスリランカ事務所協議	JICAミッションと同じ コロンボ⇒キャンディー *@キャンディー*	JICAミッションと同じ @コロンボ	ジャフナ大学調査 ジャフナ⇒キャンディー @キャンディー	業務主任に同じ コロンボ⇒キャンディー *@キャンディー*	ジャフナ大学調査 ジャフナ⇒キャンディー @キャンディー		9:30 ジャフナ大学協議 キリノッチ⇒キャンディー *@キャンディー*	ジャフナ大学調査 ジャフナ⇒キャンディー @キャンディー	業務主任に同じ コロンボ⇒キャンディー @キャンディー
15	2015/5/20	水	NRT	ペラデニア大学調査 *@キャンディー*	CMB→(SIN)→NRT	ペラデニア大学調査 キャンディー ⇒ キリノッチ @キリノッチ	ペラデニア大学調査 *@キャンディー*		ペラデニア大学調査 キャンディー ⇒ キリノッチ *@キリノッチ*			機材調達調査 *@キャンディー*
16	2015/5/21	木		ペラデニア大学調査 キャンディー ⇒ キリノッチ @キリノッチ		ジャフナ大学協議 概略設計策定 @キリノッチ	ペラデニア大学調査 キャンディー ⇒ キリノッチ @キリノッチ	ペラデニア大学調査 @キャンディー	サブコン調査 運営維持管理計画策定 *@キリノッチ*	農作物開発プログラム調査 *@キリノッチ*	サブコン調査 運営維持管理計画策定 @キリノッチ	ペラデニア大学調査 キャンディー ⇒ キリノッチ @キリノッチ
17	2015/5/22	金		農業関連機関、NGO協議 *@キリノッチ*		概略設計策定 *@キリノッチ*	農業機材調査 *@キリノッチ*	ペラデニア大学調査 キャンディー ⇒ コロンボ	設備関連調査 *@キリノッチ*	農作物開発プログラム調査 @キリノッチ	13:00 Trincomalee港調査 *@キリノッチ*	機材調達調査 *@キリノッチ*
18	2015/5/23	土		団内協議 @キリノッチ		団内協議 @キリノッチ		CMB→(SIN)→NRT	団内協議 *@キリノッチ*		団内協議、サブコン調査 @キリノッチ	団内協議 @キリノッチ
19	2015/5/24	日		書類分析 @キリノッチ		書類分析 *@キリノッチ*			書類分析 @キリノッチ			
20	2015/5/25	月		ジャフナ大学協議 *@キリノッチ*		ジャフナ大学協議 書類分析 @キリノッチ			ジャフナ大学協議 書類分析 @キリノッチ		ジャフナ大学協議 キリノッチ ⇒ コロンボ *@コロンボ*	
21	2015/5/26	火		サイト調査、建設局・都市計画局協議 ジャフナ病院視察 @キリノッチ		サイト調査、建設局・都市計画局協議 ジャフナ病院視察 *@キリノッチ*	ジャフナ大学協議、機材計画策定 *@キリノッチ*		サイト調査、建設局・都市計画局協議 ジャフナ病院視察 @キリノッチ	サイト調査（ジャフナ大学） *@キリノッチ*	建設資材調査 *@コロンボ*	機材調達調査 *@コロンボ*
22	2015/5/27	水		UNDP協議, 概略設計策定 *@キリノッチ*		概略設計協議（ジャフナ大学） *@キリノッチ*	ジャフナ大学協議、機材計画策定 @キリノッチ		概略設計（設備計画）協議（ジャフナ大学） @キリノッチ	概略設計（ほ場計画）協議（ジャフナ大学） @キリノッチ	建設資材調査 @コロンボ	機材調達調査 @コロンボ
23	2015/5/28	木		テクニカルノート協議（ジャフナ大学） @キリノッチ		テクニカルノート協議（ジャフナ大学） @キリノッチ			テクニカルノート協議（ジャフナ大学） @キリノッチ		建設資材調査 @コロンボ	機材調達調査 @コロンボ

現地調査 （2015年5月6日から6月5日）

	Date		JICAミッション	業務主任／建築計画（農業高等教育）1	副業務主任／建築計画（農業高等教育）2／自然条件調査1	建築設計／自然条件調査2	研究・農業資機材計画	農業教育・研究（作物）	施設・設備計画／運営維持管理	ほ場整備計画	施工計画／積算（施設）	調達計画／積算（機材）
			鈴木（団長）、林（無償計画）	佐々	宮武	新田	吉野	パチャキル	鎌形	矢野	石川	高橋
24	2015/5/29	金		UNWFP協議 テクニカルノート協議 *@キリノッチ*		テクニカルノート協議（ジャフナ大学） @キリノッチ			テクニカルノート協議（ジャフナ大学） @キリノッチ		建設資材調査 @コロンボ	機材調達調査 @コロンボ
25	2015/5/30	土		テクニカルノート署名 @キリノッチ		テクニカルノート署名 *@キリノッチ*			テクニカルノート署名 @キリノッチ	移動（キリノッチ ⇒ コロンボ） @コロンボ	書類整理 *@コロンボ*	
26	2015/5/31	日		キリノッチ ⇒ ワヤンバ @コロンボ		キリノッチ ⇒ ワヤンバ *@コロンボ*	キリノッチ ⇒ ワヤンバ *@コロンボ*		キリノッチ ⇒ ワヤンバ *@コロンボ*	CMB→(SIN)→NRT	キリノッチ ⇒ ワヤンバ *@コロンボ*	キリノッチ ⇒ ワヤンバ @コロンボ
27	2015/6/1	月		ワヤンバ大学調査 ワヤンバ ⇒ コロンボ @コロンボ		ワヤンバ大学調査 ワヤンバ ⇒ コロンボ @コロンボ	ワヤンバ大学調査 ワヤンバ ⇒ コロンボ @コロンボ		ワヤンバ大学調査 ワヤンバ ⇒ コロンボ @コロンボ 財務省協議		ワヤンバ大学調査 ワヤンバ ⇒ コロンボ 建設事情調査 @コロンボ	ワヤンバ大学調査 ワヤンバ ⇒ コロンボ *@コロンボ*
28	2015/6/2	火		団内協議、書類分析 *@コロンボ*		団内協議、書類分析 @コロンボ			団内協議、書類分析 @コロンボ		団内協議、書類分析 @コロンボ	
29	2015/6/3	水		JICAスリランカ事務所協議、団内協議 *@コロンボ*		JICAスリランカ事務所協議、団内協議 @コロンボ			JICAスリランカ事務所協議、団内協議 @コロンボ		JICAスリランカ事務所協議、団内協議 @コロンボ	
30	2015/6/4	木		CMB→(SIN)→NRT		CMB→(SIN)→NRT			建設事情調査 *@コロンボ*		建設事情調査 @コロンボ	CMB→(SIN)→NRT
31	2016/6/5	金							CMB→(SIN)→NRT		CMB→(SIN)→NRT	

NRT:成田空港、SIN：シンガポールチャンギ国際空港、CMB：コロンボ国際空港
NMAC: National Mine Action Center

概略設計概要説明（2015年11月25日から12月5日）

No.	Date		JICA ミッション	業務主任／建築計画（農業高等教育）1	副業務主任／建築計画（農業高等教育）2／自然条件調査1	研究・農業資機材計画	建築設計／自然条件調査2	滞在先
			平（団長）、大城（企画計画）	佐々	宮武	吉野	新田	
1	2016/11/25	水	NRT>>BKK>>CMB	NRT>>SIN>>CMB		NRT>>SIN>>CMB		コロンボ
2	2016/11/26	木	JICAスリランカ事務所協議 高等教育省協議			JICAスリランカ事務所協議 高等教育省協議		コロンボ
3	2016/11/27	金	ERD, MOER			ERD, MOER		コロンボ
4	2016/11/28	土	コロンボ→キリノッチ ジャフナ大学協議			コロンボ→キリノッチ ジャフナ大学協議		キリノッチ
5	2016/11/29	日	*追加調査*			追加調査		キリノッチ
6	2016/11/30	月	ジャフナ大学協議 M/D協議			ジャフナ大学協議 M/D協議		キリノッチ
7	2016/12/1	火	ジャフナ大学協議 移動（キリノッチ→コロンボ）		NRT>>SIN>>COL	ジャフナ大学協議 移動（キリノッチ→コロンボ）		コロンボ
8	2016/12/2	水	MOER協議、M/D協議	MOER協議、M/D協議				コロンボ
9	2016/12/3	木	MOER協議、M/D協議	MOER協議、M/D協議				コロンボ
10	2016/12/4	金	MOER, ERD, JICA協議 M/D協議・署名	MOER, ERD, JICA協議 M/D協議・署名				コロンボ
11	2016/12/5	土	CMB>>BKK>>NRT	CMB 01:10 >> 07:40 SIN (SQ0469) SIN 09:20 >> 17:05 NRT (SQ0012)				

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Mr. Hiroyuki Abe	阿部 裕之	:	Senior Representative
Mr. Makoto Asai	浅井 誠	:	Senior Representative
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Mr. Prasad Nissanka		:	Project Specialist
Ms. Eriko Nakanishi	中西 枝理子	:	Project Formulation Advisor

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Mr. D. C. Dissanayake		Secretary
Mr. A. M. R. D. Aponsu	:	Director(PI)
Ms. H. A. R. P. Fernando	:	AD (PI)

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Ms. H.D. Aneesha Rukshini	:	Assistant Director, Dept. of Fiscal Policy

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Madara De Silva	:	Assistant Director
J. D. G. Senanayake	:	Assistant Director

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S. Sivapatham	:	Senior Engineer
T. Sivanantharajah	:	Senior Engineer

7. Department of Animal Production &Health

Dr. S. Gowrithilagan	:	Assistant Director, Kilinochchi District
H. M. J. J. K. Kadigamuwa	:	Livestock Officer

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Dr. G. Mikunthan	:	Dean of Faculty of Graduate Studies/Professor of Agricultural Biology
〈農学部〉		
Dr. Mrs. S. Sivachandiran	:	Dean of Faculty of Agriculture/ Head of Agronomy (May 2015)
Dr. Thushyanthy Mikunthan	:	Dean of faculty of Agriculture/ Head of Agricultural Engineering (Nov 2015)
Dr. Nalina Gnanavelrajah	:	Head of Agricultural Chemistry

Dr. Miss. J. Sinniah	:	Head of Agricultural Science
Dr. G. Thirukkumaran	:	Head of Agricultural Biology
Dr. K. Sooriyakumar	:	Head of Agricultural Economics
Mrs. Loha Pradheeban	:	Senior Lecturer
Mrs. Anushiya Sireerangan	:	Senior Lecturer
Dr. S. Vagantharuba	:	Senior Lecturer, Agricultural Chemistry
Dr. P. Alvappillai	:	Senior Lecturer
Mr. K. Venugoban	:	Senior Lecturer
Mr. K. Jeyavanan	:	Lecture
Mrs. Vanathy Kandeepan	:	Lecture
Mr. S. Thatchaneshkantn	:	Lecturer
Kaefthipeu Tegavaran	:	Lecturer
V. Kandeepan	:	Resistor
N. Rajavisahan	:	Deputy Resistor
Mr. S. Branavan	:	Assistant Resistor
Mr. A. Aravinthan	:	Work Engineer
Mr. G. Guberan	:	Assistant Farm Manager
N. Devorajon	:	Consultant Engineer
Mr. S. Branavan	:	Instructor in IT
K. Venugoban	:	Instructor of Computer unit
K. Jeyakuumar	:	Technician
S. Santhelamor	:	Technical Office, Agri. Chemistry
S. Navarctlhrcn	:	Professor, Animal Science

9. 在スリランカインド大使館

Mr. Chandru. A	:	Second Secretary, Development Cooperation

10. 建設局

Ms. Sabdya Mendis	:	Additional Director General

11. 建設局、ジャフナ支所

Ms. Vinothine	:	Chief Engineer

12. 都市計画局

Ms. Thushani De Alwis	:	Dy Director (Planning)

13. 都市計画局、ジャフナ支所

Mr. Michelthasan	:	Engineer

14. Seed and Planting Material Development Center

Mr. Satheeswaran	:	Assistant Director

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Dr. S.P. Nissanka	:	Senior Lecturer in Crop Physiology, Forestry and Agroforestry, Department of Crop Science
Dr. W.A. Udaya Vitharana	:	Head/ Department of Soil Science
Mr. Chandrapaln	:	Livestock Farm

16. ワヤンバ大学

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O. Madhari Prasadani Dassanayaica	:	Lecture, Department Biotechnology
Dr. Anoma Chandrasekara	:	Head of Department of Applied Nutrition, Faculty of Livestock, Fisheries and Nutrition

17. 国際連合世界食糧計画 (UN WFP) スリランカ事務所

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Nadarajah Thayaharan	:	Field Coordination Officer

18. 国連開発計画 (UNDP) スリランカ事務所

Sivaprakasam Kusalavan	:	Field Project Associate
Sivanathan Senthuraan	:	Field Project Specialist

19. Trincomalee港湾局

Mr. M.U.R. Dharmawardane	:	Resident Manager, Port of Trincomalee

20. セイロン電力庁 (CEB)

Mr. Theiveegan, Superinedant	:	Area Electrical Enigeers Office, Kilinochchi
Mr. N. Nakkeevan	:	District office, Jaffna commercial division

21. National Water Supply & Drainage Board (NWSDB) Project Office, Kilinochchi

Ms. P. Jintha	:	Project Engineer

22. スリランカ電話局(SLT) キリノッチ支所

Mr. P. Sri Puveehan	:	Regional Office Manager

23. Maga Engineering (Pvt) Limited

Mr. M.G. Kularatne	:	Chairman & Managing Director
Mr. Nihal Chandrasiri	:	Asst. General Manager, Construction

24. Sanken Construction (PVT) LTD

Ms. Sarojiani Karunaratne	:	Chief Quantity Surveyor
Mr. S. G. Jayasinghe	:	Project Manager, Kilinochchi Site Office
Mr. P.K.C Jayacreera	:	QA/QC, Kilinochchi Site Office
Mr. J. Terensan	:	Planning Engineer, Kilinochchi Site Office
Mr. K. Sulaxon	:	M&E Engineer, Kilinochchi Site Office
Mr. A.M.S.U.K Dissanajake	:	SM, Kilinochchi Site Office

25. International Construction Consortium (Pvt) Ltd.

Mr. V. S. Nagodavithane	:	Executive Director (Design & Estimation)
Mr. Palitha Ranasinghe	:	General Manager (Contracts & Estimates)

26. Asiri Construction

Mr. L.M.S. Nishantha Wanigasekara	:	Construction Manager
Mr. Kavindu Silva	:	Quantity Surveyor

27. Olympus Construction (PVT) LTD

Mr. Nishad Dissanayake	:	Chairman
Mr. S.A.Mayadunne	:	Quantity Surveyor

28. Citigardens
Mr. Hilru Siddeeque J.P	:	CEO
Mr. M.S. Ahamed Muneer	:	Extension Coordinator

29. Tokyo Cement Company (Lanka) PLC at Mirusuvil
Mr. S. Rukshan A.Q.C	:	Engineer

30. Sanken Ready Mixed Concrete at Navatkuli
Mr. Lakrish	:	QA &QC Engineer

31. Hayleys Lifesciences Ltd.
Mr. Athula Wijayananda	:	Business Unit Head
Mr. Himasu Jayasiri	:	Sales & Marketing Manager
Mr. Priyantha Mahesh Welagedara	:	Head of Admin & Finance

32. Microtech Biological (Pvt) Ltd.
Mr. Kumara Ekanayake	:	Director
Dr. Thilan Wickramarachchi	:	General Manager
Mr. Surin Dias	:	Business Development Manager

33. Main Gate (Private) Limited
Mr. Anil Wijewardene	:	Chief Operating Officer

34. Analytical Instruments (Pvt) Ltd.
Mr. Praba Ranga Jayakody	:	Assistant Project Manager

35. Biomed International (Pvt) Ltd.
Mr. Ranjana D. Wijesinghe	:	Marketing Manager

36. ABC Dynamic (Pvt) Ltd.
Mr. Deepthi Pathiratne	:	Director

37. Photon Technologies (Pvt) Ltd.
Mr. Tharanga Bandara	:	Business Development Manager

38. Avon Pharmo Chem (Pvt) Ltd.
Mr. Dilip K. Fernando	:	General Manager
Mr. Hasun S. Wickramasinghe	:	Sales Manager

39. Asian Trading House (Pvt) Ltd.
Mr. P. Sivakumaran	:	Director

40. Techno Instruments (Pvt) Limited
Mr. Sujeewa Liyanaratne	:	Director

41. Hemsons International (Pte) Ltd.
Mr. Amir Esufally	:	Managing Director
Mr. P.K.G.Ranjith	:	General Manager, Marketing (Laboratory Division)
Mr. Hariharan Balachandran	:	Product Specialist

42. M.K.Electronics (Pvt) Ltd.
Mr. H. Mahendra Karunaratna : Director

43. Hayleys Agriculture Holdings Limited
Mr. Amjad Rajap : General Manager-Agri Equipment

44. Dave Tractors & Combines (Pvt) Limited
Mr. Anil De Silva : Assistant General Manager

45. Yusen Logistics & Kusuhara Lanka (Pvt) Ltd.
Mr. Roshan Perera : Manager – Customer Service & Project Operations

Minutes of Discussions on
the Preparatory Survey for the Project for
Establishment of Research and Training Complex at the Faculty of Agriculture,
University of Jaffna in the Democratic Socialist Republic of Sri Lanka

In response to the request from the Government of Sri Lanka, the Government of Japan decided to conduct a Preparatory Survey for the Project for Establishment of Research and Training Complex at the Faculty of Agriculture, University of Jaffna (hereinafter referred to as "the Project"), and entrusted the Preparatory Survey to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") to the Government of Sri Lanka, headed by Mr. Kazuya Suzuki, Deputy Director General of Agricultural and Rural Development Group 1, Rural Development Department, JICA, and is scheduled to stay in the country from 10 May to 19 May, 2015.

The Team held a series of discussions with the officials concerned of Government of Sri Lanka and conducted a field survey in the Project area. In the course of the discussions, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

Colombo, 19 May, 2015

Mr. Kazuya Suzuki
Leader,
Preparatory Survey Team,
Japan International Cooperation Agency,
Japan

Mr. Piyasena Ranepura
Secretary,
Ministry of Higher Education and Research,
The Democratic Socialist Republic of
Sri Lanka

Mr. R. M. P. Rathnayake
Director General,
Department of External Resources,
Ministry of Policy Planning, Economic Affairs, Child, Youth and Cultural Affairs,
The Democratic Socialist Republic of
Sri Lanka

Prof. Ms. V. Arasaratnam
Vice Chancellor,
University of Jaffna,
The Democratic Socialist Republic of
Sri Lanka

ATTACHMENT

1. Objective of the Project

The objective of the project is to improve effective research, education and promotion activities of dry zone agriculture in the Northern Province by establishment of Research and Training Complex which includes the functioning of Information and Communication Center (hereinafter referred to as "ICC"), and Research and Training Farms with essential equipment at the Faculty of Agriculture, University of Jaffna (hereinafter referred to as "UOJ"), thereby contributing to the improvement of agricultural productivity in the dry zone of the Northern Province.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey on the Project for Establishment of Research and Training Complex at the Faculty of Agriculture, University of Jaffna" (hereinafter referred to as " the Survey").

3. Project Site

Both sides confirmed that the site of the Project is in Kilinochchi, Northern Province, which is shown in Annex-1.

4. Line Agency and Executing Agency

Both sides confirmed the line agency and executing agency as follows:

4-1. The line agency is the Ministry of Higher Education and Research, which would be the agency to supervise the executing agency.

4-2. The executing agency is UOJ. The executing agency shall coordinate with all the relevant agencies to ensure the smooth implementation of the project and ensure that the Undertakings are taken by the relevant agencies timely and appropriately. The organization chart is shown in Annex-2.

5. Items requested by the Government of Sri Lanka

5-1. As a result of discussions, both sides confirmed the items requested by the Government of Sri Lanka, which described in Annex-3.

5-2. JICA will assess the appropriateness of the above requested items through the Survey and will report findings to the Government of Japan. The final components of the Project would be decided by the Government of Japan.

5-3. Both sides confirmed that the condition to consider the Goat Rearing Unit as priority A is the completion of all arrangements by Sri Lankan side by the end of June, 2015 for

operating the existing livestock farms such as supply of water and electricity, procurement of cattle, recruitment of necessary staff and generation of budget for operation.

6. Japan's Grant Aid Scheme

6-1. The Sri Lankan side understands the Japan's Grant Aid Scheme and its procedures as described in Annex-4, and Annex-5, and necessary measures to be taken by the Government of Sri Lanka.

6-2. The Sri Lankan side understands to take the necessary measures, as described in Annex-6, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented. The detailed contents of the Annex-6 will be worked out during the Survey and shall be agreed no later than by the Explanation of the Draft Preparatory Survey Report.

The contents of Annex-6 will be used to determine the following:

(1) The scope of the Project.

(2) The timing of the Project implementation.

(3) Timing and possibility of budget allocation.

Contents of Annex-6 will be updated as the Survey progresses, and will finally be the Attachment to the Grant Agreement.

7. Schedule of the Survey

7-1. The Team will proceed with further survey in Sri Lanka until 5 June, 2015.

7-2. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Sri Lanka in order to explain its contents around November, 2015.

7-3. If the contents of the draft Preparatory Survey Report is accepted in principle and the Undertakings are fully agreed by the Sri Lankan side, JICA will complete the final report in English and send it to Sri Lanka around March, 2016.

7-4. The above schedule is tentative and subject to change.

8. Other Relevant Issues

8-1. Acceptance of the Inception Report

The Team explained the Inception Report and the Government of Sri Lanka accepted it.

8-2. Policy for Facility Planning

(1) In order to make the Project effective for the socio economic development of dry zone agriculture in the Northern Province, both sides confirmed to consider the following items for planning the scope of the facility.

(a) Current and planned education program, curriculum and research.
(b) Current and planned student number.
(c) Current and planned number of teachers / researchers.
(d) Qualification of teachers and researchers
(e) Operation and maintenance system

(2) In order to avoid inefficient investment and excessive budgetary burden after completion of the Project, both sides confirmed to consider the following items for planning the scope of the ICC function.
(a) Existing similar facility operating under other universities or faculties.
(b) Operation and maintenance plan, including budgetary plan and management structure.

8-3. Policy for Equipment Planning

Both sides confirmed to screen the type, specifications and amount of equipment based on the following points. Detailed screening criteria (a to e) will be set by the consultant through the outline design work.

(a) Consistency with the facility plan (especially, the consistency between the planned number of students and planned number of equipment, and the balance between education and research)
(b) Current equipment in UOJ (such as quality, age, utilization and maintenance)
(c) Purpose of proposed equipment
(d) Local procurement condition
(e) Technical suitability (high technology high maintenance equipment should be avoided)

8-4. Unexploded Ordnance (UXO) Clearances

Both sides agreed on the following items for UXO clearance.

(a) The Government of Sri Lanka will conduct the land surface survey in the whole Project site in accordance with the procedures of land mine technical clearance survey and ensure the non existence of mines in the Project site before the Draft Outline Design mission.
(b) The Government of Sri Lanka will conduct the underground survey in the areas of Project site where the construction will be carried out with certain depth by using technically appropriate instrument such as Ground Penetrating Rader and ensure the non existence of UXO in the above mentioned areas before the Draft Outline Design mission.
(c) The Project will not start before the completion of UXO clearance.
(d) In case that UXO would be found during construction, the Government of Sri

Lanka will be responsible for clearing the UXO with its own expense.

(e) UXO clearing procedure shall be confirmed by the Government of Sri Lanka before Draft Outline Design mission.

8-5. Project cost borne by Sri Lankan side and its budget allocation

(1) Ministry of Higher Education and Research and UOJ shall have Sri Lankan government budget for tax exemption related to the Project implementation including, but not limited to VAT (Value Added Tax), NBT (Nation Building Tax), PAL (Port and Airport Levies), CID, CESS, Excise Special Provision, and Construction Industry Guarantee Fund Levy, which may be imposed in Sri Lanka with respect to the supply of the products and services under the verified contract. Ministry of Higher Education and Research will obtain the approval to categorize the project as the Special Project after signing of contract(s). UOJ explained that they need preliminary cost estimation of the Project by the end of July, 2015 for their budget request. Both side agreed that Japanese side will show the rough estimation of the budget to be secured for 2016 by the end of July, 2015.

(2) Both side confirmed the necessity of further discussions on the matter of direct tax such as income tax, corporate tax and PAYE tax, etc.

(3) UOJ shall bear the cost for site preparation, infrastructure connection such as electricity, water supply and drainage at the Project site. UOJ agreed to complete these work before the commencement of the construction, currently supposed to be in October, 2016.

8-6. Approval of the Project

The both sides confirmed that the approval of the Project would be subject to the decision by the Government of Japan.

8-7. Questionnaire

Ministry of Higher Education and Research and UOJ shall answer to the Questionnaire submitted by the Team in English with relevant documents by 22 May, 2015.

Annex-1 Map of the Project Site

Annex-2 Organization Chart of the Executing Agency

Annex-3 Revised contents requested by the Government of Sri Lanka

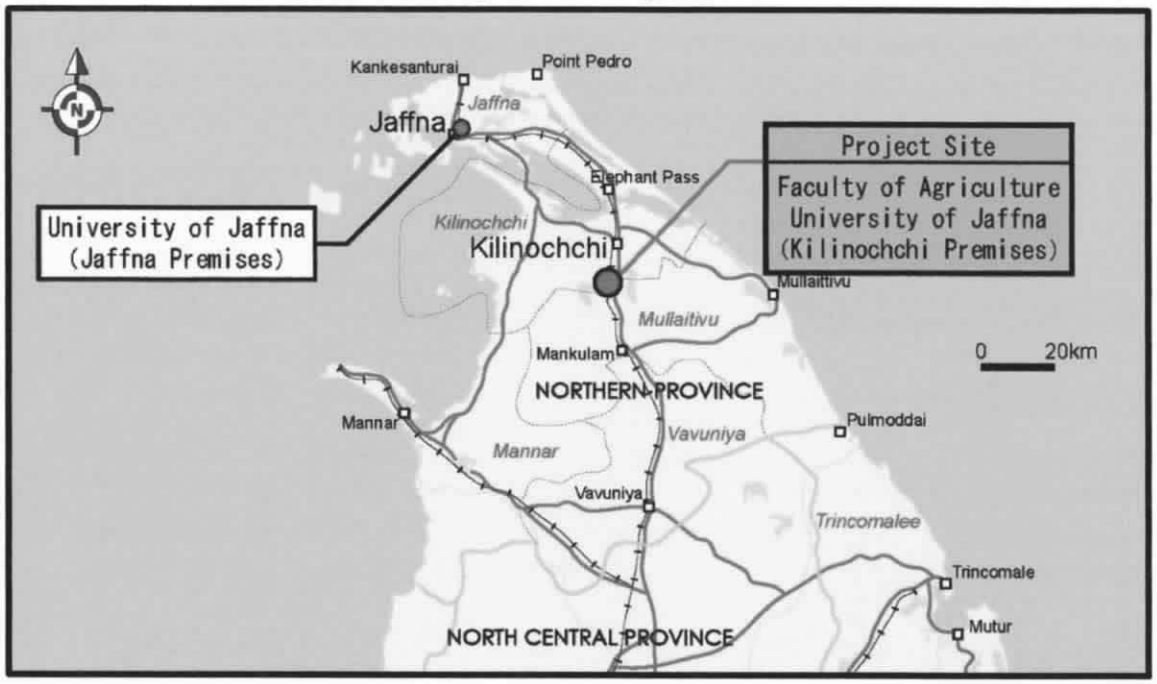
Annex-4 Japan's Grant Aid Scheme

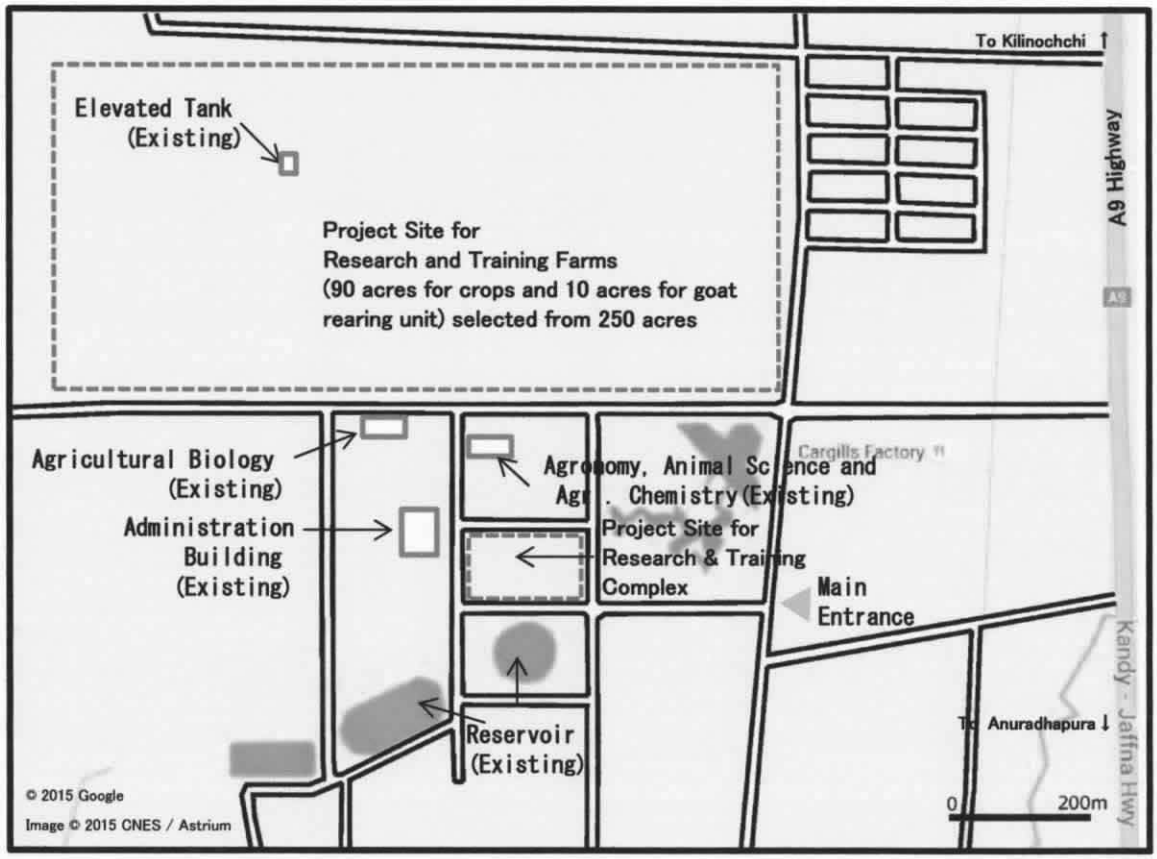
Annex-5 Financial Flow of Japan's Grant Aid

Annex-6 Major Undertakings to be taken by Each Government

19/5/15

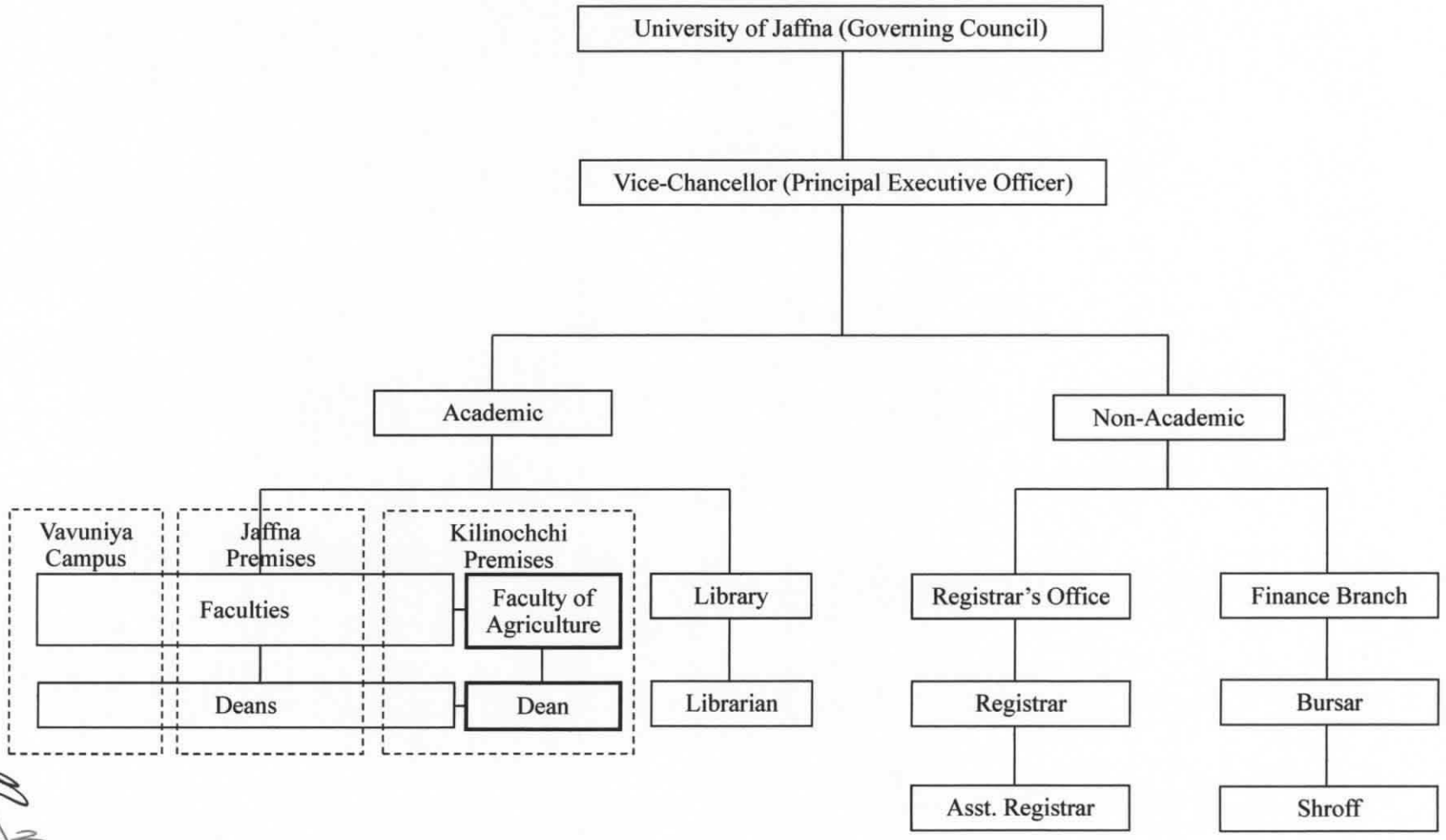
Location Map of the Project Site Annex-1





The Project Site at the Kilinochchi Premises, Faculty of Agriculture, University of Jaffna.

Organization Chart of the Executing Agency



Annex-3

Revised contents requested by the Government of Sri Lanka

The following major functions and activities of requested facilities were confirmed by the both parties. Requested facilities and equipment were revised and prioritized based on these functions and activities.

A. Expected functions/activities of requested facilities

No	Function/Activity	Priority Order*
1	Practical laboratory experiments/exercise of students who take specialization courses	A
2	Practical farm training of the faculty students (core courses & specialization courses)	A
3	Laboratory experiments for the research by academic staff and post-graduate students	A
4	Field experiments for research activity of academic staff and postgraduate students	A
5	Laboratory test/analysis services (to be charged)	B
6	Trainers training (science teachers) (to be funded by the Ministry of Education)	A
7	Training, certificates, diplomas, and degree courses (to be charged from the participants) (government staff, school leavers and private sector)	B
8	Training for farmers (to be funded by NGOs/donors)	C
9	Practical farm training for the visiting trainees (to be charged)	B
10	Consultancy services (to be charged)	C
11	Development of technical databases	A
12	Development of leaflets, booklets, and other visual materials for sale in relation to farming technology	A
13	Demonstration of advanced farming technology/systems, e.g., integrated farming (crop & livestock), animal breeding, micro-irrigation, farm mechanization, etc.	A
14	Production of quality seeds and planting material (seedlings) (fruit crops, local vegetables, etc.)	A
15	Keeping germ-plasm of fruit trees	A
16	Keeping parent stock of poultry	B
17	Artificial insemination service to farmers (to be charged)	C
18	Commercial production & sales of bio-fertilizers, bio-control agents & value-added farm products	C
19	Providing farm mechanization services to farmers (to be charged)	C

Note: *Priority Order

A: Activities to fulfill the primary roles of FoAg

B: Preferable activities to back up the primary roles of FoAg, if appropriate budget and staff are secured

C: Ambitious activities to enhance the subsidiary roles of FoAg.

B. Contents of Requested Facilities

Department	Facility	Priority Order
Research and Training Complex	Department of Agronomy	
	Crop Science Laboratory	A
	Department of Animal Science	
	Animal Nutrition Laboratory	A
	Reproductive Physiology Laboratory	A
	Department of Agri. Chemistry	
	Soil Testing and Bio fertilizer Laboratory	A
	Food Analysis and Processing Laboratory	A
	Department of Agri. Biology	
	Plant Protection and Bio control Laboratory	A
	Bio-Technology and Tissue Culture Laboratory	A
	Department of Agri. Engineering	
	Environment and Hydro Research Laboratory	A
	Common	
	Lecture Hall	A
	Administration Office	A
	Common Space (Lobby/WC/Corridor/Storage Rooms etc.)	A
Information and Communication Center	Multi- Purpose Training Room	B
	Lecture Hall	C
	Administration Office	C
	Dormitory	C
	Canteen	C
	Audio Visual Laboratory for extension	C
	Econometrics Laboratory	A
	Common Space (WC/Corridor/Storage Rooms etc.)	A
Facilities attached to Farm	Meteorological Data Collection Unit	A
	Dairy Processing Unit	A
	Food Processing Unit	A
	Crop Post-harvest Unit	A
	Primary Sample Preparation Unit	A
	Farm Machinery Storage Unit	A
	Farm Machinery Workshop	A

Note:

1. Priority Order
   A: Essential B: Preferable C: Less Priority
2. Size and details of each facility mentioned above will be examined through further survey.

C. Contents of Requested Research and Training Farms

C1. Crop, Horticultural and Agro-forestry Research and Training Farm

Unit	Purpose	Priority
1. Plant Propagation Unit	For Students	A
	For Farmers	C
2. Protected Agriculture Unit	For Students	A
	For Farmers	C
3. Fruit Crop Germ-Plasm Collection Unit	For Students	A
4. Field Corp Experimental Unit	For Students	A
	For Farmers	C
5. Plantation and Agro-forestry Unit	For Students	A
	For Farmers	C
6. Agri. Business Center	For Students	A
	For Farmers	C
	For Public	C
7. Model Home Garden Unit	For Students	A
	For Farmers	C
8. Horticulture Unit	For Students	A
	For Farmers	C
9. Floriculture Unit	For Students	A
	For Farmers	C
10. Agro-Tourism Unit	For Students	A
	For Farmers	C

Note: Priority Order A: Essential B: Preferable C: Less Priority

Crop, Horticultural and Agro-forestry Research and Training Farm will be prepared for education purpose and will include:

(i) land leveling works;
(ii) irrigation and drainage system;
(iii) farm road; and,
(iv) related structures.

The conditions for preparation of the farm are:

(i) groundwater from the existing well in the farm shall be used as irrigation purpose;
(ii) irrigation and drainage system shall be installed to the area covered by the well water only;
(iii) area of the land leveling works shall be determined through further survey; and,
(iv) the farm to be developed by the Project will be determined in accordance with the further study.

C2. Integrated Livestock Research and Training Farm

Unit	Plan	Priority
1. Daily Cattle Rearing Unit	For Students/Farmer/Others	C
2. Goat Rearing Unit	For Students/Farmers/Others	A
3. Layer Unit	For Students/Farmers/Others	C
4. Broiler Unit	-	C
5. Rabbit Unit	-	B
6. Piggery	-	B
7. Sheep Rearing Unit	-	B
8. Duck – Fish Integration Unit	-	C
9. Waste Recycling Unit & Fodder Conservation Unit		B

Note: Priority Order A: Essential B: Preferable C: Less Priority

19/5/15

D. Outline of Requested Research & Training Equipment

1. Equipment to be Considered

No	Department/Lab.
1	Department of Agronomy
(1)	Common Lab. (for core courses)
(2)	Crop Science Lab. (for special courses & research)
2	Department of Animal Sciences
(1)	Common Lab. (for core courses)
(2)	Animal Nutrition Lab. (for special courses & research)
(3)	Reproductive Physiology Lab. (for special courses & research)
3	Department of Agri. Chemistry
(1)	Common Lab. (for core courses)
(2)	Soil Testing and Bio Fertilizer Lab. (for special courses & research)
(3)	Food Analysis and Processing Lab. (for special courses & research)
4	Department of Agri. Biology
(1)	Common Lab. (for core courses)
(2)	Plant Protection and Bio Control Lab. (for special courses & research)
(3)	Biotechnology and Tissue Culture Lab. (for special courses & research)
5	Department of Agri. Engineering
(1)	Common Lab. (for core courses)
(2)	Environment and Hydro Research Lab. (for special courses & research)
6	Department of Agri. Economics
(1)	Common Lab. (for core courses)
(2)	Econometrics Lab. (for special courses & research)
7	Experimental & Training Farm
(1)	Land Preparation Implements & Plant Protection Equipment
(2)	Post-harvest Equipment
(3)	Workshop equipment & cut-models
(4)	Meteorology data measurement equipment

2. Criteria of Equipment to be Procured
   1) Equipment selection
      All equipment;
      a. shall be selected in conformity with FoAg's syllabus of practical experiments/trainings or priority research themes of academic staff from the standing point of the regional agricultural development
      b. should not be overlapped with existing equipment of FoAg
      c. shall be properly maintained with available backup services in Sri Lanka
      d. should not require huge O&M costs which will be a financial burden to FoAg
   2) Quantity of each equipment shall be examined based on the target number of students and academic staff

Annex-4

JAPAN'S GRANT AID

Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for Projects for construction of facilities, purchase of equipment, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal &Approval
  - -Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - -The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - -Agreement concluded between JICA and a recipient country
- Implementation
  - -Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.

- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles, in accordance with the E/N, to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant Aid may be used for the purchase of the products or services of a third

country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals, in principle. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT (Value Added Tax), NBT (Nation Building Tax), PAL (Port and Airport Levies), CID, CESS, Excise Special Provision, and Construction Industry Guarantee Fund Levy, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract, since the Grant Aid fund comes from the Japanese taxpayers.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"), in principle. JICA will execute the Grant Aid by making payments in Japanese yen, in principle, to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

The Government of the recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

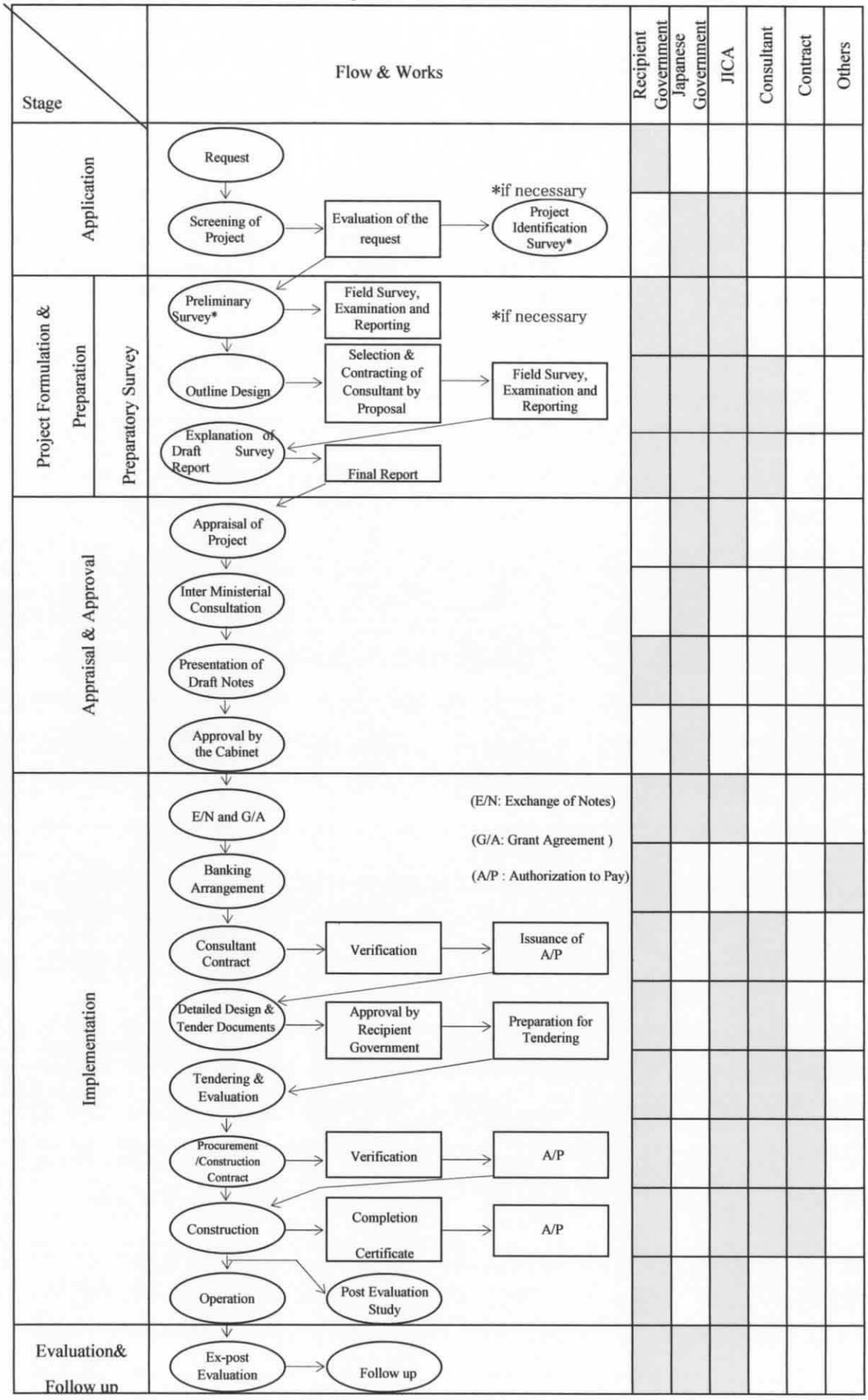
(11) Monitoring

The Government of the recipient country must take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

(12) Safety Measures

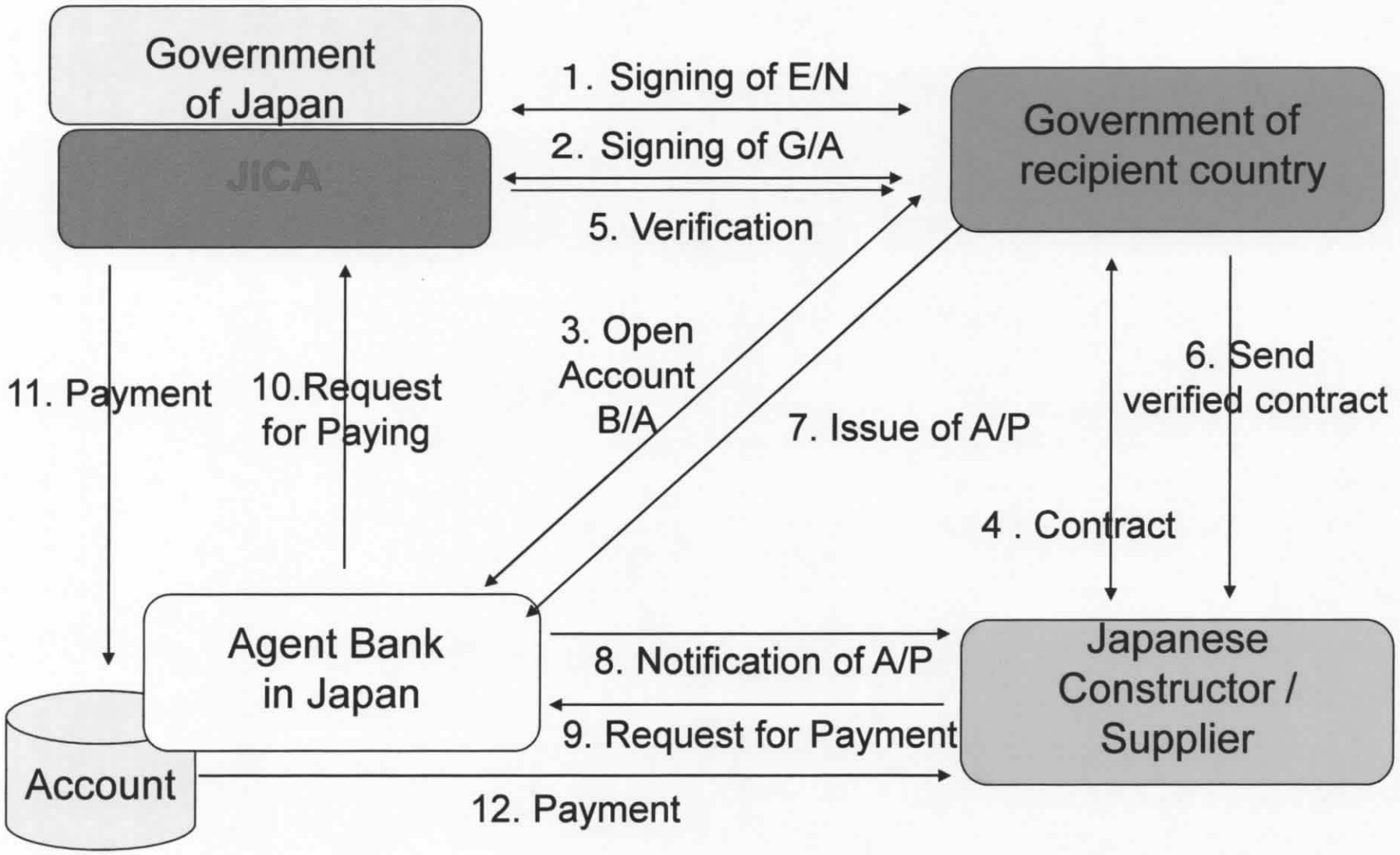
The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



Annex-5

Financial Flow of Grant Aid



Annex-6

Major Undertakings to be taken by Each Government

No	Items	Responsibility		Major Undertakings to be taken by Recipient			
		To be covered by Grant Aid	To be covered by recipient side	Deadline	In charge	Cost	Remarks
	Before Tender						
1	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A						
	1) Advising commission of A/P		●		ERD		
	2) Payment commission		●		ERD		
2	To give due environmental and social consideration in the implementation of the Project		●		MoHER		
3	To secure the following land necessary for the implementation of the Project						
	1) Project sites for the Research and Training Complex and the research and training farm.		●		UOJ		
	2) Temporary stock yard for construction near the Project area		●		UOJ		
4	To clear, level and reclaim the project site						
	1) Clearance of landmines and unexploded bombs from the project site		●		MoHER UOJ		
	2) Demolition of unnecessary existing buildings		●		UOJ		
	3) Removal of unnecessary existing trees		●		UOJ		
	4) Leveling and reclaiming the site for the building		●		UOJ		
5	To obtain the building permission		●		UOJ		
	During the Project						
6	To bear the following commissions to a bank of Japan for the banking services based upon the B/A						
	1) Advising commission of A/P		●		ERD		
	2) Payment commission for A/P		●		ERD		
7	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products						
	1) Marine (air) transportation of the Products from Japan to the recipient country	●			Contractor Supplier(s)		
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●		MoHER		
	3) Internal transportation from the port of disembarkation to the project site	●			Contractor Supplier(s)		
8	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●		ERD MoHER		

9	(To exempt Japanese nationals from, without using the Grant,) customs duties, internal taxes and other fiscal levies such as VAT(Value Added Tax), NBT(Nation Building Tax), PAL(Port and Airport Levies), CID, CESS, Excise Special Provision, and Construction Industry Guarantee Fund Levy, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●		ERD MoHER		
10	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●		MoHER UOJ		
11	Construct temporary access road for the construction work.		●		UOJ		
12	To construct the following facilities:						
	1) The building	●			Contractor		
	2) The farm	●			Contractor		
	3) The gates and fences in and around the site		●		UOJ		
	4) The parking lot	●			Contractor		
	5) The road within the site	●			Contractor		
	6) The road outside the site		●		UOJ		
13	To provide facilities for distributing electricity, water supply and drainage, and other incidental facilities necessary for the implementation of the Project outside the site						
	1) Electricity						
	a. The distribution power line to the site		●		UOJ		
	b. The drop wiring and internal wiring within the site	●			Contractor		
	c. The main circuit breaker and transformer		●		UOJ		
	2) Water Supply						
	a. The potable water distribution main to the site		●		UOJ		
	b. The water supply system within the site	●			Contractor		
	3) Drainage						
	a. The city drainage main (for storm sewer and others to the site)		●		UOJ		
	b. The drainage system (for toilet sewer, common waste, storm drainage, and others) within the site	●			Contractor		
	4) Gas Supply						
	a. The city gas main to the site		N/A				
	b. The gas cylinders		●		UOJ		
	c. The gas supply system within the site	●			Contractor		
	5) Telephone System						
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		●		UOJ		
	b. The MDF and the extension after the frame/panel	●			Contractor		
	6) Data Communication System						
	a. Internet access to the site		●		UOJ		
	b. Local area network within the site	●			Contractor		

	7) Furniture and Equipment						
	a. General furniture		•		UOJ		
	b. Project equipment	•			Supplier(s)		
	c. Installation of existing equipment, if any		•		UOJ		
	After the Project						
14	To ensure that facilities and the products be maintained and used properly and effectively for the implementation of the Project		•		UOJ		
15	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		•		MoHER		
16	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid						
	1) Allocation of maintenance cost		•		MoHER		
	2) Operation and maintenance organization and staff		•		MoHER UOJ		
	3) Routine check/periodical maintenance		•		UOJ		

(B/A: Banking Arrangement, A/P: Authorization to pay)

*; The cost estimates are provisional. This is subject to the approval of the Government of Japan.

Minutes of Discussions

on

Preparatory Survey for the Project

for

Establishment of Research and Training Complex at the Faculty of Agriculture, University of Jaffna in the Democratic Socialist Republic of Sri Lanka

(Explanation on Draft Preparatory Survey Report)

On the basis of the discussions and field survey in the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "Sri Lanka") in May and June 2015, and the subsequent technical examination of the results in Japan, the Japan International Cooperation Agency (hereinafter referred to as "JICA") prepared a draft Preparatory Survey Report on the Project for Establishment of Research and Training Complex at the Faculty of Agriculture, University of Jaffna (hereinafter referred to as "Draft Report").

In order to explain the Draft Report and to consult with the concerned officials of the Government of Sri Lanka on its contents, JICA sent to Sri Lanka the Preparatory Survey Team for the explanation of the Draft Report (hereinafter referred to as "the Team"), headed by Tomoko TAIRA, Director of Team 1, Agricultural and Rural Development Group 1, Rural Development Department, JICA, from 25 November to 4 December, 2015.

As a result of the discussions, both sides confirmed the main items described in the attached sheets.

Colombo, 4 December , 2015

For JICA

Ms. Tomoko TAIRA
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

For Sri Lanka Side

Mr. D.C. Dissanayake
Secretary
Ministry of Higher Education and Highways
The Democratic Socialist Republic of
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Prof. Vasanthy Arasaratnam
Vice Chancellor
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Mr. R. M. P. Rathnayake
Director General
Department of External Resources,
Ministry of National Policies and Economic Affairs,
The Democratic Socialist Republic of
Sri Lanka

ATTACHMENT

1. Contents of the Draft Report

   After the explanation of the contents of the Draft Report by the Team, the Sri Lanka side agreed in principle to its contents.

2. Cost Estimation

   Both sides confirmed that the Project cost estimation described in the Draft Report was provisional and would be examined further by the Government of Japan (hereinafter referred to as "GoJ") for its final approval.

3. Confidentiality of the Cost Estimation and Specifications

   Both sides confirmed that the Project cost estimation and technical specifications in the Draft Report should never be duplicated or disclosed to any third parties until all the contracts of the Project are concluded.

4. Japan's Grant Aid

   The Sri Lanka side understood the Japan's Grant Aid Scheme and its procedures as described in Annex 3, Annex 4 and Annex 5, and necessary measures to be taken by the Government of Sri Lanka (hereinafter referred to as "GoSL").

5. Project Implementation Schedule

   The Sri Lanka side understood the expected implementation schedule is as attached in Annex 6.

6. Expected Outcomes and Indicators

   Both sides agreed that key indicators for expected outcomes are as follows. The Sri Lanka side has responsibility to monitor the progress of the indicators and achieve the target in year 2021.

   (a) Quantitative Effect

Indicators	Base (Actual value in 2014)	Target (2021) (3 years after the completion of the Project)
Number of undergraduate students and graduate students	Undergraduate students: 280 Graduate students: 14	Undergraduate students: 480 Graduate students: 30
Number of teachers	24	43
Number of research paper related to improvement on Dry Zone agriculture of the northern region (Referred)	12 / a year	24 / a year
Hours of practical training on the Training Farm	0 hours / a year	105 hours / a year
Number of training programs	2 times /a year	6 times /a year

(b) Qualitative Effect

- Improvement of practical knowledge and skills of students.
- Improvement of research capacity of staff.
- Enhancement of knowledge and skills of government officer, extension staff and private sector personnel in agriculture sector who are trained by the Faculty of Agriculture, University of Jaffna for improvement of Dry Zone agriculture and animal husbandry in the northern region.

7. Technical Assistance ("Soft Component" of the Project)

Considering the sustainable operation and maintenance of the facility to be provided, technical assistance is planned to be provided under the Project. The Sri Lanka side confirmed that they would assign necessary number of competent and appropriate C/Ps as described in the Draft Report.

8. Monitoring during the Implementation

Ministry of Higher Education and Highways (hereinafter referred to as "MoHEH") and University of Jaffna (hereinafter referred to as "UoJ") agreed to monitor the Project every three (3) months during the implementation by using the Project Monitoring Report form as attached as Annex-9.

9. Ex-Post Evaluation

Both sides confirmed that JICA would conduct ex-post evaluation three (3) years after the project completion, with respect to five (5) evaluation criteria (Appropriateness, Impact, Effectiveness, Efficiency, Sustainability) of the project. Result of the evaluation will be publicized. The Sri Lanka side will provide necessary support for JICA.

10. Schedule of the Study

JICA will complete the final report of the preparatory survey in accordance with the confirmed items and send it to the Sri Lanka side around March 2016.

11. Undertakings Taken by Both Sides

Both sides agreed to undertakings described in Annex 7. The Sri Lanka side assured to take the necessary measures and coordination including allocation of the necessary budget which were preconditions of implementation of the Project. It was further agreed that Annex 7 would be the attachment to Grant Agreement, and the costs were indicative at Outline Design level.

12. Other Relevant Issues

12-1. Taxes borne by Sri Lanka side and its budget allocation

In reference to Annex-3 and Annex-7, both sides further agreed on the following items.

(a) GoSL through Ministry of Higher Education and Highways (hereinafter referred to as "MoHEH") shall ensure indirect taxes and levies related to the Project implementation will be exempted and/or borne by GoSL by categorizing the Project as the Specialized Project.

(b) GoSL through MoHEH shall bear the direct taxes levied on corporations and individuals involved in the Project implementation including Cooperate Tax and PAYE.

12-2. Unexploded Ordnance (UXO) Clearance

(a) Both sides agreed that in case an UXO is found during construction, GoSL at its own expense shall promptly clear the UXO following the procedure as described in Annex-10.

(b) The Sri Lanka side agreed to take necessary measures including safety measures to be taken during the construction in case an UXO is found from any construction sites in Kilinochchi Campus, UoJ before and during the Project.

12-3. Necessary Measures for Monitoring and Reporting of the Project

Both sides agreed that MoHEH and UoJ have the responsibility to implement, monitor and report the progress of the project, and necessary allowances / remunerations for the existing staff should be borne by the GoSL.

Annex 1 Revised contents requested by the Government of Sri Lanka
Annex 2 Project Cost Estimation
Annex 3 Japan's Grant Aid
Annex 4 Flow Chart of Japan's Grant Aid Procedures
Annex 5 Financial Flow of Japan's Grant Aid
Annex 6 Implementation Schedule
Annex 7 Major Undertakings to be taken by Each Government
Annex 8 Annual C/P Fund Requirement during the Project Implementation
Annex 9 Project Monitoring Report form
Annex 10 UXO Clearance Procedure

END

Annex-1

Revised contents requested by the Government of Sri Lanka

A. List of building components

	Department	Room Name	Area (m²)
Research & Training Complex	Deparment of Crop Science	Crop Science Laboratory	160.3
		Staff Room	120.2
	Department of Animal Science	Reproductive Physiology Laboratory	199.3
		Animal Nutrition Laboratory	181.2
		Staff Room	121.5
	Department of Agricultural Chemistry	Soil testing and bio fertilizer Laboratory	183.3
		Staff Room for Soil testing and bio fertilizer Laboratory	97.1
		Food analysis and processing Laboratory	183.3
		Staff Room for Food analysis and processing Laboratory	97.1
	Department of Agricultural Biology	Plant Protection and Bio control Laboratory	208.6
		Bio-Technology and Tissue Culture Laboratory	136.0
	Department of Agricultural Engineering	Environment and Hydro Research Laboratory	160.3
		Staff Room	120.2
	Department of Agricultural Economics	Econometrics Laboratory	119.7
		Staff Room	121.5
	Common Rooms	Freezer Room	27.5
		Water Purification Room (GFL)	12.2
		Water Purification Room (1FL)	12.2
		Analytical Measurement Room	27.5
		Microbial Analysis Room	26.8
		Lecture Hall	107.7
		Common Meeting Room A	39.0
		Common Meeting Room B	58.5
		Multi-Purpose Training Room	103.5
		Display Zone	243.3
		Entrance Lobby	106.8
		Lobby	59.8
		Pantry A	11.3
		Pantry B	13.0
	Common Area	WC / Electrical Room / Mechanical Room / Stair / Slope / EPS / Storage/ Elevated Water Tank Room	525.2
	Reserch & Training Complex Sub-total		3,583.5
	Outside Corridor		1,138.1
	Reserch & Training Complex Total (Including Outside Corridor)		4,721.6
Processing Training Building		Meat Processing Unit	76.6
		Dairy Processing Unit	84.4
		Food Processing Unit	98.1
		Entrance of Processing Units	13.5
		Changing Rooms	13.5
		Preparation Space	13.5
		Garbage Collection	16.4
		WC / EPS	8.0
		Processing Training Building Total	324.0

Farm Management Building	Office	16.0
	Farm Lecture Room	64.0
	Demonstration Space	64.0
	Primary Sample Preparation Unit	64.0
	Crop Post-harvest Unit	64.0
	Farm Machinery Storage Unit	128.0
	Farm Machinery Workshop	96.0
	Changing Rooms	8.0
	WC / Storage	39.1
	Farm Management Building Sub-total	543.1
	Washing Place (Outside Space)	32.9
	Farm Management Building Total (including Outside Corridor)	576.0
Animal Measurement Shed	Weigh Room	7.5
	Digestion Chamber (Cow)	9.0
	Digestion Chamber (Goat)	6.0
	Animal Measurement Shed Total	22.5
Goat Shed	Goat Shed Total	48.0
Grand Total		4,521.1
Grand Total (including Outside Space)		5,692.1

B. Research and Training Farm

Name of the Unit	Type of crops	Areas (Acre)
1. Plant propagation unit	1.1 Fruits crops 1.2 Field crops 1.3 Floriculture crops 1.4 Vegetable crops 1.5 Plantation & export crops 1.6 Cut-foliage crops	0.26
2. Protected agriculture unit	2.1 Cole crops 2.2 Floriculture crops 2.3 Vegetative propagated fruit plan 2.4 Cut-foliage 2.5 Department sharing	0.74
3. Fruit crops germ-plasm collection unit (1) Fruit crops germ-plasm collection unit (2)	3.1 Fruit crops 3.2 Grapes	4.20
4. Field crops experimental unit (1) Field crops experimental unit (2)	4.1 Coral crops 4.2 Oil crops 4.3 Tuber crops 4.4 Spices and condiments 4.5 Pulses 4.6 Fiber crops 4.7 Vegetable crops	1.60
5. Plantation & agro-forestry unit	5.1 Silviculture crops 5.2 Fencing crops 5.3 Valuable crops 5.4 Plantation crops 5.5 Fruit crops 5.6 Other crops	4.20
6. Agr. Management unit		0.72
7. Model home garden unit	7.1 Fruit crops 7.2 Vegetable crops 7.3 Floriculture crops 7.4 Field crops 7.5 Medicinal plants 7.6 Spices and condiments 7.7 Export crops 7.8 Plantation crops	1.00
8. Agro-tourism unit	8.1 Plantation crops 8.2 Spices and condiments 8.3 Fruit crops 8.4 Vine crops 8.5 Medicinal crops	2.00
9. Goat rearing unit	9.1 CO3&CO4 9.2 GLYRICIDIA 1/4Ac and Pasture grasses	5.00
Total		19.72

C. Equipment List

ANNEX-I

No	Equipment	Basic Specifications	Q'ty	Use Application
A. Department of Agronomy Lab. (Existing)				
1	Stereo microscope (1)	binocular, x45	24	To observe plant body and plant tissue/cells
2	Dissection kit set (2)	9-item set	26	To dissect plant body
B. Crop Science Lab.				
1	Stereo microscope (2)	x300	2	To observe plant & plant cells
2	Dissection kit set (3)	9-item set	2	To dissect plant organ
3	Seed dividers	centrifugal type	1	To divide seed samples equally
4	Seed cleaner (1)	air jet flow	1	To clean seed samples
5	Spiral seed separator	double spiral	1	To separate mature seeds
6	Oven (1)	160lit. 10~250°C	1	To dry samples & glassware
7	Electronic balance (1)	200g, 0.1mg	1	To weigh samples & chemicals
8	Weighing balance (1)	3kg, 0.001g	1	To weigh samples
9	Weighing balance (2)	12kg, 0.1g	1	To weigh samples
10	Seed germination incubator	170lit. 5~50°C	2	To encourage germination of seed samples
11	Plant growth chamber	400 lit., temp & humid & light control	1	To encourage or inhibit plant growth by controlling growing environment
12	Polyethylene sealer	W:5mm, L:350mm	1	To making pots for raising seedlings
13	EC meter (1)	desk top, EC: 0~199.9S/m	1	To measure electric conductivity of medium solution & sample soil
14	Soil moisture meter	portable, 0~40%	1	To measure moisture content of soil samples
15	Green leaf area meter	portable, Max W: 100mm,	1	To measure leaf area of plant samples
16	Chlorophyll meter	portable, double wave length	1	To measure leaf area of plant samples
17	Lux meter	portable, 0~199,999Lux	1	To measure amount of sunlight upper/under sample plants
18	CO2 dissolved sensor	10 - 1000mbar CO2	1	To measure CO2 gas concentration
19	Vernier caliper	150, 200, 300mm (3-item set)	1	To measure stem diameter of sample plants
20	Clinometer	Graduation: 0~90°, 1/4°	1	To measure strike and slope of geological
21	Diameter tape	10 m	1	To measure diameter of wood samples
22	Increment borer	50cm length	1	To collect wood samples for counting annual growth ring
23	GPS	handheld, color LCD, 240x400	1	To determine latitude, longitude and altitude
24	Water bath, with shaker	23 lit., 10~80°C, horizon-reciprocated	1	To heat samples under constant temp. condition
25	Magnetic stirrer	50-1200rpm, 5-300°C	2	To stir water solution
26	Dispenser pipettes	5 viable steps, with syringe	6	To dispense water solution
27	Autoclave	76 lit., 45~135°C, Max: 0.25MPa	1	To sterilize glassware, tools and samples by high temp. & pressure
28	Fume hood (draft chamber)	1,500(W) x 750~800(D) x 1,950~2,700(H)mm	1	To exhaust toxic gas occurred during experiment
29	Refrigerator (1)	340lit., 2~14°C	1	To store samples and chemicals under low temp. condition
C. Department of Animal Science Lab. (Exisiting)				
1	Animal models of cattle	2,800x1,500x500mm	1	To display visual images
2	Animal models of poultry	450x260x490mm	1	To display visual images
3	Animal models of rabbit	520x200x330mm	1	To display visual images
4	Animal models of pig	1020x260x480mm	1	To display visual images
5	Animal models for monogastric (pig)	210x180x390mm	1	To display visual images
6	Animal models for ruminants digestive system	280x180x350mm	1	To display visual images
7	Reproductive system of male and female ruminant	700x650x1,500mm	1	To display visual images
8	Reproductive system of male and female pig	600x70x370mm	1	To display visual images
9	Fish model to illustrate the internal and external anatomy of fish	490x150x350mm	1	To display visual images
10	Poultry vaccine syringe	automatic, 0.2~1.0ml	1	To give vaccination to poultry
11	Electronic vernier	Egg measurement	1	To measure dimensions of poultry egg
12	Egg candling light	LED white light, 45lm	1	To inspect sperm eggs and development of

13	Chick brooder	2,600x750x800mm	1	To rear chicks after hatching
14	De-beaker (for poultry)		1	To cut chick-beak
15	Yolk color fan (checking egg color)	10 charts set	1	To check color of egg yolk
16	Sphero meter (measuring egg, internal size)	Accuracy: 1/100mm	1	To measure height of dense albumen
17	Fish measuring board	1,200x250x25mm, gauge unit:	1	To measure size of fish
18	Electronic balance (2)	600g, 0.1g	1	To weigh samples & chemicals
19	Water sampler	2 lit., with 30m rope	1	To collect water samples
20	Sacchi disk (water transparency)	30cm diameter	1	To measure water color and transparency
21	Ekmanman grab sampler	stainless, 240x210x350mm	1	To collect soil samples from bottom of a water body
22	pH meter (1)	portable, pH0.00~14.00	1	To measure pH of water solution
23	EC meter (2)	portable, EC:0.00~	1	To measure electric conductivity of water
24	Thermometer (1)	portable, dual channe: -100~1300°C & -100~1000°C	1	To measure temp. of samples
25	BOD meter	portable, 0~20ppm,	1	To measure water quality by BOD
26	Salinity meter	portable, 0.0~7.0%(g/100g)	1	To measure salinity of water solution
27	Plankton nets	φ200x500mm	1	To collect plankton
D. Animal Nutrition Lab.				
1	Grass sampler	stainless, 300~1200rpm	1	To collect grass (feed) samples
2	Digestion chamber	Goat:1,260x760x1,550mm Cattle:1,300x2,120x1,900mm	1	To hold animals for measuring coefficient of feed digestibility
3	Animal fistula	Cattle:φ100/270x75mm Goat:φ35/150x50mm	1	To observe a digestive function of animals
4	Cannula fit	gastric juice collection	1	To shut an animal fistula
5	Dissection set (for small animals)	18-item set	1	To dissect animal body/organ
6	Electric pressurized washer	27lit/hr, 6.5MPa	1	To cattle house and cattle body
7	Weigh bridge for cattle	3000kg, 0.2kg, 1100x2000mm	1	To measure cattle weight
8	Animal weighing scale (small animals)	table type	1	To measure weight of small animals
9	Chicken weighing scale	4kg	1	To measure weight of chicken
10	Electronic balance (1)	200g, 0.1mg	2	To weigh samples & chemicals
11	Weighing balance (3)	2,000g, 0.1g	1	To weigh samples & chemicals
12	Analytical balance	200g, 0.01mg, with hood	1	To weigh samples & chemicals
13	Drying cabinet	300 lit, 10~35°C	1	To dry glassware and tools
14	Autoclave	76 lit., 45~135°C, Max: 0.25MPa	1	To sterilize glassware, tools and samples by high temp. & pressure
15	Centrifuge	300-6000rpm, Max: 1000ml	1	To separate substance from water solution
16	pH meter (2)	desk-top, pH0.000~14.000	1	To measure pH of water solution
17	Feed crushing mill	500-800kg/hr	1	To pulverize feed samples
18	Grinder	20000rpm or more, 150ml	1	To pulverize samples
19	Mixer (1)	1000ml, 20000rpm	1	To mix samples
20	Homogenizer	5000~10000rpm, 0.25ml~10lit.	1	To atomize and disperse substance in water solution
21	Oven (2)	97 lit., 10~250°C	1	To dry samples & glassware
22	Water bath, with shaker	23 lit., 10~80°C, horizon-reciprocated	1	To heat samples under constant temp. condition
23	Shaker	20~200rmp	1	To mix and agitate water solution
24	Voltex mixer	600~3000rpm	2	To mix water solution in tube
25	Magnetic stirrer	50~1200rpm, 5~300°C	1	To stir water solution
26	Vacuum pump (Lab.)	12lit/sec, 6.65Pa or more	1	To aspirate air for accelerating filtration time
27	Dispenser pipettes	5 viable steps, with syringe	6	To dispense water solution
28	Fiber analyzer	NDF, CF, ADF, ADL, Sample size: 0.5~1.0g	1	To make quantitative analysis of plant fiber content of samples
29	Micro Kjeldhal apparatus	6 flasks	1	To make quantitative analysis of nitrogen and protein content of samples (small quantity)
30	Macro Kjeldhal apparatus	0.1-200mgN, sample tube: 100-300ml	1	To make quantitative analysis of nitrogen and protein content of samples
31	Soxhlet apparatus	150~250ml x 4 holes	1	To extract subsistence with solvents from solid samples

32	Muffle furnace	11 lit., 100~1150°C	1	To burn or dry samples
33	Bomb calorimeter	Max:33500 joule	1	To measure calorific value of solid/liquid
34	Flame photo meter	Na, K, Li: up to 199ppm, Ca: 10-199ppm	1	To make quantitative analysis by emission from samples
35	Fume hood (draft chamber)	1,500(W) x 750~800(D) x 1,950~2,700(H)mm	1	To exhaust toxic gas occurred during experiment
36	Refrigerator (2)	150 lit., 2~14°C	2	To store samples and chemicals under low temp. condition
E. Reproductive Physiology Lab.				
1	Biological microscope	binocular, x400, with micro-warm plate	1	To observe sperms
2	Inverted microscope	x400, phase-contrast, mechanical stage, camera	1	To observe viable cells (eggs)
3	Kamar pressure-sensitive mount detector	Double-stick tape, 400pcs set	1	To detect the time of estrus (cattle)
4	Dummy cow	manual height adjustment	1	To collect sperm from cattle
5	Artificial vagina for cattle	Plastic, L:385mm1		To collect sperm from cattle
6	Artificial vagina for goat	Plastic, L:200mm1		To collect sperm from goat
7	Blood Cell counter	Thoma type	1	To measure number of blood cells
8	Sperm (semen) counting	Thoma type	1	To count number of sperms
9	Needle pipette for semen dispensing	φ1.25x100mm, 10pcs set	1	To dispense sperm
10	Thawing device for frozen semen	φ20x150mm, room temp.~65°C	1	To thaw frozen sperm
11	Vaginal speculum for cow	horizon open type, L:300mm	1	To examine vagina and uterus, and injecting sperm (cattle)
12	Vaginal speculum for goat	horizon open type, L:90mm	1	To examine vagina and uterus, and injecting sperm (goat)
13	Semen injector & sheath tube for cow	φ4x450mm	1	To inject sperm (AI of cattle)
14	Semen injector & sheath tube for goat	L: 230mm	1	To inject sperm (AI of goat)
15	AI kit for the field	AI kit, LN2 tank, Freezer for cattle semen	1	To carry out AI on site (cattle)
16	Ultra sound pregnancy detector	portable, 60~240mm	1	To diagnose pregnancy and condition of baby in the womb (animals)
17	Embryo transfer equipment and accessories	Injector & sheath tube, thawing device, dilating bougie, LN2	1	To carry out embryo transfer of cattle
18	Automatic irrigator for embryo flushing	Room temp.~50°C	1	To collect fertilized egg from cows
19	Catheter for removing vagina mucous	φ6x400mm, 30pcs set	1	To collect mucus in the cervix for measuring pH (cattle)
20	Embryo collector	φ80x53mm, 100pcs set	1	To collect fertilized egg from cows (separation of egg from mucus)
21	Dilating bougie for cow and heifer, sugie-type	Sugie type	1	To carry out embryo transfer of cattle
22	Liquid Nitrogen Gas	30 lit.	2	To preserve sperm and eggs
23	Embryo (cell) transporter	0.25ml x 20pcs, 37~38.5°C	1	To transport fertilized eggs
24	CO2 Incubator	165lit., CO2:0~20%, Temp.5	1	To incubate fertilized eggs and mammalian
25	Laminar flow cabinet	Class100, 1,300(W) x 750~800(D) x 1,700~2,100(H)mm	1	To carry out experiment under aseptic condition (to avoid contamination from dust
26	Electronic balance (1)	200g, 0.1mg	2	To weigh samples & chemicals
27	Analytical balance	200g, 0.01mg, with hood	1	To weigh samples & chemicals
28	Drying cabinet	300 lit, 10~35°C	1	To dry glassware and tools
29	Autoclave	76 lit., 45~135°C, Max: 0.25MPa	1	To sterilize glassware, tools and samples by high temp. & pressure
30	Centrifuge, refrigerated (1)	Max: 21000rpm, -9~35°C	1	To separate substance from water solution under low temp. condition
31	Micro centrifuge	Max:13500rpm, refrigerated	1	To separate substance from small quantity of water solution
32	pH meter (2)	desk-top, pH0.000~14.000	1	To measure pH of water solution
33	Oven (2)	97 lit., 10~250°C	1	To dry samples & glassware

34	Water bath, with shaker	23 lit., 10~80°C, horizon-reciprocated	1	To heat samples under constant temp. condition
35	Shaker	20~200rpm	1	To mix and agitate water solution
36	Voltex mixer	600~3000rpm	2	To mix water solution in tube
37	Magnetic stirrer	50~1200rpm, 5~300°C	1	To stir water solution
38	Dispenser pipettes	5 viable steps, with syringe	6	To dispense water solution
39	Fume hood (draft chamber)	1,500(W) x 750~800(D) x 1,950~2,700(H)mm	1	To exhaust toxic gas occurred during experiment
40	Refrigerator (2)	150 lit., 2~14°C	2	To store samples and chemicals under low temp. condition
F. Department of Agro-chemistry Lab. (Existing)				
1	Fume hood (draft chamber)	1,500(W) x 750~800(D) x 1,950~2,700(H)mm	1	To exhaust toxic gas occurred during experiment
G. Soil Testing and Bio-fertilizer Lab.				
1	GPS	handheld, color LCD, 240x400	1	To determine latitude, longitude and altitude
2	Soil auger (1)	L:600mm (handle), 8-auger	1	To collect soil samples
3	Soil sieves	φ200x45mm (4 sieve sizes), φ150x45mm (4 sieve sizes), φ100x45mm (4 sieve sizes)	1	To separate different particle sizes of soil
4	Soil effective volumetric capacity meter	0~100ml, 0.01ml	1	To measure cubic volume of sample soil
5	Soil texture analyzer	vertical movement: 30 times/min., amplitude: 38mm	1	To analyze soil texture
6	Pressure plate apparatus	pressure: 5 bar	1	To measure water retention capacity of soil
7	Wet sieving equipment	sieves: 200~360mm	1	To assess stability of soil aggregated structure
8	Soil grinder	500~1000ml, 100rpm	1	To crush soil samples
9	Electronic balance (1)	200g, 0.1mg	2	To weigh samples & chemicals
10	Analytical balance	200g, 0.01mg, with hood	1	To weigh samples & chemicals
11	Drying cabinet	300 lit, 10~350°C	1	To dry glassware and tools
12	Autoclave	76 lit., 45~135°C, Max: 0.25MPa	1	To sterilize glassware, tools and samples by high temp. & pressure
13	Oven (2)	97 lit., 10~250°C	1	To dry samples & glassware
14	Centrifuge	300-6000rpm, Max: 1000ml	1	To separate substance from water solution
15	Magnetic stirrer	50~1200rpm, 5~300°C	1	To stir water solution
16	Voltex mixer	600~3000rpm	2	To mix water solution in tube
17	Shaker	20~200rpm	1	To mix and agitate water solution, and to incubate microorganisms
18	Water bath, with shaker	23 lit., 10~80°C, horizon-reciprocated	1	To heat samples under constant temp. condition
19	Dispenser pipettes	5 viable steps, with syringe	6	To dispense water solution
20	Rotary evaporator	20~180rpm, 1 lit. flask	1	To evaporate solvent
21	Fume hood (draft chamber)	1,500(W) x 750~800(D) x 1,950~2,700(H)mm	1	To exhaust toxic gas occurred during experiment
22	Micro Kjeldhal apparatus	6 flasks	1	To make quantitative analysis of nitrogen and protein content of samples (small quantity)
23	Soxhlet apparatus	150~250ml x 4 holes	1	To extract subsistence with solvents from solid samples
24	Flame photo meter	Na, K, Li: up to 199ppm Ca: 10~199ppm	1	To make quantitative analysis by emission from samples
25	Refrigerator (2)	150 lit., 2~14°C	2	To store samples and chemicals under low temp. condition
26	Muffle furnace	11lit., 100~1150°C	1	To burn or dry samples
H. Food Analysis and Processing Lab.				
1	Weighing balance (3)	2000g, 0.1g	1	To weigh samples
2	Electronic balance (1)	200g, 0.1mg	2	To weigh samples & chemicals
3	Analytical balance	200g, 0.01mg, with hood	1	To weigh samples & chemicals
4	Drying cabinet	300 lit, 10~35°C	1	To dry glassware and tools
5	Autoclave	76 lit., 45~135°C, Max: 0.25MPa	1	To sterilize glassware, tools and samples by high temp. & pressure
6	Oven (2)	97 lit., 10~250°C	1	To dry samples & glassware
7	Centrifuge	300~6000rpm, Max:1000ml	1	To separate substance from water solution
8	Grinder	20000rpmor more, 150ml	1	To crush food samples

9	Homogenizer	5000~10000rpm, 0.25ml~10lit	1	To atomize and disperse substance in water solution
10	Magnetic stirrer	50~1200rpm, 5~300℃	1	To stir water solution
11	Voltex mixer	600~3000rpm	2	To mix water solution in tube
12	Shaker	20~200rpm	1	To mix and agitate water solution, and to incubate microorganisms
13	Water bath, with shaker	23 lit., 10~80℃, horizon-reciprocated	1	To heat samples under constant temp. condition
14	Hot plate	250℃, 400 x 300mm	1	To heat solution
15	Dispenser pipettes	5 viable steps, with syringe	6	To dispense water solution
16	Rotary evaporator	20-180rpm, 1 lit. flask	1	To evaporate solvent
17	Fume hood (draft chamber)	1,500(W) x 750~800(D) x 1,950~2,700(H)mm	1	To exhaust toxic gas occurred during experiment
18	Macro Kjeldhal apparatus	0.1~200mgN, sample tube: 100~300ml	1	To make quantitative analysis of nitrogen and protein content of samples (small quantity)
19	Micro Kjeldhal apparatus	6 flasks	1	To make quantitative analysis of nitrogen and protein content of samples
20	Soxhlet apparatus	150~250ml x 4 holes	1	To extract subsistence with solvents from solid samples
21	Fibre anayzer	NDF, CF, ADF, ADL Sample size: 0.5~1.0g	1	To make quantitative analysis of plant fiber content of samples
22	Muffle furnace	11 lit., 100~1150℃	1	To burn or dry samples
23	Flame photo meter	Na, K, Li: up to 199ppm Ca: 10-199ppm	1	To make quantitative analysis by emission from samples
24	Bomb calorimeter	Max:33500joule	1	To measure calorific value of solid/liquid
25	Water activity measuring meter	Aw:0.10~0.98	1	To measure free water in food samples
26	Rapid viscosity analyzer	0~100Pa·s, sample volume: 2~10ml	1	To measure starch gelatinization
27	Force gauge	500N	1	To measure hardness of food samples
28	Texture analyzing machine (meat & fish)	100N	1	To measure texture (hardness, solidity, elasticity, etc.) of meat and fish meat
29	Fruit firmness tester (hardness meter)	0~13kg, 0.5kg	1	To measure hardness of fruits
30	Gerber centrifuge	1130rpm, room temp.~65℃	1	To separate butterfat from raw milk
31	Milk fat tester	0~100%, sample 1.0~2.0g	1	To measure butterfat content in milk
32	Alcohol gun	For milk inspection	1	To judge freshness of milk
33	Ultrasonic milk analyzer	sample 20ml, with printer	1	To analyze milk quality, e.g. fat amount, non-fat solid, density, protein content, moisture,
34	Refractometer	portable, Brix 0~33%	1	To measure sugar content of fruits juice and beverage
35	Salinity meter	portable, 0.0~7.0%(g/100g)	1	To measure salinity of water solution
36	Ebulliometer	0~17%	1	To measure alcohol content of water solution
37	Thermometer (2)	bimetal type, 0~100℃	1	To measure temp. of water solution
38	Digital moisture meter	~100%	1	To measure moisture content of food samples
39	Food chromometer	410~660nm, LED lamp, Min sample: 1.0ml	1	To measure color and concentrations of food samples
40	Blood cell counter	x2-3	1	To count number of colonies of bacteria
41	Haemocyto-meter	Thoma type	1	To count number of cells
42	Stereo microscope (3)	x115, camera adopter	1	To observe microorganisms
43	Refrigerator (2)	150 lit., 2~14℃	2	To store samples and chemicals under low temp. condition
44	pH meter (2)	desk-top, pH0.000~14.000	1	To measure pH of water solution
45	EC meter (1)	desk top, EC: 0~199.9S/m	1	To measure electric conductivity of medium solution & sample soil
I. Department of Agricultural Biology Lab. (Existing)				
1	Magnifier	x10, φ90mm, LED light	26	To observe insect body
2	Dissection kit set (5)	8-item set	26	To dissect insect body
3	Ganong's potometer	1mm gauge	25	To measure transpiration
J. Plant Protection and Bio-control Lab.				
1	Stereo microscope (4)	x115, digital camera syatem, CCD camera	1	To observe insect body and nematode

2	Inverted microscope	x400, phase-contrast, mechanical stage, camera	1	To observe microorganisms and cells
3	Research binocular microscope	x1000, with phase contrast lens & florescent filter, digital camera system	1	To observe microorganisms and cells
4	Dissection kit set (1)	9-item set	1	To dissect insect body
5	Soil auger (2)	Hole auger: φ10mm (1m deep), Auger: φ4cmx50cm	1	To collect soil samples
6	Nematodes sieve	33-item set	1	To collect nematode from soil
7	Sprayer (1)	laboratory portable type, 4 lit	1	To spray insecticides
8	ULV sprayer (1)	14 lit., 10~20μ particle	1	To spray ULV insecticides
9	Thermo-hygrometer	Temp.:-10~45°C, Humid:20~95%	1	To measure atmosphere temp. & humidity
10	Electronic balance (1)	200g, 0.1mg	2	To weigh samples & chemicals
11	Drying cabinet	300 lit, 10~35°C	1	To dry glassware and tools
12	Oven (2)	97 lit., 10~250°C	1	To dry samples & glassware
13	Autoclave	76 lit., 45~135°C, Max: 0.25MPa	1	To sterilize glassware, tools and samples by high temp. & pressure
14	pH meter (2)	desk-top, pH0.000~14.000	1	To measure pH of water solution
15	Grinder	20000rpm or more, 150ml	1	To crush samples
16	Mortar and pestle	φ150mm	1	To crush and mix samples
17	Mixer (1)	1000ml, 20000rpm	1	To mix samples
18	Homogenizer	5000~10000rpm, 0.25ml~10lit	1	To atomize and disperse substance in water solution
19	Voltex mixer	600~3000rpm	2	To mix water solution in tube
20	Magnetic stirrer	50~1200rpm, 5~300°C	1	To stir water solution
21	Water bath, with shaker	23 lit., 10~80°C, horizon-reciprocated	1	To heat samples under constant temp. condition
22	Hot plate	250°C, 400 x 300mm	1	To heat solution
23	Shaker	20~200rpm	1	To mix and agitate water solution, and to incubate microorganisms
24	Centrifuge, refrigerated (2)	300~15000rpm, -9~35°C, Max: 1000ml	1	To separate substance from water solution under low temp. condition
25	Dispenser pipettes	5 viable steps, with syringe	6	To dispense water solution
26	Rotary evaporator	20-180rpm, 1 lit. flask	1	To evaporate solvent
27	Fume hood (draft chamber)	1,500(W) x 750~800(D) x 1,950~2,700(H)mm	1	To exhaust toxic gas occurred during experiment
28	Laminar flow cabinet	Class100, 1,300(W) x 750~800(D) x 1,700~2,100(H)mm	1	To carry out experiment under aseptic condition (to avoid contamination from dust
29	Inoculation needle	Loopφ3mm, handle 150mm, 24 gauge	1	To transplant cultivated bacteria to petri-dishes
30	Liquid Nitrogen container	30 lit.	2	To preserve bacteria
31	Incubator	150 lit., room temp. +5~60°C	1	To incubate insects and bacteria
32	Low temp. incubator	140 lit., -10~50°C	1	To incubate insects and bacteria
33	Plant growth chamber	400 lit., temp & humid & light control	1	To encourage or inhibit plant growth by controlling growing environment
34	Refrigerator (1)	340lit., 2~14°C	1	To store samples and chemicals under low temp. condition
K. Bio-technology and Tissue Culture Lab.				
1	Stereo microscope (4)	x115, digital camera system, CCD camera	1	To observe plant body and plant tissue/cells
2	Dissection kit set (4)	13-item set	1	To dissect plant body
3	Electronic balance (1)	200g, 0.1mg	2	To weigh samples & chemicals
4	Analytical balance	220g, 0.01mg, with hood	1	To weigh samples & chemicals
5	Drying cabinet	300 lit, 10~35°C	1	To dry glassware and tools
6	Oven (2)	97 lit., 10~250°C	1	To dry samples & glassware
7	Autoclave	76 lit., 45~135°C, Max: 0.25MPa	1	To sterilize glassware, tools and samples by high temp. & pressure
8	Microwave oven	2.8kW, 420x470x340mm	1	To fuse culture medium by heating
9	pH meter (2)	desk-top, pH0.000~14.000	1	To measure pH of water solution
10	Grinder	20000rpm or more, 150ml	1	To crush samples
11	Mortar and pestle	φ150mm	1	To crush and mix samples
12	Voltex mixer	600~3000rpm	2	To mix water solution in tube

13	Magnetic stirrer	50~1200rpm, 5~300°C	1	To stir water solution
14	Water bath, with shaker	23 lit., 10~80°C, horizon-reciprocated	1	To heat samples under constant temp. condition
15	Membrane filter	With funnel and decompression flask + suction	1	To eliminate microorganisms in water solution by filtration
16	Centrifuge, refrigerated (2)	300~15000rpm, -9~35°C, Max: 1000ml	1	To dispense water solution
17	Dispenser pipettes	5 viable steps, with syringe	6	To evaporate solvent
18	Fume hood (draft chamber)	1,500(W) x 750~800(D) x 1,950~2,700(H)mm	1	To exhaust toxic gas occurred during experiment
19	Laminar flow cabinet	Class100, 1,300(W) x 750~800(D) x 1,700~2,100(H)mm	1	To carry out experiment under aseptic condition (to avoid contamination from dust
20	Incubator	150 lit, room temp. +5~60°C	1	To incubate plant tissue/cells
21	Shelves with lighting	stainless, 5 shelves, 900x450x1800mm	10	To cultivate plant tissue in incubation room
22	Refrigerator (1)	340lit., 2~14°C	2	To store samples and chemicals under low temp. condition
L. Department of Agricultural Engineering Lab. (Exisiting)				
1	Plane table	A2 size	6	To carry out plane-table survey
2	Alidade		6	To find direction on the plane table
3	Dumpy level	X32-34, view: 1° 20'	6	To take a level (surveying)
4	Theodolite(transit)	x30, view: 1°20'~1°30'	6	To measure angle between two objectives (surveying)
5	Compass	5' gauge (horizontal)	6	To find direction (surveying)
6	Tri pod	Aluminum	6	To fix plane table and other instruments during surveying
7	Leveling staff	5m (5 steps)	6	To measure distance (surveying)
8	Measuring tape	50 m	6	To measure distance
9	Drafting board and drafter	A1 size, with chair	6	To make drawings
10	Oven (2)	97 lit., 10~250°C	1	To dry sample grains
11	Seed cleaner (2)	Winnowing of cereal seeds, laboratory-type	1	To clean sample grains
12	Paddy sample divider	36 divisions, Max sample: 5kg	1	To divide sample grains equally
13	Grain moisture meter	portable, MC: 11~30%	1	To measure moisture content of sample grains
14	Milling machine	laboratory-type, friction type + abrasive type (set)	1	To mill sample rice
15	Rice grader	laboratory-type, indent cylinder	1	To separate milled sample rice for grading
16	Vernier caliper	150, 200, 300mm (3-item set)	1	To measure dimension of sample grains
17	Water bath	room temp. +10~200°C, 37 lit.	1	To soak paddy grain in parboil processing (with constant temp.)
18	Water pump (1)	4hp gasoline engine, Centrifugal type	1	To explain working principle of single cylinder 4-stroke engine
19	Steamer	drawer type, gas boiler	1	To steam soaked paddy grain in parboil processing
20	Pressure cooker	2.4 lit.	1	To cook paddy grain in parboil processing
21	Thermometers (3)	thermistor -20~250°C	1	To measure storage temp.
22	Humidifiers	1200ml/hr	1	To measure storage humid.
23	Cut models (six cylinder four stroke diesel engine)	5200cc	1	To display visual images
24	Cut models (four cylinder four stroke petrol engine)	1000~1300cc	1	To display visual images
25	Cut models (synchromesh gear box)	Front 4~5 speeds, Rear 1 speed	1	To display visual images
26	Cut models (sliding mesh gear box)		1	To display visual images
27	Cut models (constant mesh gear box)	Multistage clutch	1	To display visual images
28	Cut models (fully floating differential and rear wheel mechanism)	Large-scaled truck type	1	To display visual images
29	Cut models (hydraulic brake unit-four wheel type)	Wall-hanging panel type	1	To display visual images

30	Cut models (board of fuel supply system of diesel engine)		1	To display visual images
M. Environmemt and Hydro Research Lab.				
1	CAD System	PC, digitizer, scanner, A1	1	To make computer-aided drawing
2	Staff for water elevation	5m, 5 steps	2	To measure water level of canals/rivers
3	Water-level gauge (1)	self-recording, 10 m	1	To measure water level of canals/rivers
4	Water-level gauge (2)	throw-in type, 0~12 m	2	To measure water level of canals/rivers
5	Current meter (1)	filed type, 0~3m/sec.	1	To measure current speed of canals/rivers
6	Current meter (2)	laboratory type, about 200cm/sec.	2	To measure current speed of experimental canal/river models
7	Hydrothermograph logger	Temp.: -15~65℃ Humid.: 10~99%	1	To measure and record temp. & humid. with a certain interval
8	Tensiometer	pF0~2.7, self-recording	2	To measure soil moisture content
9	Gypsum block moisture	Measurement: 1~100%	2	To measure soil moisture content
10	Soil moisture meter	0~40%, TDR method	1	To measure soil moisture content
11	Lysimeter	For examining evapotranspiration of plants,	1	To make simulation on soil environment
12	Water sample collector	2 lit., with 30m rope	1	To collect water samples
13	Water temperature meter	portable, 0~40℃, with 50m	1	To measure temp. of water samples
14	EC meter (2)	portable, EC:0.00~	1	To measure electric conductivity of water
15	DO meter	portable, DO:0~19.9mg/lit	1	To measure dissolved oxygen of water
16	Turbidity meter	0-3000FNU, with data logger	1	To measure turbidity of water samples
17	Colorimeter	portable	1	To analyze water quality (absorptiometer)
18	Refrigerator (2)	150 lit., 2~14℃	1	To store samples and chemicals under low temp. condition
N. Econometrics Lab.				
1	Computer	OS: Microsoft, i7 or more, with 19 inch color monitor &	6	To process vast amount of data
O. Common Rooms				
<Water Purification Room>				
1	Water deionizer	Max: 1 lit./min.	2	To produce deionized water
2	Water distiller	About 20 lit./hr.	2	To produce distilled water
3	Ultra-pure water equipment	Max: 0.65 lit./min.	1	To produce ultra-pure water
<Freezer Room>				
1	Freezer (1)	-20~-30℃, 270 lit.	2	To preserve samples and chemicals under very low temp. condition
2	Deep freezer	-30~-40℃, 380 lit.	1	To preserve samples and chemicals under extremely low temp. condition
3	Ultra-deep freezer	-70~-80℃, 330 lit.	1	To preserve samples and chemicals under ultra-low temp. condition
4	Freezer, programmable	-40~30℃, 3.3 lit.	1	To make soft freezing of tissue cells
5	Ice cube/flake machine	180kg/day	1	To produce ice cube & flake
<Analytical Measurement Room>				
1	Flourimeter	200~900nm	1	To analyze vitamin and microelements
2	UV Visible Spectronhotometer	190~1100nm	1	To analyze DNA, protein and cell density of samples
3	Spectrophotometer	Min. sample: 1~2μL	1	To make quantitative analysis of various substance & DNA/RNA in samples
4	PCR (Tnermo-cycler)	4~99℃, 96x0.2ml tubes	1	To amplify DNA
5	Electrophoresis	horizontal	1	To separate DNA and protein
6	Trans illuminator	UV: 300nm, UV lamp:90w	1	To analyze DNA band after electrophoresis operation
7	GC (Gas chromatography)	Temp.: room +5~450℃, No. of injectors: 3, Inflection volume: 0~1200ml/min	1	To identify and measure tiny amount of compounds (inorganic gas, carbon hydrides, pesticides, etc.)
<Microbial Analysis Room>				
1	Laminar flow cabinet	Class100, 1,300(W) x 750~800(D) x 1,700~2,100(H)mm	1	To carry out experiment under aseptic condition (to avoid contamination from dust
2	Incubator	150lit., room temp.+5~60℃	1	To incubate food microbes
P. Food Processing Room				
1	Fruits pulper	0.2~0.3 ton/hr.	1	To remove fruit pulp

2	Squeezer	Oil press, press tank cap.: 40 lit. (φ350x400mm)	1	To express juice from fruit
3	Mixer (2)	6.7 lit.	1	To crush and mix vegetables & fruits
4	Dough mixing machine	30 lit.	1	To mix up dough
5	Baking oven	900x840x370mm	1	To bake bread
6	Twin screw extruder	1～180rmp, 5Nm/screw, 300℃, manual feeding	1	To mix, blend, mush and shape food materials
7	Cabinet drier	For food drying, 3 trays	1	To dry food materials
8	Freeze dryer	-45℃, 1.5 lit.	1	To make freeze-dried foods
9	Spray drier	250℃, 3kg/hr.(evaporation volume)	1	To make dried powder from liquid mixture
10	Autoclave	79 lit. 45～135℃, 0.25MPa	1	To sterilize spices by heating
11	Bag sealing machine	Foot pedal operation	1	To seal plastic film bags
12	Vacuum packaging	2～3 cycle/min	1	To seal plastic bags after vacuuming
13	Vacuum gas-filling, Packaging equipment	Vacuum pump: 167lit./min.	1	To seal plastic bags after filling nitrogen gas
14	Refrigerator (3)	1000 lit., -5～10℃	1	To store food materials under low temp.
15	Weighing balance (2)	12kg, 0.1g	1	To weigh food materials
16	Weighing balance (3)	2000g, 0.1g	1	To weigh food materials
17	Electronic balance (1)	200g, 0.1mg	1	To weigh seasonings and additives
18	Microwave oven	2.8kW, 420x470x340mm	1	To fuse culture medium by heating
Q. Daily Processing Lab.				
1	Homogenizer (for milk)	100 lit/hr., 19.6MPa	1	To homogenize raw milk to prevent from fat separating
2	Yoghrt incubator	50 lit/day, with homogenizer	1	To produce yoghurt
3	Butter churner	Processing capacity: 4～10 lit., stainless	1	To produce butter by churning
4	Cheese presser	stainless, plate:300x300mm	1	To produce cheese by pressing curd
5	Cream separator	125lit. /hr.	1	To separate cream from milk
6	Milk pasteurizer tank set	150 lit., stainless	1	To sterilize milk with low temp. and to blend milk and flavor materials, e.g. coffee, fruits juice essence, etc.
7	Sterilizing milk processer	150 lit., stainless	1	To sterilize milk with very high temp. (long life milk)
8	Refrigerator (3)	1000 lit., -5～10℃	1	To store milk and dairy products under low temp. condition
9	Weighing balance (3)	2000g, 0.1g	1	To weigh seasonings and additives
10	Electronic balance (1)	200g, 0.1mg	1	To weigh seasonings and additives
11	Milk packing machine (1)	for plastic bags (250ml, 500ml & 1000ml)	1	To pack milk
12	Milk packing machine (2)	for carton packages (250ml, 500ml & 1000ml)	1	To pack milk
R. Meat Processing Lab.				
1	Shear force test machine	single column, Max. load 2kN	1	To measure tenderness of meat
2	Meat grinder	100～150kg/hr., table-top	1	To make minced meat
3	Bowl chopper	5 lit., table-top	1	To chop meat
4	Linking machine	Max: 2000kg/hr.	1	To make sausage (linking)
5	Meat stuffer	Manual operation1		To stuff meat into sausage casing
6	Meat tumbler	6.8kg, table-top	1	To cut connective tissue of meat
7	De boning and butchering knives	8-item set	1	To debone and cut meat
8	Ham & bacon moulding	2-item set	1	To hold ham & bacon for smoking
9	Brine injector	table-top, pump injection	1	To inject brine to meat (for making ham &
10	Steamer	drawer type, gas boiler	1	To process ham
11	Smoke chamber	20～100℃, stainless, Can.:40kg of meat	1	To process ham& bacon
12	Meat thermometer	0～100℃	1	To measure temp. of meat
13	Ice cube/flake machine	180kg/day	1	To produce ice cube & flake
14	Refrigerator (3)	1000 lit., -5～10℃	1	To store meat and meat products under low temp. condition
15	Freezer (2)	220lit., -30℃	1	To preserve foods and meat materials under very low temp.
16	Weighing balance (2)	12kg, 0.1g	1	To weigh meat

17	Weighing balance (3)	2000g, 0.1g	1	To weigh meat
18	Electronic balance (1)	200g, 0.1mg	1	To weigh seasonings and additives
S. Research and Training Farm				
1	4-wheel tractor	45hp	1	To pull and operate attached farm equipment
2	Mould board plough (attachment of 4W tractor)	2 boards	1	To plow field
3	Disc plough (attachment of 4W tractor)	2 discs	1	To plow field
4	Harrow (attachment of 4W tractor)	14 harrow discs	1	To crush soil after plowing
5	Rotor cultivator (attachment of 4W tractor)	1700mm width	1	To crush soil and level field
6	Intercultivator (attachment of 4W tractor)		1	To inter-till and weed out field
7	Seed drill (attachment of 4W tractor)	8 rows	1	To seed in line or dot with fertilizers
8	Broadcaster (attachment of 4W tractor)	450kg capacity	1	To broadcast compost, fertilizers and crop seeds
9	Grass cutters	shoulder hold type, engine operation	2	To cut weeds surroundings of filed
10	Sprayer (2)	24 lit. with engine	1	To spray pesticides, etc. (liquid)
11	Duster	26 lit. with engine	1	To blow pesticides, etc. (powder)
12	Water pump (2)	2", centrifugal, with engine, 0.40m3/min.	1	To lift water for irrigation
13	Water pump (3)	0.08~0.15m3/min.	1	To lift water for irrigation
14	Grass cutters (attachment of 4W tractor)	Tractor mounted	1	To cut weeds surroundings or in the filed
15	Refrigerator	1000 lit., -5-10°C	1	To store crop seeds and farm products
T. Farm Machinery Workshop				
1	Gas welder		1	To joint metal materials
2	Metal cutting machine	manual operation	1	To cut metal materials
3	Metal bending machine	manual operation	1	To bend metal materials
4	Bench vice	Opening: about 200mm	1	To fix materials (metals & woods) for
5	Workshop tool box	52 tool item set	1	To adjust and maintain farm machinery in good condition
6	Workshop table	1800x900x740mm, metal top	1	To do various processing works
7	Lathe machine	mini desk-top type	1	To process metal materials
U. Meteorology Station				
1	Sun shine recorder	300-2800nm, self-recording	1	To measure and record sunshine hours

D. Soft Components

Topics	Output	Achievement Indicators
I. Experiments and practical training	Classes will be given that incorporate experiments and practical training. (1) Reference books/materials will be made for experiments and practical training conducted in classes. (2) Experiments and practical training will be conducted	· The development of reference books/materials. · The number of experiments and practical training increases · There will be an increase in the number of research plans that incorporate experiments.
II. Management of laboratory's equipment	A system to properly manage the laboratory's equipment shall be built. (1) Equipment and tools shall be properly stored and managed. (2) Inventory management shall be properly conducted.	· The development of an organized equipment and glassware checklist · The development of a Manual for cleaning, organizing, and managing the equipment and glassware. · The development of an Inventory List
III. Management of training and research farm	The training and research farm shall be properly managed. (1) Farm management plan shall be prepared. (2) The farm management implementation system shall be established.	· The development of annual plan regarding crop acreage and water supply management. · The development of farm management handbook. · The establishment of farm training committee. · The calculation of the necessary farm management annual cost. · The development of agricultural machine maintenance plan.

<Confidential>

Annex-2

(1)Project Cost to be borne by Japan's Grant Aid

Category	Cost (Million Japanese Yen)
1) Construction	
2) Equipment procurement	
3) Soft component	
4) Design and supervision	
5) Contingency	
Total	

(As of November, 2015)

Note:

(1) The cost estimates in the above table are provisional and will be further examined by the Government of Japan before the approval of the Grant.

(2) Estimation Conditions

a) Date of estimation :June 2015

b) Foreign exchange rate :US$ 1= JPY121.21

:LKR 1= JPY0.91

Annex-3

JAPAN'S GRANT AID

Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the Government of Japan (GOJ), JICA has become the executing agency of the Grant Aid for Projects for construction of facilities, purchase of equipment, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal &Approval
  - -Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - -The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - -Agreement concluded between JICA and a recipient country
- Implementation
  - -Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles in accordance with the E/N, to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant Aid may be used for the purchase of the products or services of a third country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals, in principle. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, resident tax, fuel tax which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract, since the Grant Aid fund comes from the Japanese taxpayers.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"), in principle. JICA will execute the Grant Aid by making payments in Japanese yen, in principle, to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

The Government of the recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

(11) Monitoring

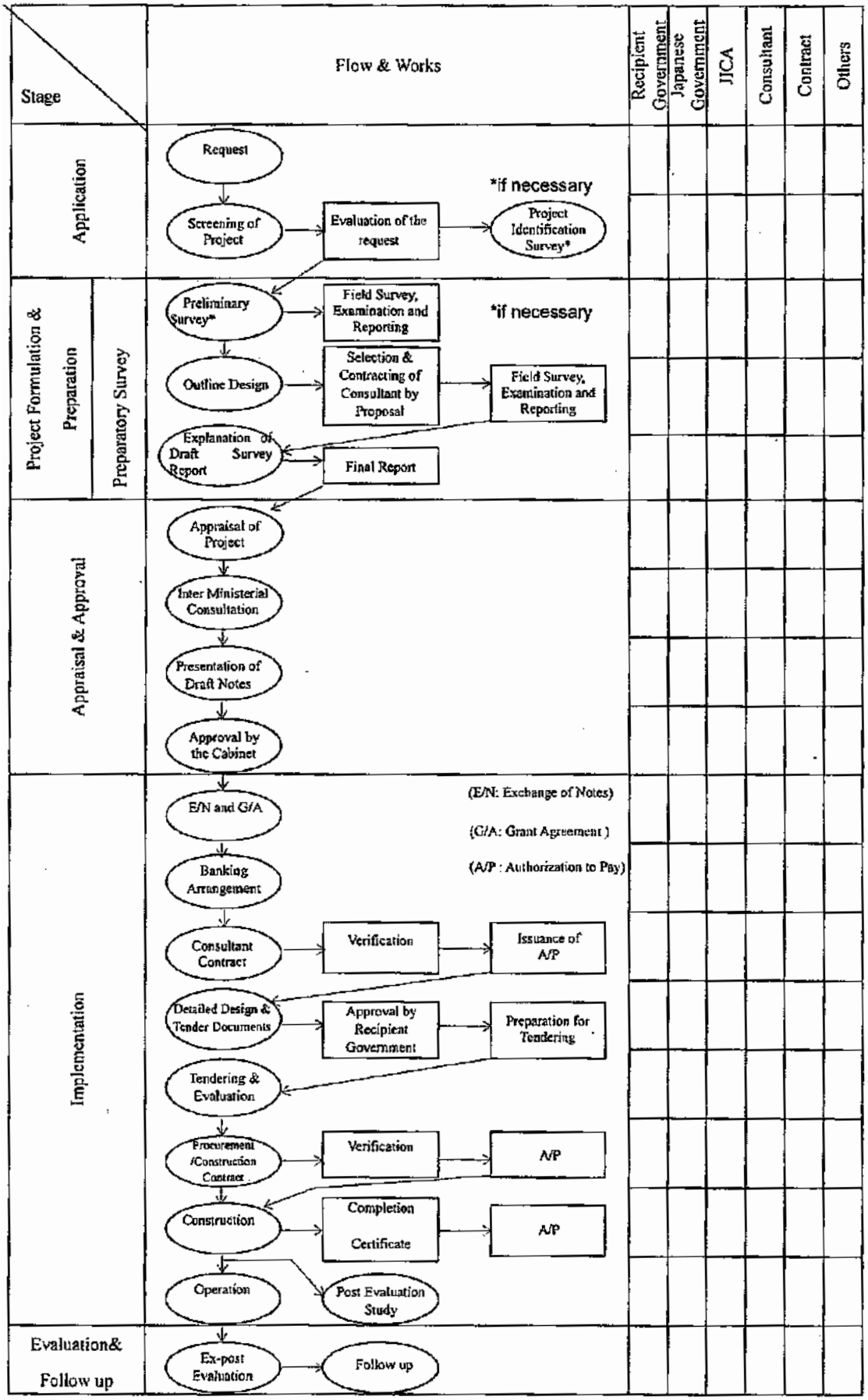
The Government of the recipient country must take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

(12) Safety Measures

The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.

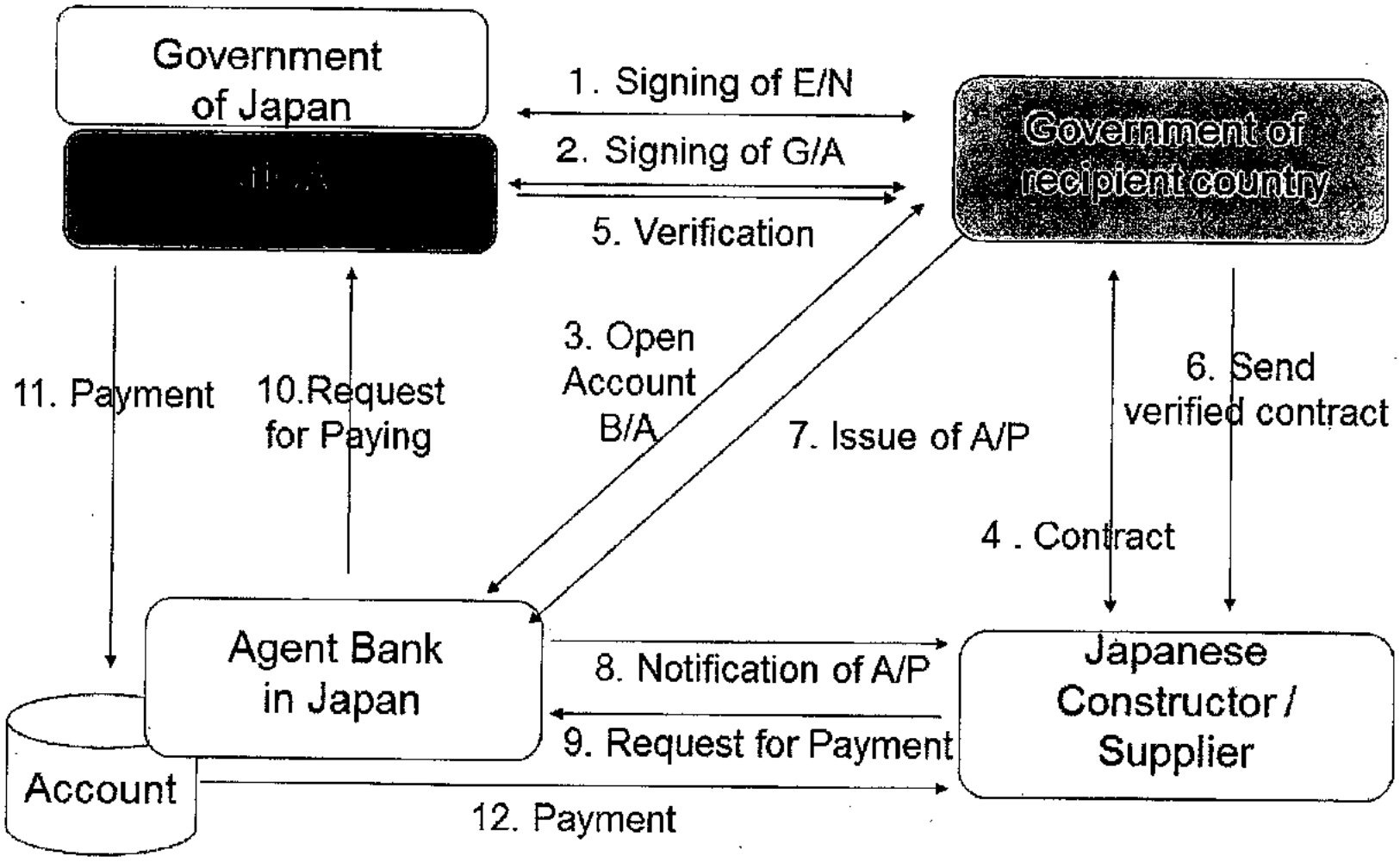
Annex-4

FLOW CHART OF JAPAN's GRANT AID PROCEDURES

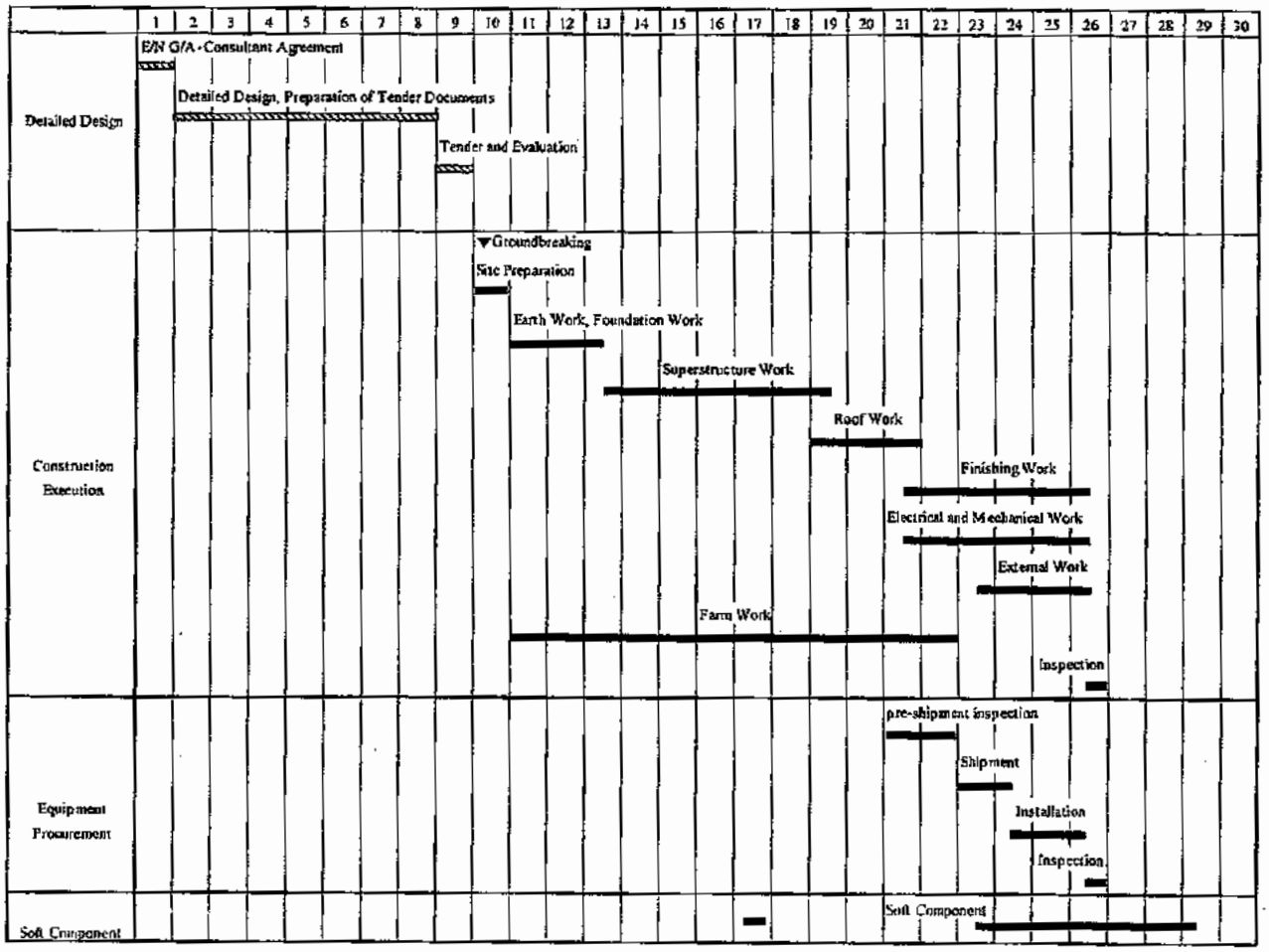


Annex-5

Financial Flow of Grant Aid



Project Implementation Schedule



Annex 7 Major Undertakings to be taken by Each Government

1. Specific obligations of the Recipient

The Recipient shall undertake the specific obligations for the Project as listed in the table below. JICA and the Recipient may agree from time to time separately in writing on the items, deadlines and other matters described in the tables below and the specific obligations of the Recipient.

1) Before the Tender

NO	Items	Deadline	In charge	Cost	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after G/A	ERD	1,500,000	
2	To secure the following lands 1) Project sites for the Research and Training Complex and the research and training farm.	before notice for prequalification	UoJ		
	2) temporary access road for the construction 3) temporary construction yard and stock yard near the Project area,secure pit and disposal site near the Project area	before commencement			
3	To obtain the planning, zoning, building permit	before commence of the construction work	UoJ	171,500	
4	To clear, level and reclaim the following sites				
	1) Clearance of landmines and unexploded bombs from the project site	before tender	MoHEH UoJ		
	2) Demolition of unnecessary existing building 3) Removal of unnecessary existing trees 4) Leveling and reclaiming the site for the building	before commencement of the construction work	UoJ	4,800,000	

2) During the Project

NO	Items	Deadline	In charge	Cost	Ref.
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A				
	1) Requesting budget for the Project	at the initial occasion to request a budget for the Project	MoHEH		
	2) Advising commission of A/P	within 1 month after the budget of the Project gets authorized by the national congress	ERD, MoHEH		
	3) Payment commission for A/P	every payment	ERD, MoHEH		
2	To ensure prompt unloading, customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation in the country of the Recipient of the products				
	1) Marine (air) transportation of the Products from Japan to	during the Project	Contractor Supplier(s)		

	2) Tax exemption and customs clearance of the products at the port of disembarkation	during the Project	MoHEH		
	3) Internal transportation from the port of disembarkation to the project site	during the Project	Contractor Supplier(s)		
3	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work	during the Project	MoHEH		
4	To exempt corporations and individuals from, without using the Grant, customs duties, internal tax and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, resident tax, fuel tax which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract	during the Project	MoHEH	56,102,000 for direct tax 237,375,000 for indirect tax	
5	To bear all the expenses, other than those to be borne by the Japanese Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment	during the Project	MoHEH		
6	Construct temporary access road for the construction work	before completion of the construction	UoJ		
7	To construct the following facilities:				
	1) The building	before completion of the construction	Contractor		
	2) The farm		Contractor		
	3) The gates and fences in and around the site		UoJ	400,000	
	4) The parking lot	before completion of the construction	Contractor		
	5) The road within the site		Contractor		
	6) The road outside the site		UoJ		
8	To provide facilities for distribution of electricity, water supply, drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)				
	1) Electricity				
	a. The distribution power line to the site	before completion of the construction	UoJ	14,000,000	
	b. The main circuit breaker and transformer		UoJ		
	c. The drop wiring and internal wiring the site		Contractor		
	2) Water Supply				
	a. The potable water distribution main to the site	before completion of the construction	N/A		
	b. The water supply system within the site		Contractor		
	3) Drainage				
	a. The city drainage main (for storm, sewer and others to the site)	before commencement of the project	UoJ		
	b. The drainage system (for toilet sewer, common waste, storm drainage, and others) within the site	before completion of the construction	Contractor		
	4) Gas Supply				
	a. The city gas main to the site		N/A		
	b. The gas cylinders	After completion of the construction	UoJ		
	c. The gas supply system within the site	Before completion of the construction	Contractor		
	5) Telephone System				
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the	1 month before	UoJ	150,000	

	building	completion of the construction			
	b. The MDF and the extension after the frame/panel	before completion of the construction	Contractor		
6)	Data Communication System				
	a. Internet access to the site	1 month before completion of the construction	UoJ		
	b. Local area network within the site	before completion of the construction	Contractor		
7)	Furniture and Equipment				
	a. General furniture	immediately after completion of the construction	UoJ		
	b. Project equipment	before completion of the construction	Supplier(s)		
	c. Installation of existing equipment, if any	immediately after completion of the construction	UoJ		

3) After the Project

NO	Items	Deadline	In charge	Cost	Ref.
1.	To maintain and use properly and effectively the facilities constructed and equipment provided under the Japanese Grant	after completion of the construction			
	1) Allocation of maintenance cost		MoHEH		
	2) Operation and maintenance structure		MoHEH UoJ		
	3) Routine check/Periodic inspection		UoJ		
	4) Others		MoHEH UoJ		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

(Note) Progress of the specific obligations of the Recipient may be confirmed and updated from time to time with written agreement between JICA and the Recipient in the form other than the amendment of the G/A.

Annex-8

Portions to be borne by the Sri Lankan side

(provisional estimation as of Nov.2015)

Nov.26, 2015
Consultant Team for the Preparatory Survey

Site Preparation, Infrastructure, and Application Works

Unit LKR

Item	Q'ty	Total	2015	2016	2017	2018
1) Site Clearance and Preparation Works						
・Detection of landmines and UXO, and their clearance	1 set	-	O			
・Removal of unnecessary existing trees.	1 set	1,200,000		1,200,000		
・Demolition of concrete floors at the training farm site	1,200m^2	3,600,000		3,600,000		
・Gate for the training farm	2 unit	400,000			400,000	
2) Installation of Utility Work						
・Electrical Works	1 set	14,000,000				14,000,000
・Network and Telecommunication Works	1 set	150,000				150,000
3) Application Procedures						
・Planning Clearance (UDA)	1 set	170,000		170,000		
・Building Construction Application	1 set	1,500		1,500		
4) Banking Arrangement Fee	1 set	1,500,000		1,500,000		
Total		21,021,500		6,471,500	400,000	14,150,000

Direct Tax

Unit LKR

Item	Q'ty	Total	2015	2016	2017	2018
1) PAYE Tax	1 set	3,302,000		194,000	2,331,000	777,000
2) Corporate Tax	1 set	52,800,000		21,120,000	21,120,000	10,560,000
Total		56,102,000		21,314,000	23,451,000	11,337,000

Indirect Tax

Unit LKR

Item	Q'ty	Total	2015	2016	2017	2018
1) VAT	1 set	91,875,000		9,187,500	45,937,500	36,750,000
2) NBT	1 set	60,000,000		6,000,000	30,000,000	24,000,000
3) PAL	1 set	22,500,000			11,250,000	11,250,000
4) CIGFL	1 set	18,000,000		1,800,000	9,000,000	7,200,000
5) CID	1 set	45,000,000			22,500,000	22,500,000
Total		237,375,000		16,987,500	118,687,500	101,700,000

Project Monitoring Report
on
Project for Establishment of Research and Training Complex at the Faculty of Agriculture, University of Jaffna

Grant Agreement No. XXXXXXX
20XX, Month

Organization Information

Authority (Signer of the G/A)	Person in Charge _____ Contacts Address: _____ Pho ne/FAX: _____ Email: _____
Executing Agency	Person in Charge _____ Contacts Address: _____ Pho ne/FAX: _____ Email:
Line Agency	Person in Charge _____ Contacts Address: _____ Pho ne/FAX: _____ Email: _____

Outline of Grant Agreement:

Source of Finance	Government of Japan: Not exceeding JPY . Government of Sri Lanka:
Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:

1: Project Description

1-1 Project Objective

1-2 Necessity and Priority of the Project

- Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

1-3 Effectiveness and the indicators

- Effectiveness by the project

Quantitative Effect (Operation and Effect indicators)		
Indicators	Original (Yr 2013)	Target (Yr 2021)
Qualitative Effect		

2: Project Implementation

2-1 Project Scope

Table 2-1-1a: Comparison of Original and Actual Location

	Original: *(M/D)*	**Actual:** *(PMR)*
Location	**Attachment(s):Map**	**Attachment(s):Map**

Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual

2-1-2 Reason(s) for the modification if there have been any.

2-2 Implementation Schedule

2-2-1 Implementation Schedule

Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
Cabinet Approval		-	-
E/N			
G/A			
Approval of consultant contract			
Early Mobilization of consultant			
Detailed Design			
Budget Request for FY2016			
Tender Process of contractor and supplier			
Approval of contractor and supplier contract			
Budget Appropriation and Issuance of A/P			
Construction Period			
Shipment			
Custom Clearance			
Installation and acceptance Check			
Soft component			
Project Completion Date			
Defect Liability Period			

*Project Completion was defined as Completion of Soft component a t the time of G/A.

2-2-2 Reasons for any changes of the schedule, and their effects on the project.

2-3 Undertakings by each Government

2-3-1 Major Undertakings

See Attachment 2.

2-3-2 Activities

See Attachment 3.

2-3-3 Report on RD

See Attachment 4.

2-4 Project Cost

2-4-1 Project Cost

Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan
(Confidential until the Tender)

Items			Cost (Million Yen)	
	Original	Actual	Original	Actual
Construction of Facilities				
Equipment				
Soft Component				
Consulting Services				
Contingency				
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =**Yen

Table 2-4-1b Comparison of Original and Actual Cost by the Government of **

Items			Cost (Thousand MMK)	
	Original	Actual	Original	Actual

Please state not only the most updated schedule

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =(local currency)

2-4-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

2-5 Organizations for Implementation

2-5-1 Executing Agency:

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original: *(M/D)*
Actual, if changed: *(PMR)*

2-6 Environmental and Social Impacts

- The environmental monitoring is not required in the Project as this project was categorized as category C in accordance with the GUIDELINES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS of JICA as of April 2010.

3: Operation and Maintenance (O&M)

3-1 O&M and Management

- Organization chart of O&M
- Operational and maintenance system (structure and the number ,qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

Original: *(M/D)*
Actual: *(PMR)*

3-2 O&M Cost and Budget

- The actual annual O&M cost for the duration of the project up to today, as well as the annual O&M budget.

Original: *(M/D)*

Actual: *(PMR)*

4: Precautions (Risk Management)

- Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.

Original Issues and Countermeasure(s): *(M/D)*	
Potential Project Risks	Assessment
1. Delay of budget appropriation	Probability: H/M/L
	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
2.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
3.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
Actual issues and Countermeasure(s)	
(PMR)	

5: Evaluation at Project Completion and Monitoring Plan

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan for the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Undertakings to be taken by each Government
3. Monthly Report
4. Report on RD
5. Yearly disbursement plan
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)

(Final Report Onl y)

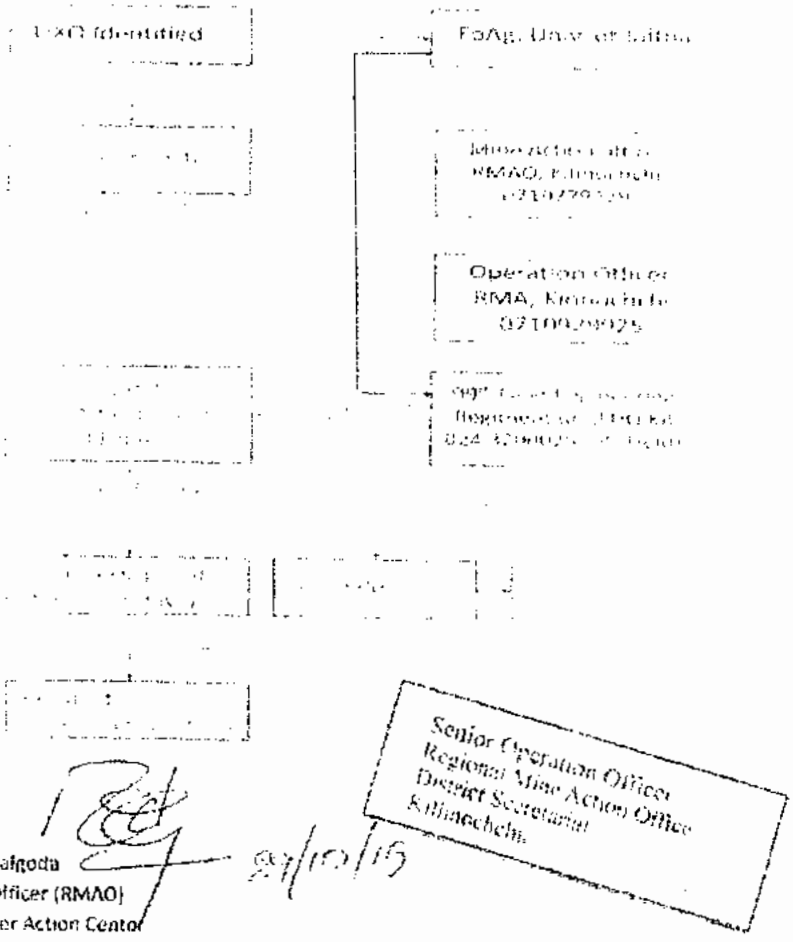
Annex 10

UXO Clearance Procedure

නැවත පදිංචි කිරීම, ප්‍රතිසංස්කරණ හා හින්දු ආගමික කටයුතු අමාත්‍යාංශය
மீள்குடியேற்றம்,புனர்நிர்மாணம் மற்றும் இந்துமத அலுவல்கள் அமைச்சு
Ministry of Resettlement, Reconstruction and Hindu Religious Affairs
බිම්බෙවි සඳහා ක්‍රියාකාරී ජාතික මධ්‍යස්ථානය
தேசியபநிலக்கண்ணிவெடிசெயற்பாட்டுநிலையம்
National Mine Action Centre (NMAC)

No.302, Galle Road, Colombo 06

MRRHRA/NMAC/RMAO/OPS/37 — 29th Oct 2015



29/10/15

DAND Idumalgoda
Operations Officer (RMAO)
National Mine Action Center
Ministry of Resettlement, Reconstruction and Hindu Religious Affairs

スリランカ国
ジャフナ大学農学部研究施設等建設計画準備調査

ソフトコンポーネント計画書

2015 年 11 月

株式会社　オリエンタルコンサルタンツグローバル
株式会社　アールコンサルタンツ

目　次

内容

１．ソフトコンポーネントを計画する背景

スリランカ国（以下「ス」国）「ジャフナ大学農学部研究施設等建設計画準備調査」は、内戦の影響でジャフナ県に避難していたジャフナ大学農学部が、キリノッチ県に戻りキャンパスを再建するにあたり、必要となる研究棟の施設と機材、およびほ場の整備を支援するものである。

「ス」国北部地域では、2009 年の内戦終結以降、国内避難民の帰還と再定住促進、破壊されたインフラの整備等が進められてきた。内戦終結後５年が経過した現在は再定住した住民の生計向上、地域経済活動の促進への取組が行われている。しかし住民の多くが従事する農業において、農民の多くは、適切な知識や農業技術普及等の行政支援を十分に受けられないまま、脆弱な環境下で農業に従事している状況であり、その生産性は低いため、農業の生産性の向上が喫緊の課題となっている。

ジャフナ大学農学部は、北部地域における唯一の農業高等教育機関であることから、その教育・研究活動に期待されている役割は大きい。ジャフナ県に避難していた 25 年間は、他学部の施設や民家を間借りしつつも継続的に学生への教育や研究、農業省の農業普及員への研修を実施してきたものの、施設・機材の制約により、その教育・研究活動が非常に限られていたことは否めない。今後、北部州の農業技術改善、人材育成をより効果的・効率的に行っていくためには、北部州の気候・土壌等に合った実践的研究・教育を行うことが重要であり、本事業の実施により研究棟の施設・機材、および圃場を整備することは、その実現を支える上で重要な意義を有するものである。

ジャフナ県へ避難していた当時は、必要に応じて他学部あるいは他大学の施設・機材を借りて実験・実習を行ってきたことから、授業における実験・実習、及び教員の研究の機会が非常に限られていた。特に、同農学部の教員は、自ら実験・実習を指導する機会が限られていたことから、本件で整備する施設・機材の有効活用のためには、農学部教員の実験・実習実施能力、研究能力の向上を行うことが必要である。

また「ス」国においては、通常、実験室専任の「技官」が実験室全般の管理（機材、器具、試薬等含む）を行い、「実験補助員」が実験のサポートを行う。本件にて新たに整備される機材の維持管理、および効率的な研究・実習の実施のためには、この「技官」と「実験補助員」への指導が非常に重要となる。

さらに整備される実習試験用のほ場についても同様であり、避難中は専用の試験ほ場を有していなかったことから、現在その職員募集等を行っているが、その管理体制の構築、管理方法の確立が必要である。

２．ソフトコンポーネントの目標

ソフトコンポーネントの実施により、以下に示す目標が達成されることが期待される。

I. ジャフナ大学農学部において、実験・実習等を取り入れた実践的な授業が提供されるようになる。

II. ジャフナ大学農学部において、各実験室の管理、具体的には実験機材、試薬、サンプル等の管理が適切に行われ、実験が効率的に行われるようになる。
III. ジャフナ大学農学部において、実習ほ場が適切に管理される。

３．ソフトコンポーネントの成果

ソフトコンポーネント実施により期待される直接的成果は以下の通り。

I. 教員が、今回整備される機材、施設を使った実験・実習の指導方法を習得し、実験・実習を取り入れた授業が実施される。
(1) 実験・実習のための参考書が作られる。
(2) 教員が実験・実習の方法を習得し、実験・実習が行われる。
II. 各学科にて、ラボ技官を中心に実験研究室及び実習室の実験機材管理を適切に行う体制が構築される。
(1) 実験機材が適正に保管・管理されるようになる。
(2) 保有・試薬品の在庫管理が適切に行われる。
III. ほ場管理者が、ほ場を適切に管理できるようになる。
(1)ほ場管理計画書が作成される。
(2)ほ場管理の実施体制が整う。

４．成果達成度の確認方法

本ソフトコンポーネントの成果及び成果の確認方法は下記の通りである。なお、以下成果 I〜III の達成を以て、教員の能力向上が図られたとみなす。

成果項目		達成度の確認項目	確認方法
分野	成果		
I. 実験・実習を取り入れた授業が実施される	（1）実験・実習のための参考書、手引き書ができる	・参考書、手引き書ができる。	ソフトコンポーネント専門家による参考書、手引き書の目視確認。
	（2）実験・実習が実施される	・実験・実習の授業数が増える。 ・実験を取り入れた研究計画（卒業研究、修士・博士課程における研究を含む）数が増える。	ソフトコンポーネント専門家による授業実施報告書、研究計画の目視確認。
II. 実験研究室・実習室の機材の管理体制が整う。	（1）機材・器具類が適正に管理されるようになる。	・機材・ガラス器具の整理整頓チェックリストが整備される。 ・機材の清掃、整頓、管理方法がマニュアル化され	ソフトコンポーネント専門家による整理整頓チェックリスト、機材管理マニュアルの目視確認。

		る。	
	（2）保有器具・試薬品の在庫管理が適正に行われる。	・保有器具・試薬品の在庫管理リストが作成される。	ソフトコンポーネント専門家による在庫管理リストの目視確認。
III.ほ場を適切に管理できるようになる。	(1)ほ場管理計画書が作成される。 (2)ほ場管理の実施体制が整う。	・作付面積並びに揚水管理に関する年間計画が作成される。 ・使用・不使用のほ場について管理方法の手引き書が作成される。 ・年間のほ場管理に必要な費用が算出される。 ・農業機械のメンテナンス計画が作成される。	ソフトコンポーネント専門家によるほ場管理計画書、手引き書、維持管理費積算、機械メンテナンス計画の目視確認。

５．ソフトコンポーネントの活動（投入計画）

各成果達成に向けた活動（投入計画）は以下の通り。

（1）活動計画

項目別活動計画

成果項目		活動項目	確認方法
分野	成果		
I. 実験・実習を取り入れた授業の実施	1) 実験・実習のための参考書の作成。 2) 実験・実習が実施される	・各学科の実験・実習の実施状況と教員の知識・技術レベルを確認する。 ・各学科の教員とともにシラバスの中から実験・実習の導入・実施目標を作成する。 ・参考書が必要な実験・実習をリストアップする。 ・各学科の教員と共に参考書、手引き書を作成する。 ・各学科の教員に対し参考書、手引き書に基づく指導を行う。	・ソフトコンポーネント専門家による参考書、手引き書の目視確認。 ・ソフトコンポーネント専門家による授業実施報告書、研究計画の目視確認。
II. 実験・実習室の管理方法の習得	1) 機器の適正な保管・管理	・具体的な機材の清掃、整頓、管理方法を説明する。 ・機材の整理整頓チェックリストを作成し、使用する。 ・技官及び実験補助員とともに機材の保管管理マニュアルを作成する。	・ソフトコンポーネント専門家による整理整頓チェックリスト、機材管理マニュアルの目視確認。
	2) 器具・試薬品などの管理	・管理方法の説明を行う。 ・保有器具・試薬品等の在庫を確認する。 ・在庫管理リストの作成と記入方法を指導する。	・ソフトコンポーネント専門家による在庫管理リストの目視確認。
III. ほ場の管理方	1) ほ場管理計画書が	・ほ場管理者及びほ場使用者（農学部）と共に作付面積並びに揚水管理に関する年間計	・ソフトコンポーネント専門家によるほ場管理

法の習得	作成される。 2) ほ場管理の実施体制が整う。	画を作成する。 ・ほ場管理者及びほ場使用者（農学部）と共に使用するほ場、未使用のほ場について管理方法の手引き書を作成する。 ・年間のほ場管理に必要な費用をほ場管理者とほ場使用者と共に算出する。 ・ほ場管理者とほ場使用者と共に、農業機械のメンテナンス体制、方法などを記した計画書を作成する。	計画書、手引き書、維持管理費積算、機械メンテナンス計画の目視確認。

派遣時期別活動計画

<table>
<tr><th colspan="2">I　実験・実習の実施</th><th colspan="2">II　機材管理</th><th colspan="2">III　ほ場管理</th></tr>
<tr><td>一次派遣
(10 日
現地
1 週間)</td><td>・実験・実習の実施状況を確認する。
・対象とする科目、内容の概要を計画する。</td><td>国内</td><td>派遣前準備</td><td>国内</td><td>派遣前準備</td></tr>
<tr><td>国内</td><td>派遣前準備</td><td rowspan="5">一次派遣
(30 日)</td><td rowspan="5">[実験・実習機材]
・具体的な機材・ガラス器具等の清掃、整頓、管理方法を説明する。
・機材の整理整頓チェックリストを作成し、使用する。
・農学部側担当者とともに機材の保管管理マニュアルを作成する。
[器具・試薬品]
・在庫管理方法の指導を行う。
・保有器具・試薬品等の在庫を確認する。
・在庫管理リストの作成を行い、記入方法を指導する。</td><td rowspan="2">一次派遣
(15 日)</td><td rowspan="2">ほ場管理者及びほ場使用者（農学部）と共に以下を実施する。
・ほ場管理者の管理状況と課題を確認する。
・作付面積並びに揚水管理に関する年間計画の作成。
・ほ場（使用、不使用）の管理の手引き書の作成を指導する。
・。</td></tr>
<tr><td>二次派遣
(10 日
現地
1 週間)</td><td>・学科別に具体的な実験・実習の実施状況と課題を確認する。
・各学科の教員の実験・実習の知識・技術レベルを確認する。
・シラバスの内容確認と実験・実習の実施目標を設定する。
・参考書が必要な実験・実習項目を検討する。</td></tr>
<tr><td>国内</td><td>・具体的な参考書類の準備　（「ス」国側とのE-mail ベースの調整）</td><td>国内</td><td>・管理の手引書の作成（E-mail ベース）</td></tr>
<tr><td>三次派遣
(14 日
現地
10 日間)</td><td>・準備した参考書、手引書に基づく、実験・実習の指導を行う。
・実践に基づく参考書、手引書の見直し、加筆を行う。</td><td>二次派遣
(15 日
現地
1 週間)</td><td>・実情に合わせほ場の管理の手引き書を完成させる。
・年間の必要管理費を算出する。
・農業機械のメンテナンス計画を作成する。</td></tr>
<tr><td>国内</td><td>完了報告書作成</td><td>国内</td><td>完了報告書作成</td><td>国内</td><td>完了報告書作成</td></tr>
</table>

（2）投入計画

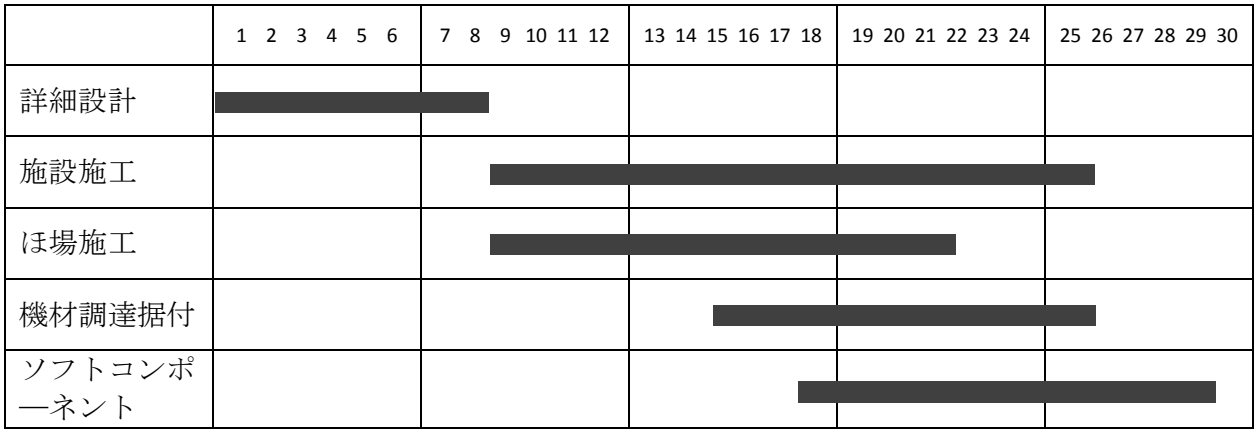
上記活動を行うために以下の専門家の投入を行う。学科ごとの専門性が異なることから、あまり実験・実習の少ない農業経済を除く全学科に 1 名ずつ派遣することを検討する。

1） 作物学実験・実習指導専門家　1名
2） 畜産学実験・実習指導専門家　1名
3） 土壌分析・有機肥料実験・実習指導専門家　1名
4） 食品分析実験・加工実習指導専門家　1名
5） 農業生物学実験・実習指導専門家　1名
6） 農業工学実験・実習指導専門家　1名
7） ほ場管理専門家　1名
8） 機器保守・管理指導専門家　1名

６．ソフトコンポーネントの実施リソースの調達方法

当ソフトコンポーネントの実施に当たっては、本調査にて東京農業大学より各分野の専門家を現地に派遣し、指導を行う予定である。

７．ソフトコンポーネントの実施工程



８．ソフトコンポーネントの成果品

ソフトコンポーネントの成果品として次を予定する。

① ソフトコンポーネント完了報告書（和・英）
② 実験・実習の参考書

９．相手国実施機関の責務

ジャフナ大学農学部では、対象各学科より、ソフトコンポーネントの対象となる教員、技官及び実験補助員を選定し、技術指導に参加させることが求められる。また、成果として得られた参考書、手引き書等に関しては、確実に活用し、実習・実験の実施及び研究室の管理につなげることが必要である。

TECHNICAL NOTES

Preparatory Survey on the Project for

Establishment of Research and Training Complex at the Faculty of Agriculture,

University of Jaffna in the Democratic Socialist Republic of Sri Lanka

The preliminary planning for the project components, which were agreed and attached on the Minutes of Discussion (M/D) signed on May 19, 2015 (herein after described as "the components"), was discussed between members of the Faculty of Agriculture, University of Jaffna (UoJ), and the JICA survey team(JST) from May 7 to May 30, 2015. The result of discussions were summarized as follows. The components and plans described here are subject to further study and discussions with JICA in Japan.

1. Architectural Planning

Through the series of discussions, the facility components and conceptual plan of the proposed buildings were developed and agreed as shown in the following appendices.

- Appendix 1 Floor area schedule of the proposed facility components
- Appendix 2 Site plan of the proposed facility
- Appendix 3 Floor plan of the proposed facility

These conceptual plan will be a base for developing outline design of the buildings including room layout plan, and cost estimation.

2. Research and Training Farm Planning

2.1 Size of Crop- and Livestock Research and Training Farms

(1) Crop Research and Training Farm

Size of crop farm is decreased from 90Ac to 14.15 Ac with consideration of the followings:

a) Area of sports complex with 58 Ac within the proposed farm site; and,

b) Capacity for operation and maintenance.

Components of the farm is shown in the Appendix-4. The size of each unit will be adjusted in accordance with the result of topographic survey.

(2) Livestock Research and Training Farm

In the Goat rearing unit, total 30 goats are planned to be reared annually. The daily consumption amount of green fodder grass per a goat is around 6 kg in Sri Lanka. Therefore the fodder grass of 65,700kg (30 goats x 6kg/goat/day x 365) will be needed in a year.

Based on the yield of pasture crops below, total 5.0 Ac of fodder grass farm will be developed.

a) 4 Ac of Fodder grass, Coimbatore 3 (CO3) and Coimbatore 4 (CO4) (18,000kg/Ac/year):

72,000kg/year

b) 1 Ac of fodder trees and pasture: (supplemental use)

(3) Area developed by UoJ

The area of 15 Ac nearby livestock barn funded by WB, has been developed by the UoJ, is not included in this Project.

2.2 Design of the Irrigation facilities

(1) Water Requirement for Crops- and Livestock Research and Training Farms

a) Evapotranspiration (ETo) and Effective Rainfall

- ETo with effective rainfall is estimated by using the data of Jaffna Meteorological Station.
- Analysis of water requirement will be based on the criteria of FAO.

b) Crop Calendar

- Crop calendar prepared by Department of Agronomy will be used to estimate the water requirement of the all units including pasture land.

c) Availability of Water for the Training Farm of Crops and Livestock

- Capacity of existing well in the farm is estimated by the pumping test. Based the test result, total design water volume will be fixed.

(2) Irrigation System

a) Pipeline system

- Closed pipeline system will be installed connecting with existing pipeline system of UoJ.
- Performance of the irrigation system has been determined by the existing well facility with elevated tank. From the hydraulic analysis, should the head losses be large, JICA study team will request UoJ to replace the main supply pipe having adequate size.

b) Hydrant in the Unit

- Hydrant (outlet) will be installed to each unit.
- In case of water shortage against the demand, UoJ shall select the unit to be irrigated according to importance of the target crops

c) Irrigation hour

- 8 hours from 8:00 to 16:00 is adopted to the irrigation system
- However, according to the result of hydraulic analysis, the operation of more than 8 hours will be required.

(3) Drainage canal

Earthen drainage canal will be installed to each unit. Used water will be drained to the out of farm therefore UoJ shall prepare the main drainage canal around the farm.

(4) Farm Road

Farm road within the site will be developed as follows:

- Width of farm road installed in each unit will be 3.0m.

- The width of main farm road shall meet with the one of existing road.

2.3 Construction Work Items for the Crop- and Livestock- Research and Training Farms

(1) Land leveling works

Land leveling works will be applied to the unit in case the irregularity of plus or minus 10cm would be detected from the topographic survey result.

Scope of the land leveling work is shown in the Attachment-5.

(2) Trees to be maintained

a) Manilhara hexandra (Palu tree)

b) Chlroxylon switenia (Brutha)

c) Deypetus ebonum (Ebony)

d) Azadiracta indica (Neem)

e) Cassia spp.

f) Albizzia

3. Equipment Planning

Based on the review of curriculum, syllabus, and research themes of each department, the draft list of candidate equipment attached as Annex-10 were confirmed and agreed by both side. Contents of equipment for the Department of Agricultural Engineering shall be carefully examined, so that the "Environment and Hydro Research Laboratory" under the Department function well in accordance with the Syllabus.

It was confirmed that the list of equipment, priority of these equipment and specifications of each equipment will be studied and developed in accordance with the following criteria.

Criteria for selection of equipment

(1) Following equipment will be excluded from the project.

- Equipment which is overlapped with the existing equipment. (Number of necessary equipment will be considered.)
- Simple equipment & tools which can be purchased easily at low-cost, or easily made in Sri Lanka.
- General glassware and chemical agents
- Equipment which operation and maintenance cost is very high

(2) Criteria for prioritizing equipment

A: Essential equipment for general experiments and practices of students and research activities with high versatility and high frequency of use.

B: Necessary equipment for the general experiments and practices, or prioritized research activities, even though which versatility and frequency of use are limited. (e.g. analytical devices)

C: Other equipment (e.g. high-degree analyzing devices with limited usage, equipment which can

be replaced by other equipment with high versatility, accessories less related to the substantial function of the main equipment, software for computer, etc.)

4. Utility Planning

4.1 Basic Concept of Utility Design

As a result of the series of discussions, it has been identified that the new Research and Training Complex will be provided with the following utilities:

Electrical work	**Plumbing work**
1) Electrical Power Supply System	1) Water Supply System incorporating a new deep well
2) Stand-by Generator	2) Sewerage Drainage System
3) Main Feeder Wiring System	3) Plumbing Fixtures
4) Lighting Fixtures	4) Liquid Petroleum Gas Supply System
5) Telephone System	5) Fire Extinguishers
6) Local Area Network System	6) Sewerage Treatment Plant (Septic tanks & Soaked tanks)
7) Manual Fire Alarm System	**Air conditioning &Ventilation work**
8) Lightning Protection System	1) Air conditioning System
	2) Mechanical Ventilation System

4.2 Utilities to be equipped in each room including laboratory:

Both parties have confirmed that the items of utility such as Air condition system, socket outlets, telephone outlets and LAN Outlets should be reflected precisely with the equipment schedule and the Sri Lankan side's requests in each room including laboratories.

Please refer the following plans:

Appendix-7	Schedule of Utilities per Room
Appendix-8	Power Supply Plan
Appendix-9	Network Extension Plan

5. Establishment of Operation and Maintenance System

The human and financial resources being allocated currently have not been sufficient for proper operation and maintenance of the existing utilities, and the document system for maintenance, such as O&M manuals, operation records, etc. has not been established properly.

The Faculty of Agriculture is recommended to establish an appropriate integrated O & M system for the existing and new facilities and equipment.

6. Unexploded Ordinance (UXO) Clearance

(1) UoJ officially requested to the District Secretary Kilinochchi for land surface survey with the land mine technical clearance, and implementation agency the Halo Trust conducted the preliminary investigation. (refer to Appendix-12)

(2) UoJ officially requested to the District Secretary Kilinochchi to issue the official document of UXO clearance procedure.

(3) UoJ assured to obtain the certificate of mine clearance as mentioned in the M/D before end of June.

7. Project Cost born by Sri Lankan Side

Both parties have mutually confirmed the major undertakings to be implemented by both side described in the Attachment-11, and agreed that JICA study team will prepare the necessary budget for these works, and UoJ will provide necessary information for that purpose.

8. Information on future budget and staffing

The UOJ agreed information on the budget and staff for 2016 will be provided to JICA Study Team apon approval.

Kilinochchi, May 30, 2015

Dr. S. Sivachandiran,
Dean,
The Faculty of Agriculture,
University of Jaffna

Ms. Yuko SASA
Chief Consultant
Preparatory Survey Team
Japan International Cooperation Agency

Appendices:

Appendix 1	Building Area Schedule
Appendix 2	Site Layout Plan of Research and Training Complex
Appendix 3	Floor Plan of Research and Training Complex
Appendix 4	Area Schedule of the Farm
Appendix 5	Scope of Leveling Work
Appendix 6	Site Layout Plan of Research and Training Farms
Appendix 7	Schedule of Utilities per Room
Appendix 8	Power Supply Plan
Appendix 9	Network Extension Plan
Appendix 10	List of Candidate Equipment
Appendix 11	Extent of Works
Appendix 12	Letter to request UXO clearance and flow chart of clearance procedure

Appendix-1 Building Area Schedule

Current Situation

Existing Building	Area (m2)	Remarks
Department of Agronomy		
Agronomy Laboratory	286	Labo space. + Rooms for Lecturer's and Tech.l Officer's, Equipment, Preparation and Storage
Department of Animal Science		
Animal Scienc Laboratory	286	Labo space + Lecturer's and Technical Officer's rm, Storage, etc.
Department of Agri - Chemistry		
Laboratory A	286	Labo space + Technical Officer's space and Prep. space
Laboratory B	286	Half used for Labo space, and half used for Lecturer's and Technical Officer's.
Department of Agri - Biology		
Student Laboratory	270	Labo space + staff room, storage
Research Laboratory	170	Labo space + staff room, storage
Staff Room GFL	157	Room for Head, lecturers, Technical Officer, Internet Lab.etc.
Hall	121	
Department of Agri - Engineering		
Drawing Room	114	
Workshop	39	
Laboratory	39	
Staff Room 1FL	135	1 Room for Head, 6 Rooms for lecturers
Department of Agri - Economics		
Lecture Hall	135	
Staff Room		1 Room for Head, 6 Rooms for lecturers
Common		
Lecture Hall (Admin. Building)	147	2 Lecture Halls
Lecture Hall (Next to Adm. Building)	212	2 Lecture Halls

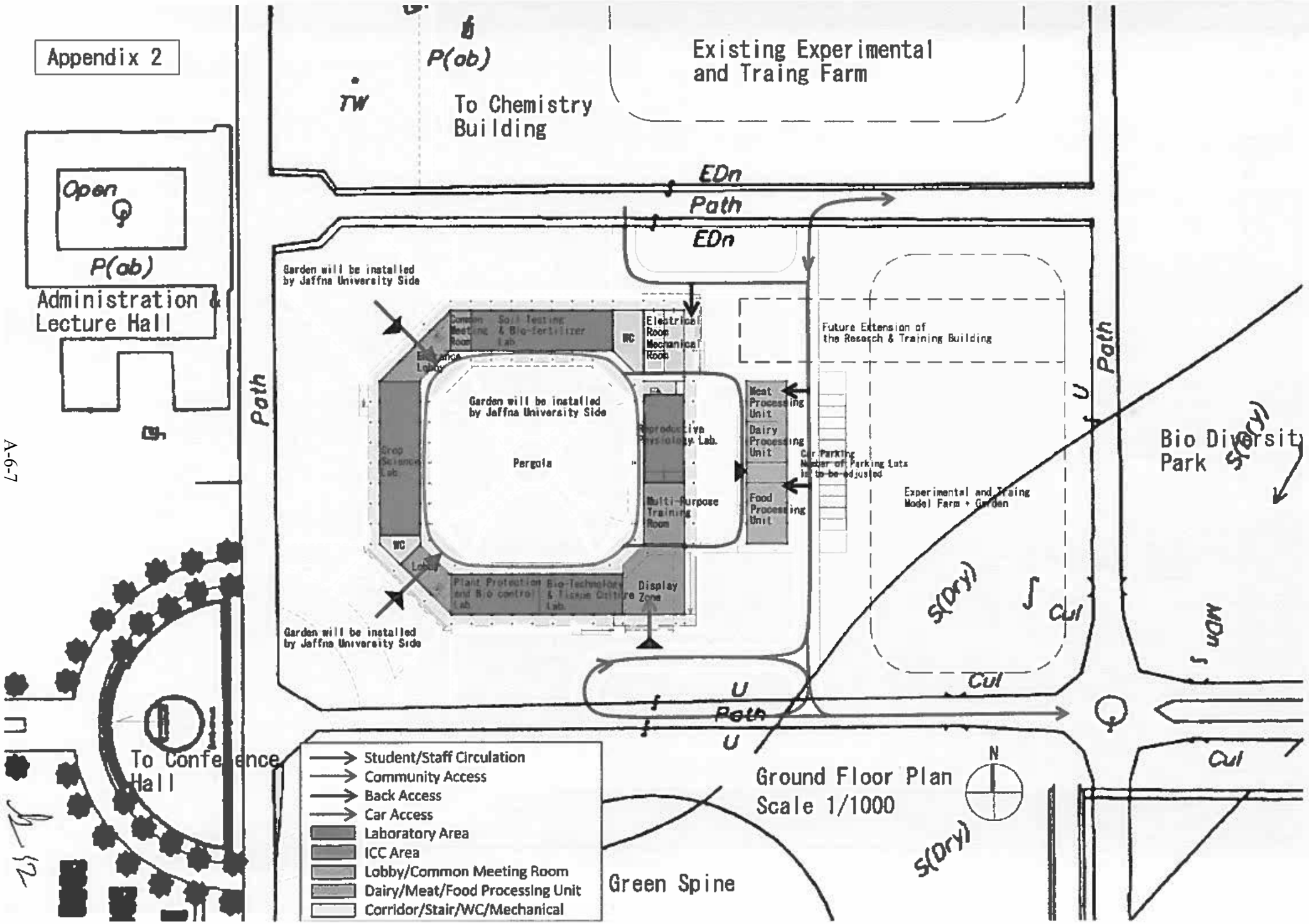
Future Plan

Existing Building	Area (m2)
Department of Agronomy	
Laboratory for Core Course (including Tech. Officer's rm)	288
Department of Animal Science	
Laboratory for Core Course (including Tech. Officer's rm)	288
Department of Agri - Chemistry	
Laboratory for Core Course (including Tech. Officer's rm)	288
Laboratory for Core Course (including Tech. Officer's rm)	288
Department of Agri - Biology	
Laboratory for Core Course A	270
Laboratory for Core Course B	170
Staff Room GFL	157
Hall	121
Department of Agri - Engineering	
Drawing Room	114
Workshop	39
Department of Agri - Economics	
Lecture Hall	135
Common	
Lecture Hall (Admin. Building)	147
Lecture Hall (Next to Adm. Building)	212

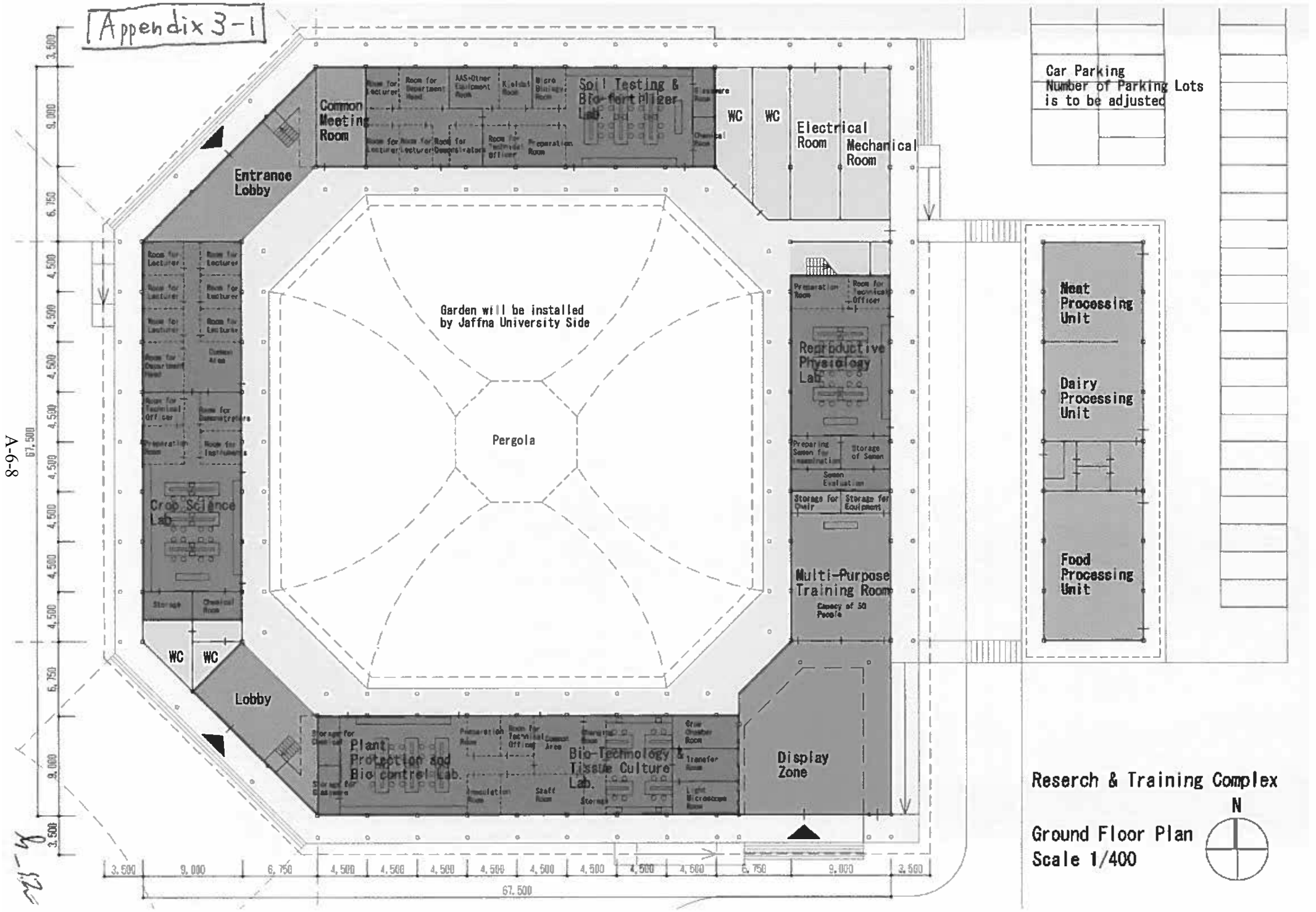
Research & Training Complex	Area (m2)	Remarks
Department of Agronomy		
Crop Science Laboratory	172	Capacity of 20 Students, 1 Room for Technical Officer
Staff Room	135	Rms for Head, 6 Lecturers, 4-5 Demonstrators with Common Area
Department of Animal Science		
Animal Nutrition Laboratory	189	Capacity of 20 Students, 1 Room for Technical Officer
Staff Room	108	Rms for Head, 6 Lecturers, 4-5 Demonstrators with Common Area
Reproductive Physiology Laboratory	176	Including 1 Room for Technical Officer
Department of Agri - Chemistry		
Soil testing and bio fertilizer Laboratory	200	Capacity of 20 Students, 1 Room for Technical Officer
Staff Room	83	Rms for Head, 6 Lecturers, 4-5 Demonstrators with Common Area
Food analysis and processing Laboratory	200	Capacity of 20 Students, 1 Room for Technical Officer
Staff Room	83	Rms for Head, 6 Lecturers, 4-5 Demonstrators with Common Area
Department of Agri - Biology		
Plant Protection and Bio control Laboratory	175	Capacity of 20 Students, Rooms for Staff and Technical Officer
Bio-Technology and Tissue Culture Laboratory	167	1 Room for Staff and 1 Room for Technical Officer
Department of Agri - Engineering		
Environment and Hydro Research Laboratory	148	Capacity of 20 Students, 1 Room for Technical Officer
Staff Room	135	Rm for Head, 6 Lecturers, 4-5 Demonstrators with Common Area
Department of Agri - Economics		
Econometrics Laboratory	100	Capacity of 25 Students,
Staff Room	156	Rm for Head, 6 Lecturers, 4-5 Demonstrators with Common Area
Dairy/ Meat/ Food Processing Unit	324	
ICC Zone		
Multi- Purpose Training Room	112	Capacity of 75 people
Display Area	205	
Common		
Lecture Hall	56	Capacity of 50 students
Common Meeting Room	41	
Analitical Room	54	
Lobby	182	Including Business Unit
WC/Mechanical Room/Storage	637	
Total	3848	
Corridor (Outdoor)	1178	

Farm Related Facilities		Remarks
Crop Harvest Processing Unit	64	
Primary sample preparation Room	64	
Farm Machinery Storage	128	
Farm Machinery Workshop	96	
Farm Lecture Room	128	
Office/WC/Storage/Gas Room	87	
Total	567	

Appendix 2


Existing Experimental and Traing Farm
To Chemistry Building
P(ob)
TW
EDn
Path
Open
Administration & Lecture Hall
Garden will be installed by Jaffna University Side
Soil Testing & Bio-fertilizer Lab.
Common Meeting Room
WC
Electrical Room
Mechanical Room
Entrance Lobby
Crop Science Lab.
Pergola
Reproductive Physiology Lab.
Multi-Purpose Training Room
Meat Processing Unit
Dairy Processing Unit
Food Processing Unit
Plant Protection and Bio control Lab.
Bio-Technology & Tissue Culture Lab.
Display Zone
Future Extension of the Reseach & Training Building
Car Parking
Number of Parking Lots is to be adjusted
Experimental and Traing Model Farm + Garden
Bio Diversity Park
S(Dry)
Cul
U
Path
To Conference Hall
Green Spine
Student/Staff Circulation
Community Access
Back Access
Car Access
Laboratory Area
ICC Area
Lobby/Common Meeting Room
Dairy/Meat/Food Processing Unit
Corridor/Stair/WC/Mechanical
N
Ground Floor Plan
Scale 1/1000

Appendix 3-1



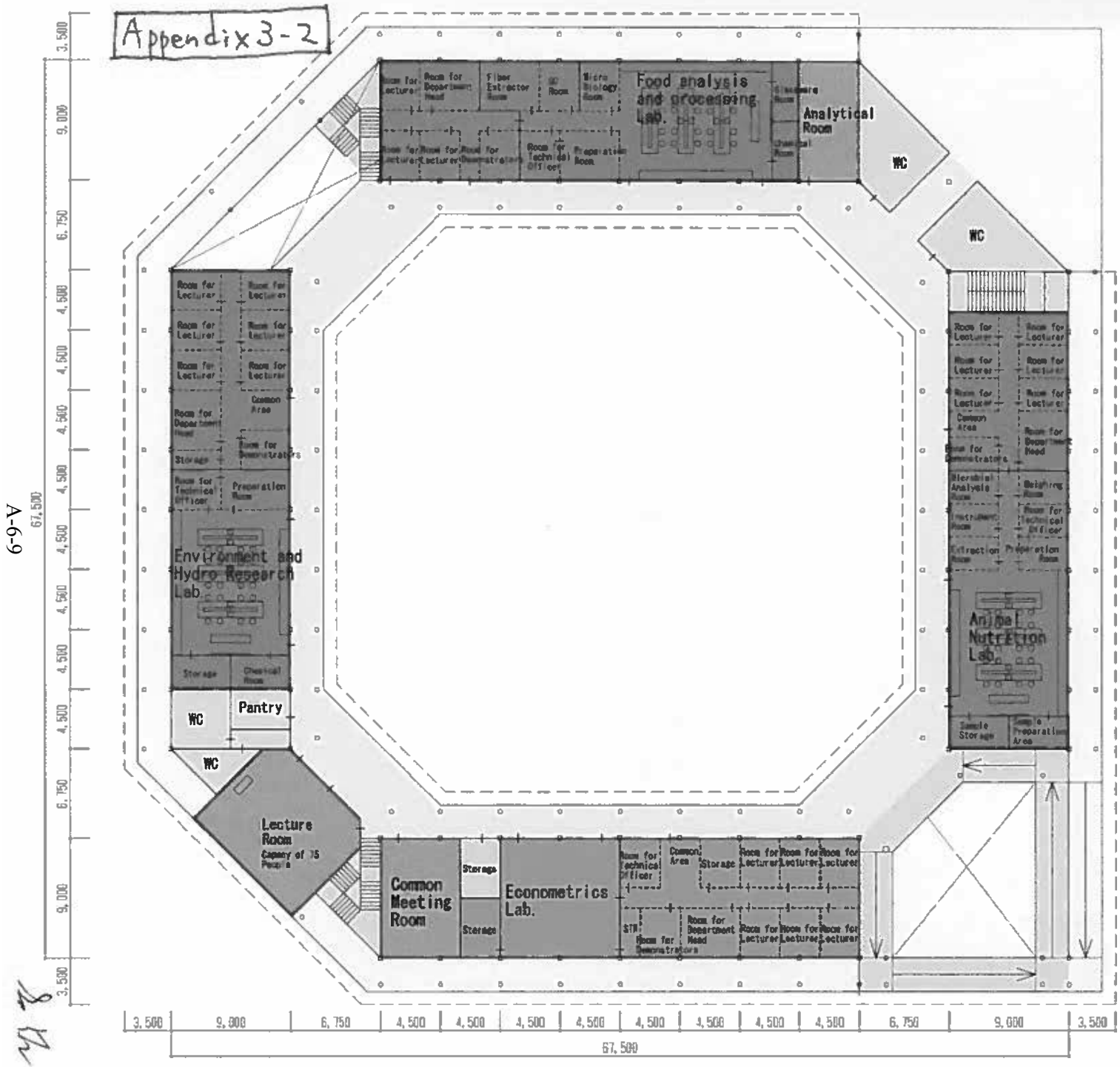
Reserch & Training Complex

Ground Floor Plan
Scale 1/400

N

A-6-8

Appendix 3-2



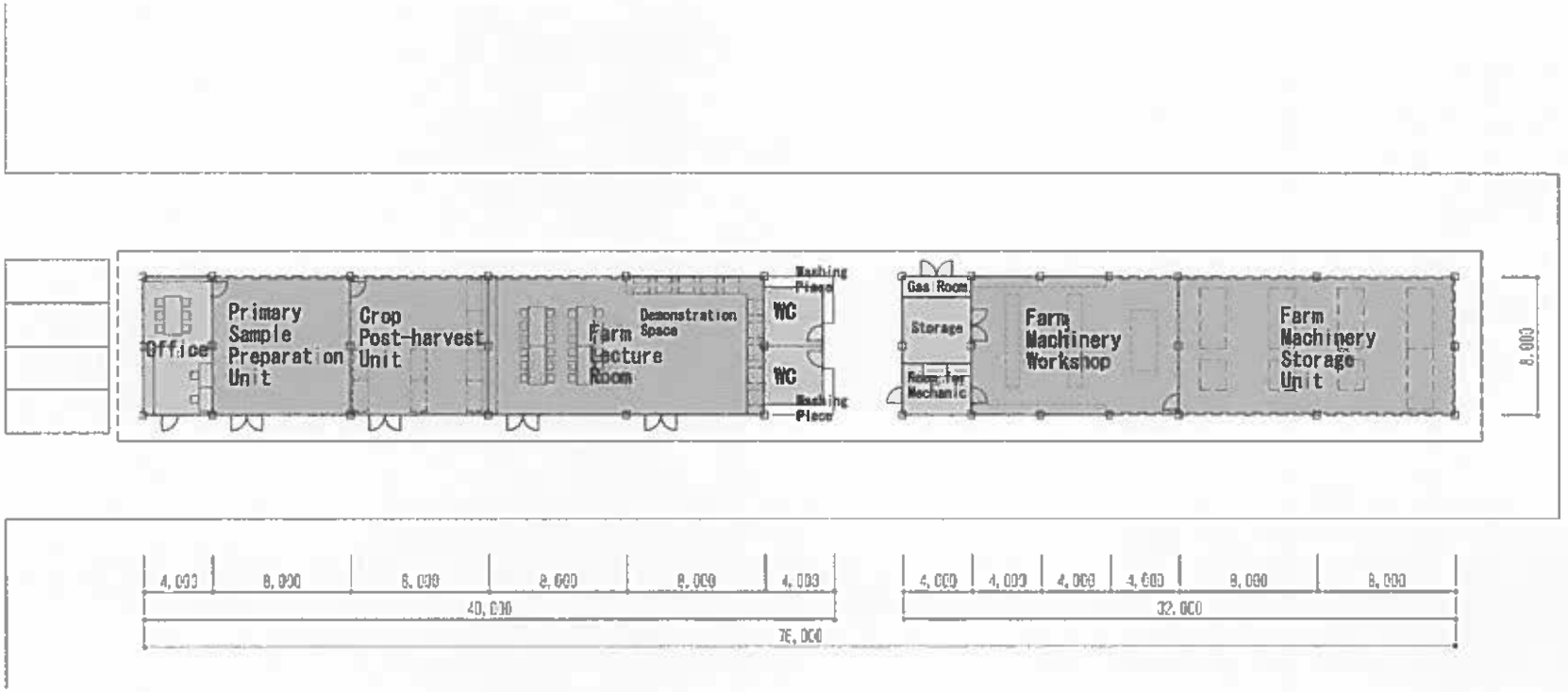
A-6-9

Reserch & Training Complex

1st Floor Plan
Scale 1/400

N

Appendix 3-3



Farm Management Center

Ground Floor Plan
Scale 1/400

N

Appendix-4 Farm area schedule

Farm Area Schedule

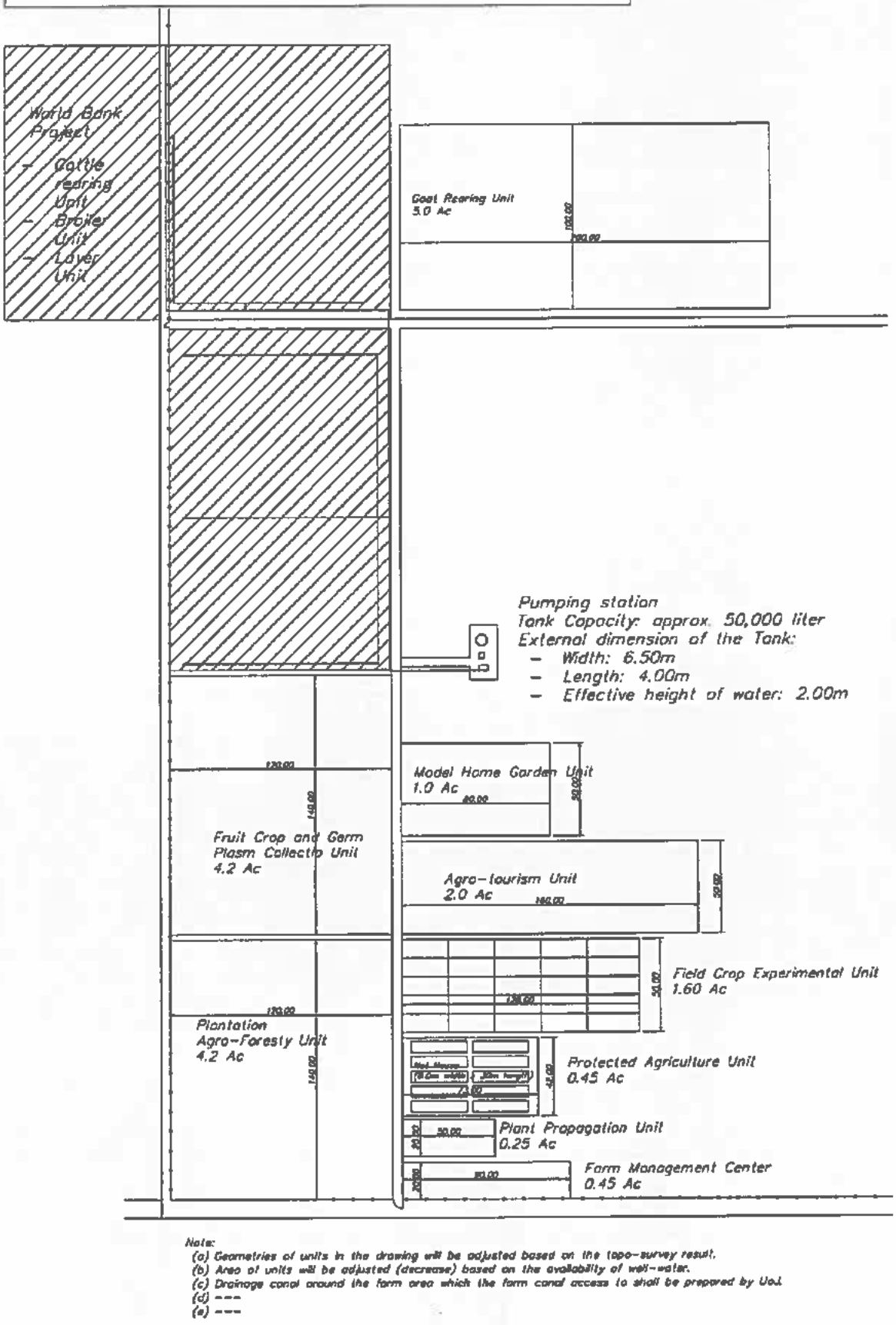
Unit	Size in Ac		Remarks
	Requested	Modified	
Crop, Horticulture and Agroforestry Research and Training Farm			
1. Plant Propagation Unit	10.00	0.25	
2. Protected Agriculture Unit	5.00	0.45	
3. Fruit Crops Germ-Plasm Collection Unit	9.00	4.20	
4. Field Crops Experimental Unit	14.00	1.60	
5. Plantation and Agro-forestry Unit	20.00	4.20	
6. Farm Management Center (~~Agr. Business Centre~~)	3.00	0.45	(i) Office (ii) Crop post-harvest unit (iii) Primary sample preparation unit (iv) Farm Machinery storage (v) Farm Machinery Workshop
7. Model Home Garden Unit	1.00	1.00	
8. Horticulture Unit	15.00	-	The unit is included to Field crops experimental unit
9. Floriculture Unit	9.00	-	The unit is included to Protected agriculture unit.
10. Agro-Tourism Unit	4.00	2.00	
Total	90.00	14.15	
Integrated Livestock Research and Training Farm			
1. Goat-rearing Unit	10.00	5.00	Including Goat Shed
Total	10.00	5.00	
Grand Total	100.00	19.30	

Appendix-5

Scope or the Land Leveling Work for Farms

Unit	Clearing	Plowing	Leveling
1. Crop Research and Training Farm			
1.1 Plant Propagation Unit	Yes	Yes	Yes
1.2 Protected Agriculture Unit	Yes	No	Yes
1.3 Fruit Crops Germ-Plasm Collection Unit	Yes	No	Yes
1.4 Field Crops Experimental Unit	Yes	Yes	Yes
1.5 Plantation and Agro-forestry Unit	Yes	Yes	Yes
1.6 Farm Management Center	Yes	No	Yes
1.7 Model Home Garden Unit	Yes	Yes	Yes
1.8 Agro-Tourism Unit	Yes	Yes	Yes
2. Livestock Research and Training Farm			
2.1 Goat-rearing Unit	Yes	Yes	Yes

Appendix -6 Site Layout Plan of Research and Training Farms



Note:
(a) Geometries of units in the drawing will be adjusted based on the topo-survey result.
(b) Area of units will be adjusted (decrease) based on the availability of well-water.
(c) Drainage canal around the farm area which the farm canal access to shall be prepared by UoI.
(d) ---
(e) ---

APPENDIX-7

Schedule of Utilities per Room

■ Research and Training Complex

Revi.1 30,May.2015

	Department	Floor	Floor Area m2	Occupants (Persons)	Room Name	A/C	Mechanical	Ceiling	Lighting		Socket Outlet		Telephone	LAN Outlet	Water	Drainage		LPG	Remarks
						Split type	Ventilation	Fan	Type	Lux	230V	400V				Waste	Chemical		
1	Agronomy	GF		21	Crop Science Laboratory	○	Ⅲ	–	A	400	○	○(If any)	○×1	○×1	○	–	○	–	
				2	Preparation Room	–	Ⅲ	○	B	300	○	–	–	–	○	–	○	–	
				2	Technical Officer's Room	–	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
				–	Instruments Room	○	Ⅲ	○	B	300	○	–	–	–	○	–	○	–	
				1	Department Head Room	△	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
				1 x6	Lecturer's Room-1,2,3,4,5,6	△	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
				4	Demonstrator's Room	△	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
				–	Common area for Lecturers	–	–	○	A	300	○	–	○×1	○×1	○	○	–	–	One lavatory
				–	Storage A	–	–	–	D	100	–	–	–	–	–	–	–	–	
				–	Storage B	–	–	–	D	100	–	–	–	–	–	–	–	–	
				–	Storage C	–	–	–	D	100	–	–	–	–	–	–	–	–	
2	Animal science	1F		21	Animal Nutrition Laboratory	○	Ⅲ	–	A	400	○	○(If any)	○×1	○×1	○	–	○	–	
				2	Weighing Room	○	Ⅲ	–	B	400	○	○(If any)	–	–	–	–	–	–	
				2	Microbial Analysis Room	○	Ⅲ	–	A	400	○	○(If any)	○×1	○×1	○	–	○	–	
				–	Sample Preparation Room	–	Ⅲ	○	B	300	○	–	–	–	–	–	–	–	
				–	Sample Storage	–	Ⅲ	–	B	100	○	–	–	–	–	–	–	–	
				2	Preparation Room	–	–	○	B	300	○	–	–	–	○	–	○	○	
				2	Technical Officer's Room	–	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
				1	Department Head Room	△	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
				1 x6	Lecturer's Room-1,2,3,4,5,6	△	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
				4	Demonstrator's Room	△	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
				–	Common area for Lecturers	–	–	○	A	300	○	–	○×1	○×1	○	○	–	–	One lavatory
				–	Storage	–	–	–	D	100	–	–	–	–	–	–	–	–	
		GF		21	Reproductive Physiology Laborator	○	Ⅲ	–	A	400	○	○(If any)	○×1	○×1	○	–	○	–	Emergency shower
				–	Semen Storage	○	Ⅲ	–	D	300	○	○(If any)	–	–	–	–	–	–	
				–	Semen Preparation Room	○	Ⅲ	–	A	400	○	–	–	–	○	–	○	–	
				2	Preparation Room	–	–	○	D	300	○	–	–	–	○	–	○	○	
				2	Technical Officer's Room	–	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
3	Agro-Chemistry	GF		21	Soil testing & Bio-fertilizer Laboratory	○	Ⅲ	–	A	400	○	○(If any)	○×1	○×1	○	–	○	–	Emergency shower
				–	Glass Ware Room	–	–	–	D	100	○	–	–	–	–	–	–	–	
				–	Chemical Room	–	–	–	D	200	○	–	–	–	–	–	–	–	
				2	Atomic Absorb Spectrometer Room	○	Ⅲ	–	A	400	○	–	○×1	○×1	○	–	○	–	
				2	Kjeldahl Room	–	Ⅲ	–	A	400	○	–	–	–	○	–	○	–	
				2	Micro biology room	○	Ⅲ	–	A	400	○	–	–	–	–	–	–	–	
				2	Preparation Room	–	Ⅲ	○	D	300	○	–	–	–	○	–	○	–	
				2	Technical Officer's Room	–	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
				1	Department Head Room	△	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
				1 x6	Lecturer's Room-1,2,3,4,5,6	△	–	○	A	300	○	–	○×1	○×1	–	–	–	–	
				4	Demonstrator's Room	△	–	○	A	400	○	–	○×1	○×1	–	–	–	–	
				–	Common area for Lecturers	–	–	○	A	300	○	–	○×1	○×1	○	○	–	–	One lavatory
				–	Storage A	–	–	–	D	100	–	–	–	–	–	–	–	–	

	Department	Floor	Floor Area m2	Occupants (Persons)	Room Name	A/C	Mechanical	Ceiling	Lighting		Socket Outlet		Telephone	LAN Outlet	Water	Drainage		LPG	Remarks
						Split type	Ventilation	Fan	Type	Lux	230V	400V				Waste	Chemical		
		1F		21	Food Analysis & Processing Laboratory	O	III	-	A	400	O	O(If any)	O×1	O×1	O	-	O	-	Emergency shower
				2	Gas Chromatography Room	O	III	-	A	400	O	-	O×1	O×1	O	-	O	-	
				2	Fiber Extractor Room	O	III	-	A	400	O	-	-	-	O	-	O	-	
				2	Micro biology room	O	III	-	A	400	O	-	-	-	-	-	-	-	
				-	Glass Ware Room	-	-	-	D	100	O	-	-	-	-	-	-	-	
				-	Chemical Room	-	-	-	D	100	O	-	-	-	-	-	-	-	
				2	Preparation Room	-	III	O	D	300	O	-	-	-	O	-	O	-	
				2	Technical Officer's Room	-	-	O	A	300	O	-	O×1	O×1	-	-	-	-	
4	Agro-Biology	GF		21	Plant Protection & Bio-control Lab.	O	III	-	A	400	O	O(If any)	O×1	O×1	O	-	O	-	Emergency shower
				-	Inoculation Room	O	III	-	A	400	O	O(If any)	-	-	-	-	-	O	
				-	Glass Ware Room	-	-	-	D	300	O	-	-	-	-	-	-	-	
				-	Chemical Room	-	-	-	D	300	O	O	-	-	-	-	-	O	
				2	Preparation Room	-	III	O	D	300	O	-	-	-	O	-	O	-	
				2	Technical Officer's Room	-	-	O	A	300	O	-	O×1	O×1	-	-	-	-	
		1F		21	Bio-technology & Tissue Culture Lab.	O	III	-	A	400	O	O(If any)	O×1	O×1	O	-	O	-	
				-	Research Space	O	III	-	A	400	O	O(If any)	-	-	-	-	-	-	
				2	Preparation Room	-	-	O	D	300	O	-	-	-	O	-	O	-	
				-	Storage	-	-	-	D	100	-	-	-	-	-	-	-	-	
				1	Staff room	-	-	O	A	300	O	-	O×1	O×1	-	-	-	-	
				1	Preparation Area	-	III	O	A	300	O	-	-	-	O	-	O	-	
				-	Transfer Room	O	III	-	A	300	O	-	-	-	-	-	-	-	
				-	Grow Chamber Room	O	III	-	A	300	O	-	-	-	-	-	-	-	
				2	Light Microscope Room	O	III	-	A	400	O	-	-	-	-	-	-	-	
5	Agro-Engineering	GF		21	Environment & Hydro Research Rm.	O	III	-	A	400	O	O(If any)	O×1	O×1	O	-	O	-	Emergency shower
				-	Storage	-	-	-	D	100	O	-	-	-	-	-	-	-	
				-	Chemical Room	-	-	-	D	200	O	-	-	-	-	-	-	-	
				2	Preparation Room	-	III	O	D	300	O	-	-	-	-	-	-	-	
				2	Technical Officer's Room	-	-	O	A	300	O	-	O×1	O×1	-	-	-	-	
				1	Department Head Room	Δ	-	O	A	300	O	-	O×1	O×1	-	-	-	-	
				1 x6	Lecturer's Room-1,2,3,4,5,6	Δ	-	O	A	300	O	-	O×1	O×1	-	-	-	-	
				4	Demonstrator's Room	Δ	-	O	A	400	O	-	O×1	O×1	-	-	-	-	
				-	Common area for Lecturers	-	-	O	A	300	O	-	O×1	O×1	O	O	-	-	One lavatory
				-	Storage A	-	-	-	D	100	-	-	-	-	-	-	-	-	
6	Agro-economics	GF		21	Multi-purpose Training Room	Δ	1	O	B	400	O	-	O×1	O×1	-	-	-	-	
				-	Storage for Chair	-	-	-	D	100	-	-			-	-	-	-	
				-	Storage for Equipment	-	-	-	D	100	-	-	-	-	-	-	-	-	
		1F		26	Econometrics Laboratory	O	III	O	A	400	O	-	O×1	O×1	-	-	-	-	
				2	Preparation Room	-	III	O	D	300	O	-	-	-	-	-	-	-	
				2	Technical Officer's Room	-	-	O	A	300	O	-	O×1	O×1	-	-	-	-	
				1	Department Head Room	Δ	-	O	A	300	O	-	O×1	O×1	-	-	-	-	
				1 x6	Lecturer's Room-1,2,3,4,5,6	Δ	-	O	A	300	O	-	O×1	O×1	-	-	-	-	
				4	Demonstrator's Room	Δ	-	O	A	300	O	-	O×1	O×1	-	-	-	-	
				-	Common area for Lecturers	-	-	O	A	300	O	-	O×1	O×1	O	O	-	-	One lavatory
				-	Storage	-	-	-	D	100	-	-	-	-	-	-	-	-	

	Department	Floor	Floor Area m2	Occupants (Persons)	Room Name	A/C	Mechanical	Ceiling	Lighting		Socket Outlet		Telephone	LAN Outlet	Water	Drainage		LPG	Remarks
						Split type	Ventilation	Fan	Type	Lux	230V	400V				Waste	Chemical		
7	Common				Toilet	–	Ⅲ	–	D	150	–	–	–	–	○	○	–	–	WC,Urinal, Lavatory
					Pantry	–	Ⅲ	–	D	200	○	–	–	–	○	○	–	–	
					Corridor	–	–	–	D	100	○	–	–	–	–	–	–	–	
					Entrance Hall	–	–	–	C,F	200	○	–	–	–	–	–	–	–	FAP, SW
					Electrical Room	–	Ⅰ	–	D	100	○	○(If any)	–	–	–	–	–	–	
					Water Reservoir Room	–	Ⅰ	–	D	100	○	○(If any)	–	–	○	○	–	–	

■ Farm Management Center

	Department	Floor	Floor Area m2	Occupants (Persons)	Room Name	A/C	Mechanical	Ceiling	Lighting		Socket Outlet		Telephone	LAN Outlet	Water	Drainage		LPG	Remarks
						Split type	Ventilation	Fan	Type	Lux	230V	400V				Waste	Chemical		
	Training Farm	GF			Office	△	Ⅲ	○	D	300	○	–	○	○	○	○	–	–	Lavatory
					Preliminary Sample Preparation Unit	–	–	–	D	200	○	–	–	–	○	○	–	–	Utility sink
					Crop Post-harvest Unit	–	–	–	D	200	○	–	–	–	○	○	–	–	Utility sink
					Farm Lecture Room	△	–	○	D	200	○	–	○	○	–	–	–	–	
					Toilet	–	–	–	D	150	–	–	–	–	○	○	–	–	WC,Urinal, Lavatory
					Room for Mechanics	△	–	○	D	300	○	–	○	○	○	○	–	–	Lavatory
					Storage	–	–	–	D	100	–	–	–	–	–	–	–	–	
					Cylinder's Storage	–	–	–	D	100	–	–	–	–	–	–	–	–	
					Farm Machinery Workshop	–	–	–	D	300	○	○(If any)	–	–	○	○	–	–	Lavatory
					Farm Machinery Storage	–	–	–	D	200	○	–	–	–	–	–	–	–	

Abbreviation

Lighting Fixture
- A: Recessed Mount Type W/Louver FL or LED
- B: Recessed Mount Type FL or LED
- C: Down Light FL or LED
- D: Surface Mount V-Shaped Type FL or LED
- E: Surface Mount Type W/Reflector FL
- F: Wall Light FL or LED

Mechanical Ventilation
- Ⅰ :Supply & Exhaust Fan
- Ⅲ: Exhaust Fan

Air-conditioning system
- ○: Installed by the Project
- △: To be installed in future
- –: Not installed

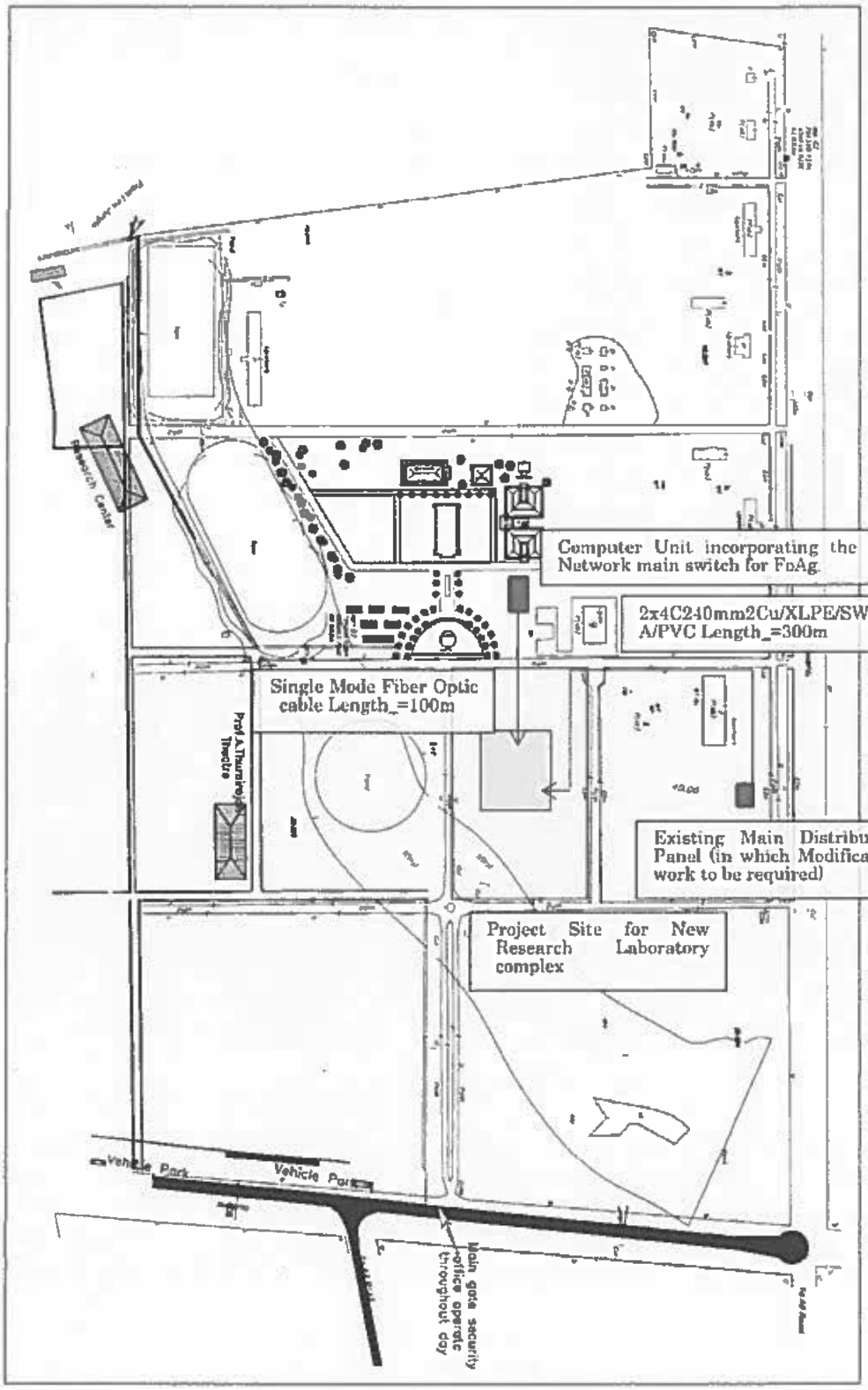
LAN System
- SW: Switching Hub
- ○: RJ45 LAN outlet

FAP:
Fire Alarm Control Panel

LPG
Liquid Petroleum Gas

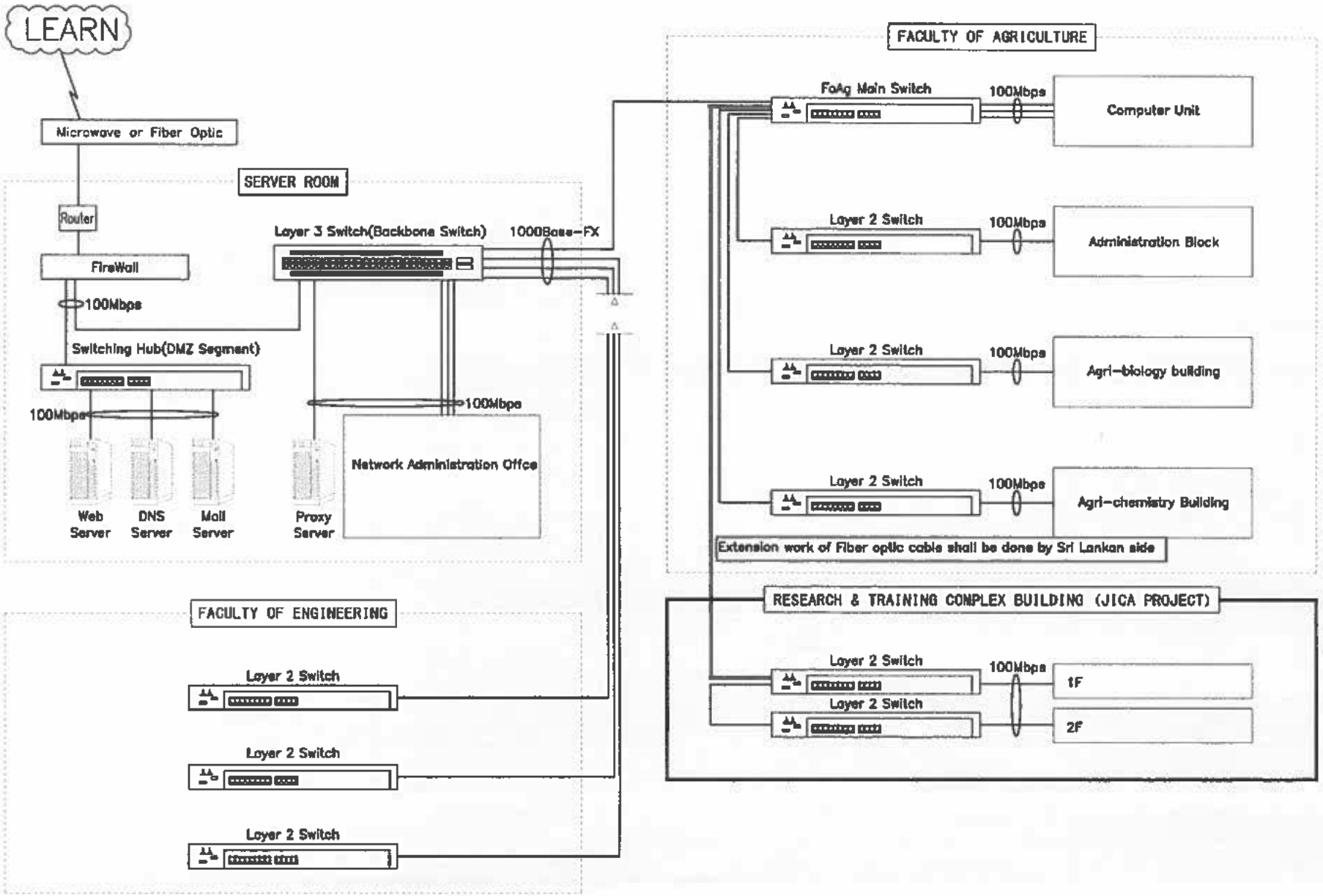
APPENDIX -8

Power Supply Work and Network Extension Work to the JICA Project Done by Sri Lankan Side 27/May, 2015 JICA Study Team



APPENDIX-9

NETWORK EXTENSION PLAN FOR RESEARCH AND TRAINING COMPLEX



Appendix-10(1) List of Candidate Equipment

Department of Agronomy

No.	Equipment	Spec.
1	Mesuring tape	
2	Magnifier	with lamp
3	Stereo-microscope	
4	Dissection kit set	in box
5	Centrifugal seed dividers	
6	Labo. seed cleaner	
7	Labo. spiral seed separator	
8	Grain moisture meter	
9	Oven	
10	Electronic balance	
11	Weighing balance	
12	Seed germination incubator	
13	Refrigerators	
14	Grafting knife	
15	Budding knife	
16	Garden scissors	
17	Polyethylene sealer	plastic pot making
18	Packing machine	
19	Digital leaf area mete	portable
20	Green leaf area meter	table-top
21	Chlorophyll meter	
22	Lux meter	
23	Portable photosynthesis analyzer	Infrared gas analysis (IRGA), CO2:0 - 2000ppm, , H2O: 0-75 mbar, Leaf temp -5 - 50oC
24	pH meter	
25	EC meter	
26	Vaccum pump	for filtering sample
27	Thermometer	
28	Soil moisture meter	
29	CO2 dissolved sensor	
30	Root scanner	
31	Vanier caliber	
32	Clinometer	
33	Diameter tape	
34	Increment borer	
35	GPS	
36	Digital camera	
37	ArcView (ArcGIS)	software
38	WinRHIZO	software
39	Statistica	software
40	Minitab	software
41	SPSS	software
42	Real Time Landscaping Plus Review	software
43	Water stirilizer	
44	Water bath	
45	Magnetic stirrer	
46	Dispenser pipette	

47	Autoclave	
48	Kjeldahl digestion and distillation unit	
49	Auto fiber analyzer	
50	Muffle furnace	
51	Membrane filter	
52	PCR	
53	Clean bench (laminar flow)	
54	Incubator (incubation room)	
55	Net green house	
56	Cheesecloth	
57	Hydroponic unit	
58	Plant incubator (growth chamber)	temp & humid control
59	4W tractor	
60	Mould board plough (attachnent of 4W tractor)	
61	Disc plough (attachnent of 4W tractor)	
62	Harrow (attachnent of 4W tractor)	
63	Rotator cultivator (attachnent of 4W tractor)	
64	Intercultivator (attachnent of 4W tractor)	
65	Seed drill (attachnent of 4W tractor)	
66	Flower and leaf plucker (attachnent of 4W tractor)	
67	2W tractor	
68	Attachnent of 2W tractor	rotator cultivator, trailer
69	Power sprayer	
70	Sprinkler unit	
71	Transplanter	
72	Combine harvester	
73	Maximum and minimum thermometer	
74	Wet & dry bulb thermometer	
75	Rain-gauge	tipping bucket
76	Barometer	
77	Wind anemometers	
78	Soil thermometer	
79	Open pan evaporimeter	
80	Sun shine recorder	
81	Hygrometer	

Appendix-10(2) List of Candidate Equipment

Department of Animal Science

No.	Equipment	Spec.
1	Animal models of cattle	
2	Animal models of poultry	
3	Animal models of rabbit	
4	Animal models of pig	
5	Animal models for monogastric (pig)	
6	Animal models for ruminants digestive system (cattle)	
7	Animal models for digestive system of poultry	
8	Reproductive system of male and female ruminant models	
9	Reproductive system of male and female pig models	
10	Reproductive system of male and female poultry models	
11	General animal models for nervous system	
12	General animal models for circulatory system	
13	General animal models for respiratory system	
14	Dissection set (for small animals)	
15	RBC counting chamber	
16	WBC counting chamber	
17	CMT kit	
18	Digestion chambers	cattle & goat
19	Respiration & metabolic chamber	cattle & goat
20	Animal fistula	
21	Cannula fit	
22	Grass sampler	
23	Vacuum bag for silage	
24	Air suction pump	
25	Electric pressurized washer	
26	Weigh bridge for cattle	
27	Animal weighing scale (small animals)	
28	Milking machine	
29	Binocular microscope (x400)	
30	Warm stage microscope - 100x	
31	Warm stage microscope - 400x	
32	Phase contrast microscope	
33	Florescent microscope	
34	Microtome	
35	Microtpme sample processer	
36	Electronic balance	200g, 0.5mg
37	Electronic balance	500g, 0.1g
38	Analytical balance	
39	Drying cabinet	
40	Autoclave	
41	Centrifuge	3000 rpm
42	Centrifuge, refrigirated	
43	Micro centrifuge	refrigirated
44	Hematocrit centrifuge	
45	Gerber centrifuge	milk centrifuge
46	Water distillation unit	
47	pH meter	desk top

48	Feed crushing mill	
49	Grinder	labo type
50	Mixer	labo type
51	Homogenizer	labo type
52	Oven	
53	Water bath with shaker	
54	Shaker	agitator
55	Voltex mixer, test tube	
56	Magnetic stirrer	
57	Dispenser	
58	Feed fiber analyzer	Fiber tec
59	Micro Kjeldhal apparatus	
60	Macro Kjeldhal apparatus	
61	Soxhlet apparatus	
62	Muffle Furnace	
63	Vaccume pump (Lab.)	for filtering
64	Fume hood	
65	Bomb calorimeter	
66	Milk fat tester	electronic
67	Fatty acid analyzer	
68	Ultrasonic milk analyzer	Lacto Scan
69	Alcohol gun	milk inspection
70	Refractometer	
71	Texture analyzing machine (meat & fish)	
72	Haemocytometer	
73	Bovine sperm photometer	
74	Sperm motility analyzer	
75	Flame photo meter	
76	Amino acid analyzer	
77	Incubator	general & biological
78	Low temperature incubator	
79	Laminar flow cabinet	
80	PCR	
81	Electrophoresis	Gel, horizontal
82	UV illuminator	
83	Colony counter	
84	ELISA kit	
85	ELISA reader	
86	AI kit for the field	for cattle & goat
87	Artificial vagina for cattle	
88	Artificial vagina for goat	
89	Artificial vagina for poultry	
90	Artificial vagina for pig	
91	Ultra sound pregnancy detector	for cattle & goat
92	Kamar Pressure-Sensitive Mount Detectors(Heat detection aids)	
93	Electronic Mount Detectors(Heat detection aids)	
94	Pedometer(Heat detection aids)	
95	Chin ball detector(Heat detection aids)	
96	Semen processor	

97	Single straw filling and sealing machine	
98	Straw printer	
99	Diluter of semen	
100	Liquid nitrogen gas container (10 L)	
101	Thawing device for frozen semen	
102	Vaginal speculum for cow	
103	Flow cytometer machine	
104	Automatic irrigator for embryo flushing	
105	Catheter for removing vagina mucous	
106	Embryo collector 10 pcs./set	for cattle & goat
107	Dilating bougie for cow and heifer, sugie-type	
108	Program freezer	
109	Liquid Nitrogen gas container (30L) with square canister	
110	Thawing device for frozen tube	
111	Embryo transporter	for cattle & goat
112	Embryo transplanter	for cattle & goat
113	Cabinet type poultry incubator	
114	Electronic vernier (egg measurement)	
115	Egg candling light	
116	Chick brooder	
117	De-beaker (for poultry)	
118	Yolk color fan (checking egg color)	
119	Sphero meter (measuring egg, internal size)	
120	Fish model to illustrate the internal and external anatomy of fish	
121	Fish measuring board	
122	Sacchi dish (water transparency)	
123	Water sampler	different depth
124	Ekmnman grab sampler	bottom soil sampling
125	pH meter, portable	
126	EC meter, portable	
127	Thermometer, portable	
128	BOD meter, portable	
129	Salinity meter, portable	
130	Plankton nets	zoo plankton & phyto plankton
131	Homogenizer (for Yoghurt & ice cream)	
132	Incubator for Yoghurt making	
133	Butter churner (5 – 10 lit.)	electric
134	Cheese presser	
135	Cream separator	
136	Pasteurizing milk processer	
137	Sterilizing milk processer	
138	Flavored milking machine	
139	Ice cream maker	
140	Steam sterilizer	spices
141	Meat mincer	
142	Meat grinder	
143	Bowl chopper	
144	Linking machine	
145	Meat thermometer	

146	Smoke chamber	
147	Meat stuffer	
148	Meat tumbler	
149	De boning and butchering knife	
150	Ham & bacon moulding cases	
151	Brine injector	
152	Steamer	
153	Ice flake machine	
154	Shear force test machine	meat quality inspection
155	Refrigerator	
156	Freezer	programmed & general
157	Deep freezer	
158	4W tractors	
159	Grass cutters	Farm machnery attachment
160	Grass choppers	Farm machnery attachment
161	Broadcaster	Farm machnery attachment
162	Seeder	Farm machnery attachment
163	irrigation facilities (pipeline) & sprinklers	

Appendix-10(3) List of Candidate Equipment

Department of Agri. Chemistry

No.	Equipment	Spec.
1	GPS	
2	Sampling equipment (Soil auger)	
3	Soil sieves	
4	Binocular microscope	x 1000, oil emersion lens
5	pH meter	
6	Electrical conductivity meter	
7	Soil texture analyzer	
8	Pressure plate apparatus	
9	Wet sieving equipment	wet aggregate stability study
10	Soil grinder	
11	Water still (double distilled water apparatus)	
12	Water deionizer	
13	Conventional free-swinging equal arm balance	
14	Top loading balance	2kg, 10g
15	Electronic balance	
16	Analytical balance	
17	Autoclave	
18	Oven	
19	Centifuge	3000 rpm
20	Mixer grinder	
21	High speed blender	
22	Magnetic stirrer	
23	Vortex stirrer	
24	Shaker	
25	Shaking water bath	
26	Water bath	
27	Hot plate	
28	Rotary Evaporator	
29	Fume hood (draft chamber)	
30	Macro kjeldal	
31	Micro kjeldal	
32	Soxhlet appratus	
33	Fibre anayzer	fibre tec
34	Muffle furnace	
35	Flame photometer	
36	Spectrophotometer	
37	High Performance Thin Layer Chromatography (HPTLC)	
38	Nitrogen & Carbon Analyser	
39	GC (Gas chromatography)	
40	AA spectrometer	
41	Colori meter	
42	Bomb calorimeter	
43	Water activity measuring meter	food material
44	Rapid visco analyzer	
45	Texture analyzer	food hardness
46	Fruit firmness tester (hardness meter)	
47	Salinometer	

48	Ebulliometer	alcohol % measurement
49	Dial thermometer	measure temp. of cordial
50	Digital moisture meter	for food
51	Flourimeter	Vitamin B analysis
52	Food chronometer	
53	Refractometer	measure solids contents of fruits juice
54	Laminar flow cabinet	
55	Incubator	
56	Colony counter	
57	Haemocyto-meter	
58	Steam bath	
59	Cabinet drier	food
60	Fruits pulper	For mango, etc
61	Twin screw extruder	
62	Dough mixing machine	for wheat flour
63	Bakery oven	Lab scale
64	Freeze dryer	
65	Spray drier	
66	Bag sealing machine	
67	Vacuum packaging machine	
68	Modified atmosphere packaging equipment	N gas
69	Refrigerator	
70	Freezer	
71	Deep freezer	Temp. 0 to -10Co
72	GIS software (Arc view)	
73	Laptop computer	
74	Tractor	with land preparation attachment
75	Sprayer	
76	Net house	
77	Flame photometer	
78	Net house	

Appendix-10(4) List of Candidate Equipment

Department of Agri. Biology

No.	Equipment	Spec.
1	Ganong's photometer	transpiration measurement
2	Dissection microscopes	x 100
3	Research binocular microscope	attachment
4	Stereo binocular micoscope	three dimention, x 100, with camera attachment
5	Stage microscopes	x 100
6	Computers +printers & accessories to attached with microscope	
7	Microscope pointer	
8	Dissection kit	
9	Insect collection appliances	insect aspirator, etc.
10	Soil sample auger	
11	Nematodes sieve	for nematodes
12	Atomizer	spraying
13	ULV Sprayer	pesticide
14	Refrigerator	
15	Deep freezer	Temp.0 to -10 Co
16	Ultra deep freezer	
17	Liquid nitrogen container	with tube holding container
18	Water distiller	
19	Electronic balance	
20	Oven	
21	Autoclave	
22	Microwave oven	
23	pH meter	
24	Thermo-hygrometer	
25	Grinder	
26	Mortar and pestle	
27	Sample mixer	
28	Homogenizer	
29	Vortex mixture	
30	Magnetic stirrer	
31	Water bath	
32	Hot plate	
33	Orbital shaker	
34	Rotary evaporator	
35	Centrifuge, refrigirated	refrigerated, 10000rpm
36	Micropipette dispensor	
37	Spectrometer	
38	Gas chromatography	liquid (GLC)
39	Gel-electrophoresis	horizontal
40	Trans illuminator	UV
41	PCR (Tnermo-cycler)	
42	DNA sequencer	
43	Computer software	Micro Gene & Blast

44	Laminar flow cabinet	double electrical socket, vacuum tab, gas tap with solenoid valve high level UV lamp, UV shield spare HEPA filter set, stand with casters
45	Inoculation needle	
46	Incubator	
47	Cooled incubator	Temp. -10 - 40 Co
48	Plant growth chamber	
49	Shelves with lighting	Incubation/culture room (Temp. 25 Co)
50	Net house	

Appendix-10(5) List of Candidate Equipment

Department of Agri. Engineering

No.	Equipment	Spec.
1	Drawing board A3 with T square	
2	Instrument box, set square 60o /30o	
3	Instrument box, set square 45 o	
4	Rainfall meters	
5	Current meter	
6	Staff for water elevation	
7	Sun shine recorder	
8	Anemometers	
9	Wet & dry bulb thermometer	
10	Engine cut models and spares	
11	4 wheel tractor	
12	2 wheel tractor	
15	Work shop tools and welding equipment	
16	Dip meter(sounding apparatus for water level measurement)	
17	Sieve set with shaker	
18	pump (open impeller, semi open impeller, close impeller) submersible pump	
19	Water sampler	
20	EC meter	
21	DO meter	
22	Spectrophotometer	
23	Dumpy level	
24	Theodolite	
25	Tri pod	
26	Plane table	
27	Alidade	
28	Compass	
29	Soil moisture measurement instrument (tensiometer, gypsum block, neutron probe)	
30	Auger	
31	Strainer pipe	
32	Pan evaporimeter	
33	Lysimeter	
36	Milling machines	
37	Penitrometer and Measuring tools	
38	Thermometers and humidifiers	
39	Evaporators and Heat exchangers	
40	Cyclone	
41	Calorimeter	
42	pH meter	
43	Gas chromatography	
44	Model for land fill	
46	Drip irrigation set	
47	Sprinkler irrigation set	
48	Primary tillage implement	
49	Second tillage implement	
50	Combine harvester	

51	Knapsack sprayer	
52	Power sprayer	
53	Duster	
54	Reaper	
55	Thresher	
56	Seeder	
57	Planter	
58	Trickling filter	
59	Sewage plant design	
60	Bio mass burner	
61	Sedimentation tank	
62	Aerator	
63	Separation unit	
64	Gasifier	
65	Bio filter	
66	Activator	
67	Sludge chamber	
68	Single and multi-effect evaporators	
69	bomb calorimeter	
70	Electronic balance	
71	Freezer	
72	Ruttner Water sample collector	
73	Refrigerator	
74	Turbidity meter	
75	Sun drying	
76	Drier or Oven	
77	Oven	
78	Analytical balance (four digits)	
79	Potable colori meter(DR 2700)	
80	Incubator (26 – 50oC) and manifold filter with vacuum pump (eight filtering unit)	
81	BOD Incubator (0 – 20oC)	
82	Thermo stable Water bath 30 – 120 o C	
83	Re-circulatory soaking setup – Water pump and sprinkler head	
84	Auto clave (15 psi)	
85	Pressure cooker	
86	Steamer	
87	A laboratory-scale rice huller	
88	Polisher	
89	Rice Grader	Labo-type, Indent Cylinder
90	Cyclone cylinder (seed cleaning)	Labo-type
91	Seed paddy divider	Labo-type
94	Electrical Rice cooker	
95	Volumetric flask	
96	Electronic taste analyzer	
97	Gluco-meter kit	
98	Kjeldhar apparatus (Digestion, distillation and titration)	
102	Venire caliber	
103	Micro meter	

104	Potable grain moisture meter	
105	Microwave oven	
106	Digital image analyzer	
107	Eureka bucket	
108	Fruit penetro meter (Digital)	
109	Colorimeter (Digital)	
110	Refractor meter (Digital)	
111	Digital instron cyclinder	
112	Fluidized bed drum dryer	
114	Centrifuge	
115	Magnetic stirrer	
116	Electrical conductivity meter	
117	Muffle furnace	
118	Grinders	
119	Scanning electron microscope	
120	FT-IR spectroscopy	
122	Chlorophyll meter	
123	Measuring cylinders	
124	Micro wave digester	
126	Membrane filter	

(Note)

1. Many equipment is overlapped with other departments, as the department of Agri-engineering covers many inter-discipline subjects in its practical experiments & research

2. Need to include many equipment for hydrology instead of overlapped equipment with other department

Appendix-10(6) List of Candidate Equipment

Department of Agri. Economics

No.	Equipment	Spec.
1	DSLR Camera:- 12 -15 mega pix	
2	Computer	Digital
3	Video camera HD digital	
4	Mini voice recorder	
5	Multimedia projector	
6	OHP	
7	Duplex photocopier	monochrome & color
8	Printer monochrome	rotary press system
9	Color printer	for photo printing
10	Scanner flatbed type	
11	Public addressing system (out-door)	speaker sets on field
12	Computers	i3 or i7
13	Analytical software	GAUSS, RATS, STATA

Appendix-11 Major undertakings to be taken by both side

	Portions by the Sri Lankan Side	
	Items	**Budget (Rough Estimation in Rs.)**
(1) Building Works a) Structure works, finishing works b) Parking lot c) Accessroad whitning the site (2) Farm Works a) Land leveling works b) Irrigation and drainage system c) Farm road d) Related structure works (3) Electrical Works a) Low voltage power supply system within the Project site including installation of distribution panels, cables, conduit pipes and outlets b) Emergency power supply system providing a diesel engine generator c) Lighting system within the Project site including installation of lighting fixures, cables, conduit pipes and switches d) Local Area Network System within the Project site including installation of swiches, cables and LAN outlets e) Telecommunications system applying VoIP within the Project site f) Lightning Protection System g) Manual Fire Alarm System (4) Mechnical Works a) Installation of a new Deep well b) Water Supply system within the Project site including installation of Elevated tank, reserve	(1) Site Preparation a) Pre-construction works - Detection of landmines and UXO, and their clearance. b) Ground-preparation works: - Demolition of unnecessary existing buildings, utilities. - Removal of unnecessary existing trees. - Leveling and reclaiming the site for the building c) Preparation of temporary stock yard for construction period d) Temporary access road for the construction. Separate gate from students/staff access. (2) External Works and Approach Roads - Landscaping, planting, etc., within the Site - Fencing around the site - Permanent road works around the site (3) Utilities and Facilities a) Electrical Works Cabling works from the existing low voltage distoribution panel to the distribution panel at the Research & Training Complex and Farm Managemet building provided by the Project b) Network and Telecommunication Works Installation work of Fiber optic cable from the existing main switch located in the Computer Unit to the switch provided by the Project c) Storm drainage from outside	(1) Site Preparation a) (include temporary access road) b) — c) d) (2) External Works and Approach Roads — — (3) Utilities and Facilities a) Rs.14,000,000 b) Rs.150,000

A-6-33

	Portions by the Sri Lankan Side	
	Items	**Budget (Rough Estimation in Rs.)**
tank, pumps, piping and fixtures c) Sewerage system including piping works within the Project site d) Waste water treatment facility (Septic tanks and soaked pits) e) Storm drainage piping to the existing open ditch inside the Project site f) Fire extinguishing facility (Fire extinguishers) g) Air conditioning system and Mechanical Ventilation system (5) External Work for the Building Road, path and parking lots within the site (6) Equipment Equipment for Research	(4) Others (before implementing project) a) Commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement (B/A) namely the advising commission of the Authorization to Pay (A/P) and payment commission b) Smooth customs clearance, tax exemptions, and prompt internal transportation for the imported construction materials and equipment c) Governmental works including the application and obtaining of governmental approvals and permissions	a) *Will be estimated based on the total project cost.* b) c) Rs. 169,630 for Planning Clearance (UDA) Rs. 1,500 for Building Construction Application (Kilinochchi Pradesasava)
	(5) Tax exemptions and necessary preferential treatment for the construction staff from Japan or a third country	(5)
	(6) Smooth entry, re-entry, and departure of DRC for the Japanese technical members	(6)
	(7) All the expenses, other than those to be born by Japan's Grant Aid within the scope of the Project	(7)
	After the Constrtuction	
	(8) Management, operation and maintenance cost for the new building and facilities	(8)

A-6-34

Appendix-12

O/C.

මගේ අංකය
எமது இல.
My Number

ඔබේ අංකය
உமது இல.
Your Number

තැ.පෙ.අංකය-57
තිරුනෙල්වේලි,
යාපනය

த.பெ. எண் - 57,
திருநெல்வேலி,
யாழ்ப்பாணம்.

දුරකථනය
தொலைபேசி 021 206 0175
Telephone :
Fax : 021 206 0175

යාපනය විශ්වවිද්‍යාලය - ශ්‍රී ලංකාව
யாழ்ப்பாணப் பல்கலைக்கழகம் - இலங்கை
UNIVERSITY OF JAFFNA - SRI LANKA
OFFICE OF THE DEAN
FACULTY OF AGRICULTURE
ARIVIYAL NAGAR, KILINOCHCHI

P.O. Box - 57,
Thirunelvely,
Jaffna.

25.05.2015

The District Secretary,
Kilinochchi,

Dear Sir,

Request for Land Mine Clearance Certificate

We.the Faculty of Agriculture applied for a JICA Grant for the development of our faculty. The JICA office asked to submit Land Mine Clearance Certificate as prerequisite for entire area belong to Faculty of Agriculture at Ariviyal Nagar to be consider the project proposal. Then we requested the then District Secretary/Kilinochchi and she issued the nontechnical survey report for the area which had been already submitted to JICA Sri Lanka office.

Unfortunately the same kind of certificate was issued by your office for a water project carried by JICA in KIlinochchi district, came across some UXO's while implementing the project. Therefore now they insist us to provide technical survey report for the entire area. We did land leveling and clearing using heavy machineries in the proposed areas with the help of Security Forces Head Quarters Kilinochchi. Anyway the military personalsare not authorized to issue the certificate.

Now the preliminary work for the project is completed and the minutes were finalized and singed and a copy is attached for your reference. In that minutes the provision of technical survey for land mine clearance is mentioned as a prerequisite and have to be submitted in very short period. Further, they requested to provide the Action Flow Chart if any case UXO found while executing the project.

I would be very much thankful to you if kindly make necessary arrangement to do technical survey for land mine clearing and issue the certificate by authorized persons at your earliest. Please indicate the time needed for the technical survey. The entire area will be around 125 ac.

In addition please provide the flow chart diagram mentioning the details of to whom have to inform, who will be responsible for removal of UXO, etc. if any UXO present during implementation period.

Thanking you.

Yours faithfully,

Dr.Mrs.S.Sivachandiran
(Dean/Agriculture)

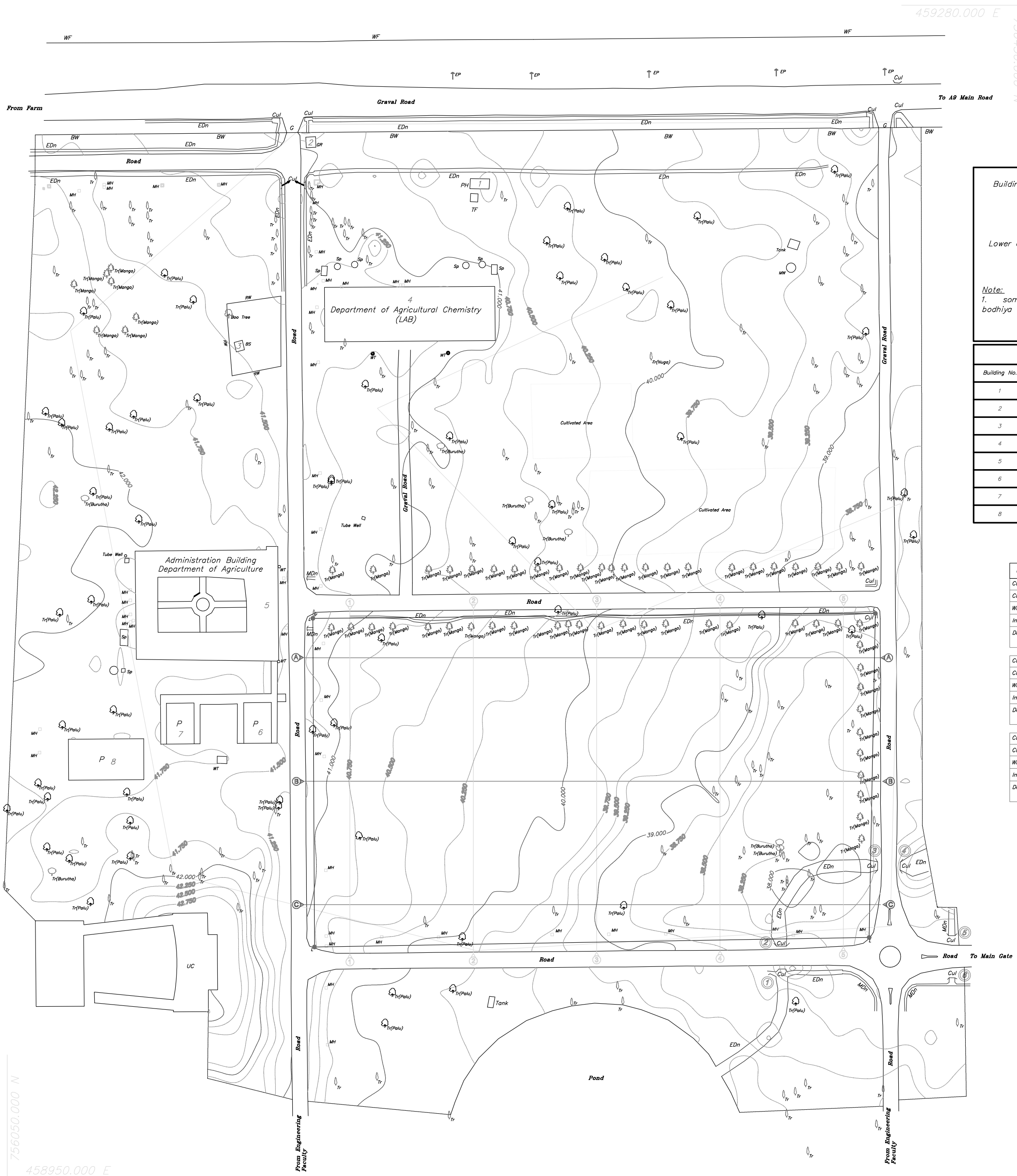
Copy: JICA. Sri Lanka Office
Vice Chancellor/University of Jaffna

ジャフナ大学農学部研究施設等建設計画準備調査
収集資料リスト

番号	資料の名称	発行機関	形態※	種類					取扱い区分	図書館記入欄
				収集資料	専門家作成資料	JICA作成資料	テキスト	その他		
1	Electricity Tariff	Ceylon Electricity Board	紙媒体	1					JR・CR()・SC	
2	Electricity Bill Copy Data of University	Ceylon Electricity Board/ University of Jaffna	紙媒体	1					JR・CR()・SC	
3	Quotation for Power Supply to the R & T Farm	Ceylon Electricity Board/ University of Jaffna	紙媒体	1					JR・CR()・SC	
4	Construction Statistic Volume 25 No. 04 April 2015	Construction Industry Development Authority	紙媒体	1					JR・CR()・SC	
5	Crop Production Trend 1986 to 2014	Department of Agriculture Northern Province	紙媒体	1					JR・CR()・SC	
6	The Gazette of the Democratic Socialist Republic of Sri Lanka Extraordinary 2006.01.17	Department of Government Printing	紙媒体	1					JR・CR()・SC	
7	The Gazette of the Democratic Socialist Republic of Sri Lanka Extraordinary 1986.03.10	Department of Government Printing	紙媒体	1					JR・CR()・SC	
8	Assistant Program Table for Livelihood Sector	FAO	紙媒体	1					JR・CR()・SC	
9	Supported Projects and Road Map of Sri Lanka	JICA Sri Lanka Office	紙媒体	1					JR・CR()・SC	
10	Key Plan of The Project for Rehabilitation of Kilinochchi Water Supply Scheme	National Water Supply And Drainage Board	紙媒体	1					JR・CR()・SC	
11	Broadband Package Plan	Sri Lanka Telecom	紙媒体	1					JR・CR()・SC	
12	Broadband communicationTariff	Sri Lanka Telecom/	紙媒体	1					JR・CR()・SC	
13	Invoice Copy Data of University	Sri Lanka Telecom/ University of Jaffna	紙媒体	1					JR・CR()・SC	
14	Architects' Data BSP Professional Book 1994	UGC	紙媒体	1					JR・CR()・SC	
15	Agriculture Handbook 2015	University of Jaffna	電子データ	1					JR・CR()・SC	
16	Drawing CAD Data of Training Farm	University of Jaffna	電子データ	1					JR・CR()・SC	
17	Faculty of Agriculture Drawing	University of Jaffna	電子データ	1					JR・CR()・SC	
18	Faculty of Engineering Drawing	University of Jaffna	電子データ	1					JR・CR()・SC	
19	Final Accountants 2014	University of Jaffna	紙媒体	1					JR・CR()・SC	

ジャフナ大学農学部研究施設等建設計画準備調査
収集資料リスト

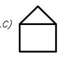
番号	資料の名称	発行機関	形態※	種類					取扱い区分	図書館記入欄
				収集資料	専門家作成資料	JICA作成資料	テキスト	その他		
20	General layout plan of Sports Complex	University of Jaffna	紙媒体	1					JR・CR()・SC	
21	Indian Buildings	University of Jaffna	電子データ	1					JR・CR()・SC	
22	M.Sc in Enviromental Management 2011/12 (Batch 1) Dissertation Title	University of Jaffna	紙媒体	1					JR・CR()・SC	
23	Master Plan	University of Jaffna	電子データ	1					JR・CR()・SC	
24	Materials for Animal Science Labs	University of Jaffna	電子データ	1					JR・CR()・SC	
25	Materials for Goad Rearing Unit	University of Jaffna	紙媒体	1					JR・CR()・SC	
26	Memorandum of Understanding Between India and Sri Lanka for Providing Facilities to tha UoJ	University of Jaffna	紙媒体	1					JR・CR()・SC	
27	Proposal for Development of IT Infrastructure in Ariviyal Nagar Premises, University of Jaffna	University of Jaffna	紙媒体	1					JR・CR()・SC	
28	Registration of Suppliers 2015	University of Jaffna	紙媒体	1					JR・CR()・SC	
29	Application form for Preliminary Planning Clearance	Urban Development Authority, Jaffna	紙媒体	一式					JR・CR()・SC	
30	As Built Drawings for Panel Board and Power Cable Laying	Veraade Consultants/ Univercity of Jaffna	紙媒体	1					JR・CR()・SC	
31	Meteorogical Data on VAVUNIYA (Daily Max/Min Temperature, Relative Humidity, Daily Rainfall)	Ministry Disaster Management, Department of Meteorology	電子データ	1					JR・CR()・SC	
32	Meteorogical Data on JAFFNA (Daily maxi/min temperature, Daily relative humidity, Daily wind speeds, Daily sunshine hours, Daily rainfall data, Rainfall intensity)	Ministry Disaster Management, Department of Meteorology	電子データ	1					JR・CR()・SC	



Building heights are taken as follows

upper corner (UC)

Lower corner(LC)



Lower corner(LC)

Note:
1. some buildings (guard room,power house, bodhiya and etc.)have only 2 height values

Building Heights			
Building No.	Lower Corner	Upper Corner	Lower Corner
1	44.988	–	44.228
2	43.788	45.088	–
3	42.644	44.879	–
4	48.944	50.711	48.937
5	50.338	–	48.789
6	–	47.682	45.574
7	45.710	47.709	45.648
8	44.671	46.904	–

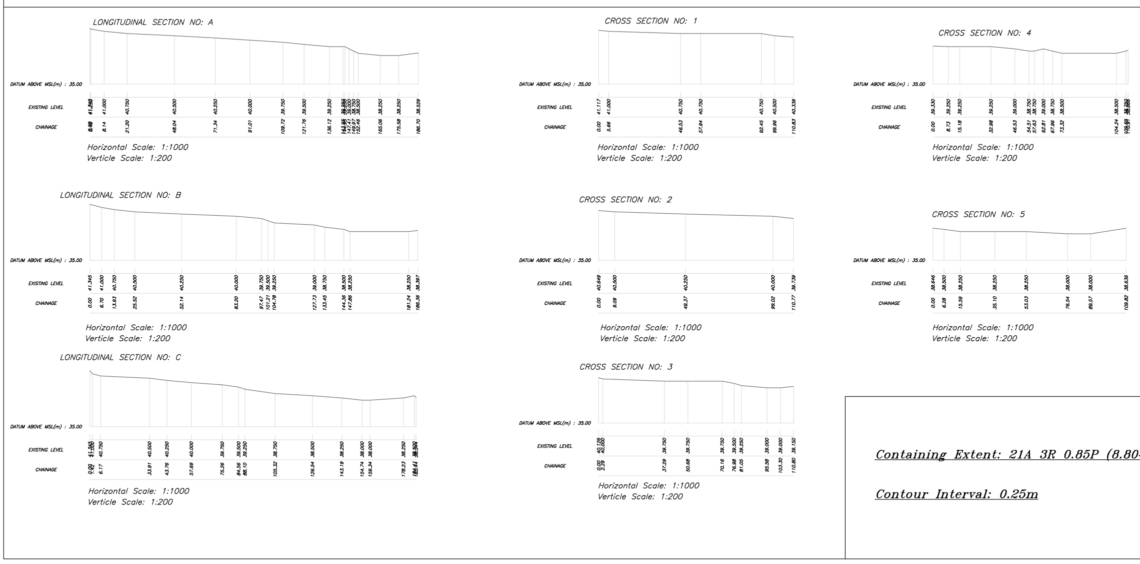
Culvert Deatails

Culvert No:	1		Culvert No:	2
Culvert Type:	Box		Culvert Type:	Box
Width:	2.26		Width:	3.13
Invert Level:	37.448		Invert Level:	37.592
Deck Level:	38.105		Deck Level:	38.073
Culvert No:	3		Culvert No:	4
Culvert Type:	Box		Culvert Type:	Box
Width:	2.62		Width:	2.53
Invert Level:	37.167		Invert Level:	37.170
Deck Level:	37.831		Deck Level:	37.865
Culvert No:	5		Culvert No:	6
Culvert Type:	Box		Culvert Type:	Box
Width:	1.81		Width:	2.12
Invert Level:	37.582		Invert Level:	37.399
Deck Level:	38.332		Deck Level:	38.355

PLAN NO. ....

Reference

BH	Bore Hole
BS	Budda Statue
BW	Boundary Wall
Cul	Culvert
EDn	Earth Drain
G	Gate
GR	Guard Room
L	Land Mark
MDn	Masonry Drain
MH	Man Hole
P	Permanent Building
PH	Power House
Sp	Sockage Pit
TF	Transformer
Tr	Tree
UC	Under Construction
WT	Water Tap



Containing Extent: 21A 3R 0.85P (8.8042Ha)

Contour Interval: 0.25m

Note

1. All the values in this Survey are in meters.
2. Oringin of the Grid System is 500,000 meters south and west of Piduruthalagala
3. All the Height values are reference to Mean Sea Level
4. Longitudanal Sections and Cross Sections are in 40m interval

DATE	9th MAY 2015

CLIENT

ORIENTAL CONSULTANT GLOBAL CO., LTD
EARL CONSULTANTS, Inc.
12-1, HONIMACHI 3-CHOME, SHIBUYA-KU, TOKYO, 151-0071, JAPAN

SURVEYED AND DRAWN BY

JAYASUNDARA ASSOCIATES

PROJECT

PREPARATORY SURVEY ON THE PROJECT FOR ESTABLISHMENT OF RESEARCH & TRAINING COMPLEX AT FACULTY OF AGRICULTURE UNIVERSITY OF JAFFNA

DRAWING TITLE

TOPOGRAPHIC SURVEY PLAN FOR PROPOSED RESEARCH & TRAINING COMPLEX AT FACULTY OF AGRICULTURE UNIVERSITY OF JAFFNA

SCALE	1 : 500	CHECKED	J.P.N. JAYASUNDARA
DRAWN	A.H.K.K. PATHMADEWA		

CERTIFIED BY

J.P.N. JAYASUNDARA
REGISTERED LICENSED SURVEYOR & LEVELLER

SHEET NO 01 of 04

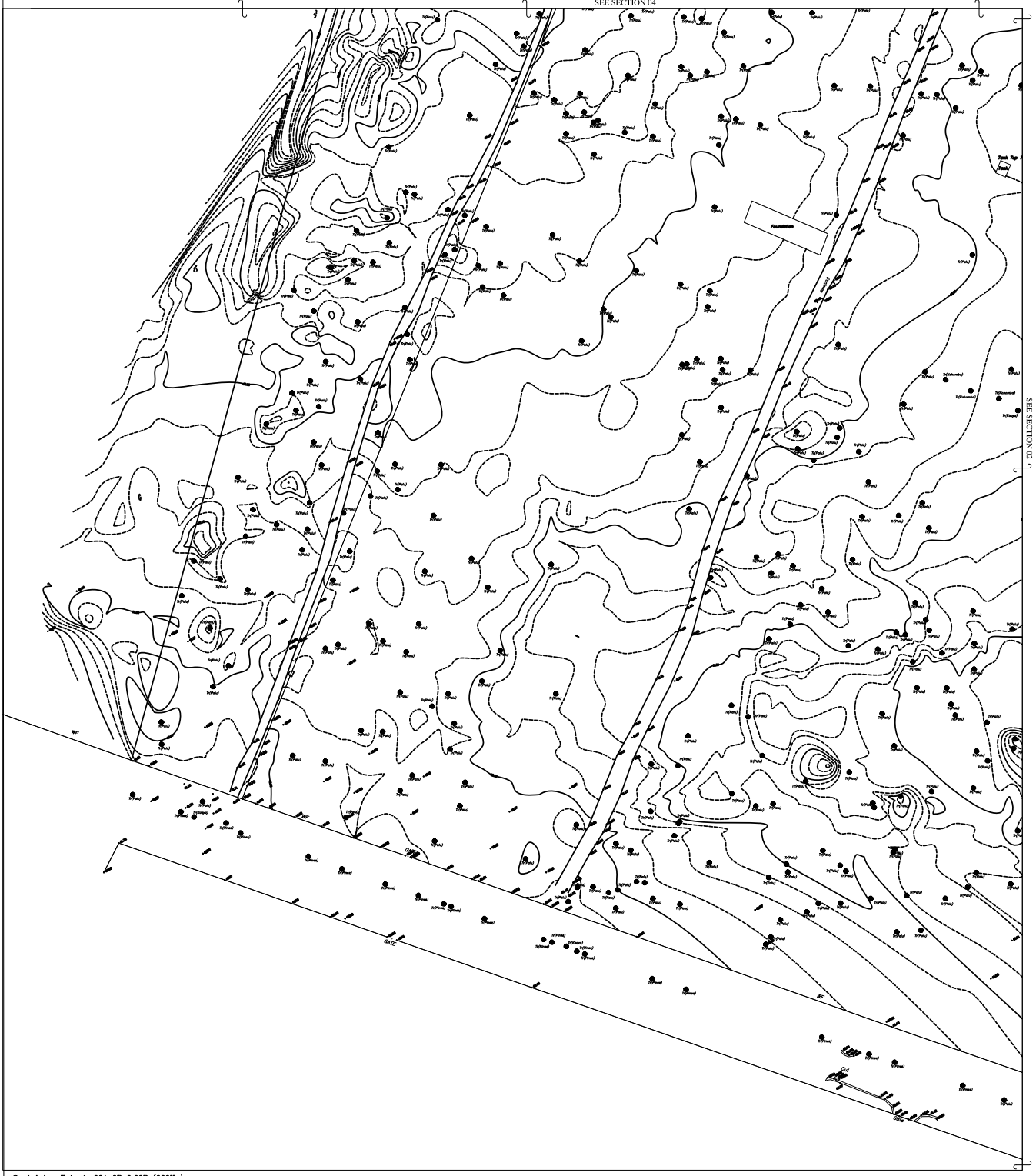
PLAN NO. .....

N

Reference

BW	Boundary Wall
Cul	Culvert
MH	Man Hole
P	Permanent Building
Tr	Tree
WT	Water Tap
WF	Wire Fence

SEE SECTION 04

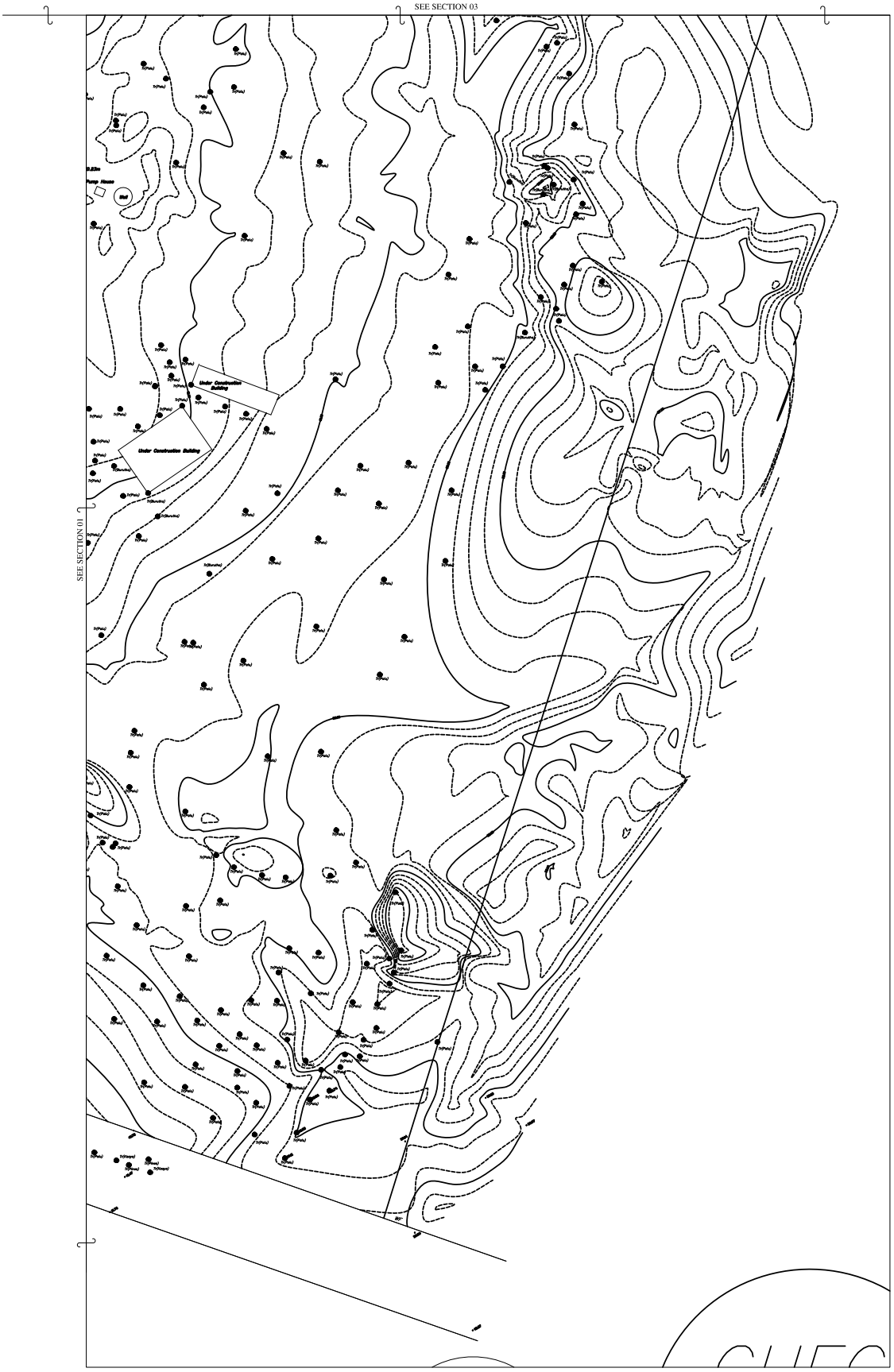


Containing Extent: 00A 0R 0.00P (000Ha)
Contour Interval: 0.25m

PROJECT	DRAWING TITLE	CLIENT	Note	SURVEYED AND DRAWN BY	
PREPARATORY SURVEY ON THE PROJECT FOR ESTABLISHMENT OF RESEARCH & TRAINING COMPLEX AT FACULTY OF AGRICULTURE UNIVERSITY OF JAFFNA	TOPOGRAPHIC SURVEY PLAN FOR PROPOSED RESEARCH & TRAINING COMPLEX AT FACULTY OF AGRICULTURE UNIVERSITY OF JAFFNA	ORIENTAL CONSULTANT GLOBAL CO., LTD EARL CONSULTANTS, Inc. 12-1, HONIMACHI 3-CHOME, SHIBUYA-KU, TOKYO, 151-0071, JAPAN	1. All the values in this Survey are in meters. 2. Origin of the Grid System is 500,000 meters south and west of Pihirathalagala 3. All the Height values are reference to Mean Sea Level 4. Longitudanal Sections and Cross Sections are in 40m interval	JAYASUNDARA ASSOCIATES No. 3/16, PAYALAVEDIYAWATTA YAKKALA, SRI LANKA Tel:+94 33 222 4971, +94 71 684 6137	SCALE 1: 800 DRAWN K.D.N SURVEYED DATE —— CHECKED J.P.N. JAYASUNDARA CERTIFIED BY J.P.N. JAYASUNDARA REGISTERED LICENSED SURVEYOR & LEVELLER 15TH 000 2015

SHEET NO 02 of 03

PLAN NO. .....

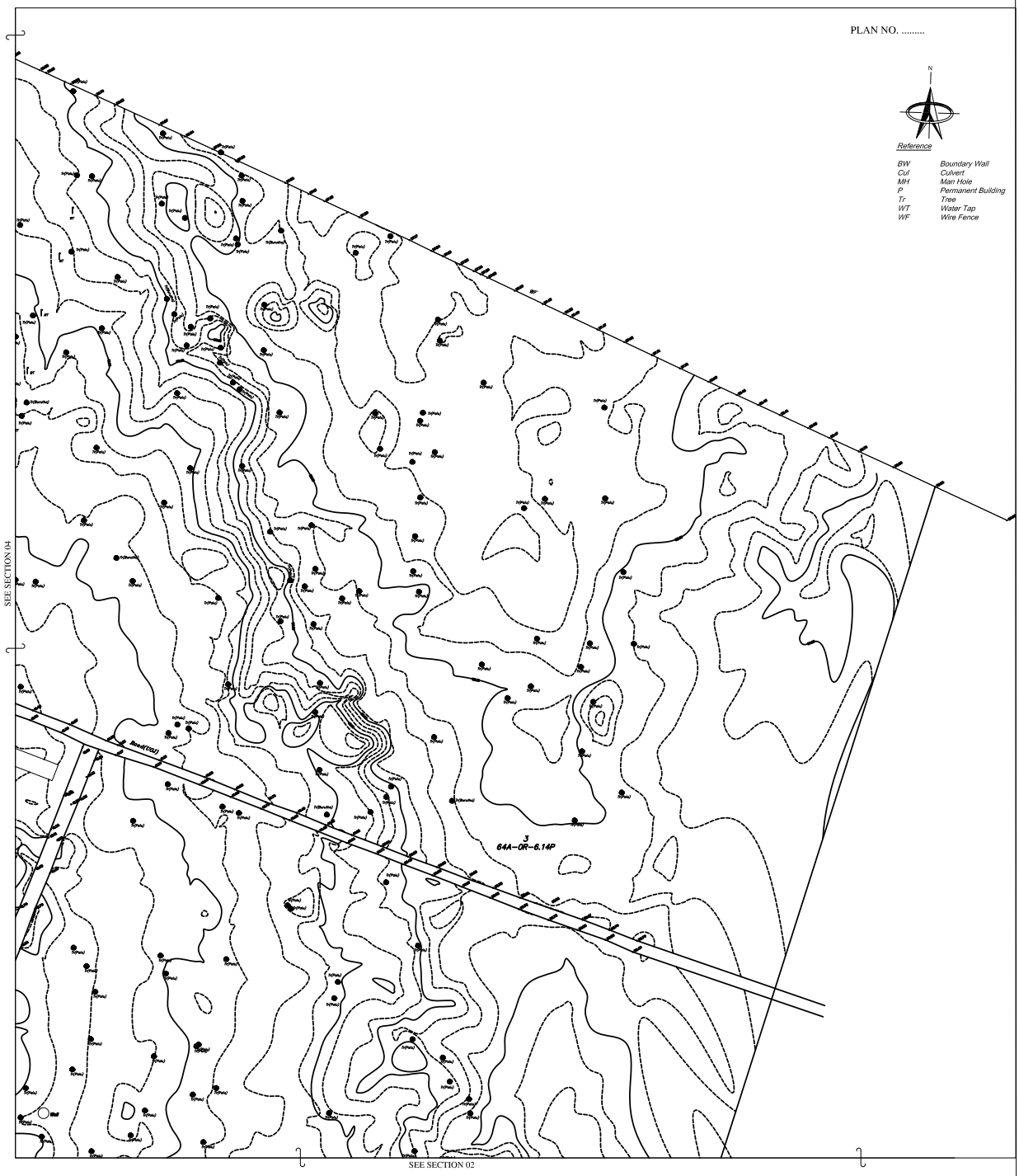


Containing Extent: 00A 0R 0.00P (000Ha)
Contour Interval: 0.25m

PROJECT	DRAWING TITLE	CLIENT	Note	SURVEYED AND DRAWN BY	
PREPARATORY SURVEY ON THE PROJECT FOR ESTABLISHMENT OF RESEARCH & TRAINING COMPLEX AT FACULTY OF AGRICULTURE UNIVERSITY OF JAFFNA	TOPOGRAPHIC SURVEY PLAN FOR PROPOSED RESEARCH & TRAINING COMPLEX AT FACULTY OF AGRICULTURE UNIVERSITY OF JAFFNA	ORIENTAL CONSULTANT GLOBAL CO., LTD EARL CONSULTANTS, Inc. 12-1, HONIMACHI 3-CHOME, SHIBUYA-KU, TOKYO, 151-0071, JAPAN	1. All the values in this Survey are in meters. 2. Origin of the Grid System is 500,000 meters south and west of Pihirathalagala 3. All the Height values are reference to Mean Sea Level 4. Longitudanal Sections and Cross Sections are in 40m interval	JAYASUNDARA ASSOCIATES No. 3/16, PAYALAVEDIYAWATTA YAKKALA, SRI LANKA Tel:+94 33 222 4971, +94 71 684 6137	SCALE 1: 500 DRAWN K.D.N SURVEYED DATE —— CHECKED J.P.N. JAYASUNDARA CERTIFIED BY J.P.N. JAYASUNDARA REGISTERED LICENSED SURVEYOR & LEVELLER 15TH 000 2015

SHEET NO 03 of 04

PLAN NO. .....

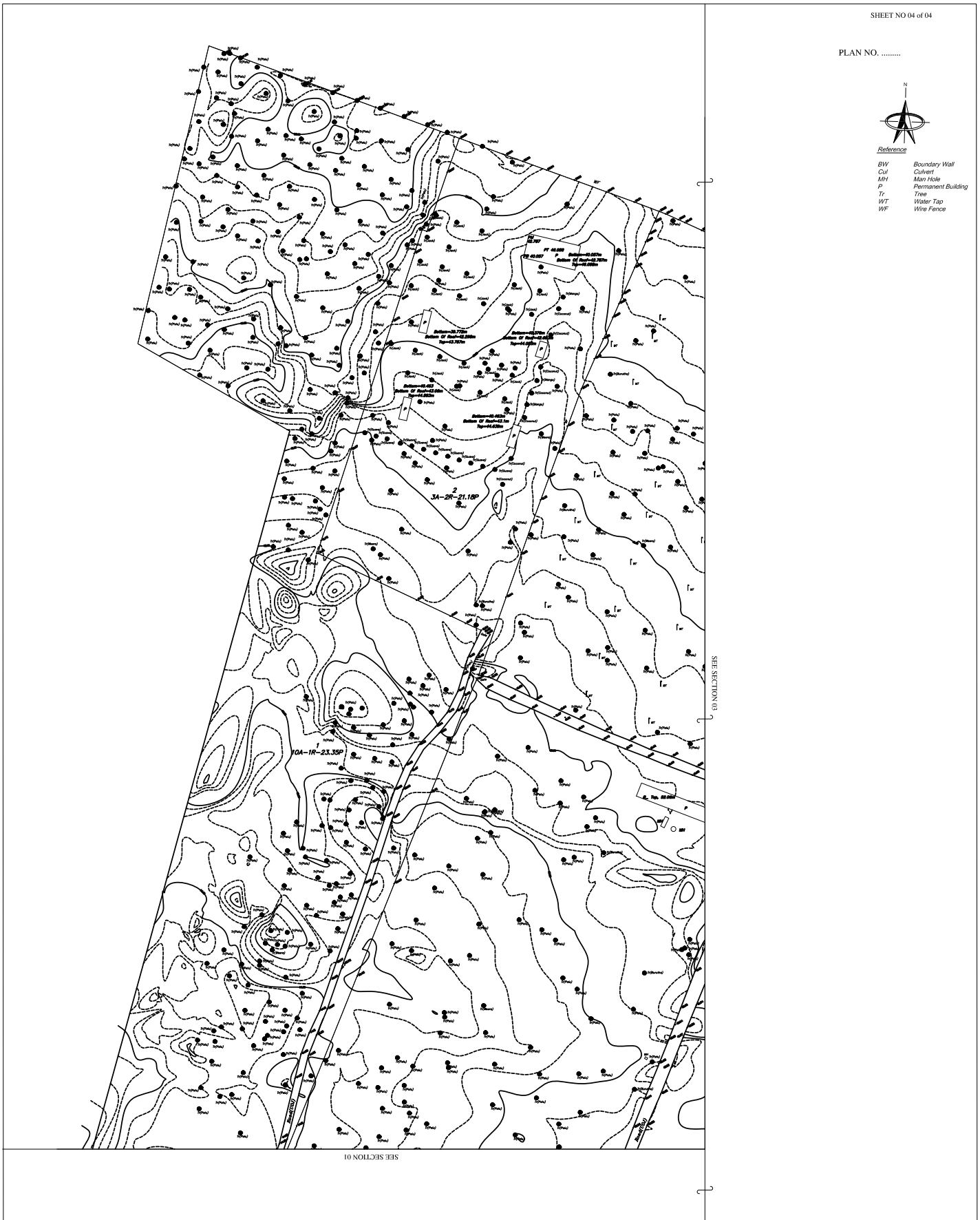


Containing Extent: 00A 0R 0.00P (000Ha)
Contour Interval: 0.25m

PROJECT	DRAWING TITLE	CLIENT	Note	SURVEYED AND DRAWN BY	
PREPARATORY SURVEY ON THE PROJECT FOR ESTABLISHMENT OF RESEARCH & TRAINING COMPLEX AT FACULTY OF AGRICULTURE UNIVERSITY OF JAFFNA	TOPOGRAPHIC SURVEY PLAN FOR PROPOSED RESEARCH & TRAINING COMPLEX AT FACULTY OF AGRICULTURE UNIVERSITY OF JAFFNA	ORIENTAL CONSULTANT GLOBAL CO., LTD EARL CONSULTANTS, Inc. 12-1, HONIMACHI 3-CHOME, SHIBUYA-KU, TOKYO, 151-0071, JAPAN	1. All the values in this Survey are in meters. 2. Origin of the Grid System is 500,000 meters south and west of Pithurahalagala 3. All the Height values are reference to Mean Sea Level 4. Longitudanal Sections and Cross Sections are in 40m interval	JAYASUNDARA ASSOCIATES No. 3/16, PAYALAVEDIYAWATTA YAKKALA, SRI LANKA Tel:+94 33 222 4971, +94 71 684 6137	SCALE 1: 500 DRAWN K.D.N SURVEYED DATE —— CHECKED J.P.N. JAYASUNDARA CERTIFIED BY J.P.N. JAYASUNDARA REGISTERED LICENSED SURVEYOR & LEVELLER 15TH 000 2015

SHEET NO 04 of 04

PLAN NO. .....



Containing Extent: 00A 0R 0.00P (000Ha)
Contour Interval: 0.25m

PROJECT	DRAWING TITLE	CLIENT	Note	SURVEYED AND DRAWN BY
PREPARATORY SURVEY ON THE PROJECT FOR ESTABLISHMENT OF RESEARCH & TRAINING COMPLEX AT FACULTY OF AGRICULTURE UNIVERSITY OF JAFFNA	TOPOGRAPHIC SURVEY PLAN FOR PROPOSED RESEARCH & TRAINING COMPLEX AT FACULTY OF AGRICULTURE UNIVERSITY OF JAFFNA	ORIENTAL CONSULTANT GLOBAL CO., LTD EARL CONSULTANTS, Inc. 12-1, HONIMACHI 3-CHOME, SHIBUYA-KU, TOKYO, 151-0071, JAPAN	1. All the values in this Survey are in meters. 2. Origin of the Grid System is 500,000 meters south and west of Pihiruthalagala 3. All the Height values are reference to Mean Sea Level 4. Longitudinal Sections and Cross Sections are in 40m interval	JAYASUNDARA ASSOCIATES No. 3/16, PAYALAYEDIYAWATTA YAKKALA, SRI LANKA Tel:+94 33 222 4971, +94 71 684 6137

SCALE	1: 800	CHECKED	J.P.N. JAYASUNDARA
DRAWN	K.D.N		
SURVEYED DATE	———		

CERTIFIED BY

J.P.N. JAYASUNDARA
REGISTERED LICENSED SURVEYOR & LEVELLER
15TH 000 2015

ENGINEERING & LABORATORY SERVICES (PVT) LTD.
SITE INVESTIGATIONS DIVISION

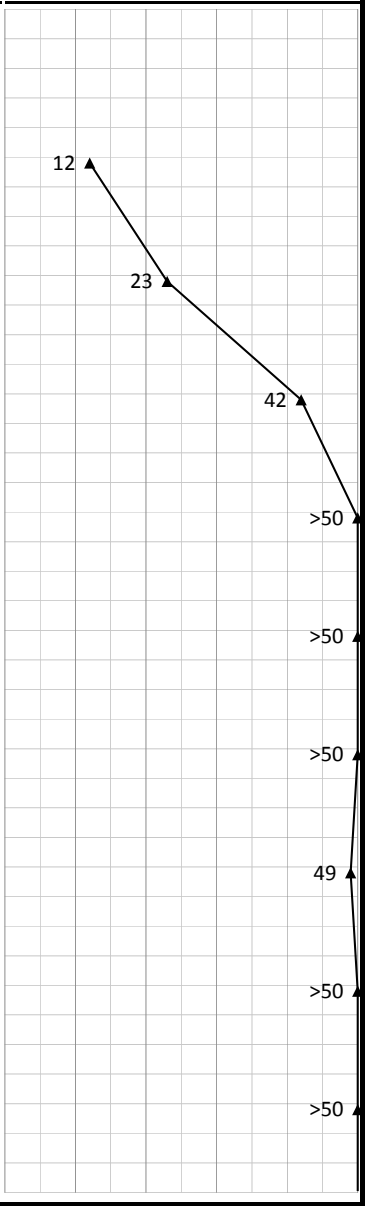
NO 62/3, Neelammahara Road,
Katuwawala, Sri Lanka.
Tel: 0114 309 494

Format No: ELS-SI-02

Project	**Soil Investigation for proposed Research and Training Complex at Faculty of Agriculture,University of Jaffna, Sri Lanka**			Borehole No	BH-01
Client	**M/s. Oriental Consultants Global Co. Ltd**			Sheet	1 of 3
Location	Kilinochchi	Rig: Chinese	Core Diameter: 54.00mm	Ground Water level	2.70m
Date of Started	29.05.2015	Drilling Method: Rotary	Casing depth: 30.00m	Coordinates	_
Date of Finished	01.06.2015	Casing Diameter: 76.00mm	Elevation (m): _		_

Depth (m)	Sa. Cond	Sa.NO.	Sa.Type	Reduced level	Depth (m)	Legend	Soil Description	Field Records (SPT) 15cm	15cm	15cm	N
0.00							Ground level				
		D1	DS		0.00		Reddish brown fine to medium sub angular to sub rounded sandy LATERITIC CLAY **(TOP SOIL)**				
1.00		D2	SS		1.00		Stiff reddish brown fine to medium sub angular to sub rounded sandy LATERITIC CLAY	6	5	7	**12**
2.00			WS								
		D3	SS		2.00		Medium dense pale yellow silty fine to medium sub angular to sub rounded SAND with fragments of mica **(COMPLETELY WEATHERED ROCK)**	7	10	13	**23**
3.00			WS	G.W.L. at 2.70m							
		D4	SS		3.00		Dense pale yellow silty fine to medium sub angular to sub rounded SAND with fragments of mica **(COMPLETELY WEATHERED ROCK)**	7	12	30	**42**
4.00			WS								
					4.00			4	10	HB/ 27cm	**>50**
		D5	SS								
5.00							Very dense pale yellow silty fine to medium sub angular to sub rounded SAND with fragments of mica	25	HB/ 27cm	HB/ 10cm	**>50**
			WS								
6.00											
		D6	SS					17	HB/ 26cm	HB/ 10cm	**>50**
7.00			WS				**(COMPLETELY WEATHERED ROCK)**				
					7.00		Dense pale yellow silty fine to medium sub angular to sub rounded SAND with fragments of mica **(COMPLETELY WEATHERED ROCK)**	20	20	29	**49**
		D7	SS								
8.00					8.00			HB/ 13cm			**>50**
			WS				Very dense pale yellow silty fine to medium sub angular to sub rounded SAND with fragments of mica				
9.00		D8	SS					HB/ 12cm			**>50**
			WS								
10.00							**(COMPLETELY WEATHERED ROCK)**				

Moisture Content - %
Undrained Shear Strength - t/m^2 (10 20 30 40 50 60 70 80 90)
SPT Resistance - Blows/ft (5 10 15 20 25 30 35 40 45)



Sample Key / Test Key

SPT Where full 0.3m penetration has not been achieved the number of blows for the quoted penetration is given (not N-value)	D - Disturbed Sample	N - Natural Moisture Content	C - Consolidation
GWL : Ground Water Level observed inside the Borehole, after the saturation	SS -SPT Sample	L - Atterberg Limit Test	UCT-Unconfined Compression
NE Not Encountered	W - Water Sample	G - Grain Size Analysis	CU - Consolidated Undrained
HB -Hammer Bounce	WS-Wgrey Sample	SG -Specific Gravity Test	UU-Unconsolidated Undrained
FD - Free Down	UD- Undisturbed Sample	B - Bulk Density	pH - Chemical
	CS- Core Sample	V - Vane Shear Test	O - Organic content
	Cr - Core Recovery (%)		SO_4^{2-} - Sulphate Content
	RQD-Rock Quality Designation (%)		Cl^- - Cloride Content

Remarks: Existing ground level considered as the zero level

Logged By: J.R.M.Sashikala
Supervised By: Lahiru
Drilled By: Saman

Made Ground | Silt | Gravel | Laterite Nodules | Completely Weathered Rock
Clay | Sand | Organic Matter | Silty Sand | Highly Weathered Rock | Fresh Rock

	ENGINEERING & LABORATORY SERVICES (PVT) LTD. SITE INVESTIGATIONS DIVISION	NO 62/3, Neelammahara Road, Katuwawala, Sri Lanka. Tel: 0114 309 494	Format No: ELS-SI-02

Project	**Soil Investigation for proposed Research and Training Complex at Faculty of Agriculture,University of Jaffna, Sri Lanka**					Borehole No	BH-01
Client	**M/s. Oriental Consultants Global Co. Ltd**					Sheet	2 of 3
Location	Kilinochchi	Rig	Chinese	Core Diameter	54.00mm	Ground Water level	2.70m
Date of Started	29.05.2015	Drilling Method	Rotary	Casing depth	30.00m	Coordinates	_
Date of Finished	01.06.2015	Casing Diameter	76.00mm	Elevation (m)	_		_

Depth (m)	Sa. Cond	Sa.NO.	Sa. Type	Reduced level	Depth (m)	Legend	Soil Description	Field Records (SPT) 15cm	15cm	15cm	N
10.00							Continue from Page 1				
		D9	SS				Same as previous	HB/ 12cm			>50
			WS								
11.00											
		D10	SS		11.00		Very dense dark brown sub angular to sub rounded SAND with fragments of mica	HB/ 10cm			>50
			WS								
12.00							**(COMPLETELY WEATHERED ROCK)**				
		D11	SS		12.00		Very dense dark brown sub angular to sub rounded SAND with fragments of mica	HB/ 10cm			>50
			WS								
13.00							**(COMPLETELY WEATHERED ROCK)**				
		D12	SS		13.00		Very dense dark brown sub angular to sub rounded SAND with fragments of mica	HB/ 12cm			>50
			WS								
14.00		D13	SS					HB			>50
			WS								
15.00							**(COMPLETELY WEATHERED ROCK)**				
		D14	SS		15.00		Very dense whitish yellow slightly clayey fine to medium sub angular to sub rounded SAND with fragments of mica	HB/ 12cm			>50
			WS								
16.00		D15	SS					11	HB/ 13cm		>50
			WS								
17.00							**(COMPLETELY WEATHERED ROCK)**				
		D16	SS		17.00		Very dense greenish gray fine to medium sub angular to sub rounded SAND with fragments of mica	HB/ 12cm			>50
			WS								
18.00		D17	SS					HB/ 13cm			>50
			WS								
19.00		D18	SS					8	25	HB/ 33cm	>50
			WS								
20.00							**(COMPLETELY WEATHERED ROCK)**				

Moisture Content - %
Undrained Shear Strength - t/m^2 (10 20 30 40 50 60 70 80 90)
SPT Resistance - Blows/ft (5 10 15 20 25 30 35 40 45)

Sample Key / Test Key

SPT Where full 0.3m penetration has not been achieved the number of blows for the quoted penetration is given (not N-value)	D - Disturbed Sample	N - Natural Moisture Content	C - Consolidation
GWL : Ground Water Level observed inside the Borehole, after the saturation	SS -SPT Sample	L - Atterberg Limit Test	UCT-Unconfined Compression
NE Not Encountered	W - Water Sample	G - Grain Size Analysis	CU - Consolidated Undrained
HB -Hammer Bounce	WS-Wgrey Sample	SG -Specific Gravity Test	UU-Unconsolidated Undrained
FD - Free Down	UD- Undisturbed Sample	B - Bulk Density	pH - Chemical
	CS- Core Sample	V - Vane Shear Test	O - Organic content
	Cr - Core Recovery (%)		SO_4^{2-} - Sulphate Content
	RQD-Rock Quality Designation (%)		Cl - Cloride Content

Remarks: Existing ground level considered as the zero level

Logged By: J.R.M.Sashikala
Supervised By: Lahiru
Drilled By: Saman

Made Ground, Silt, Gravel, Laterite Nodules, Completely Weathered Rock
Clay, Sand, Organic Matter, Silty Sand, Highly Weathered Rock, Fresh Rock

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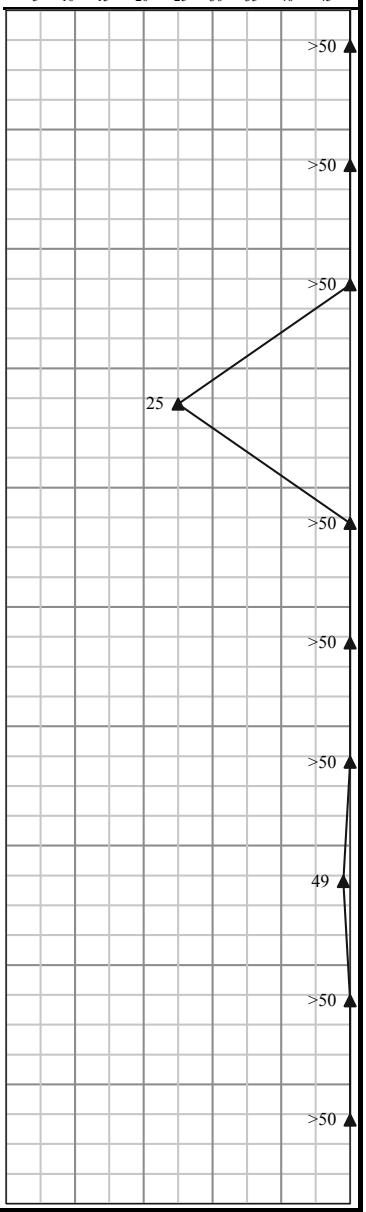
Project	**Soil Investigation for proposed Research and Training Complex at Faculty of Agriculture,University of Jaffna, Sri Lanka**					Borehole No	BH-01
Client	**M/s. Oriental Consultants Global Co. Ltd**					Sheet	3 of 3
Location	Kilinochchi	Rig	Chinese	Core Diameter	54.00mm	Ground Water level	2.70m
Date of Started	29.05.2015	Drilling Method	Rotary	Casing depth	30.00m	Coordinates	_
Date of Finished	01.06.2015	Casing Diameter	76.00mm	Elevation (m)	_		_

Depth (m)	Sa. Cond	Sa.NO.	Sa. Type	Reduced level	Depth (m)	Legend	Soil Description	Field Records (SPT) 15cm	15cm	15cm	N
20.00							Continue from Page 2				
		D19	SS					33	37	24	>50
			WS								
21.00		D20	SS				Same as previous	15	43	35	>50
			WS								
22.00		D21	SS					HB/13 cm			>50
			WS								
23.00		D22	SS		23.00		Medium dense greenish gray fine to medium sub angular to sub rounded SAND with fragments of mica	9	10	15	25
			WS				**(COMPLETELY WEATHERED ROCK)**				
24.00		D23	SS		24.00			45	HB/ 18cm		>50
			WS								
25.00		D24	SS				Very dense greenish gray fine to medium sub angular to sub rounded SAND with fragments of mica	HB/ 5cm			>50
			WS								
26.00		D25	SS					HB			>50
			WS				**(COMPLETELY WEATHERED ROCK)**				
27.00		D26	SS		27.00		Dense greenish gray fine to medium sub angular to sub rounded SAND with fragments of mica	20	20	29	49
			WS				**(COMPLETELY WEATHERED ROCK)**				
28.00		D27	SS		28.00		Very dense greenish gray fine to medium sub angular to sub rounded SAND with fragments of mica	HB			>50
			WS								
29.00		D28	SS				**(COMPLETELY WEATHERED ROCK)**	HB			>50
			WS								
30.00							END OF THE BOREHOLE AT 30.00m				

Moisture Content - %
Undrained Shear Strength - t/m^2 (10 20 30 40 50 60 70 80 90)
SPT Resistance - Blows/ft (5 10 15 20 25 30 35 40 45)



Sample Key / Test Key

SPT Where full 0.3m penetration has not been achieved the number of blows for the quoted penetration is given (not N-value)	D - Disturbed Sample	N - Natural Moisture Content	C - Consolidation
GWL : Ground Water Level observed inside the Borehole, after the saturation	SS -SPT Sample	L - Atterberg Limit Test	UCT-Unconfined Compression
NE Not Encountered	W - Water Sample	G - Grain Size Analysis	CU - Consolidated Undrained
HB -Hammer Bounce	WS-Wgrey Sample	SG -Specific Gravity Test	UU-Unconsolidated Undrained
FD - Free Down	UD- Undisturbed Sample	B - Bulk Density	pH - Chemical
	CS- Core Sample	V - Vane Shear Test	O - Organic content
	Cr - Core Recovery (%)		SO_4^{2-} - Sulphate Content
	RQD-Rock Quality Designation (%)		Cl - Cloride Content

Remarks: Existing ground level considered as the zero level

Logged By: J.R.M.Sashikala
Supervised By: Lahiru
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Made Ground, Silt, Gravel, Laterite Nodules, Completely Weathered Rock
Clay, Sand, Organic Matter, Silty Sand, Highly Weathered Rock, Fresh Rock

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SITE INVESTIGATIONS DIVISION

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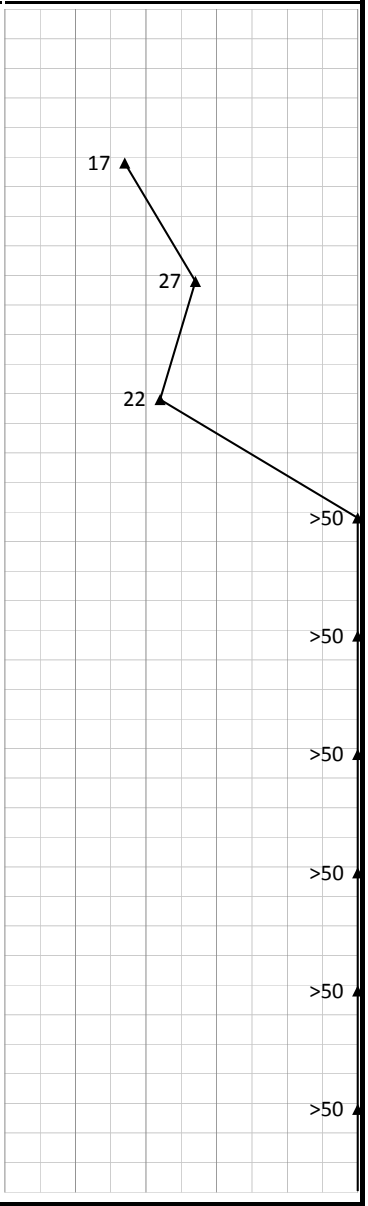
Tel: 0114 309 494

Format No: ELS-SI-02

Project	**Soil Investigation for proposed Research and Training Complex at Faculty of Agriculture,University of Jaffna, Sri Lanka**			Borehole No	BH-02
Client	**M/s. Oriental Consultants Global Co. Ltd**			Sheet	1 of 3
Location	Kilinochchi	Rig: Chinese	Core Diameter: 54.00mm	Ground Water level	2.70m
Date of Started	03.06.2015	Drilling Method: Rotary	Casing depth: 23.00m	Coordinates	_
Date of Finished	06.06.2015	Casing Diameter: 76.00mm	Elevation (m): _		_

Depth (m)	Sa. Cond	Sa.NO.	Sa.Type	Reduced level	Depth (m)	Legend	Soil Description	Field Records (SPT) 15cm	15cm	15cm	N
0.00							Ground level				
		D1	DS		0.00		Reddish brown fine to medium sub angular to sub rounded LATERITIC SAND **(TOP SOIL)**				
1.00		D2	SS		1.00			8	7	10	**17**
			WS								
2.00		D3	SS				Medium dense reddish brown LATERITIC clayey fine to medium sub angular to sub rounded SAND	7	14	13	**27**
			WS	▼ G.W.L. at 2.70m							
3.00		D4	SS					2	6	16	**22**
4.00			WS		4.00			6	15	38	**>50**
		D5	SS				Very dense yellowish brown silty fine to medium sub angular to sub rounded SAND with fragments of mica; Sample colour changed to yellowish black from 7.00m depth.				
5.00			WS					13	29	33	**>50**
6.00		D6	SS					32	48	50	**>50**
7.00			WS					31	50	HB	**>50**
		D7	SS								
8.00			WS					50/ 10 cm			**>50**
9.00							**(COMPLETELY WEATHERED ROCK)**				
		D8	SS		9.00		Very dense pale greenish white silty fine to medium sub angular to sub rounded SAND	14	HB/ 12cm		**>50**
10.00			WS				**(COMPLETELY WEATHERED ROCK)**				

Moisture Content - %
Undrained Shear Strength - t/m^2 (10 20 30 40 50 60 70 80 90)
SPT Resistance - Blows/ft (5 10 15 20 25 30 35 40 45)



Sample Key / Test Key

SPT Where full 0.3m penetration has not been achieved the number of blows for the quoted penetration is given (not N-value)	D - Disturbed Sample	N - Natural Moisture Content	C - Consolidation
GWL : Ground Water Level observed inside the Borehole, after the saturation	SS -SPT Sample	L - Atterberg Limit Test	UCT-Unconfined Compression
NE Not Encountered	W - Water Sample	G - Grain Size Analysis	CU - Consolidated Undrained
HB -Hammer Bounce	WS-Wgrey Sample	SG -Specific Gravity Test	UU-Unconsolidated Undrained
FD - Free Down	UD- Undisturbed Sample	B - Bulk Density	pH - Chemical
	CS- Core Sample	V - Vane Shear Test	O - Organic content
	Cr - Core Recovery (%)		SO_4^{2-} - Sulphate Content
	RQD-Rock Quality Designation (%)		Cl^- - Cloride Content

Remarks: Existing ground level considered as the zero level

Logged By: J.R.M.Sashikala
Supervised By: Lahiru
Drilled By: Saman

Made Ground | Silt | Gravel | Laterite Nodules | Completely Weathered Rock
Clay | Sand | Organic Matter | Silty Sand | Highly Weathered Rock | Fresh Rock

ENGINEERING & LABORATORY SERVICES (PVT) LTD. **SITE INVESTIGATIONS DIVISION**	NO 62/3, Neelammahara Road, Katuwawala, Sri Lanka. Tel: 0114 309 494	Format No: ELS-SI-02

Project	**Soil Investigation for proposed Research and Training Complex at Faculty of Agriculture,University of Jaffna, Sri Lanka**					Borehole No	BH-02
Client	**M/s. Oriental Consultants Global Co. Ltd**					Sheet	2 of 3
Location	Kilinochchi	Rig	Chinese	Core Diameter	54.00mm	Ground Water level	2.70m
Date of Started	03.06.2015	Drilling Method	Rotary	Casing depth	23.00m	Coordinates	_
Date of Finished	06.06.2015	Casing Diameter	76.00mm	Elevation (m)	_		_

Depth (m)	Sa. Cond	Sa.NO.	Sa. Type	Reduced level	Depth (m)	Legend	Soil Description	Field Records (SPT) 15cm	15cm	15cm	N
10.00							Continue from Page 1				
		D9	SS				Very dense pale yellowish brown sub angular to sub rounded SAND with fragments of mica	HB/ 10cm			>50
11.00			WS								
		D10	SS		11.00		Very dens brownish black fine to medium sub angular to sub rounded SAND with fragments of mica	HB/ 12cm			>50
12.00			WS				**(COMPLETELY WEATHERED ROCK)**				
		D11	SS		12.00			HB/ 3cm			>50
			WS					NO SAMPLE			
13.00		D12	SS					HB/ 2cm			>50
			WS					NO SAMPLE			
14.00		D13	SS				Wash samples:	HB/ 2cm			>50
			WS					NO SAMPLE			
15.00		D14	SS				Blackish gray fine to medium sub angular to sub rounded SAND with fragments of mica	HB			>50
			WS					NO SAMP			
16.00		D15	SS				**(COMPLETELY WEATHERED ROCK)**	HB/ 2cm			>50
			WS					NO SAMPLE			
17.00		D16	SS					HB/ 2cm			>50
			WS					NO SAMPLE			
18.00		D17	SS					HB			>50
			WS					NO SAMPLE			
19.00		D18	SS					HB			>50
			WS					NO SAMPLE			
20.00											

Moisture Content - %
Undrained Shear Strength - t/m^2 (10 20 30 40 50 60 70 80 90)
SPT Resistance - Blows/ft (5 10 15 20 25 30 35 40 45)

Sample Key / Test Key

SPT Where full 0.3m penetration has not been achieved the number of blows for the quoted penetration is given (not N-value)	D - Disturbed Sample	N - Natural Moisture Content	C - Consolidation
GWL : Ground Water Level observed inside the Borehole, after the saturation	SS -SPT Sample	L - Atterberg Limit Test	UCT-Unconfined Compression
NE Not Encountered	W - Water Sample	G - Grain Size Analysis	CU - Consolidated Undrained
HB -Hammer Bounce	WS-Wgrey Sample	SG -Specific Gravity Test	UU-Unconsolidated Undrained
FD - Free Down	UD- Undisturbed Sample	B - Bulk Density	pH - Chemical
	CS- Core Sample	V - Vane Shear Test	O - Organic content
	Cr - Core Recovery (%)		SO_4^{2-} - Sulphate Content
	RQD-Rock Quality Designation (%)		Cl - Cloride Content

Remarks: Existing ground level considered as the zero level

Logged By: J.R.M.Sashikala
Supervised By: Lahiru
Drilled By: Saman

Made Ground, Silt, Gravel, Laterite Nodules, Completely Weathered Rock
Clay, Sand, Organic Matter, Silty Sand, Highly Weathered Rock, Fresh Rock

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Project	**Soil Investigation for proposed Research and Training Complex at Faculty of Agriculture,University of Jaffna, Sri Lanka**					Borehole No	BH-02
Client	**M/s. Oriental Consultants Global Co. Ltd**					Sheet	3 of 3
Location	Kilinochchi	Rig	Chinese	Core Diameter	54.00mm	Ground Water level	2.70m
Date of Started	03.06.2015	Drilling Method	Rotary	Casing depth	23.00m	Coordinates	_
Date of Finished	06.06.2015	Casing Diameter	76.00mm	Elevation (m)	_		_

Depth (m)	Sa. Cond	Sa.NO.	Sa. Type	Reduced level	Depth (m)	Legend	Soil Description	Field Records (SPT) 15cm	15cm	15cm	N
20.00							Continue from Page 2				
		D19	SS				Very dense brownish black fine to medium sub angular to sub rounded SAND with fragments of mica	HB			>50
			WS				**(COMPLETELY WEATHERED ROCK)**				
21.00		D20	SS		21.00		Wash Samples:	HB			>50
			WS					NO SAMPLE			
22.00		D21	SS				Blackish gray fine to medium sub angular to sub rounded SAND with fragments of mica	HB			>50
			WS					NO SAMPLE			
23.00		D22	SS				**(COMPLETELY WEATHERED ROCK)**				
			WS				**ROCK LEVEL**				
24.00					23.70		Grayish black moderately weathered moderately fractured BIOTITE GNEISS	Cr=40%		RQD=28%	
			CS								
25.00					25.20		Grayish black fresh moderately fractured BIOTITE GNEISS	Cr=57%		RQD=27%	
26.00			CS								
27.00					27.50		Grayish black fresh moderately weathered moderately fractured BIOTITE GNEISS	Cr=95%		RQD=77%	
28.00			CS								
29.00					28.70		END OF THE BOREHOLE 28.70m				
30.00											

Moisture Content - %
Undrained Shear Strength - t/m^2 (10 20 30 40 50 60 70 80 90)
SPT Resistance - Blows/ft (5 10 15 20 25 30 35 40 45)

>50 >50 >50

Sample Key / Test Key

SPT Where full 0.3m penetration has not been achieved the number of blows for the quoted penetration is given (not N-value)	D - Disturbed Sample	N - Natural Moisture Content	C - Consolidation
GWL : Ground Water Level observed inside the Borehole, after the saturation	SS -SPT Sample	L - Atterberg Limit Test	UCT-Unconfined Compression
NE Not Encountered	W - Water Sample	G - Grain Size Analysis	CU - Consolidated Undrained
HB -Hammer Bounce	WS-Wgrey Sample	SG -Specific Gravity Test	UU-Unconsolidated Undrained
FD - Free Down	UD- Undisturbed Sample	B - Bulk Density	pH - Chemical
	CS- Core Sample	V - Vane Shear Test	O - Organic content
	Cr - Core Recovery (%)		SO_4^{2-} - Sulphate Content
	RQD-Rock Quality Designation (%)		Cl - Cloride Content

Remarks: Existing ground level considered as the zero level

Logged By: J.R.M.Sashikala
Supervised By: Lahiru
Drilled By: Saman

Made Ground, Silt, Gravel, Laterite Nodules, Completely Weathered Rock
Clay, Sand, Organic Matter, Silty Sand, Highly Weathered Rock, Fresh Rock

ENGINEERING & LABORATORY SERVICES (PVT) LTD.

SITE INVESTIGATIONS DIVISION

NO 62/3, Neelammahara Road, Katuwawala, Sri Lanka. Tel: 0114 309 494

Format No: ELS-SI-02

Project	Soil Investigation for proposed Research and Training Complex at Faculty of Agriculture,University of Jaffna, Sri Lanka					Borehole No	BH-03
Client	M/s. Oriental Consultants Global Co. Ltd					Sheet	1 of 2
Location	Kilinochchi	Rig	Chinese	Core Diameter	54.00mm	Ground Water level	2.20m
Date of Started	08.06.2015	Drilling Method	Rotary	Casing depth	18.00m	Coordinates	
Date of Finished	09.06.2015	Casing Diameter	76.00mm	Elevation (m)			

Depth (m)	Sa. Cond	Sa.NO.	Sa.Type	Reduced level	Depth (m)	Legend	Soil Description	Field Records (SPT) 15cm	15cm	15cm	N
0.00							Ground level				
		D1	DS		0.00		Reddish brown fine to medium sub angular to sub rounded LATERITIC SAND (TOP SOIL)				
1.00		D2	SS		1.00		Medium dense reddish brown LATERITIC clayey fine to medium sub angular to sub rounded SAND	3	5	6	11
2.00			WS								
		D3	SS	G.W.L. at 2.20m	2.00		Medium dense pale yellow silty fine to medium sub angular to sub rounded SAND with fragments of mica (COMPLETELY WEATHERED ROCK)	3	5	10	15
3.00			WS								
		D4	SS		3.00			28	27	27	>50
4.00			WS					HB/ 8cm			>50
		D5	SS								
5.00			WS				Very dense pale yellow silty fine to medium sub angular to sub rounded SAND with fragments of mica	HB/ 8cm			>50
6.00		D6	SS					HB/ 10cm			>50
7.00			WS					HB/ 16cm			>50
		D7	SS								
8.00			WS				From (8.00-9.00)m depth; sample colour changed to dark brown	7	32	HB	>50
9.00		D8	SS				From (9.00-12.00)m depth; sample colour changed to pale yellow	50	HB/ 5cm		>50
			WS				(COMPLETELY WEATHERED ROCK)				
10.00											

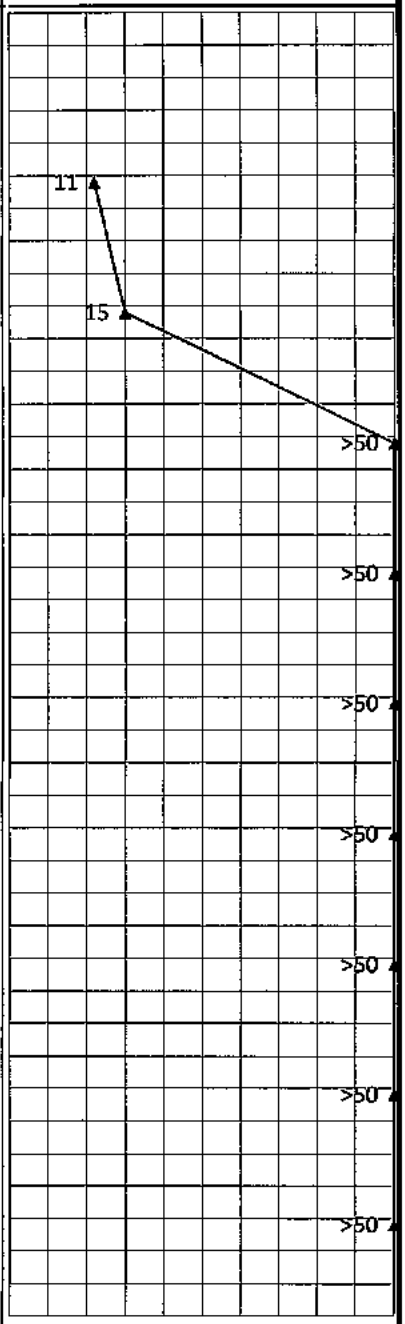
Moisture Content - %

Undrained Shear Strength - t/m²

10 20 30 40 50 60 70 80 90

SPT Resistance - Blows/ft

5 10 15 20 25 30 35 40 45



Sample Key / Test Key

SPT: Where full 0.3m penetration has not been achieved the number of blows for the quoted penetration is given (not N-value)	D - Disturbed Sample	N - Natural Moisture Content	C - Consolidation	Remarks: Existing ground level considered as the zero level
GWL: Ground Water Level observed inside the Borehole, after the saturation	SS -SPT Sample	L - Atterberg Limit Test	UCT-Unconfined Compression	Logged By: J.R.M.Sashikala
NE: Not Encountered	W - Water Sample	G - Grain Size Analysis	CU - Consolidated Undrained	Supervised By: Lahiru
HB: -Hammer Bounce	WS-Wgrey Sample	SG -Specific Gravity Test	UU-Unconsolidated Undrained	Drilled By: Saman
FD: - Free Down	UD- Undisturbed Sample	B - Bulk Density	pH - Chemical	
	CS- Core Sample	V - Vane Shear Test	O - Organic content	
	Cr - Core Recovery (%)		SO_4^{2-} - Sulphate Content	
	RQD-Rock Quality Designation (%)		Cl^- - Cloride Content	

Made Ground | Silt | Gravel | Laterite Nodules | Completely Weathered Rock

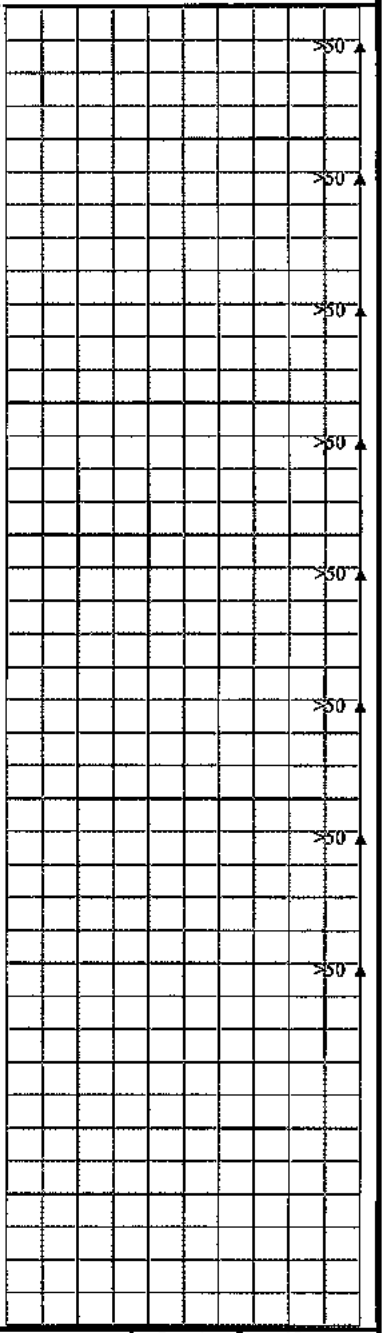
Clay | Sand | Organic Matter | Silty Sand | Highly Weathered Rock | Fresh Rock

ENGINEERING & LABORATORY SERVICES (PVT) LTD. SITE INVESTIGATIONS DIVISION	NO 62/3, Neelammahara Road, Katuwawala, Sri Lanka. Tel: 0114 309 494	Format No: ELS-SI-02

Project	Soil Investigation for proposed Research and Training Complex at Faculty of Agriculture,University of Jaffna, Sri Lanka					Borehole No	BH-03
Client	M/s. Oriental Consultants Global Co. Ltd					Sheet	2 of 2
Location	Kilinochchi	Rig	Chinese	Core Diameter	54.00mm	Ground Water level	2.20m
Date of Started	08.06.2015	Drilling Method	Rotary	Casing depth	18.00m	Coordinates	–
Date of Finished	09.06.2015	Casing Diameter	76.00mm	Elevation (m)			–

Depth (m)	Sa. Cond	Sa.NO.	Sa.Type	Reduced level	Depth (m)	Legend	Soil Description	Field Records (SPT) 15cm	15cm	15cm	N
10.00							Continue from Page 1				
		D9	SS					50			>50
			WS								
11.00							Same as previous				
		D10	SS					50	HB/ 3cm		>50
			WS								
12.00											
		D11	SS		12.00			HB			>50
			WS					NO SAMPLE			
13.00											
		D12	SS					HB			>50
			WS					NO SAMPLE			
14.00											
		D13	SS				Wash Sample:	HB			>50
			WS				Blackish gray fine to medium sub angular to sub rounded SAND with fragments of mica	NO SAMPLE			
15.00											
		D14	SS					HB			>50
			WS					NO SAMPLE			
16.00							(COMPLETELY WEATHERED				
		D15	SS					HB			>50
			WS					NO SAMPLE			
17.00											
		D16	SS					HB			>50
			WS					NO SAMPLE			
18.00							ROCK LEVEL				
					18.15		END OF THE BOREHOLE AT 18.15m				
19.00											
20.00											

Moisture Content - %
Undrained Shear Strength - t/m²
10 20 30 40 50 60 70 80 90
SPT Resistance - Blows/ft
5 10 15 20 25 30 35 40 45



Sample Key / Test Key

SPT	Where full 0.3m penetration has not been achieved the number of blows for the quoted penetration is given (not N-value)	D - Disturbed Sample	SS -SPT Sample	W - Water Sample	WS-Wgrey Sample	UD- Undisturbed Sample	CS- Core Sample
GWL	: Ground Water Level observed inside the Borehole, after the saturation	Cr - Core Recovery (%)	RQD-Rock Quality Designation (%)	N - Natural Moisture Content	L - Atterberg Limit Test	G - Grain Size Analysis	SG -Specific Gravity Test
NE	Not Encountered	B - Bulk Density	V - Vane Shear Test	C - Consolidation	UCT-Unconfined Compression	CU - Consolidated Undrained	UU-Unconsolidated Undrained
HB	-Hammer Bounce	pH - Chemical	O - Organic content	SO_4^{2-} - Sulphate Content	Cl - Cloride Content		
FD	- Free Down						

Made Ground | Silt | Gravel | Laterite Nodules | Completely Weathered Rock
Clay | Sand | Organic Matter | Silty Sand | Highly Weathered Rock | Fresh Rock

Remarks: Existing ground level considered as the zero level

Logged By : J.R.M.Sashikala
Supervised By: Lahiru
Drilled By: Saman

ENGINEERING & LABORATORY SERVICES (PVT) LTD.
SITE INVESTIGATIONS DIVISION

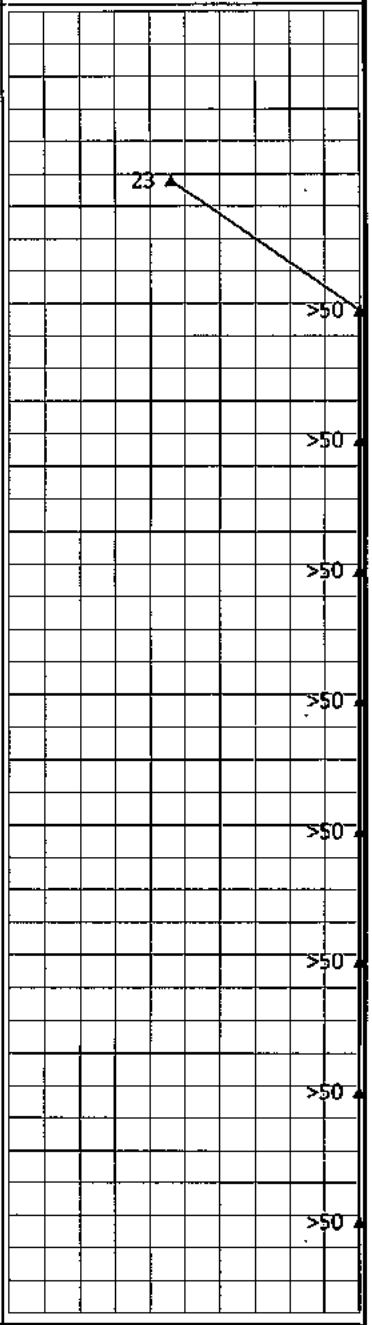
NO 62/3, Neelammahara Road, Katuwawala, Sri Lanka.
Tel: 0114 309 494

Format No: ELS-SI-02

Project	**Soil Investigation for proposed Research and Training Complex at Faculty of Agriculture,University of Jaffna, Sri Lanka**					Borehole No	BH-04
Client	**M/s. Oriental Consultants Global Co. Ltd**					Sheet	1 of 3
Location	Kilinochchi	Rig	Chinese	Core Diameter	54.00mm	Ground Water level	2.80m
Date of Started	11.06.2015	Drilling Method	Rotary	Casing depth	21.00m	Coordinates	–
Date of Finished	21.06.2015	Casing Diameter	76.00mm	Elevation (m)			–

Depth (m)	Sa. Cond	Sa.NO.	Sa.Type	Reduced level	Depth (m)	Legend	Soil Description	Field Records (SPT) 15cm	15cm	15cm	N
0.00							Ground level				
1.00		D1	DS		0.00		Reddish brown fine to medium sub angular to sub rounded LATERITIC SAND (TOP SOIL)				
2.00		D2	SS / WS		1.00		Medium dense reddish brown LATERITIC clayey fine to medium sub angular to sub rounded SAND	6	9	14	23
3.00		D3	SS / WS	G.W.L. at 2.80m	2.00		Hard yellowish brown fine to medium sub angular to sub rounded sandy CLAY	19	25	35	>50
4.00		D4	SS / WS					26	50	HB	>50
5.00		D5	SS / WS		4.00		Very dense pale yellow silty fine to medium sub angular to sub rounded SAND with fragments of mica	8	18	50	>50
6.00							From (5.00-6.00)m depth; Very dense off white silty fine to medium sub angular to sub rounded SAND with fragments of mica	25	50	HB/ 15 cm	>50
7.00		D6	SS / WS					50/ 5cm			>50
8.00		D7	SS / WS				From (6.00-9.00)m depth; sample colour changed to pale yellow	20	50	HB/ 15cm	>50
9.00								25	50	HB/ 5cm	>50
10.00		D8	SS / WS				From (9.00-11.00)m depth; sample colour changed to off white (COMPLETELY WEATHERED ROCK)	19	39	50	>50

Moisture Content - %
Undrained Shear Strength - t/m²: 10 20 30 40 50 60 70 80 90
SPT Resistance - Blows/ft: 5 10 15 20 25 30 35 40 45



Sample Key / Test Key

SPT	Where full 0.3m penetration has not been achieved the number of blows for the quoted penetration is given (not N-value)	D - Disturbed Sample	N - Natural Moisture Content	C - Consolidation
		SS -SPT Sample	L - Atterberg Limit Test	UCT-Unconfined Compression
		W - Water Sample	G - Grain Size Analysis	CU - Consolidated Undrained
GWL	: Ground Water Level observed inside the Borehole, after the saturation	WS-Wgrey Sample	SG -Specific Gravity Test	UU-Unconsolidated Undrained
		UD- Undisturbed Sample	B - Bulk Density	pH - Chemical
NE	Not Encountered	CS- Core Sample	V - Vane Shear Test	O - Organic content
HB	-Hammer Bounce	Cr - Core Recovery (%)		SO_4^{2-} - Sulphate Content
FD	- Free Down	RQD-Rock Quality Designation (%)		Cl⁻ - Cloride Content

Remarks

Existing ground level considered as the zero level — J.R.M.Sashikala; Lahiru; Saman

Made Ground; Silt; Gravel; Laterite Nodules; Completely Weathered Rock
Clay; Sand; Organic Matter; Silty Sand; Highly Weathered Rock; Fresh Rock

ENGINEERING & LABORATORY SERVICES (PVT) LTD. SITE INVESTIGATIONS DIVISION	NO 62/3, Neelammahara Road, Katuwawala, Sri Lanka. Tel: 0114 309 494	Format No: ELS-SI-02

Project	**Soil Investigation for proposed Research and Training Complex at Faculty of Agriculture,University of Jaffna, Sri Lanka**					Borehole No	BH-04
Client	**M/s. Oriental Consultants Global Co. Ltd**					Sheet	2 of 3
Location	Kilinochchi	Rig	Chinese	Core Diameter	54.00mm	Ground Water level	2.80m
Date of Started	11.06.2015	Drilling Method	Rotary	Casing depth	21.00m	Coordinates	–
Date of Finished	21.06.2015	Casing Diameter	76.00mm	Elevation (m)			–

Depth (m)	Sa. Cond	Sa.NO.	Sa.Type	Reduced level	Depth (m)	Legend	Soil Description	Field Records (SPT) 15cm	15cm	15cm	N
10.00							Continue from Page 1				
	X	D9	SS				Same as previous desciption	10	35	45	>50
			WS								
11.00	X	D10	SS				From (11.00-12.00)m depth; the sample colour changed to pale yellow	15	30	50	>50
			WS								
12.00	X	D11	SS				From (12.00-13.00)m depth; the sample colour changed to dark brown	24	36	42	>50
			WS								
13.00	X	D12	SS				From (13.00-14.00)m depth; the sample colour changed to pale brown	28	40	45	>50
			WS								
14.00	X	D13	SS				Wash Sample:	50	HB/ 10 cm		>50
			WS						NO SAMPLE		
15.00	X	D14	SS				From (14.00-17.00)m depth; Gray fine to medium sub angular to sub rounded SAND	50	HB/ 10 cm		>50
			WS						NO SAMPLE		
16.00	X	D15	SS					50			>50
			WS						NO SAMPLE		
17.00	X	D16	SS					HB			>50
			WS				From (17.00-21.10)m depth: Very dense pale brown fine to medium sub angular to sub rounded SAND with traces of mica.				
18.00	X	D17	SS					50	HB/ 2 cm		>50
			WS								
19.00	X	D18	SS				COMPLETELY WEATHERED ROCK	50	HB/ 10 cm		>50
			WS								
20.00											

Moisture Content - %
Undrained Shear Strength - t/m²
10 20 30 40 50 60 70 80 90
SPT Resistance - Blows/ft
5 10 15 20 25 30 35 40 45

Sample Key / Test Key

SPT Where full 0.3m penetration has not been achieved the number of blows for the quoted penetration is given (not N-value)	D - Disturbed Sample	N - Natural Moisture Content	C - Consolidation	Remarks: Existing ground level considered as the zero level
GWL : Ground Water Level observed inside the Borehole, after the saturation	SS -SPT Sample	L - Atterberg Limit Test	UCT-Unconfined Compression	Logged By: J.R.M.Sashikala
NE Not Encountered	W - Water Sample	G - Grain Size Analysis	CU - Consolidated Undrained	Supervised By: Lahiru
HB -Hammer Bounce	WS-Wgrey Sample	SG -Specific Gravity Test	UU-Unconsolidated Undrained	Drilled By: Saman
FD - Free Down	UD- Undisturbed Sample	B - Bulk Density	pH - Chemical	
	CS- Core Sample	V - Vane Shear Test	O - Organic content	
	Cr - Core Recovery (%)		SO_4^{2-} - Sulphate Content	
	RQD-Rock Quality Designation (%)		Cl^- - Cloride Content	

Made Ground | Silt | Gravel | Laterite Nodules | Completely Weathered Rock

Clay | Sand | Organic Matter | Silty Sand | Highly Weathered Rock | Fresh Rock

ENGINEERING & LABORATORY SERVICES (PVT) LTD. SITE INVESTIGATIONS DIVISION

NO 62/3, Neelammahara Road, Katuwawala, Sri Lanka. Tel: 0114 309 494

Format No: ELS-SI-02

Project	**Soil Investigation for proposed Research and Training Complex at Faculty of Agriculture,University of Jaffna, Sri Lanka**				Borehole No	BH-04
Client	**M/s. Oriental Consultants Global Co. Ltd**				Sheet	3 of 3
Location	Kilinochchi	Rig	Chinese	Core Diameter 54.00mm	Ground Water level	2.80m
Date of Started	11.06.2015	Drilling Method	Rotary	Casing depth 21.00m	Coordinates	_
Date of Finished	21.06.2015	Casing Diameter	76.00mm	Elevation (m)		_

Depth (m)	Sa. Cond	Sa.NO.	Sa.Type	Reduced level	Depth (m)	Legend	Soil Description	Field Records (SPT) 15cm	15cm	15cm	N
20.00							Continue from Page 1				
		D19	SS				Same as previous	10	35	45	>50
21.00			WS				**ROCK LEVEL**				
					21.10		END OF THE BOREHOLE AT 21.10 m				
22.00											
23.00											
24.00											
25.00											
26.00											
27.00											
28.00											
29.00											
30.00											

Moisture Content - %
Undrained Shear Strength - t/m²
10 20 30 40 50 60 70 80 90
SPT Resistance - Blows/ft
5 10 15 20 25 30 35 40 45
>50

Sample Key / Test Key

SPT Where full 0.3m penetration has not been achieved the number of blows for the quoted penetration is given (not N-value)	D - Disturbed Sample	N - Natural Moisture Content	C - Consolidation
GWL : Ground Water Level observed inside the Borehole, after the saturation	SS -SPT Sample	L - Atterberg Limit Test	UCT-Unconfined Compression
NE Not Encountered	W - Water Sample	G - Grain Size Analysis	CU - Consolidated Undrained
HB -Hammer Bounce	WS-Wgrey Sample	SG -Specific Gravity Test	UU-Unconsolidated Undrained
FD - Free Down	UD- Undisturbed Sample	B - Bulk Density	pH - Chemical
	CS- Core Sample	V - Vane Shear Test	O - Organic content
	Cr - Core Recovery (%)		SO_4^{2-} - Sulphate Content
	RQD-Rock Quality Designation (%)		Cl - Cloride Content

Remarks: Existing ground level considered as the zero level

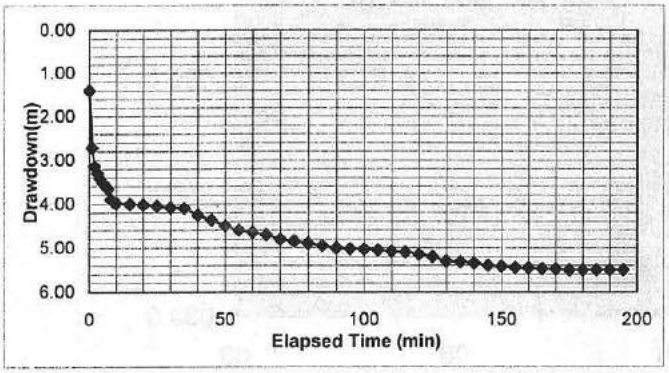
Logged By: J.R.M.Sashikala
Supervised By: Lahiru
Drilled By: Saman

Made Ground | Silt | Gravel | Laterite Nodules | Completely Weathered Rock
Clay | Sand | Organic Matter | Silty Sand | Highly Weathered Rock | Fresh Rock

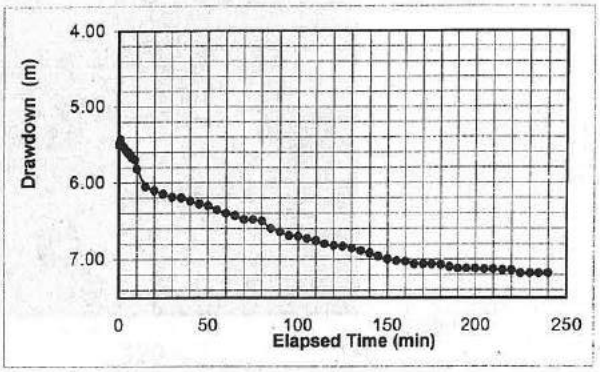
PUMP TEST RECORD (STEP DRAWDOWN TEST)

Kilinochchi

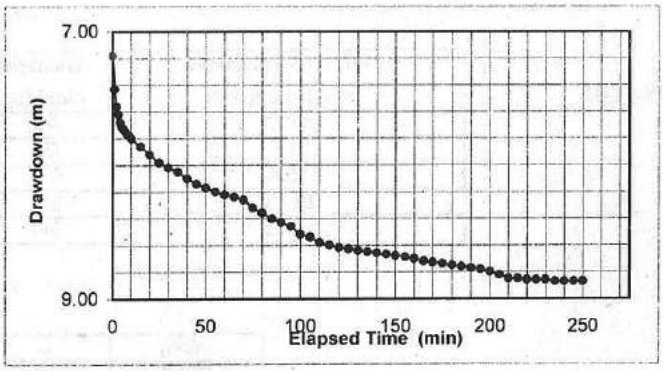
Discharge l/min 60



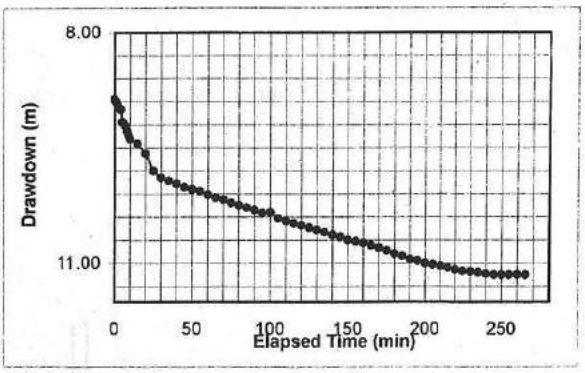
Discharge l/min 80



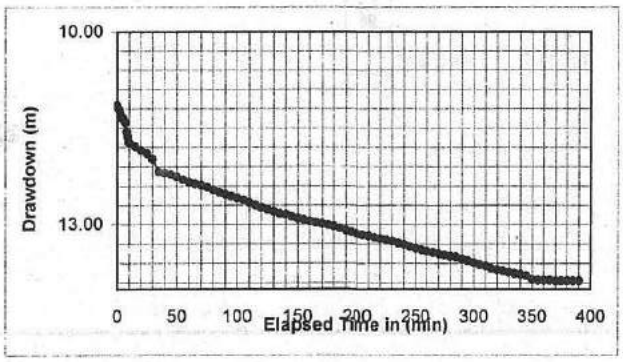
Discharge l/min 100



Discharge l/min 120

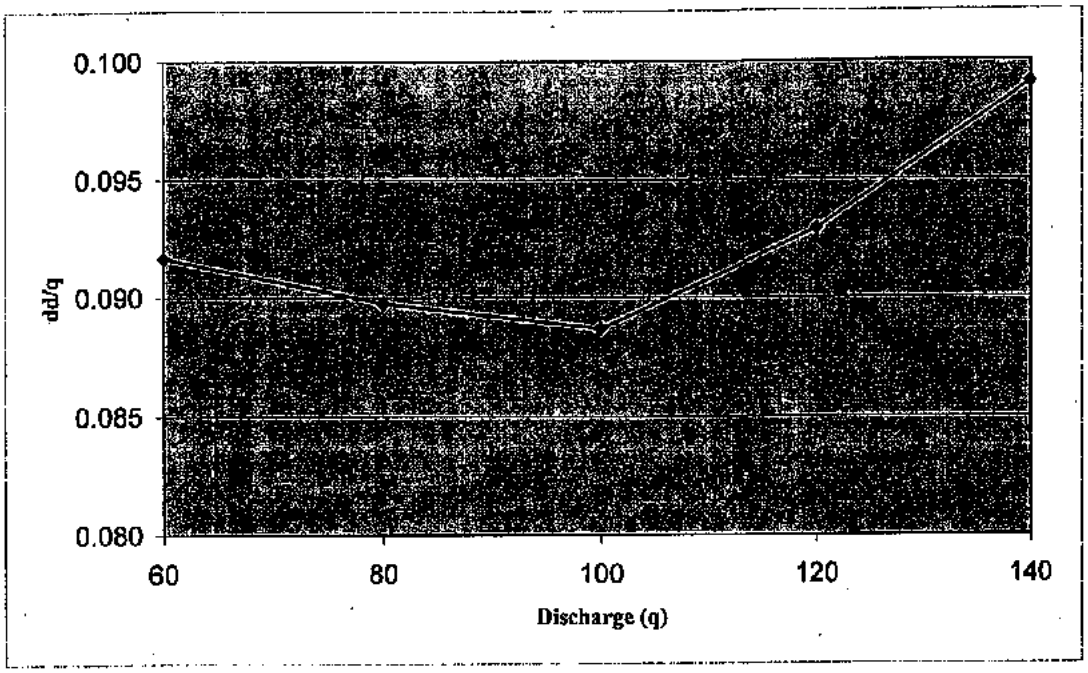


Discharge l/min 140



PUMP TEST RECORD (STEP DRAWDOWN TEST)

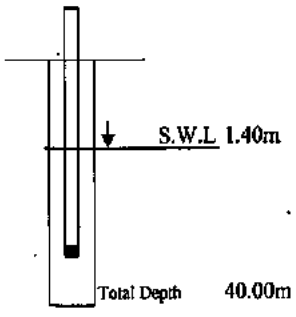
Kilinochchi



Discharge (q) l/min	Stabilised W.L. from the ground level
60	5.50
80	7.18
100	8.87
120	11.15
140	13.87

Recorded Safe Yield = 100 l/min

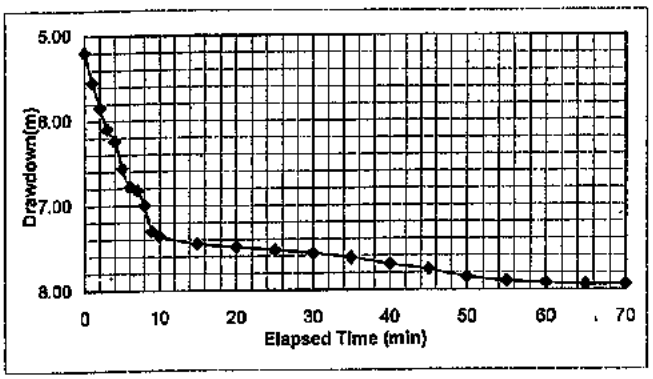
q	(dd/q)
60	0.092
80	0.090
100	0.089
120	0.093
140	0.099



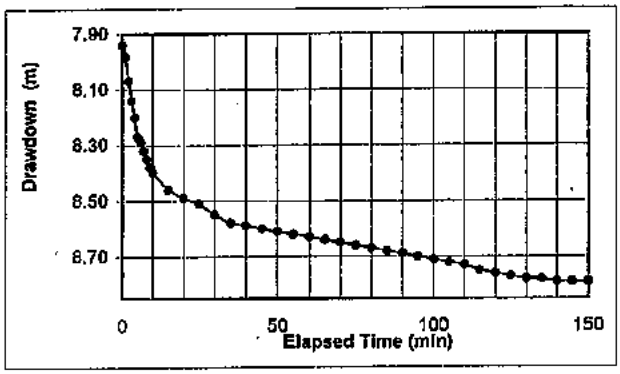
PUMP TEST RECORD (STEP DRAWDOWN TEST)

Kilinochchi

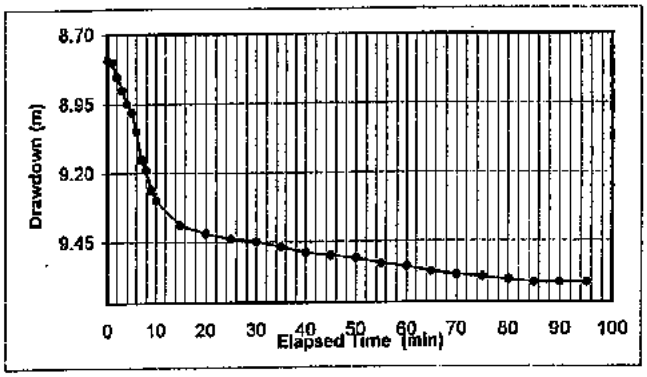
Discharge l/min 60



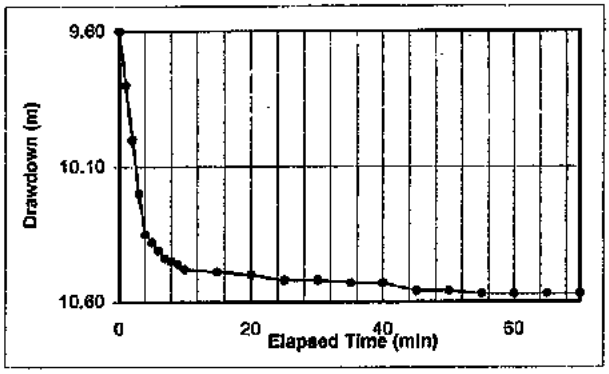
Discharge l/min 80



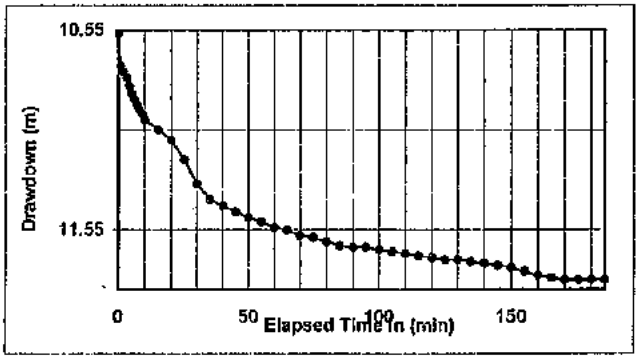
Discharge l/min 100



Discharge l/min 120

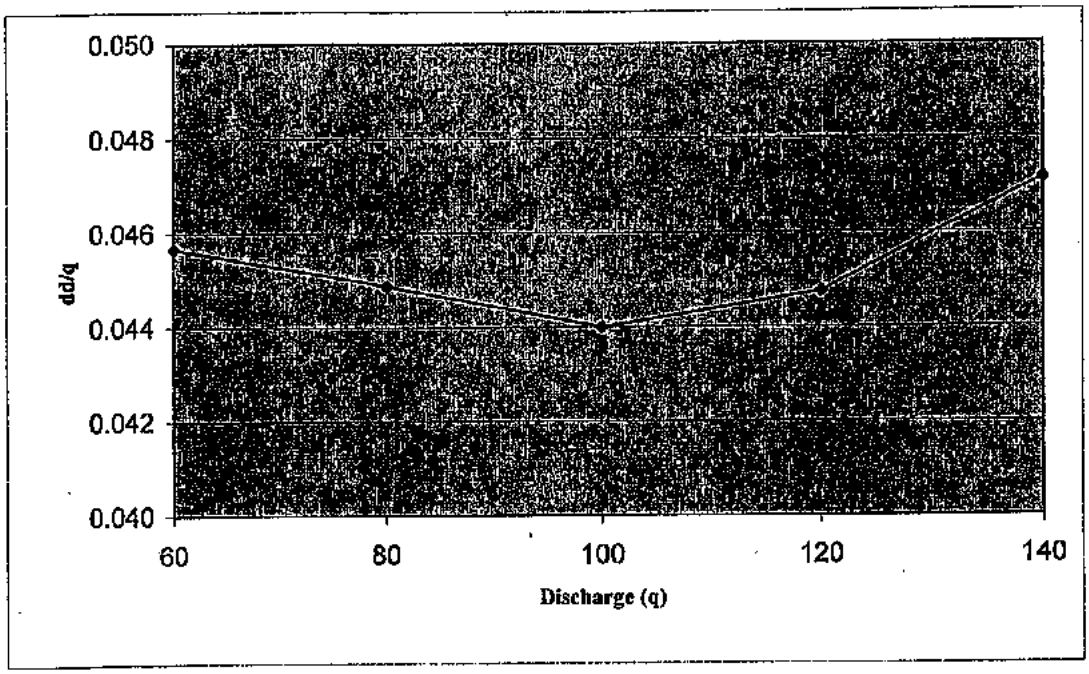


Discharge l/min 140



PUMP TEST RECORD (STEP DRAWDOWN TEST)

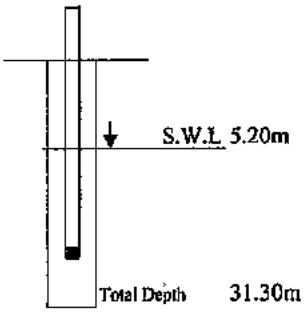
Kilinochchi



Discharge (q) l/min	Stabilised W.L. from the ground level
60	2.74
80	3.59
100	4.40
120	5.37
140	6.60

Recorded Safe Yield = 100 l /min

q	(dd/q)
60	0.046
80	0.045
100	0.044
120	0.045
140	0.047



ලේකම්
செயலாளர்
Secretary

காரியாலய
அலுவலகம்
Office
☎ 94-21-2285415

பැක්ස්
தொலைநகல்
Fax

பැක්ස්
தொலைநகல்
Fax
94-21-2285415

නැවත පදිංචි කිරීම, ප්‍රතිසංස්කරණය හා හින්දු ආගමික කටයුතු අමාත්‍යාංශය

Ministry of Resettlement, Reconstruction and Hindu Religious Affairs

மீள்குடியேற்றம், புனர்நிர்மாணம் மற்றும் இந்துமத அலுவல்கள் அமைச்சு

NMAC//RMAO/OPS

දිනය
திகதி
ஜயவந
23rd June 2015

MINE CLEARANCE CERTIFICATION LETTER

Technical Survey on faculty of Agriculture in kilinochchi

This is to certify that the Sri Lanka Army 06 field Engineering Regiment, conducted a Technical Survey (TS) on the above area, (Reference – SLA letter GOPS/12/07)

As per the above reference letter no evidence or record of any current or any previous landmine or UXO contamination in the above mention area, were found. As a result of this survey the above mentioned location is certified as a low risk area.

As a precaution, individual or groups wishing to reside or conduct work in the area under discussion should report any suspicious items immediately either to Sri Lanka Army, the Regional Mine Action office, or districts to the Government Agent trough their DS, or GS. Mine Risk Education is recommended and can be arranged on request by the Regional Mine Action Office.

RMN Karunathilaka
Acting Mine Action Officer
Regional Mine Action office
Kilinochchi

அரசாங்க அதிபர் / மாவட்டச் செயலாளர்
திஸாபதி / டிஸ்ட்ரிக் ஸ்ரேகம்
Govt.Agent / District Secretary

தொலைபேசி
தூரகதனய
Telephone } 021 - 228 3965

தொலைநகல்
ෆැක්ස්
Fax } 021 228 3966

மின்னஞ்சல்
විද්‍යුත් තැපෑල
E-mail } gakili@sltnet.lk

பொதுத்தொலைபேசி
පොදු දුරකථනය
General Telephone } 021 - 228 3945

மேலதிக மாவட்டச் செயலாளர்
අතිරේක දිස්ත්‍රික් ලේකම්
Addl.District Secretary } 021 - 228 5456

மாவட்டச் செயலகம், கிளிநொச்சி
දිස්ත්‍රික් ලේකම් කාර්යාලය,කිලිනොච්චි.
District Secretariat, Kilinochchi

எனது இல මගේ අංකය My No	KN/DPS/D.M/2015	உமது இல ඔබේ අංකය Your No		திகதி දිනය Date	03.06.2015

Dean,

Faculty of Agriculture

University of Jaffna.

Ariviyal Nagar,Kilinochchi

Submission of the contact details for land mine clearance in Kilinochchi district

This has reference to your letter dated 2015.05.25 on the above subject.

The above mentioned detail is attached herewith for your information please.

Note- If the UXO identified anywhere in this district you can contact to Mine action office, Old District Secertariat, Kilinochchi any time .Then Appropriate Action will be taken by them as early as possible.

Sigd.

Suntharam Arumainayaham,

Govt. Agent/District Secretary,

Kilinochchi District.

S. Mohanabavan

Director Planning

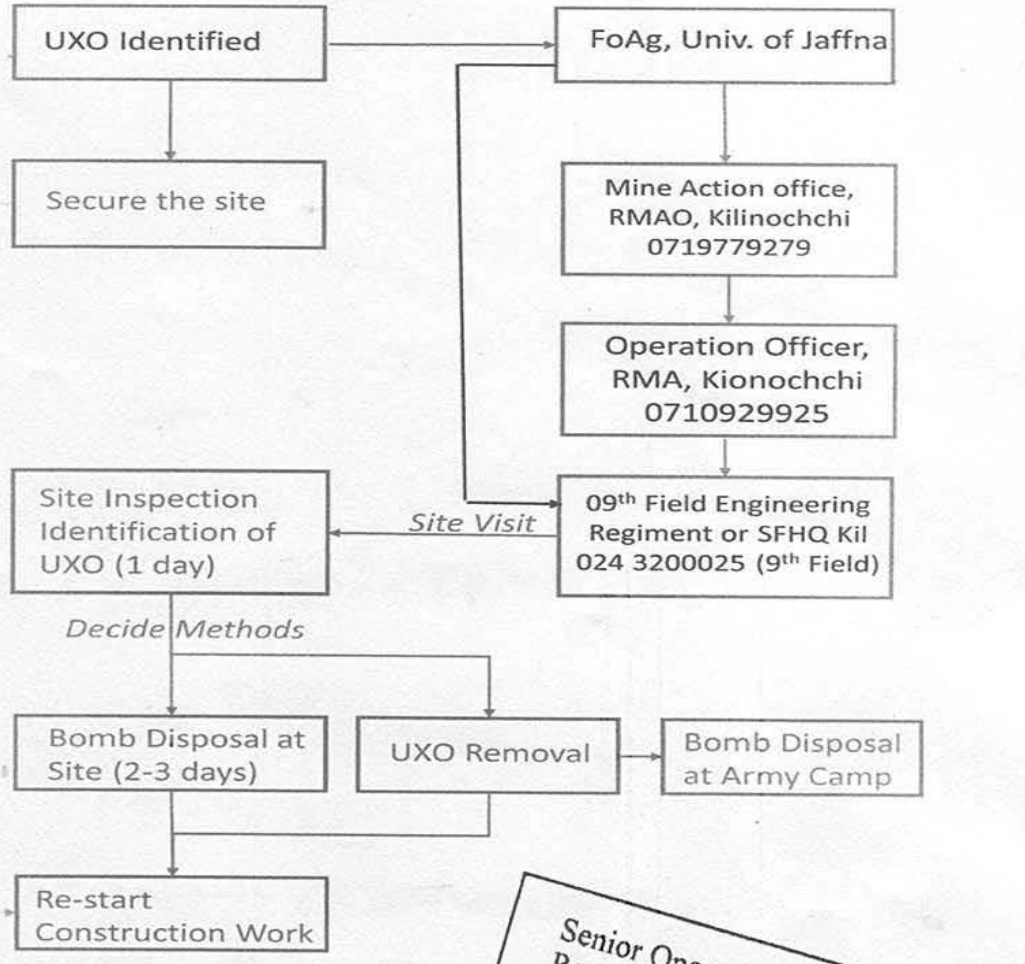
S.Mohanabavan
Director of Planning
District Secretariat
Kilinochchi

The Massage will be received by a group of security forces and they will come to the spot to dispose the UXO

නැවත පදිංචි කිරීම, ප්‍රතිසංස්කරණ හා හින්දු ආගමික කටයුතු අමාත්‍යාංශය
மீள்குடியேற்றம்,புனர்நிர்மாணம் மற்றும் இந்துமதஅலுவல்கள் அமைச்சு
Ministry of Resettlement, Reconstruction and Hindu Religious Affairs
බිම්වෙඩි සඳහා කියාකාරී ඡාකික මධ්‍යස්ථානය
தேசியநிலக்கண்ணிவெடிசெயற்பாட்டுநிலையம்
National Mine Action Centre (NMAC)
අංක: 302, ගාලුපාර, කොළඹ 04　இல. 302,காலிவீதி,கொழும்பு 04　No.302, Galle Road, Colombo 04

මගේ අංකය எனது இல. My No: **MRRHRA/NMAC/RMAO/OPS/37**

දිනය திகதி நாயவந: **29th Oct 2015**



Senior Operation Officer
Regional Mine Action Office
District Secretariat
Killinochchi.

29/10/15

OAND Iddamalgoda
Operations Officer (RMAO)
National Miner Action Center
Ministry of Resettlement, Reconstruction and Hindu Religious Affairs.

ペラデニア大学農学部　現況写真

①実験室

②食品加工実験室（仮設建物）

③講義室

④乳製品販売用の食品加工室

⑤カフェテリア兼生産品販売所

⑥牛舎

⑦ヤギ舎

⑧試験ほ場　アルミ製のスプリンクラー資材

ワヤンバ大学農学部　現況写真

①ワヤンバ大学農学部外観

②講義室

③実験室

④新たに整備された実験室

⑤職員室の各部屋（アルミ製の間仕切り）

⑥試験ほ場のネットハウス

⑦農業機械のワークショップ

⑧ヤギ舎