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・実習は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

資料	1	調査団員・氏名	A-1-1
資料	2	調査日程	A-2-1
資料	3	関係者(面会者)リスト	A-3-1
資料	4	討議議事録(MD)	A-4-1
資料	5	ソフトコンポーネント計画書	A-5-1
資料	6	テクニカルノート	A-6-1
資料	7	収集資料リスト	A-7-1
資料	8	その他の資料・情報	
資料	8-1	敷地現況測量図	A-8-1-1
資料	8-2	地盤調査結果	A-8-2-
資料	8-3	地下水調査結果	A-8-3-1
資料	8-4	地雷に関するレター	A-8-4-1
資料	8-5	UXO 発見時のフロー	A-8-5-
資料	8-6	類似施設現況写真	A-8-6-1

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/自然条件調查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/自然条件調查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)

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	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				IN)→CMB ロンボ				NRT→(SIN)→CMB <i>@コロンボ</i>		
2	2015/5/7	木			協議(ジャファ	リノッチ(移動) +大学農学部) <i>ノノッチ</i>				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				ジャフナ大学農学部) ノノッチ				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	±				査 (農学部) <i>リノッチ</i>		-		サイト調査 (農学部) @キリノッチ		
5	2015/5/10	日	NRT→CMB <i>@コロンボ</i>		コロンボ(移動) コンボ		整理			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)		vョンと同じ ノッチ	協議(ジャフナ大学農 キリノッチ => @キャン			NRT→(SIN)→CMB <i>@コロンボ</i>	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)		キャンディー	I P大学調査 - ⇒ ジャフナ <i>ャフナ</i>		NRT→(SIN)→CMB @コロンボ	コロンボ ⇒ キャンディー ベラデニア大学調査 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 <i>@コロンボ</i>	
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)		/ヨンと同じ ノッチ	サイト調査 (ジャフナ大学 農学部) <i>®</i> キリノッチ	業務主任と同じ <i>®キリノッチ</i>	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) 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		vョンと同じ 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	y .	┃ イト調査(ジャフナ大学農学 <i>@キリノッチ</i>	部)	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		ィョンと同じ ノッチ	建設事情調査 <i>@キリノッチ</i>	業務主任と同じ <i>@キリノッチ</i>	農業教育調査 <i>@キリノッチ</i>	施設調査 <i>@キリノッチ</i>	ほ場調査 <i>@キリノッチ</i>	建設事情調査 @キリノッチ	
11	2015/5/16	±	10.00 ベラデニア大学調査 (Mahailluppallamaキャンパス) 13.00 CIC農場調査(ベラデニア) 15.00 移動 (ベラデニア→コロンボ)		vョンと同じ コンボ	サイト調査、団内協議 @キリノッチ	業務主任と同じ <i>@コロンボ</i>	サイト調査、団内協議		サイト調査、団内協議	l	

A-2-1

現地調査(2015年5月6日から6月5日)

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		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	2	2015/5/17	日	書類整理		I i整理 ロンボ	書類整理 <i>@キリノッチ</i>	書類整理 @コロンボ			 整理 ノッチ		NRT→(SIN)→CMB <i>@コロンボ</i>
1	3	2015/5/18		14:00-14:30 ERD協議 15:00-18:00 高等教育省協議 - M/D協議		rョンと同じ コンボ	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 <i>®キリノッチ</i>	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
1	4	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 キャンディー 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
1	5	2015/5/20	水	NRT	ペラデニア大学調査 <i>®キャンディー</i>	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		ア大学調査 ン <i>ディー</i>		ペラデニア大学調査 キャンディー ⇒ キリノッチ <i>@キリノッチ</i>		機材調達調査 @キャンディー
1	6	2015/5/21	*		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 <i>@キリノッチ</i>	農作物開発プログラム調 査 <i>@キリノッチ</i>	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
1	7	2015/5/22	金		農業関連機関、NGO協議 <i>@キリノッチ</i>		概略設計策定 @キリノッチ	農業機材調査 <i>@キリノッチ</i>	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 <i>@キリノッチ</i>	機材調達調査 @キリノッチ
1	8	2015/5/23	±		団内協議 @キリノッチ		団内 @キリ	協議 ノッチ	CMB→(SIN)→NRT		a協議 ノノッチ	団内協議、サブコン調査 @キリノッチ	団内協議 @キリノッチ
1	9	2015/5/24	日		書類分析 @キリノッチ			i分析 <i>リノッチ</i>				i分析 ノッチ	
2	0	2015/5/25	月		ジャフナ大学協議 <i>@キリノッチ</i>		書類	大学協議 分析 ノッチ		書類	大学協議 i分析 レッチ	キリノッチ	大学協議 ⇒ コロンボ <i>コンボ</i>
2	1	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) <i>@キリノッチ</i>	建設資材調査 <i>@コロンボ</i>	機材調達調査 <i>@コロンボ</i>
2	2	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
2	3	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			3議(ジャフナ大学) ノノッチ			3議(ジャフナ大学) ノノッチ	建設資材調査 @コロンボ	機材調達調査 @コロンボ

調査日程

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
2	24	2015/5/29	金		UNWFP協議 テクニカルノート協議 <i>@キリノッチ</i>		テクニカルノート協 @キリ			テクニカルノート協 @キリ	・ 温議(ジャフナ大学) ノッチ	建設資材調査 @コロンボ	機材調達調査 @コロンボ
2	?5	2015/5/30	±		テクニカルノート署名 @キリノッチ		テクニカル <i>@キリ</i>			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 <i>@コE</i>	
2	26	2015/5/31	B		キリノッチ ⇒ ワヤンバ @コロンボ		キリノッチ ⇒ ワヤンバ <i>@コロンボ</i>	キリノッチ ⇒ ワヤンバ <i>@コロンボ</i>		キリノッチ ⇒ ワヤンバ <i>@コロンボ</i>	CMB→(SIN)→NRT	キリノッチ ⇒ ワヤンバ <i>@コロンボ</i>	キリノッチ ⇒ ワヤンバ @コロンボ
2	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 ワヤンパ ⇒ 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 <i>®コロンボ</i>
	28	2015/6/2	火		団内協議、書類分析 @コロンボ		団内協議、 @コロ	書類分析		団内協議、書類分析 @コロンボ		団内協議、 @コロ	. 書類分析 コンポ
2	29	2015/6/3	水		JICAスリランカ事務所協 議、団内協議 <i>@コロンボ</i>		JICAスリランカ事剤 @コロ			JICAスリランカ事務所協 議、団内協議 @コロンボ		JICAスリランカ事剤 @コロ	所協議、団内協議 コンボ
3	30	2015/6/4	木		CMB→(SIN)→NRT		CMB→(S	IN)→NRT		建設事情調査 @コロンボ		建設事情調査 @コロンボ	CMB→(SIN)→NRT
3	81	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	
			平(団長)、大城(企画計画)	佐々	宮武	吉野	新田	滞在先
1	2016/11/25	水	NRT>>BKK>>CMB	NRT>>SIN>>CMB		NRT>>S	IN>>CMB	コロンボ
2	2016/11/26	木	JICAスリランカ 高等教育				力事務所協議 育省協議	コロンボ
3	2016/11/27	金	ERD, M	OER		ERD,	MOER	コロンボ
4	2016/11/28	土	コロンボ <i>→=</i> ジャフナ大				→キリノッチ 大学協議	キリノッチ
5	2016/11/29	日	追加訂	<i>剛査</i>		追加	1調査	キリノッチ
6	2016/11/30	月	ジャフナ大 M/D協				大学協議)協議	キリノッチ
7	2016/12/1	火	ジャフナ大 移動(キリノッチ		NRT>>SIN>>COL		大学協議 /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 M/D協調			コロンボ
11	2016/12/5	土	CMB>>BKK>>NRT		CMB 01:10 >> 07 SIN 09:20 >> 17:0			

関係者(面会者)リスト

1. 在スリランカ日本国大使館

Mr. Masayuki Nakatsukuma 中津熊 真幸 : Second Secretary, Economic Cooperation

Section

2. JICAスリランカ事務所

Mr. Kiyoshi Amada天田 聖: Chief RepresentativeMr. Hiroyuki Abe阿部 裕之: Senior RepresentativeMr. Makoto Asai浅井 誠: Senior RepresentativeMs. Namiko Yamada山田 菜美子: Assistant Representative

(Project Formulation)

Mr. Prasad Nissanka : Project Specialist

Ms. Eriko Nakanishi 中西 枝理子 : Project Formulation Advisor

3. 高等教育省

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

4. <u>財務省</u>

Ms. W. Thanuja A. Perera : TAX Policy Advisor, Dept. of Fiscal

Policy

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

5. Department of External Resources (ERD)

M. H. H. Perera : Assistant Director
Madara De Silva : Assistant Director
J. D. G. Senanayake : Assistant Director

6. Department of Irrigation

N. Suthakaran : Deputy Director 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

8. ジャフナ大学

Prof. Ms. V. Arasaratnam : Vice Chancellor

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)

Dean of faculty of Agriculture/ Head of

Dr. Thushyanthy Mikunthan

Dr. Nalina Gnanavelrajah

Agricultural Engineering (Nov 2015)

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. RajavisahanMr. S. BranavanMr. A. AravinthanDeputy ResistorAssistant ResistorWork 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. Navarctlhren : 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

15. ペラデニア大学

Prof. K. Samarasinghe : Dean, Faculty of Agriculture

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

Prof. DPSTG Attanayake : Dean, Faculty of Agriculture & Plantation

Mgt

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

Kayathiri Kumaran : Field Coordination Officer 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. <u>Hayleys Lifesciences Ltd.</u>

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. Kazuva Suzuki

Leader,

Preparatory Survey Team,

Japan International Cooperation Agency,

Japan

Mr. R. M. P. Rathnayake

Director General.

Department of External Resources,

Diami,

Ministry of Policy Planning, Economic

Affairs, Child, Youth and Cultural Affairs,

The Democratic Socialist Republic of

Sri Lanka

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Mr. Piyasena Ranepura

Secretary,

Ministry of Higher Education and Research,

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

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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.

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

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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

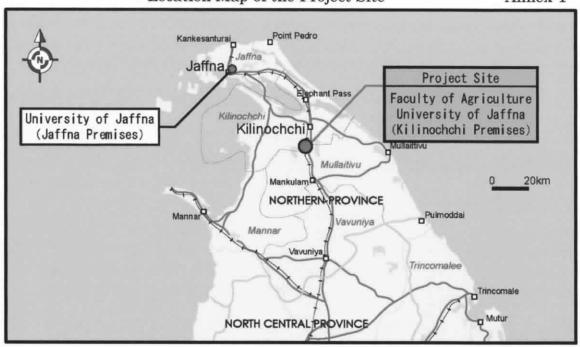
Annex-3 Revised contents requested by the Government of Sri Lanka

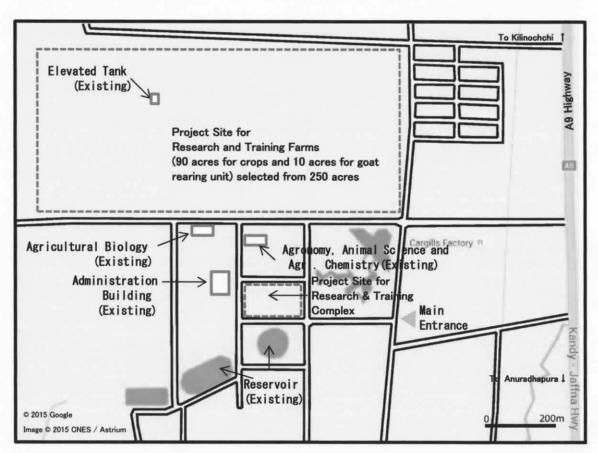
Annex-4 Japan's Grant Aid Scheme

Annex-5 Financial Flow of Japan's Grant Aid

Annex-6 Major Undertakings to be taken by Each Government

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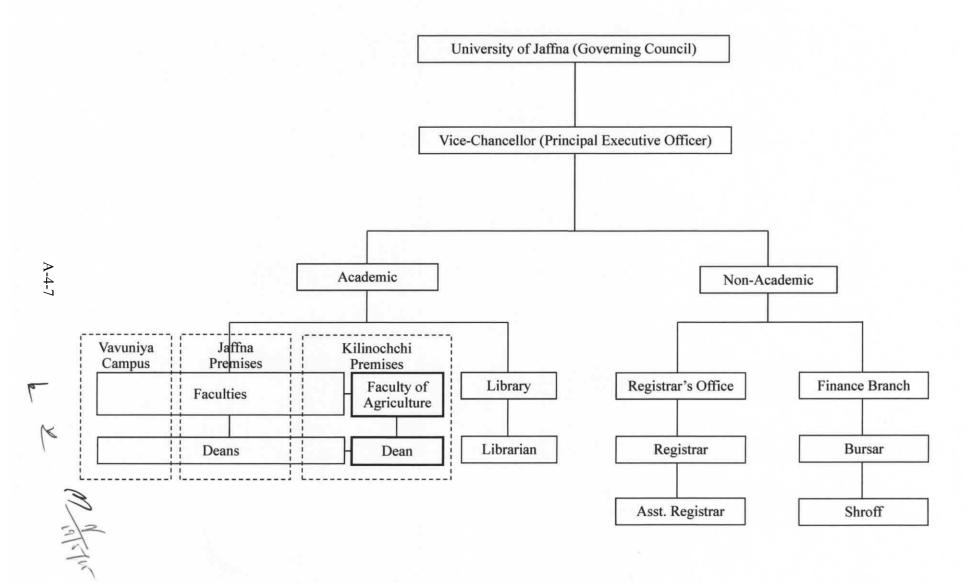




The Project Site at the Kilinochchi Premises, Faculty of Agriculture, University of Jaffna.

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Organization Chart of the Executing Agency



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	Α
4	Field experiments for research activity of academic staff and postgraduate students	A
5	Laboratory test/analysis services (to be charged)	В
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)	В
8	Training for farmers (to be funded by NGOs/donors)	С
9	Practical farm training for the visiting trainees (to be charged)	В
10	Consultancy services (to be charged)	C
11	Development of technical databases	Α
12	Development of leaflets, booklets, and other visual materials for sale in relation to farming technology	Α
13	Demonstration of advanced farming technology/systems, e.g., integrated farming (crop & livestock), animal breeding, micro-irrigation, farm mechanization, etc.	Α
14	Production of quality seeds and planting material (seedlings) (fruit crops, local vegetables, etc.)	Α
15	Keeping germ-plasm of fruit trees	Α
16	Keeping parent stock of poultry	В
17	Artificial insemination service to farmers (to be charged)	С
18	Commercial production & sales of bio-fertilizers, bio-control agents & value-added farm products	С
19	Providing farm mechanization services to farmers (to be charged)	С

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.

Contents of Requested Facilities B.

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	Multi- Purpose Training Room	В
Center	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
	Meteorological Data Collection Unit	A
Facilities attached to Farm	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

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
Plant Propagation Unit	For Students	A
	For Farmers	C
Protected Agriculture Unit	For Students	A
	For Farmers	C
Fruit Crop Germ-Plasm Collection Unit	For Students	A
 Field Corp Experimental Unit 	For Students	A
	For Farmers	C
Plantation and Agro-forestry Unit	For Students	A
	For Farmers	C
Agri. Business Center	For Students	A
	For Farmers	C
	For Public	C
Model Home Garden Unit	For Students	A
	For Farmers	С
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

Ur	it	Plan	Priority
1.	Daily Cattle Rearing Unit	For Students/Farmer/Others	С
2.	Goat Rearing Unit	For Students/Farmers/Others	A
3.	Layer Unit	For Students/Farmers/Others	С
4.	Broiler Unit	-	С
5.	Rabbit Unit	-	В
6.	Piggery	e i L-indinui	В
7.	Sheep Rearing Unit	-	В
8.	Duck - Fish Integration Unit	:=	C
9.	Waste Recycling Unit & Fodder Conservation Unit		В

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

2 19/5/10

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

& Note M

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.

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- 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

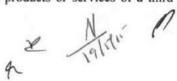
After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government 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 taxpavers.

(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)

ay and payme 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.

X

FLOW CHART OF JAPAN'S GRANT AID PROCEDURES Recipient Government Japanese Government Consultant Contract Others Flow & Works Stage Request Application *if necessary Project Identification Evaluation of the Screening of Project request Survey* Field Survey, Preliminary Examination and Project Formulation & *if necessary Survey* Reporting Preparation Preparatory Survey Selection & Field Survey, Contracting of Outline Design Consultant by Examination and Proposal Reporting Explanation of Draft Survey Report Final Report Appraisal of Project Appraisal & Approval Inter Ministerial Consultation Presentation of Draft Notes Approval by the Cabinet (E/N: Exchange of Notes) E/N and G/A (G/A: Grant Agreement) Banking (A/P : Authorization to Pay) Arrangement Issuance of Consultant Verification A/P Contract Implementation Detailed Design & Approval by Preparation for Tender Documents Recipient Tendering Government Tendering & Evaluation V Procurement Verification A/P Contract Completion Construction A/P Certificate Post Evaluation Operation Study Evaluation&

Follow up

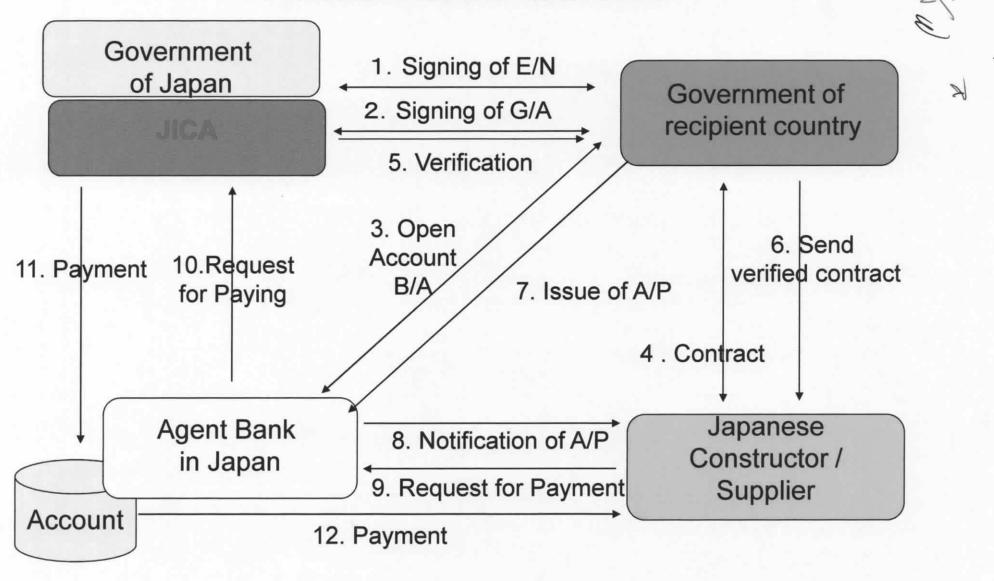
Ex-post

Evaluation

Follow up

Financial Flow of Grant Aid

Annex-5



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						
	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						
	Project sites for the Research and Training Complex and the research and training farm.		•		LOO		
	Temporary stock yard for construction near the Project area		•		LOOI		
4	To clear, level and reclaim the project site						
	Clearance of landmines and unexploded bombs from the project site		•		MoHER UOJ		
	Demolition of unnecessary existing buildings		•		UOJ		
	Removal of unnecessary existing trees		•		UOJ		
	Leveling and reclaiming the site for the building		•		IOU		
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						
	Advising commission of A/P		•		ERD		
	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						
	Marine (air) transportation of the Products from Japan to the recipient country	•			Contractor Supplier(s)		
	Tax exemption and customs clearance of the products at the port of disembarkation		•		MoHER		
	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		

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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),		•	ERD	T
	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			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.		•	IOI	
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) 		•	ION	
	 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				+
	The telephone trunk line to the main distribution frame/panel (MDF) of the building		•	lon	
	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		•	LON	
	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				
	Allocation of maintenance cost		•	MoHER	
	Operation and maintenance organization and staff		•	MoHER UOJ	
	Routine check/periodical maintenance		•	UOJ	

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

Note M

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^{*;} 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.



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

Colombo,

✓ 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

Sri Lanka

Prof. Vasanfhy Arasaratnam

Vice Chancellor

University of Jaffna,

The Democratic Socialist Republic of

Sri Lanka

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

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

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(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.

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.

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.

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



Revised contents requested by the Government of Sri Lanka

A. List of building components

	Department	Room Name	Area (m²)
	December of Case Spinner	Crop Science Laboratory	160.3
	Department of Crop Science	Staff Room	120.2
		Reproductive Physiology Laboratory	199.3
	Department of Animal Science	Animal Nutrition Laboratory	181.2
	i	Staff Room	121.5
		Soil testing and bio fertilizer Laboratory	183.3
	Department of Agricultural	Staff Room for Soil testing and bio fertilizer Laboratory	97.1
	Chemistry	Food analysis and processing Laboratory	183.3
	1	Staff Room for Food analysis and processing Laboratory	97.1
		Plant Protection and Bio control Laboratory	208.6
	Department of Agricultural Biolog	Bio-Technology and Tissue Culture Laboratory	136,0
	Department of Agricultural	Environment and Hydro Research Laboratory	160.3
	Engineering	Staff Room	120.2
	Department of Agricultural Econometrics Laboratory		119.7
	Economics	Staff Room	121.5
Research		Freezer Room	27,5
. &		Water Purification Room (GFL)	12,2
Training Complex		Water Purification Room (1FL)	12.2
JOH PICA		Analytical Measurement Room	27.5
		Microbial Analysis Room	26.8
		Lecture Hall	107.7
		Common Meeting Room A	39.0
	Common Rooms	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
		Paritry B	13.0
	Соттоп Агеа	WC / Electrical Room / Mechanical Room / Stair / Stope /	
	Re	serch & Training Complex Sub-total	3,583.5
	Outside Corridor		1,138.1
		ning Complex Total (Including Outside Comidor)	4,721,6
		Meat Processing Unit	76.6
		Dairy Processing Unit	84.4
		Food Processing Unit	98.1
		Entrance of Processing Units	13.5
Pa	rocessing Training Building	Changing Rooms	13.5
		Preparation Space	13.5
		Garbage Collection	16,4
		WC / EPS	8.0
		Processing Training Building Total	324,0





	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 Management Building	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
	Weigh Room	7.5
Animal Measurement Shed	Digestion Chamber (Cow)	9.0
Anima Meastrement Shed	Digestion Chamber (Goat)	6.0
	Animal Measurement Shed Total	22.5
Goat Shed	Goat Shed Total	48.0
	Grand Total	4,521.
Grand	Total (including Outside Space)	5,692.

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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
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



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ANNEX-I

MI	Equipment List			
No	Equipment	Basic Specifications	Q'ty	Use Application
A. D	epartment of Agronomy L	ab. (Existing)		
	Stereo microscope (1)	binocular, x45	24	To observe plant body and plant tissue/cells
	Dissection kit set (2)	9-item set	26	To dissect plant body
B. C	rop Science Lab.			
ı	Stereo microscope (2)	x300	2	To observe plant & plant cells
2	Dissection kit set (3)	9-item set	2	To dissect plant organ
	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
	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
	Weighing balance (2)	12kg, 0.1g		To weigh samples
10	Seed germination incubator	170lit, 5~50℃	2	To encourage germination of seed samples
	Plant growth chamber	400 lit., temp & humid & light	1	To encourage or inhibit plant growth by
_ 1		control	L	controlling growing environment
12	Polyethylene sealer	W:5mm, L:350mm	1	To making pots for raising seedlings
	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
	Green leaf area meter	portable, Max W: 100mm,	i_	To measure leaf area of plant samples
	Chlorophyll meter	portable, double wave length	. 1	To measure leaf area of plant samples
	Lux meter	portable, 0~199,999Lux	1	To measure amount of sunlight upper/under
		<u> </u>		isample plants
18	CO2 dissolved sensor	10 - 1000mbar CO2	. 1	To measure CO2 gas concentration
	Vernier caliper	150, 200, 300mm (3-item set)	1	To measure stem diameter of sample plants
	Clinometer	Graduation: 0~90°, 1/4°	_ 1	To measure strike and slope of geological
_	Diameter tape	10 m	1	To measure diameter of wood samples
	Increment borer	50cm length	1	To collect wood samples for counting annual
				erowth rine
23	GPS	handheld, color LCD, 240x400	_ 1_	To determine latitude, longitude and altitude
24	Water bath, with shaker	23 lit., 10~80°C, horizon-	1	To heat samples under constant temp.
		reciprocated	<u></u>	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:	1	To sterilize glassware, tools and samples by
		0.25MPa		high temp. & pressure
28	Fume hood (draft chamber)	1,500(W) x 750~800(D) x	1	To exhaust toxic gas occurred during
		1.950~2.700(H)mm	<u>L</u>	experiment
29	Refrigerator (1)	340lit., 2~14℃	i	To store samples and chemicals under low
1			L	temp, condition
	epartment of Animal Scien	ice Lab. (Exisiting)		
	Animal models of cattle	2.800x1,500x500mm		To display visual images
	Animal models of poultry	450x260x490mm	1	To display visual images
	Animal models of rabbit	520x200x330mm	1	To display visual images
	Animal models of pig	1020x260x480mm	<u> </u>	To display visual images
5	Animal models for	210x180x390mm	1	To display visual images
	monogastric (pig)	<u> </u>		
6	Animal models for	280x180x350mm	1	To display visual images
	ruminants digestive system		<u> </u>	
	Reproductive system of	700x650x1,500mm	1	To display visual images .
	male and female ruminant			
	Reproductive system of	600x70x370mm	1	To display visual images
	male and female pig			
ol		490x150x350mm]	To display visual images
기	internal and external			
	MICCINEL WIST OVERTIMES		1	
	anatomy of fish.			
		automatic, 0.2~1.0ml	1	To give vaccination to poultry
10	anatomy of fish.	automatic, 0.2~1.0ml Egg measurement	1	To give vaccination to poultry To measure dimensions of poultry egg



49

		2 (22 770 002	1	To many alliabor - One betshing
		2,600x750x800mm		To rear chicks after hatching
14	De-beaker (for poultry)			To cut chick-beak
15	Yolk color fan (checking	10 charts set	i	To check color of egg yolk
	egg color)	· · · · · · · · · · · · · · · · · · ·		
16	Sphero meter (measuring	Accuracy: I/100mm	t	To measure height of dense albumen
	egg, internal size)			
17	Fish measuring board	1.200x250x25mm, gauge unit:	1	To measure size of fish
	Electronic balance (2)	600g, 0.1g	1	To weigh samples & chemicals
	Water sampler	2 lit., with 30m rope	1	To collect water samples
	Sacchi disk (water	30cm diameter	1	To measure water color and transparency
	transparency)	Svon dianotor	•	
7:1	Ekmaman grab sampler	stainless, 240x210x350mm	1	To collect soil samples from bottom of a
~1	Eximinitali grati sample:	Statiliess, 240X210X330thin	'	•
			1 .	water body To measure pH of water solution
	pH meter (1)	portable, pH0.00~14.00		To measure electric conductivity of water
	EC meter (2)	portable, EC:0.00~	1	
24	Thermometer (1)	portable, dual channe: -100~	J	To measure temp. of samples
		1300°C & -100~1000°C		
25	BOD meter	portable, 0~20ppm,	.]	To measure water quality by BOD
26	Salinity meter	portable, 0.0~7.0%(g/100g)	<u>l</u>	To measure salinity of water solution
27	Plankton nets	φ200x500mm	1	To collect plankton
D. A	Animal Nutrition Lab.			
	Grass sampler	stainless, 300~1200rpm	1	To collect grass (feed) samples
	Digestion chamber	Goat:1,260x760x1,550mm	1	To hold animals for measuring coefficient of
^	Digostion chattoo	Caltle: 1.300x2.120x1.900mm		feed digestibility
7	Animal fistula	Cattle: \(\phi 100/270 \times 75 \times 1		To observe a digestive function of animals
1 3	Animai ristuta		,	10 00361 ve a digestive successor or annuals
\vdash	6 1 5	Goat:035/150x50mm	-	To shut an animal fistula
	Cannula fit	gastric juice collection		
] 5	Dissection set (for small	18-item set	1	To dissect animal body/organ
Ш	animals)			
	Electric pressurized washer		1	To cattle house and cattle body
	Weigh bridge for cattle	3000kg, 0.2kg, 1100x2000mm	1	To measure cattle weight
8	Animal weighing scale	table type	1	To measure weight of small animals
	(small animals)			
9	Chicken weighing scale	4kg	ţ	To measure weight of chicken
10	Electronic balance (1)	200g, 0.1mg	2	To weigh samples & chemicals
	Weighing balance (3)	2.000g, 0.1g	1	To weigh samples & chemicals
	Analytical balance	200g, 0.01mg, with hood	i	To weigh samples & chemicals
	Drying cabinet	300 lit, 10~35°C	ı	To dry glassware and tools
_	Autoclave	76 lit., 45~135°C, Max:		To sterilize glassware, tools and samples by
**	71000,000	0.25MPa		high temp. & pressure
15	Centrifuge	300-6000rpm, Max: 1000ml	ī	To separate substance from water solution
		desk-top, pH0.000~14.000	i	To measure pH of water solution
	pH meter (2)		- 1	To pulverize feed samples
	Feed crushing mill	500-800kg/hr	- ;	7
	Grinder	20000rpm or more, 150ml		To pulverize samples
	Mixer (1)	1000ml, 20000rpm	1	To mix samples
20	Homogenizer	5000~10000rpm, 0.25mI~	1	To atomize and disperse substance in water
_		10lit.	<u> </u>	solution
	Oven (2)	97 lit., 10~250°C	1_1_	To dry samples & glassware
22	Water bath, with shaker	23 lit., 10~80°C, horizon-	1	To heat samples under constant temp.
	water bath, with shaker			
	Water bath, With Shaker			condition
		reciprocated 20~200rmp	1	condition To mix and agitate water solution
23	Shaker	reciprocated 20~200rmp	1 2	
23 24	Shaker Voltex mixer	recinrocated 20~200rmp 600~3000rpm	2	To mix and agitate water solution To mix water solution in tube
23 24 25	Shaker Voltex mixer Magnetic stirrer	recinrocated 20~200rmp 600~3000rpm 50~1200rpm, 5~300°C	1	To mix and agitate water solution To mix water solution in tube To stir water solution
23 24 25 26	Shaker Voltex mixer Magnetic stirrer Vacuum pump (Lab.)	recinrocated 20~200rmp 600~3000rpm 50~1200rpm, 5~300°C 12lit/sec, 6.65Pa or more	2 1 1	To mix and agitate water solution To mix water solution in tube To stir water solution To aspirate air for accelerating filtration time
23 24 25 26 27	Shaker Voltex mixer Magnetic stirrer Vacuum pump (Lab.) Dispenser pipettes	reciprocated 20~200rmp 600~3000rpm 50~1200rpm, 5~300°C 12lit/sec, 6.65Pa or more 5 viable steps, with syringe	2 1 1 6	To mix and agitate water solution To mix water solution in tube To stir water solution To aspirate air for accelerating filtration time To dispense water solution
23 24 25 26 27	Shaker Voltex mixer Magnetic stirrer Vacuum pump (Lab.)	recinrocated 20~200rmp 600~3000rpm 50~1200rpm, 5~300°C 12lit/sec, 6.65Pa or more 5 viable steps, with syringe NDP, CF, ADF, ADL, Sample	2 1 1	To mix and agitate water solution To mix water solution in tube To stir water solution To aspirate air for accelerating filtration time To dispense water solution To make quantitative analysis of plant fiber
23 24 25 26 27 28	Shaker Voltex mixer Magnetic stirrer Vacuum pump (Lab.) Dispenser pipettes Fiber analyzer	reciprocated 20~200rmp 600~3000rpm 50~1200rpm, 5~300°C 12lit/sec, 6.65Pa or more 5 viable steps, with syringe NDF, CF, ADF, ADL, Sample size: 0.5~1.0g	2 1 1 6 1	To mix and agitate water solution To mix water solution in tube To stir water solution To aspirate air for accelerating filtration time To dispense water solution To make quantitative analysis of plant fiber content of samples
23 24 25 26 27 28	Shaker Voltex mixer Magnetic stirrer Vacuum pump (Lab.) Dispenser pipettes	recinrocated 20~200rmp 600~3000rpm 50~1200rpm, 5~300°C 12lit/sec, 6.65Pa or more 5 viable steps, with syringe NDP, CF, ADF, ADL, Sample	2 1 1 6	To mix and agitate water solution To mix water solution in tube To stir water solution To aspirate air for accelerating filtration time To dispense water solution To make quantitative analysis of plant fiber content of samples To make quantitative analysis of nitrogen and
23 24 25 26 27 28	Shaker Voltex mixer Magnetic stirrer Vacuum pump (Lab.) Dispenser pipettes Fiber analyzer Micro Kjeldhal apparatus	reciprocated 20~200rmp 600~3000rpm 50~1200rpm, 5~300°C 12lit/sec. 6.65Pa or more 5 viable steps, with syringe NDF, CF, ADF, ADL, Sample size: 0.5~1.0g 6 flasks	2 1 1 6 1	To mix and agitate water solution To mix water solution in tube To stir water solution To aspirate air for accelerating filtration time To dispense water solution To make quantitative analysis of plant fiber content of samples To make quantitative analysis of nitrogen and protein content of samples (small quantity)
23 24 25 26 27 28	Shaker Voltex mixer Magnetic stirrer Vacuum pump (Lab.) Dispenser pipettes Fiber analyzer	reciprocated 20~200rmp 600~3000rpm 50~1200rpm, 5~300°C 12lit/sec, 6.65Pa or more 5 viable steps, with syringe NDF, CF, ADF, ADL, Sample size: 0.5~1.0g	2 1 1 6 1	To mix and agitate water solution To mix water solution in tube To stir water solution To aspirate air for accelerating filtration time To dispense water solution To make quantitative analysis of plant fiber content of samples To make quantitative analysis of nitrogen and
23 24 25 26 27 28	Shaker Voltex mixer Magnetic stirrer Vacuum pump (Lab.) Dispenser pipettes Fiber analyzer Micro Kjeldhal apparatus	reciprocated 20~200rmp 600~3000rpm 50~1200rpm, 5~300°C 12lit/sec, 6.65Pa or more 5 viable steps, with syringe NDF, CF, ADF, ADL, Sample size: 0.5~1.0g 6 flasks 0.1-200mgN, sample tube: 100-300ml	2 1 1 6 1	To mix and agitate water solution To mix water solution in tube To stir water solution To aspirate air for accelerating filtration time To dispense water solution To make quantitative analysis of plant fiber content of samples To make quantitative analysis of nitrogen and protein content of samples (small quantity) To make quantitative analysis of nitrogen and protein content of samples
23 24 25 26 27 28 29	Shaker Voltex mixer Magnetic stirrer Vacuum pump (Lab.) Dispenser pipettes Fiber analyzer Micro Kjeldhal apparatus	reciprocated 20~200rmp 600~3000rpm 50~1200rpm, 5~300°C 12lit/sec, 6.65Pa or more 5 viable steps, with syringe NDF, CF, ADF, ADL, Sample size: 0.5~1.0g 6 flasks 0.1-200mgN, sample tube:	2 1 1 6 1	To mix and agitate water solution To mix water solution in tube To stir water solution To aspirate air for accelerating filtration time To dispense water solution To make quantitative analysis of plant fiber content of samples To make quantitative analysis of nitrogen and protein content of samples (small quantity) To make quantitative analysis of nitrogen and





33	Muffle furnace	11 lit., 100~1150°C	1	To burn or dry samples
	Bomb calorimeter	Max:33500 joule	-	To measure calorific value of solid/liquid
		Na, K, Li: up to 199ppm,	1	To make quantitative analysis by emission
-7	Tiame photo meter	Ca: 10-1990nm		from samples
35	Fume hood (draft chamber)	1,500(W) x 750~800(D) x	1	To exhaust toxic gas occurred during
	t unte mood (Little bilanioos)	1,950~2,700(H)mm	•	experiment
_				
36	Refrigerator (2)	150 lit., 2~14°C	2	To store samples and chemicals under low
				temp, condition
	teproductive Physiology La		·- <u>-</u>	
1	Biological microscope	binocular, x400, with micro-	.1	To observe sperms
_		warm plate		in the state of th
2	Inverted microscope	x400, phase-contrast,	1	To observe viable cells (eggs)
		mechanical stape, camera		m to the first of
	Kamar pressure-sensitive	Double-stick tape, 400pcs set	İ	To detect the time of estrus (cattle)
	mount detector			T -11
	Dummy cow	manual height adjustment	1_	To collect sperm from cattle
	Artificial vagina for cattle	Plastic, L:385mm1		To collect sperm from cattle
	Artificial vagina for goat	Plastic, L:200mm1		To collect sperm from goat
	Blood Cell counter	Thoma type	<u> </u>	To measure number of blood cells
	Sperm (semen) counting	Thoma type	1	To count number of sperms
	Needle pipette for semen	φ1.25x100mm, 10pcs set	1	To dispense sperm
	dispensing			
10	Thawing device for frozen	φ20x150mm, room temp.~	Ī	To thaw frozen sperm
	semen	65°C		The state of the s
11	Vaginal speculum for cow	horizon open type, L:300mm	1	To examine vagina and uterus, and injecting
Ш				sperm (cattle)
12	Vaginal speculum for goat	horizon open type, L:90mm	1	To examine vagina and uterus, and injecting
				sperm (goat)
	Semen injector & sheath	φ4x450mm	1	To inject sperm (Al of cattle)
	tube for cow.		-	(47 - 5
14	Semen injector & sheath	L: 230mm	1	To inject sperm (AI of goat)
Ш	tube for goat			700
15	Al kit for the field	Al kit, LN2 tank, Freezer for	1	To carry out AI on site (cattle)
-:-	• • • •	cattle semen		T- discusses assessment pandition of holy
16	Ultra sound pregnancy	portable, 60~240mm	1	To diagnose pregnancy and condition of baby
	detector	Injector & sheath tube, thawing	1	in the womb (animals) To carry out embryo transfer of cattle
	Embryo transfer equipment	1 ' '	ı	16 carry out emplyo bansier of carrie
	and accessories	device, dilating bougie, LN2 Room temp.~50°C	1	To collect fertilized egg from cows
18	Automatic irrigator for	Room temp.~30 C	ı ı	16 conect termized egg from cows
1	embryo flushing	C 400 20 cot	1	To collect mucus in the cervix for measuring
19	Catheter for removing	φ6x400mm, 30pcs set	,	
	vagina mucous	φ80x53mm, 100pcs set	-	DH (cattle) To collect fertilized egg from cows
20	Embryo collector	i pouxosium, roopes sec	'	(separation of egg from mucus)
	Dilatina kanala fan aant	Suciatura	1	To carry out embryo transfer of cattle
21	Dilating bougie for cow	Sugie type	١,	To early our emoryo transfer of carrie
1	and heifer, sugie-type	20 12:	2	To preserve sperm and eggs
	Liquid Nitrogen Gas	30 lit. 0.25ml x 20pcs, 37~38.5°C	1	To transport fertilized eggs
	Embryo (cell) transporter	165lit., CO2:0~20%, Temp.5	_	To incubate fertilized eggs and mammalian
	CO2 Incubator		1	To carry out experiment under aseptic
25	Laminar flow cabinet	Class 100, 1,300(W) x 750~	,	
_		800(D) x 1,700~2,100(H)mm		condition (to avoid contamination from dust
	Electronic balance (1)	200g, 0.1mg	2_	To weigh samples & chemicals
	Analytical balance	200g, 0.01 mg, with hood	1	To weigh samples & chemicals
	Drying cabinet	300 lit, 10~35°C	1	To dry glassware and tools To sterilize glassware, tools and samples by
29	Autoclave	76 lit., 45~ 135°C, Max:	1	•
		0.25MPa	<u> </u>	high temp. & pressure
30	Centrifuge, refrigerated (1)	Max: 21000rpm, -9~35°C	l	To separate substance from water solution
				under low temp. condition
31	Micro centrifuge	Max:13500rpm, refrigerated	i	To separate substance from small quantity of
L_				water solution
	pH meter (2)	desk-top. pH0.000~14.000	_1_	To measure pH of water solution
22	Oven (2)	97 lit 10~250°C	1	To dry samples & glassware



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2 3 Merc bath, with shaker 23 11, 10 - 80°C, horizon-recinencated 1 10 20 20 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200					
3.5 Shaker 20~200pm	34	Water bath, with shaker	· · · · · · · · · · · · · · · · · · ·	Ī	To heat samples under constant temp.
36 Volkex mixer 560~3000cmm 57 300°C 1 To mix water solution in tube 370 Meaneths stirrer 50~1200mm, 5~300°C 1 To signense repirettes 5 viable steps, with surince 6 To dispense water solution 150 lit., 2~14°C 1 To signense water solution 1 To dispense water solution 1 Solut., 2~14°C 1 To stirred solution 1 Solut., 2~14°C 1 To stirred solution 1 Solut., 2~14°C 1 To stirred solution 1 Solut., 2~14°C 1 To store samples and chemicals under low temp. condition 1 Solut., 2~14°C 1 To cenhaust toxic gas occurred during experiment 1 Solut., 2~14°C 1 To exhaust toxic gas occurred during experiment 1 Solut., 2~14°C 1 To exhaust toxic gas occurred during experiment 2 Solit august (1) 1.500°C + 2.700(H) mm 2 Solit august (1) 1.500°C + 2.700(H) mm 2 Solit august (1) 1.500°C +	L				condition
37 Monnerfo stirrer So - 1200 pmm S - 300°C 1 To stir water solution 38 Usenseer pirettes 5 viable steps, with syringe 6 To dispense water solution 1,500(W) x 750 - 800(D) x 1 To dispense water solution 1,500(W) x 750 - 800(D) x 1 To dispense water solution 1,500 w	.35	Shaker	20~200rpm	1	
Specific pipettes Spiable steps, with swringe 6 To dispense water solution 1,900(w) x 750~800(D) x 1 1 1 1 1 1 1 1 1	36	Voltex mixer	600~3000rpm	2	
Specific pipettes Spiable steps, with swringe 6 To dispense water solution 1,900(w) x 750~800(D) x 1 1 1 1 1 1 1 1 1	37	Magnetic stirrer	50~1200rpm, 5~300°C	1_	To stir water solution
Soli properties 1,500(M) x 750~800(D) x 1,950~2,700(H)mm 1,950			5 viable steps, with syringe	6	To dispense water solution
1.950~2.700(H)mm canceriment cancerime				_	+
To store samples and chemicals under low temp, condition tem	~	t dille lioud (mair elidinetr)			
Emperiment of Agro-chemistry Lab. (Existing) Fume hood (draft chamber) 1,500(W) x 750~800(D) x 1,950~2,700(H)mm G. Soil Testing and Bio-Fertilizer Lab. 1,000mm (handle), 8-auger 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1,000mm (handle), 8-auger 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To determine latitude, longitude and altitude Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during exoceriment Common (Laboratory) 1 To exhaust toxic gas occurred during expensed paratus Common (Laboratory) 1 To exhaust toxic gas occurred during expensed paratus Common (Laboratory) 1 To exhaust toxic gas occurred during expensed paratus Common (Laboratory) 1 To exhaust toxic gas occurred during expensed paratus Common (Laboratory) 1 To exhaust toxic gas occurred during expensed paratus Common (Laboratory) 1 To exhaust toxic gas occurred during expensed paratus Common (Laboratory) 1 To exhaust toxic gas occ	-	D-Cimpoten (2)	150 lt 2 - 14 c	-	To store samples and chemicals under low
F. Department of Agro-chemistry Lab. (Existing) Fume hood (draft chamber) 1,500(W) x 750~800(D) x 1 To exhaust toxic gas occurred during 1,500(W) x 750~800(D) x 1 To exhaust toxic gas occurred during 1,500(W) x 750~800(D) x 1 To exhaust toxic gas occurred during 1,500(M) x 750~800(D) x 1 To exhaust toxic gas occurred during 1,500(M) x 750~800(D) x 1 To collect soil samples 1 To measure cubic volume of sample soil 1 To measure cubic volume of sample soil 1 To measure water retention capacity of soil 1 To weigh samples & chemicals 1	40	Keingerator (2)	130 M., 2-0 14 C		
Fune hood (draft chamber) 1,500(W) x 750~800(D) x 1 To exhaust toxic gas occurred during 1,950~2,700(H)mm 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950 2,950	듣		way Y ale (Freintlan)		temp. condition
C. Soil Testing and Bio-fertilizer Lab. C. Soil Testing and Bio-fertilizer Lab.					
G. Soil Testing and Bio-fertilizer Lab. 1 GPS	1	Fume hood (draft chamber)		1	_
1 GPS	Ш		1.950~2.700(H)mm	<u></u>	lexneriment
2 Soil auger (1)					
Soil sleves	1	GPS	handheld, color LCD, 240x400	_1_	
## Soil effective volumetric canacity meter Soil texture analyzer vertical movement: 30 times/min_amolitude: 38mm pressure: 5 bar 1 To measure cubic volume of sample soil times/min_amolitude: 38mm 1 To analyze soil texture 1 To analyze soil texture 1 To measure cubic volume of sample soil times/min_amolitude: 38mm 1 To analyze soil texture 1 To measure cubic volume of sample soil times/min_amolitude: 38mm 1 To analyze soil texture 1 To measure water retention capacity of soil agregated situcture 1 To measure water retention capacity of soil agregated situcture 1 To measure water retention capacity of soil agregated situcture 1 To ensh soil samples & chemicals 1 To weigh samples water solution 1 To exhaust toxic gas occurred during 1 To weigh samples and chemicals under low terms. condition 1 To weigh samples 1 To make quantitative analysis of nitroga and protein content of samples (small quantity) 1 To weigh samples & chemicals 1 To weigh samples	2	Soil auger (1)	L:600mm (handle), 8-auger	1	To collect soil samples
## Soil effective volumetric canacity meter Soil texture analyzer vertical movement: 30 times/min_amolitude: 38mm pressure: 5 bar 1 To measure cubic volume of sample soil times/min_amolitude: 38mm 1 To analyze soil texture 1 To analyze soil texture 1 To measure cubic volume of sample soil times/min_amolitude: 38mm 1 To analyze soil texture 1 To measure cubic volume of sample soil times/min_amolitude: 38mm 1 To analyze soil texture 1 To measure water retention capacity of soil agregated situcture 1 To measure water retention capacity of soil agregated situcture 1 To measure water retention capacity of soil agregated situcture 1 To ensh soil samples & chemicals 1 To weigh samples water solution 1 To exhaust toxic gas occurred during 1 To weigh samples and chemicals under low terms. condition 1 To weigh samples 1 To make quantitative analysis of nitroga and protein content of samples (small quantity) 1 To weigh samples & chemicals 1 To weigh samples	3	Soil sieves	φ200x45mm (4 sieve sizes),	1	To separate different particle sizes of soil
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21 Fume hood (draft chamber) 1,500(W) x 750~800(D) x 1.950~2.700(H)mm 2.950~2.700(H)mm 5.950~2.700(H)mm 5.950~2.700(H)mm 6.950~2.700(H)mm 6.950~2.700(H)mm 6.950~2.700(H)mm 6.950~2.700(H)mm 6.950~2.700(H)mm 6.950~2.700(H)mm 6.950~2.950 ml x 4 holes 7.950 ml x 1	20	Rotary evaporator	20~180rpm, 1 lit. flask	_1	To evaporate solvent
1.950~2.700(H)mm exneriment			1.500(W) x 750~800(D) x	I	To exhaust toxic gas occurred during
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 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: 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		, , , , , , , , , , , , , , , , , , , ,			
Drying cabinet Dryi	22	Micro Kieldhal annaratus		1	To make quantitative analysis of nitrogen and
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 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 term, condition 26 Muffle furnace 11lit., 100~1150°C 1 To burn or dry samples H. Food Analysis and Processing Lab. To weigh samples Weighing balance (3) 2000g, 0.1g 2 To weigh samples & chemicals 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:] ~~	v zaj vranimi uppiu mius		1	
solid samples 24 Flame photo meter Na, K, Li: up to 199ppm Ca: 10~199ppm From samples 25 Refrigerator (2) 150 lit., 2~14°C 2 To store samples and chemicals under low temp. condition 11lit., 100~1150°C 1 To burn or dry samples H. Food Analysis and Processing Lab. Weighing balance (3) Electronic balance (1) Analytical balance 200g, 0.1mg To weigh samples & chemicals To dry glassware and tools Autoclave 76 lit., 45~135°C, Max: To sterilize glassware, tools and samples by high temp. & pressure To dry samples & glassware	22	Soxblet appearatus	150~250ml v 4 holes	1	
24 Flame photo meter Na, K, Li: up to 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 term, condition 11lit., 100~1150°C 1 To burn or dry samples 1 To burn or dry samples 1 Weighing balance (3) 2000g, 0.1g 1 To weigh samples 2 Electronic balance (1) 200g, 0.1mg 2 To weigh samples & chemicals 2 County of the samples 2 County of t	23	Soxillet apparatus	150 *250m x + 1101cs	l '	
Ca: 10~199ppm from samples	بيا	[P]	No. K. 1 is year 100		
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) 2 Electronic balance (1) 3 Analytical balance 4 Drying cabinet 300 lit. 10~35°C 5 Autoclave 76 lit., 45~135°C, Max: 1 To dry glassware, tools and samples by high temp. & pressure 6 Oven (2) 97 lit. 10~250°C 1 To dry samples & glassware	24	riame photo meter		, ,	
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: 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	<u> </u>		Ca: 10~199ppm		
26 Muffle furnace 11lit., 100~1150°C 1 To burn or dry samples	25	Refrigerator (2)	150 lit., 2~14°C	2	•
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: 1 To sterilize glassware, tools and samples by 0.25MPa 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	\sqsubseteq				temp, condition
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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: 1 To sterilize glassware, tools and samples by 0.25MPa 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					
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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: 1 To sterilize glassware, tools and samples by 0.25MPa 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				2	
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5 Autoclave 76 lit., 45~135°C, Max: 1 To sterilize glassware, tools and samples by 0.25MPa 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	_			 	
0.25MPa 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	1	Autociave		,	
7 Centrifuge 300∼6000rpm, Max;1000ml 1 To separate substance from water solution	—		0.25MPa	 	
			97 ld 10~250°C		
8 Grinder 20000rpmor more, 150ml 1 To crush food samples					
	8	Grinder	20000rpmor more, 150m1	1	To crush food samples





0	Homogenizer	5000~10000rpm, 0,25ml~	1	To atomize and disperse substance in water
ן י	Homogenizer	10lit.	1	· -
10	Magnetic stirrer	50~1200rpm, 5~300°C	1	solution To stir water solution
	Voltex mixer	600~3000rpm	2	To mix water solution in tube
12	Shaker -	20~200rpm	l	To mix and agitate water solution, and to
<u> </u>				incubate microorganisms
13	Water bath, with shaker	23 lit., 10~80°C, horizon-	l	To heat samples under constant temp.
		reciprocated		condition
	Hot plate	250°C, 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
	Fume hood (draft chamber)	1,500(W) x 750~800(D) x	1	To exhaust toxic gas occurred during
l *′	Tanto noon (diana viiminaan)	1.950~2.700(H)mm	_	experiment
10	Macro Kjeldhal apparatus	0.1~200mgN, sample tube:	1	To make quantitative analysis of nitrogen and
'°	iviacio Rjeidilai apparacias	100~300ml	'	protein content of samples (small quantity)
	127 - 121 1 H - I			
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
<u> </u>				solid samples
21	Fibre anayzer	NDF, CF, ADF, ADL	1	To make quantitative analysis of plant fiber
		Sample size: 0.5~1.0g		content of samples
22	Muffle furnace	11 lit., 100~1150°C	1	To burn or dry samples
23	Flame photo meter	Na, K, Li: up to 199ppm	1	To make quantitative analysis by emission
	, man pass man	Ca: 10-199ppm		from samples fit
24	Bomb calorimeter	Max:33500joule	ī	To measure calcrific value of solid/liquid
	Water activity measuring	Aw:0.10~0.98	1	To measure free water in food samples
23		AW.0.10° ~0.96	1 1	110 measure nee water in food samples
-	meter	0. 1000	- -	To manage at a fatigination
26	Rapid viscosity analyzer	0~100Pa's, sample volume: 2	1	To measure starch gelatinization
⊢		~10ml		
	Force gauge	500N	1	To measure hardness of food samples
28	Texture analyzing machine	100N]	To measure texture (hardness, solidity,
	(meat & fish)			elasticity, etc.) of meat and fish meat.
29	Fruit firmness tester	0~13kg, 0.5kg	1	To measure hardness of fruits
	(hardness meter)		L.	
30	Gerber centrifuge	1130rpm, room temp.~65°C	1	To separate butterfat from raw milk
	Milk fat tester	0~100%, sample 1.0~2.0g	1	To measure butterfat content in milk
	Alcohol gun	For milk inspection-	1	To judge freshness of milk
	Ultrasonic milk analyzer	sample 20ml, with printer	1	To analyze milk quality, e.g. fat amount, non-
33	Oli asomo nink anaryzor	Smitple 20mi, William primor	Ι'	fat solid, density, protein content, moisture,
-	n 6	-4-bl- D-1-0- 220/	1	To measure sugar content of fruits juice and
54	Refractometer	portable, Brix 0~33%	,	
-			 -	beverage
35	Salinity meter	portable, 0.0~7.0%(g/100g)	1	To measure salinity of water solution
	Ebulliometer	0~17%		To measure alcohol content of water solution
37	Thermometer (2)	bimetal type, 0~100°C	1	To measure temp, of water solution
38	Digital moisture meter	~100%	11	To measure moisture content of food samples
39	Food chromometer	410~660nm, LED lamp, Min	1	To measure color and concentrations of food
		sample: 1.0ml		samples
40	Blood cell counter	x2-3	1	To count number of colonies of bacteria
	Haemocyto-meter	Thoma type	1	To count number of cells
	Stereo microscope (3)	x115, camera adopter	1	To observe microorganisms
			2	To store samples and chemicals under low
43	Refrigerator (2)	150 lit., 2~14℃	_	*
<u> </u>	latterator (2)	dock ton = 140,000 = 14,000	-	temp. condition To measure pH of water solution
	pH meter (2)	desk-top, pH0.000~14.000	1	
45	EC meter (1)	desk top, EC: 0~199.9S/m	1	To measure electric conductivity of medium
	<u> </u>		L	solution & sample soil
	epartment of Agricultural	Biology Lab. (Existing)		
]	Magnifier	×10. φ90mm, LED light	26	To observe insect body
	Dissection kit set (5)	8-item set	26	To dissect insect body
	Ganong's potometer	lmm gauge	25	To measure transpiration
	Plant Protection and Bio-co			1 T. Martin Hill & Committee of the Comm
_	Stereo microscope (4)	x115, digital camera system,	i	To observe insect body and nematode
l ¹	Stereo inicroscope (4)		'	10 appears a macer of all and hemerage
	<u> </u>	CCD camera		<u> </u>





2				
-	Inverted microscope	x400, phase-contrast, mechanical stage, camera	I	To observe microorganisms and cells
-2	Research binocular	x1000, with phase contrast lens	1	To observe microorganisms and cells
			1	10 bosci ve interoorganismis and cons
1	microscope	& florescent filter, digital		
	51 1 1 1 1 1 1 1	camera system		To discourable here
		9-item set	1	To dissect insect body
5	Soil auger (2)	Hole auger: φ10mm (1m deep),	1	To collect soil samples
		Auger: 04cmx50cm		
-6	Nematodes sieve	33-item set	1	To collect nematode from soil
7	Sprayer (1)	laboratory portable type, 4 lit	I	To spray insecticides
8	ULV sprayer (1)	14 lit., 10~20μ particle	1	To spray ULV insecticides
	Thermo-hygrometer	Temp.:-10~45°C,	1	To measure atmosphere temp. & humidity
[Thomas nagronier	Hemid:20~95%	_	,
10	Electronic balance (1)	200g, 0.1mg	. 2	To weigh samples & chemicals
	Drying cabinet	300 lit. 10~35°C	1	To dry glassware and tools
		97 lit., 10~250°C	<u>.</u>	To dry samples & glassware
	Oven (2)		-	
13	Autoclave	76 lit., 45~135°C, Max:	1	To sterilize glassware, tools and samples by
_		0.25MPa		high temp. & pressure
	pH meter (2)	desk-top, pH0.000~14.000	1	To measure pH of water solution
	Grinder	20000rpm or more, 150ml	1	To crush samples
16	Mortar and pestle	φ150mm	L	To crush and mix samples
	Mixer (1)	1000ml, 20000rpm	<u> </u>	To mix samples
	Homogenizer	5000~10000rpm, 0.25ml~	1	To atomize and disperse substance in water
	3	10lit		solution
10	Voltex mixer	600~3000грт	2.	To mix water solution in tube
	Magnetic stirrer	50~1200rpm, 5~300°C	7	To stir water solution
		23 lit., 10~80°C, horizon-	1	To heat samples under constant temp.
21	Water bath, with shaker	,	. '	•
		reciprocated	- , -	condition
	Hot plate	250°C, 400 x 300mm		To heat solution
23	Shaker	20~200 rp m	1	To mix and agitate water solution, and to
				incubate microorganisms
24	Centrifuge, refrigerated (2)	300~15000rpm, -9~35°C,	ì	To separate substance from water solution
		Max: 1000ml		under low terns, 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
	Fume hood (draft chamber)	1,500(W) x 750~800(D) x	1	To exhaust toxic gas occurred during
	,	1.950~2.700(H)mm		experiment
28	Laminar flow cabinet	Class100, 1,300(W) x 750~	1	To carry out experiment under aseptic
		800(D) x 1,700~2,100(H)mm	i	condition (to avoid contamination from dust
20		000(D) x 1,700 2,300(11)hun		
27	In amilation models	I come2mm bandle 150mm		
	Inoculation needle	Loopφ3mm, handle 150mm,	1	To transplant cultivated bacteria to petri-
		24 eauge		To transplant cultivated bacteria to petri- dishes
30	Liquid Nitrogen container	24 sauge 30 lit.	2	To transplant cultivated bacteria to petri- dishes To preserve bacteria
30 31	Liquid Nitrogen container Incubator	24 gauge 30 lit. 150 lit., room temp. +5~60°C	2	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria
30 31 32	Liquid Nitrogen container Incubator Low temp. incubator	24 gauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C	2 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria
30 31 32	Liquid Nitrogen container Incubator	24 gauge 30 lit. 150 lit., room temp. +5~60°C	2	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by
30 31 32 33	Liquid Nitrogen container Incubator Low temp. incubator Plant growth chamber	24 sauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control	2 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment
30 31 32 33	Liquid Nitrogen container Incubator Low temp. incubator	24 eauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light	2 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by
30 31 32 33	Liquid Nitrogen container Incubator Low temp. incubator Plant growth chamber Refrigerator (1)	24 eauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control. 340 lit., 2~14°C	2 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment
30 31 32 33	Liquid Nitrogen container Incubator Low temp. incubator Plant growth chamber	24 eauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control. 340 lit., 2~14°C	2 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low
30 31 32 33 34	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue	24 eauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control. 340 lit., 2~14°C	2 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low
30 31 32 33 34	Liquid Nitrogen container Incubator Low temp. incubator Plant growth chamber Refrigerator (1)	24 sauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control 340 lit., 2~14°C Culture Lab. x115, digital camera system,	2 1 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low itemp, condition
30 31 32 33 34 K. I	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue of Stereo microscope (4)	24 gauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control. 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera	2 1 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low temp, condition. To observe plant body and plant tissue/cells
30 31 32 33 34 K. I	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue (4) Dissection kit set (4)	24 gauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control. 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera 13-item set	2 1 1 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low temp, condition. To observe plant body and plant tissue/cells To dissect plant body
30 31 32 33 34 K. I	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue (1) Stereo microscope (4) Dissection kit set (4) Electronic balance (1)	24 gauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera 13-item set 200g. 0.1mg	2 1 1 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low temp, condition To observe plant body and plant tissue/cells To dissect plant body To weigh samples & chemicals
30 31 32 33 34 K. I 1 2 3 4	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue (5) Stereo microscope (4) Dissection kit set (4) Electronic balance (1) Analytical balance	24 sauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera 13-item set 200g. 0.1mg 220g. 0.01mg, with hood	2 1 1 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low itemp, condition To observe plant body and plant tissue/cells To dissect plant body To weigh samples & chemicals To weigh samples & chemicals
30 31 32 33 34 K. I 1 2 3 4 5	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue (1) Stereo microscope (4) Dissection kit set (4) Electronic balance (1) Analytical balance Drying cabinet	24 gauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera 13-item set 200g. 0.1mg 220g. 0.01mg, with hood 300 lit. 10~35°C	2 1 1 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low temp, condition To observe plant body and plant tissue/cells To dissect plant body To weigh samples & chemicals To weigh samples & chemicals To dry glassware and tools
30 31 32 33 34 K. I 1 2 3 4 5 6	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue (1) Stereo microscope (4) Dissection kit set (4) Electronic balance (1) Analytical balance Drying cabinet Oven (2)	24 gauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera 13-item set 200g. 0.1mg 220g. 0.01mg, with hood 300 lit. 10~35°C 97 lit., 10~250°C	2 1 1 1 1 1 2 1 1 2	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low temp, condition To observe plant body and plant tissue/cells To dissect plant body To weigh samples & chemicals To weigh samples & chemicals To dry glassware and tools To dry samples & glassware
30 31 32 33 34 K. I 1 2 3 4 5 6	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue (1) Stereo microscope (4) Dissection kit set (4) Electronic balance (1) Analytical balance Drying cabinet	24 gauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera 13-item set 200g. 0.1mg 220g. 0.01mg, with hood 300 lit. 10~35°C 97 lit., 10~250°C 76 lit., 45~135°C, Max:	2 1 1 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low itemp, condition To observe plant body and plant tissue/cells To dissect plant body To weigh samples & chemicals To weigh samples & chemicals To dry glassware and tools To dry samples & glassware To sterilize glassware, tools and samples by
30 31 32 33 34 1 2 3 4 5 6	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue (1) Stereo microscope (4) Dissection kit set (4) Electronic balance (1) Analytical balance Drying cabinet Oven (2) Autoclave	24 sauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control. 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera 13-item set 200g. 0.1mg 220g. 0.01mg, with hood 300 lit. 10~35°C 97 lit 10~250°C 76 lit., 45~135°C, Max: 0.25MPa	2 1 1 1 1 1 2 1 1 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low itemp, condition To observe plant body and plant tissue/cells To dissect plant body To weigh samples & chemicals To weigh samples & chemicals To dry glassware and tools To dry samples & glassware To sterilize glassware, tools and samples by high temp, & pressure
30 31 32 33 34 K. I 2 3 4 5 6	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue (1) Stereo microscope (4) Dissection kit set (4) Electronic balance (1) Analytical balance Drying cabinet Oven (2) Autoclave	24 sauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control. 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera 13-item set 200g. 0.1mg 220g. 0.01mg, with hood 300 lit. 10~35°C 97 lit 10~250°C 76 lit., 45~135°C, Max: 0.25MPa 2.8kW. 420x470x340mm	2 1 1 1 1 1 2 1 1 2	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low itemp, condition To observe plant body and plant tissue/cells To dissect plant body To weigh samples & chemicals To weigh samples & chemicals To dry glassware and tools To dry samples & glassware To sterilize glassware, tools and samples by
30 31 32 33 34 1 1 2 3 4 5 6 7	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue (1) Stereo microscope (4) Dissection kit set (4) Electronic balance (1) Analytical balance Drying cabinet Oven (2)	24 sauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control. 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera 13-item set 200g. 0.1mg 220g. 0.01mg, with hood 300 lit. 10~35°C 97 lit 10~250°C 76 lit., 45~135°C, Max: 0.25MPa 2.8kW. 420x470x340mm	2 1 1 1 1 1 2 1 1 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low itemp, condition To observe plant body and plant tissue/cells To dissect plant body To weigh samples & chemicals To weigh samples & chemicals To dry glassware and tools To dry samples & glassware To sterilize glassware, tools and samples by high temp, & pressure
30 31 32 33 34 K. I 1 2 3 4 5 6 7	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue of Stereo microscope (4) Dissection kit set (4) Electronic balance (1) Analytical balance Drying cabinet Oven (2) Autoclave Microwave oven pH meter (2)	24 gauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera 13-item set 200g. 0.1mg 220g. 0.01mg, with hood 300 lit. 10~35°C 97 lit., 10~250°C 76 lit., 45~135°C, Max: 0.25MPa 2.8kW, 420x470x340mm desk-top. pH0.000~14.000	2 1 1 1 1 1 2 1 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low terms, condition To observe plant body and plant tissue/cells To dissect plant body To weigh samples & chemicals To weigh samples & chemicals To dry glassware and tools To dry samples & glassware To sterilize glassware, tools and samples by high temp. & pressure To fuse culture medium by heating To measure pH of water solution
30 31 32 33 34 1 2 3 4 5 6 7 8 9	Liquid Nitrogen container Incubator Low temp, incubator Plant growth chamber Refrigerator (1) Bio-technology and Tissue (1) Stereo microscope (4) Dissection kit set (4) Electronic balance (1) Analytical balance Drying cabinet Oven (2) Autoclave Microwave oven	24 sauge 30 lit. 150 lit., room temp. +5~60°C 140 lit., -10~50°C 400 lit., temp & humid & light control. 340 lit., 2~14°C Culture Lab. x115, digital camera system, CCD camera 13-item set 200g. 0.1mg 220g. 0.01mg, with hood 300 lit. 10~35°C 97 lit 10~250°C 76 lit., 45~135°C, Max: 0.25MPa 2.8kW. 420x470x340mm	2 1 1 1 1 1 2 1 1 1	To transplant cultivated bacteria to petri- dishes To preserve bacteria To incubate insects and bacteria To incubate insects and bacteria To encourage or inhibit plant growth by controlling growing environment To store samples and chemicals under low temp, condition To observe plant body and plant tissue/cells To dissect plant body To weigh samples & chemicals To weigh samples & chemicals To dry glassware and tools To dry samples & glassware To sterilize glassware, tools and samples by high temp. & pressure To fuse culture medium by heating



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10	N	150 1500 5 2000		- I
	Magnetic stirrer	50~1200rpm. 5~300°C		To stir water solution
14	Water bath, with shaker	23 lit., 10~80°C, horizon-	l	To heat samples under constant temp.
		reciprocated		condition
15	Membrane filter	With funnel and	1	To eliminate microorganisms in water
		decompression flask + suction.		solution by filtration
16	Centrifuge, refrigerated (2)	300~15000rpm, -9~35℃,	1	To dispense water solution
		Max: 1000ml		L
17	Dispenser pipettes	5 viable steps, with syringe	6	To evaporate solvent
	Fume hood (draft chamber)		ì	To exhaust toxic gas occurred during
		1.950~2.700(H)mm	-	experiment
19	Laminar flow cabinet	Class100, 1,300(W) x 750~	1	To carry out experiment under aseptic
•	Lantina 12011 Cabillet	800(D) x 1,700~2.100(H)mm	١ .	condition (to avoid contamination from dust
20	Incubator	150 lit. room temp. +5 ~60°C	1	To incubate plant tissue/cells
			_	
41	Shelves with lighting	stainless, 5 shelves,	10	To cultivate plant tissue in incubation room
	n a	900x450x1800mm		
22	Refrigerator (1)	340lit., 2~14°C	2	To store samples and chemicals under low
_				itemp, condition
		Engineering Lab. (Exisiting)		
1	Plane table	A2 size	6	To carry out plane-table survey
	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)
	Tri pod	Aluminum	6	To fix plane table and other instruments
•	111 pou	,	ľ	during surveying
7	Leveling staff	5m (5 steps)	6	To measure distance (surveying)
		50 m		
	Measuring tape		_6	To measure distance
	Drafting board and drafter	At size, with chair	6	To make drawings
	Oven (2)	97 lit., 10~250°C	1	To dry sample grains
11	Seed cleaner (2)	Winnowing of cereal seeds,	i	To clean sample grains
		laboratory-type		
12	Paddy sample divider	36 divisions, Max sample: 5kg	_ I	To divide sample grains equally
13	Grain moisture meter	portable, MC: 11~30%	<u> </u>	To measure moisture content of sample grain
14	Milling machine	laboratory-type, friction type +	1	To mill sample rice
		abrasive type (set)	l	1
15	Rice grader	laboratory-type, indent cylinder	1	To separate milled sample rice for grading
	Vernier caliper	150, 200, 300mm (3-item set)	1	To measure dimension of sample grains
	Water bath	room temp. +10~200°C, 37	1	To soak paddy grain in parboil processing
• [Wild Comit	Hit.	Ĺ	(with constant temp.)
10	Water pump (1)	4hp gasoline engine,		To explain working principle of single
10	water pump (1)		i '	
10	24	Centrifugal type	, -	cylinder 4-stroke engine
17	Steamer	drawer type, gas boiler	1	To steam soaked paddy grain in parboil
20	n	0.41%	-	processing
	Pressure cooker	2.4 lit.		To cook paddy grain in parboil processing
	Thermometers (3)	thermistor -20~250°C	1	To measure storage temp.
	<u>Humidifiers</u>	1200ml/hr	1	To measure storage humid.
23	Cut models (şix cylinder	520 0 cc	ī	To display visual images
	four stroke diesel engine)			
24	Cut models (four cylinder	1000~1300cc	1	To display visual images
	four stroke petrol engine)			
25	Cut models (synchromesh	Front 4~5 speeds, Rear I]	To display visual images
	gear box)	speed	•	To anopina, transaction and
76	Cut models (sliding mesh	and a second	1	To display visual images
20			,	10 display visani ininges
27	gear box)	Multistana abutah	-,-	To display vigual imposes
21	`	Multistage clutch	1	To display visual images
	gear box)			
28	Cut models (fully floating	Large-scaled truck type	1	To display visual images
	differential and rear wheel		ŀ	Ì
			ı	
	mechanism)			
29	mechanism). Cut models (hydraulic	Wall-hanging panel type	1	To display visual images





30	Cut models (board of fuel	j	1	To display visual images
1 }	supply system of diesel			
1 1	engine)			
м	Environment and Hydro R	esearch Lab		
		PC, digitizer, scanner, A1	1	To make computer-aided drawing
	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
	Current meter (1)	filed type. 0~3m/sec.	1	To measure current speed of canals/rivers
	Current meter (2)	laboratory type, about	2	To measure current speed of experimental
١٥	Current meter (2)		2	
_		200cm/sec.	·	canal/river models
7	Hydrothermograph logger	Temp.: -15~65°C	j	To measure and record temp. & humid. with a
	- <u></u>	Humid.: 10~99%		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
	Soil moisture meter	0~40%, TDR method	1	To measure soil moisture content
				To make simulation on soil environment
111	Lysimeter	For examining	1	to make simulation on son cityfolkheit
<u> </u>		evapotranspiration of plants.		
12	Water sample collector	2 lit., with 30m rope	1	To collect water samples
13	Water temperature meter	portable, 0~40°C, with 50m	1	To measure temp, of water samples
	EC meter (2)	portable, EC:0.00~	ī	To measure electric conductivity of water
	DO meter	portable, DO:0~19.9mg/lit	1	To measure dissolved oxygen of water
	Turbidity meter	0-3000FNU, with data logger		To measure turbidity of water samples
	Colorimeter	portable	1	To analyze water quality (absorptiometer)
18	Refrigerator (2)	150 lit., 2~14°C	l l	To store samples and chemicals under low
1	• • • •			temp, condition
N. 1	Econometrics Lab.			
 -	Computer	OS: Microsoft, i7 or more,	6	To process vast amount of data
Ι'	Computer		_	To proceed read automit of and
<u> </u>	<u></u>	with 19 inch color monitor &		<u> </u>
	Common Rooms			· · · · · · · · · · · · · · · · · · ·
<\	ater Purification Room>			
1	Water deionizer	Max: 1 lit./min.	2	To produce deionized water
7	Water distiller	About 20 lit./hr.	2	To produce distilled water
				110 produce distined water
1 7	I (Itra-nure water equipment	May: 0.65 lit /min	_	
3	Ultra-pure water equipment	Max: 0.65 lit./min.	1	To produce ultra-pure water
3 < F 1	Ultra-pure water equipment reezer Room>	Max: 0.65 lit/min.		To produce ultra-pure water
3 < F 1	Ultra-pure water equipment	Max: 0.65 lit./min. -20~-30°C, 270 lit.	_	To produce ultra-pure water To preserve samples and chemicals under
3 <f<sub>1</f<sub>	Ultra-pure water equipment reezer Room> Freezer (1)	Max: 0.65 lit/min. -20~-30°C, 270 lit.	2	To produce ultra-pure water To preserve samples and chemicals under very low term, condition
3 <f<sub>1</f<sub>	Ultra-pure water equipment reezer Room>	Max: 0.65 lit/min.		To produce ultra-pure water To preserve samples and chemicals under very low term, condition To preserve samples and chemicals under
3 < F 1	Ultra-pure water equipment reezer Room> Freezer (1)	Max: 0.65 lit/min. -20~-30°C, 270 lit.	2	To produce ultra-pure water To preserve samples and chemicals under very low term, condition To preserve samples and chemicals under
3 <f<sub>1</f<sub>	Ultra-pure water equipment reezer Room> Freezer (1) Deep freezer	Max: 0.65 lit/min20~-30°C, 270 lit30~-40°C, 380 tit.	2	To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition.
3 <f<sub>1</f<sub>	Ultra-pure water equipment reezer Room> Freezer (1)	Max: 0.65 lit/min. -20~-30°C, 270 lit.	2	To produce ultra-pure water To preserve samples and chemicals under very low terms, condition To preserve samples and chemicals under extremely low temp, condition To preserve samples and chemicals under
3 <f<sub>1 2</f<sub>	Ultra-pure water equipment reezer Room> Freezer (1) Deep freezer Ultra-deep freezer	Max: 0.65 lit/min. -20~-30°C, 270 lit. -30~-40°C, 380 tit. -70~-80°C, 330 lit.	2 1	To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition.
3 <f<sub>1 2 3</f<sub>	Ultra-pure water equipment reezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable	Max: 0.65 lit./min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit.	2	To produce ultra-pure water To preserve samples and chemicals under very low temp, condition To preserve samples and chemicals under extremely low temp, condition To preserve samples and chemicals under ultra-low temp, condition To make soft freezing of tissue cells
3 <f<sub>1 2 3</f<sub>	Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine	Max: 0.65 lit./min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day	2 1	To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition.
3 <f<sub>1 2 3</f<sub>	Ultra-pure water equipment reezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable	Max: 0.65 lit/min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day	2 1	To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition. To make soft freezing of tissue cells. To produce ice cube & flake.
3 <f1 1 2 3 4 5</f1 	Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine	Max: 0.65 lit./min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day	2 1	To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition. To make soft freezing of tissue cells. To produce ice cube & flake.
3 <f<sub>1 2 3 4 5 <a< td=""><td>Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine malytical Measurement Roo Flourimeter</td><td>Max: 0.65 lit/min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day</td><td>2 1 1</td><td>To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition. To make soft freezing of tissue cells. To produce ice cube & flake.</td></a<></f<sub>	Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine malytical Measurement Roo Flourimeter	Max: 0.65 lit/min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day	2 1 1	To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition. To make soft freezing of tissue cells. To produce ice cube & flake.
3 <f<sub>1 2 3 4 5 <a< td=""><td>Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine nalytical Measurement Roo Flourimeter UV Visible</td><td>Max: 0.65 lit/min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day</td><td>1 2 1 1</td><td>To produce ultra-pure water To preserve samples and chemicals under very low temp. condition To preserve samples and chemicals under extremely low temp. condition To preserve samples and chemicals under ultra-low temp. condition To make soft freezing of tissue cells To produce ice cube & flake To analyze vitamin and microelements To analyze DNA, protein and cell density of</td></a<></f<sub>	Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine nalytical Measurement Roo Flourimeter UV Visible	Max: 0.65 lit/min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day	1 2 1 1	To produce ultra-pure water To preserve samples and chemicals under very low temp. condition To preserve samples and chemicals under extremely low temp. condition To preserve samples and chemicals under ultra-low temp. condition To make soft freezing of tissue cells To produce ice cube & flake To analyze vitamin and microelements To analyze DNA, protein and cell density of
3 <f<sub>1 1 2 3 4 5 <a 1="" 2<="" td=""><td>Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine malytical Measurement Roo Flourimeter UV Visible Spectronhotometer</td><td>Max: 0.65 lit/min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day m> 200~900nm 190~1100nm</td><td>2 1 1 1</td><td>To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition. To make soft freezing of tissue cells. To produce ice cube & flake. To analyze vitamin and microelements. To analyze DNA, protein and cell density of samples.</td></f<sub>	Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine malytical Measurement Roo Flourimeter UV Visible Spectronhotometer	Max: 0.65 lit/min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day m> 200~900nm 190~1100nm	2 1 1 1	To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition. To make soft freezing of tissue cells. To produce ice cube & flake. To analyze vitamin and microelements. To analyze DNA, protein and cell density of samples.
3 <f<sub>1 1 2 3 4 5 <a 1="" 2<="" td=""><td>Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine nalytical Measurement Roo Flourimeter UV Visible</td><td>Max: 0.65 lit/min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day</td><td>1 2 1 1</td><td>To produce ultra-pure water To preserve samples and chemicals under very low temp. condition To preserve samples and chemicals under extremely low temp. condition To preserve samples and chemicals under ultra-low temp. condition To make soft freezing of tissue cells To produce ice cube & flake To analyze vitamin and microelements To analyze DNA, protein and cell density of samples To make quantitative analysis of various</td></f<sub>	Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine nalytical Measurement Roo Flourimeter UV Visible	Max: 0.65 lit/min. -20~-30°C, 270 lit. -30~-40°C, 380 lit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day	1 2 1 1	To produce ultra-pure water To preserve samples and chemicals under very low temp. condition To preserve samples and chemicals under extremely low temp. condition To preserve samples and chemicals under ultra-low temp. condition To make soft freezing of tissue cells To produce ice cube & flake To analyze vitamin and microelements To analyze DNA, protein and cell density of samples To make quantitative analysis of various
3 <fri 1 2 3 4 5 <a 1="" 2="" 3<="" td=""><td>Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable lee cube/flake machine malytical Measurement Roo Flourimeter UV Visible Spectrophotometer Spectrophotometer</td><td>Max: 0.65 lit./min. -20~-30°C, 270 lit. -30~-40°C, 380 tit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day m> 200~900nm 190~1100nm Min. sample: 1~2μL</td><td>2 1 1 1 1</td><td>To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition. To make soft freezing of tissue cells. To produce ice cube & flake. To analyze vitamin and microelements. To analyze DNA, protein and cell density of samples. To make quantitative analysis of various substance & DNA/RNA in samples.</td></fri 	Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable lee cube/flake machine malytical Measurement Roo Flourimeter UV Visible Spectrophotometer Spectrophotometer	Max: 0.65 lit./min. -20~-30°C, 270 lit. -30~-40°C, 380 tit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/day m> 200~900nm 190~1100nm Min. sample: 1~2μL	2 1 1 1 1	To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition. To make soft freezing of tissue cells. To produce ice cube & flake. To analyze vitamin and microelements. To analyze DNA, protein and cell density of samples. To make quantitative analysis of various substance & DNA/RNA in samples.
3 <fri 1="" 2="" 3="" 4="" 4<="" 5="" <a="" td=""><td>Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine malytical Measurement Roo Flourimeter UV Visible Spectrophotometer Spectrophotometer PCR (Tnermo-cycler)</td><td>Max: 0.65 lit./min. -20~-30°C, 270 lit. -30~-40°C, 380 tit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/dav m> 200~900nm 190~1100nm Min. sample: 1~2μL 4~99°C, 96x0.2ml tubes</td><td>1 2 1 1 1 1</td><td>To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition. To make soft freezing of tissue cells. To produce ice cube & flake. To analyze vitamin and microelements. To analyze DNA, protein and cell density of samples. To make quantitative analysis of various substance & DNA/RNA in samples. To amplify DNA</td></fri>	Ultra-pure water equipment rezer Room> Freezer (1) Deep freezer Ultra-deep freezer Freezer, programmable Ice cube/flake machine malytical Measurement Roo Flourimeter UV Visible Spectrophotometer Spectrophotometer PCR (Tnermo-cycler)	Max: 0.65 lit./min. -20~-30°C, 270 lit. -30~-40°C, 380 tit. -70~-80°C, 330 lit. -40~30°C, 3.3 lit. 180kg/dav m> 200~900nm 190~1100nm Min. sample: 1~2μL 4~99°C, 96x0.2ml tubes	1 2 1 1 1 1	To produce ultra-pure water To preserve samples and chemicals under very low term, condition. To preserve samples and chemicals under extremely low temp, condition. To preserve samples and chemicals under ultra-low temp, condition. To make soft freezing of tissue cells. To produce ice cube & flake. To analyze vitamin and microelements. To analyze DNA, protein and cell density of samples. To make quantitative analysis of various substance & DNA/RNA in samples. To amplify DNA
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2	Squeezer	Oil press, press tank cap.: 40	1	To express juice from fruit
_	\$45 (A)	lit, (φ350x400mm) 6.7 lit.	1	To crush and mix vegetables & fruits
	Mixer (2) Dough mixing machine	30 lit.	1	To mix up dough
	Baking oven	900x840x370mm	1	To bake bread
	Twin screw extruder	1~180rmp, 5Nm/screw,	1	To mix, blend, mush and shape food materials
		300°C, manual feeding	1	To do food materials
	Cabinet drier	For food drying, 3 trays	<u></u>	To dry food materials To make freeze-dried foods
	Freeze dryer	-45°C, 1.5 lit.		To make dried powder from liquid mixture
9	Spray drier	250°C, 3kg/hr.(evaporation volume)		
10	Autoclave	79 lit. 45~135°C, 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
	Vacuum gas-filling, Packaging equipment	Vacuum pump: 167lit./min.	l	To seal plastic bags after filling nitrogen gas
	Refrigerator (3)	1000 lit., -5~10°C	1	To store food materials under low temp.
	Weighing balance (2)	12kg, 0.1g	1	To weigh food materials
	Weighing balance (3)	2000g, 0.1g	1	To weigh food materials
	Electronic balance (1)	200g. 0.1mg	1	To weigh seasonings and additives
	Microwave oven	2.8kW, 420x470x340mm	1	To fuse culture medium by heating
	Daily Processing Lab.			
	Homogenizer (for milk)	100 lit/hr., 19.6MPa	1	To homogenize raw milk to prevent from fat separating
<u> </u>	Yoghrt incubator	50 lit/day, with homogenizer	1	To produce yoghurt
	Butter churner	Processing capacity: 4~10	1	To produce butter by churning
		Lit stainless	,	To produce cheese by pressing curd
	Cheese presser	stainless, plate:300x300mm		
	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 three essence etc.
7	Sterilizing milk processer	150 lit., stainless	1	To sterilize milk with very high temp. (long life milk)
8	Refrigerator (3)	1000 līt., -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
	Electronic balance (1)	200g, 0.1mg	1	To weigh seasonings and additives
	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
\mathbf{R}_{r}	Ment Processing Lab.			
	Shear force test machine	single column, Max. load 2kN	1	To measure tenderness of meat
	Meat grinder	100~150kg/hr., table-top	1	To make minced meat
	Bowl chopper	5 lit., table-top	1	To chop meat
	Linking machine	Max: 2000kg/hr.	1	To make sausage (linking)
	Meat stuffer	Manual operation1		To stuff meat into sausage casing
	Meat tumbler	6.8kg, table-top		To cut connective tissue of meat
	De boning and butchering knives	8-item set	1	To debone and cut meat
-	Ham & bacon moulding	2-item set	1	To hold ham & bacon for smoking
	Brine injector	table-top, pump injection	i	To inject brine to meat (for making ham &
	Steamer	drawer type, gas boiler	1	To process ham
	Smoke chamber	20~100°C, stainless,	1	To process ham& bacon
1	3.4	Can.:40kg of meat	1	To measure terms of most
	Meat thermometer	0~100°C	 	To measure temp, of meat To produce ice cube & flake
	Ice cube/flake machine	180kg/day	 	
	Refrigerator (3)	1000 lit., -5~10℃	1	To store meat and meat products under low temp, condition
15	Freezer (2)	220lit., -30°C	1	To preserve foods and meat materials under very low temp.
\vdash	Weighing balance (2)	12kg, 0.1g	1	To weigh meat





17 Walatina balanca (2)	2000- 0.1-	1 1	To waish man
17 Weighing balance (3)	2000g, 0.1g	- !	To weigh meat
18 Electronic balance (1)	200g, 0.1mg	<u> </u>	To weigh seasonings and additives
S. Research and Training Far	<u>'m</u>		lm 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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)		1	To plow field
4 Harrow (attachment of 4W tractor)	14 harrow discs	Ţ	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
r. Farm Machinery Worksho	p		
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
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	, , , , , , , , , , , , , , , , , , , ,		
I Sun shine recorder	300-2800nm, self-recording	1	To measure and record sunshine hours

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D. Soft Components

Topics	Output	Achievement Indicators				
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.				
il. 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. 				



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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





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.



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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

(I) 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"



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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



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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).

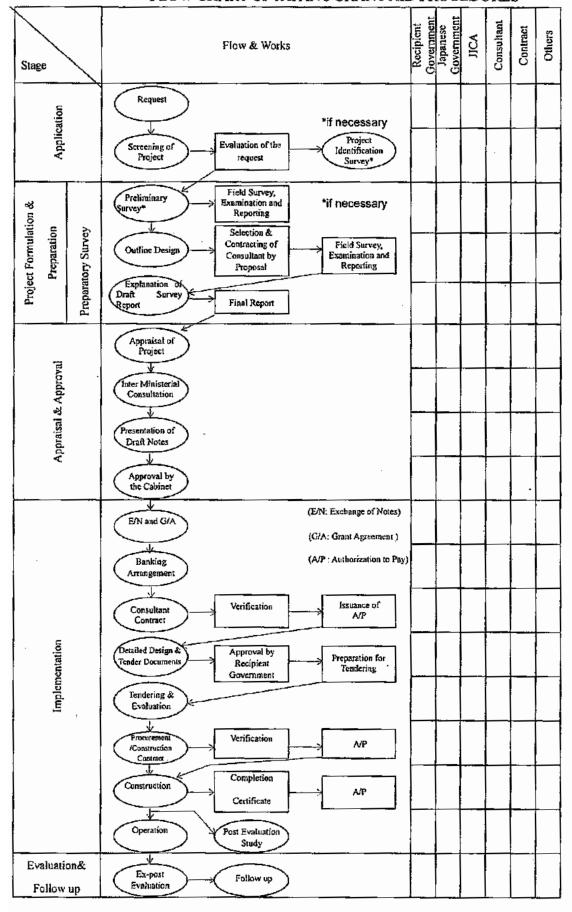
(12) Safety Measures

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



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FLOW CHART OF JAPAN'S GRANT AID PROCEDURES

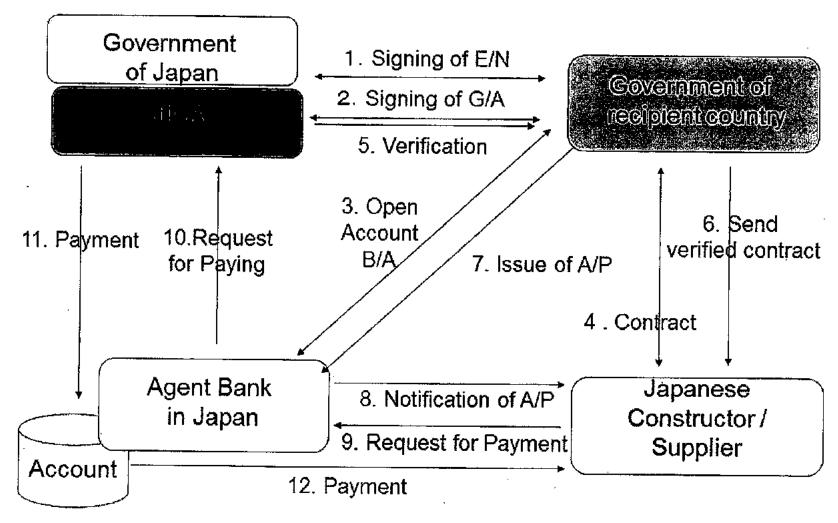




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Financial Flow of Grant Aid





Project Implementation Schedule

	1	2	3	4	5	6	7	8	9	16	11	12	13	14	15	16	17	⊺8	19	20	21	22	23	24	25	26	27	28	29	30
Detailed Design	225		iled Da		Ī		of Ter			er and	Evalu	Jation																		
Construction Execution										i	Prepar 	preakin	Ī		Super	sinuçi	work Work		Ro	oof W	_		nd Me		ezi Wo	orik				
Equipment Prosurement										_											pre-s		nt ins	-	n Stallaci	on ccion.				
Soft Chingapent																	_			-	Soft (опарс	ners						-	



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Annex 7 Major Undertakings to be taken by Each Government

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	ltems	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	บ๗		
	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	Fo obtain the planning, zoning, building permit	before commence of the construction work	UoJ	171,500	
4	To clear, level and reclaim the following sites				
	Clearance of landmines and unexploded bombs from the project site	before tender	МоНЕН ИоЈ		
	Demolition of unnecessary existing building	before	UoJ	4,800,000	
•	3) Removal of unnecessary existing trees	commencement of			
	Leveling and reclaiming the site for the building	the construction work			

2) During the Project

NO	Items	Deadline	In charge	Cost	Ref.
İ	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	МоНЕН		ĺ
		for the Project			<u></u>
	2) Advising commission of A/P	within I month after			
		the budget of the			1
		Project gets	ERD, MoHEH		
		authorized by the	1		
		national congress			
	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				T
	the recipient country and to assist internal transportation in the country of the Recipient of the				1
	products		İ		
	1) Marine (air) transportation of the Products from Japan to		Contractor		1
		during the Project	Supplier(s)		



T

_				
ł	2) Tax exemption and customs clearance of the products at the port of disembarkation	during the Project	МоНЕН	
	3) Internal transportation from the port of disembarkation to the project site	during the Project	Contractor Supplier(s)	
	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		МоНЕН	
1. !	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, esident 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	МоНЕН	56,102,000 for direct tax 237,375,000 for indirect tax
- 1	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	МоНЕН	
K	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	Contractor	
].	2) The farm	the construction	Contractor	
Ļ	3) The gates and fences in and around the site		UoJ	400,000
	4) The parking lot	before completion of	Contractor	
ļ	5) The road within the site	the construction	Contractor	
	6) The road outside the site		LoJ	
	o provide facilities for distribution of electricity, water supply, drainage and other incidental acilities necessary for the implementation of the Project outside the site(s)			
) Electricity			
1	a. The distribution power line to the site	before completion of	UoJ	14,000,000
ŀ	b. The main circuit breaker and transformer	the construction	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	N/A	
r	b. The water supply system within the site	the construction	Contractor	
3) Drainage			
	a. The city drainage main (for storm, sewer and others to the site)	before commencement of the project	ÜоJ	19, 20, 21, 21, 21
	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	CIBA THE INCIDENT OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY
	c. The gas supply system within the site	Before completion of the construction	Contractor	
E	Telephone System			
ľ				





		building	completion of the construction		
	ъ. т	he MDF and the extension after the frame/panel	before completion of the construction	Contractor	
6)	Data C	ommunication System			
	а.	Internet access to the site	1 month before completion of the construction	UoJ	
	ь.	Local area network within the site	before completion of the construction	Contractor	
7)	Furnit	ue 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.
ŧ.	To maintain and use properly and effectively the facilities constructed and equipment provided under the Japanese Grant				
	Allocation of maintenance cost		МоНЕН		
	Operation and maintenance structure	after completion of the construction	Монен Оој		
	3) Routine check/Periodic inspection		UeJ		
	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.



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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
Site Clearance and Preparation Works						
 Detection of landmines and UXO, and their 	1 set		0			
clearance		•				
Removal of unnecessary existing trees.	1 set	1,200,000		1,200,000		
Demolition of concrete floors at the training farm	1,200m²	3,600,000		3,600,000		
site	i	3,000,000				
Gate for the training farm	2 unit	400,000			400,000	
2) Installation of Utility Work	l				"	
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	U	ni	t	L	K	R
----------	---	----	---	---	---	---

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

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

Grant Agreement No. XXXXXXXX 20XX, Month

Organization Information

Authority (Signer of the G/A)	Person in Charge	Address:
	Contacts	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	Project Objective		
-2		of the Project development policy, sector and demand of target group a	
	•		
_9	Effectiveness and the	indicators	
-3	Effectiveness and the		
	- Effectiveness by the positive antitative Effect (Operation	and Effect indicators)	
	- Effectiveness by the p	project	Target (Yr 2021)
-3 Qua	- Effectiveness by the positive antitative Effect (Operation	and Effect indicators)	Target (Yr 2021)
	- Effectiveness by the positive antitative Effect (Operation	and Effect indicators)	Target (Yr 2021)



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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
}		
1		
·		
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	,	
5		
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2-1-2 Reason	2-1-2 Reason(s) for the modification if there have been any.					
İ						
					•	



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2-2 Implementation Schedule

2-2-1 Implementation Schedule

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

Y1	Orig	inal	A of wat
Items	DOD	G/A	Actual
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			į
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 <u>Completion of Soft component</u> at the time of G/A.

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

- 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			1 ,	Cost (Million Yen)		
<u></u>	Original	Actual	Original	Actual		
Construction of Facilities						
Equipment				<u> </u>		
Soft Component						
Consulting Services						
Contingency						
Total						

Note: 1) Date of estimation:

2) Exchange rate:

1 US Dollar =**Yen



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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		
			schodulo		

Note: 1) Date of estimation: 2) Exchange rate: 1 US Dollar =(local currency)	<u> </u>
•	
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)					
			 	. <u> </u>	 	
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)			
	 	·	·
	 		<u> </u>
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)	 	-	
		 	·



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Actual: (PMR)	 	<u>-</u> '	

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
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 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 Only)



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UXO Clearance Procedure



නෑවන පදිංචි කිරීම, පුනිසංස්කරණ හා නින්දු ආගමික කටයුතු අමානකාංශය மீன்குடியேற்றம்,புனர்நிர்மாணம் மற்றும் இந்துமதஅலுவல்கள் அரைச்சு Ministry of Resettlement, Reconstruction and Hindu Religious Affairs

වීම්ලවඩ් සඳහා කියාකාරී ජාතික මධාසේථානය

தேசியநிலக்கண்ணிவெடிசெயற்பாட்டுநிலை பம்

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Ministry of Resettlement, Reconstruction and Kindu 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

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

	(2) 保有器具・ 試薬品の在庫管理 が適正に行われ る。	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

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

画書を作成する。		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表も作される。	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。
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派遣時期別活動計画

1	実験・実習の実施		Ⅱ 機材管理		Ⅲ ほ場管理
一次	・実験・実習の実施状況	国内	派遣前準備	国内	派遣前準備
派遣 (10 日 現地 1 週間)	を確認する。 ・対象とする科目、内容 の概要を計画する。				ほ場管理者及びほ場 使用者(農学部)と 共に以下を実施す
国内	派遣前準備		[実験・実習機材]		る。
二次 派遣 (10 日 現地 1 週間)	・学科別に具体的な状況を開題を確認する。実施との実施をの知識するの実施をできる。実施というでは、一次では、一次では、一次では、一次では、一次では、一次では、一次では、一次	一次 派遣 (30 日)	・具体的な機材・整理を 器具等の清掃、整理を 管理方法を説明する。 ・機材の整理整成し、 クリストを作成し、 用する。 ・農学部側担当管理 に機材の保管でる。 に機材のを作成する。 [器具・試薬品] ・在庫管理方法の指導を	一次 派遣 (15 日)	・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。 ・。
国内	・ 具体的な参考書類の準 備 (「ス」国側との E-mail ベースの調整)		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	国内二次	管理の手引書の作成 (E-mail ベース)実情に合わせほ場の
三次 派遣 (14 日 現地 10 日間)	・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。		を行い、記入方法を指 導する。	派遣 (15 日 現地 1 週間)	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。
国内	完了報告書作成	国内	完了報告書作成	国内	完了報告書作成

(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

	1 2 3 4 5 6	7 8 9 10 11 12	13 14 15 16 17 18	19 20 21 22 23 24	25 26 27 28 29 30
詳細設計					
施設施工					
ほ場施工					
機材調達据付					
ソフトコンポ ーネント					

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):

Q m

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.

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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

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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:

Ele	ctrical work	Plumbing work							
1)	Electrical Power Supply System	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.

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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

this

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

2. 12

Current Situation	_	
Existing Building	Area (m2)	Remarki
Department of Agranomy		
Agronomy Laboratory	285	Labo space. + Rooms for Lecturer's and Tech.I Cifficer's, Equipment Properation and Storage
Department of Animal Science	3	
Animal Scienc Laboratory	286	Cabin space + Successor's and Technical Officer's rm, Storage, etc.
Department of April - Chemistry	0	
Laboratory A	288	Labo space + Technical Officer's space and Prep. space
Laboratory B	386	Helf used for Lako space, and helf used for Lecturer's and Technic Officer's.
Department of Agri - Bloingy	9	
Student Laboratory	270	Labo space + staff room, marage
Reserch Laboratory	170	Laboranico + steff room, storage
Staff Room GFL	157	Room for Head, lecturers, Technical Officer, Internet Lab.esc.
etali	121	
Department of Agri - Engineering	n / W	
Drawing Room	114	
Workshop	39	
Laboratory	39	· · · · · · · · · · · · · · · · · · ·
Staff Room 1FL	135	3 Room for Heed, 6 Rooms for leasurers
Department of Agri - Economics	9 3	
Lacture Hall	135	
Staff Room		2 Room for Head, & Rooms for lecturers
Common	-	
Lecture Hall (Mirror, Suitary)	147	2 Lecture Halls
Lacture Hall (host to dom, Soliding)	212	2 Lecture Halls
	7	

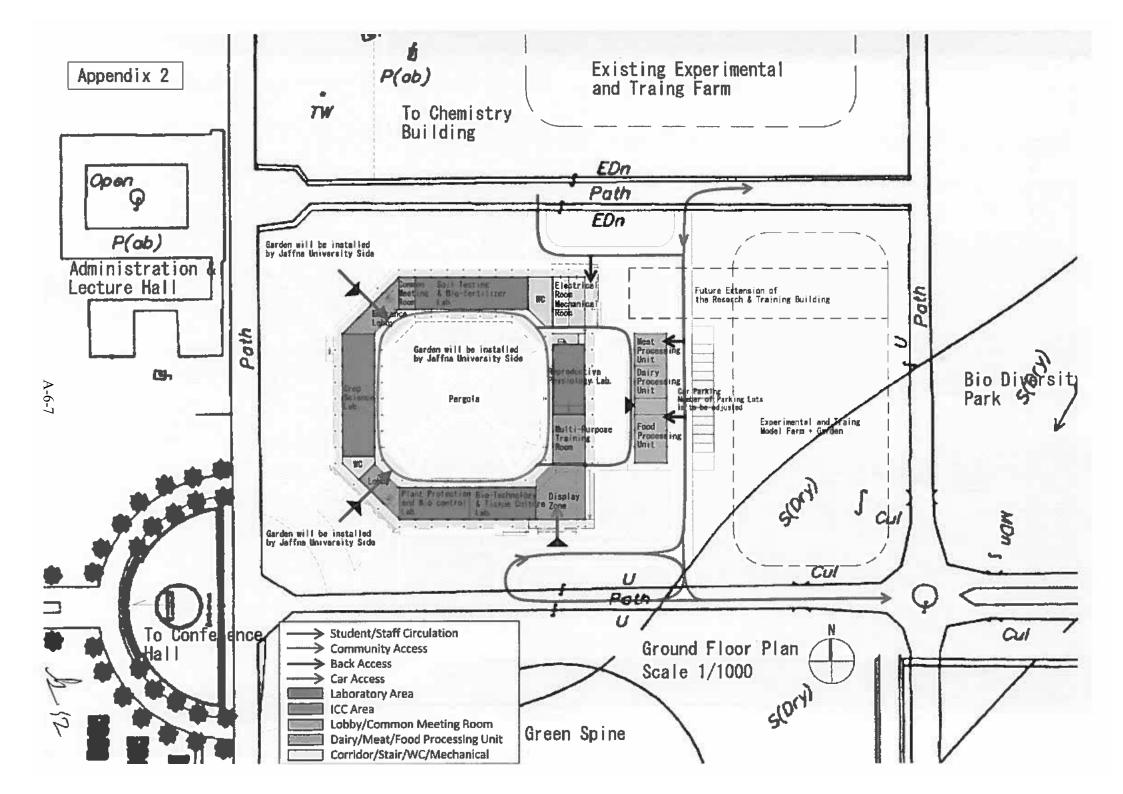
Department of Agreeomy	(m2)
Laboratory for Core Course (including York, Officer's (m)	232
Department of Animal Science	
Laboratory for Core Course (including Tech. Officer's mb)	288
Department of Agri - Chemistry	
Laboratory for Core Gourse (including Tech, Officer's ray)	228
Laboratory for Core Course (Including Tech. Officer's rm)	268
Department of Agri - Biology	
Laboratory for Core Laborat A	270
Laboratory for Core Course®	170
Staff Ream GFL	257
Hall	121
Department of Agri - Engineering	9
Drawing Room	114
Workshop	39
Department of Agri - Economics	
Lecture Hall	135
Common	
Lecture Half (Admin. Building)	147
Lecture Half (Next to Adv. Building)	212

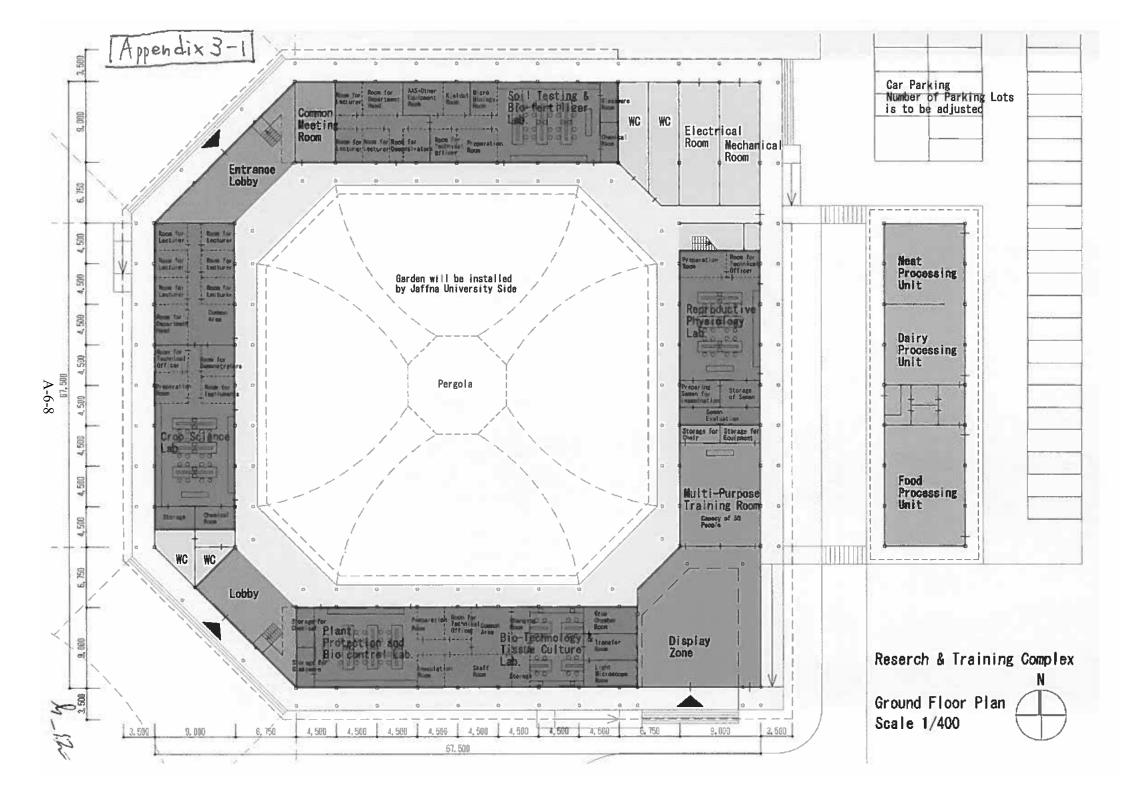
Reserch & Fraining Complex	Area (m2)	Remorks						
Department of Agronomy								
Crop Science Laboratory	172	Capacity of 20 Students, 1 Room for Technical Officer						
Staff Room	L35	Rims for Head, 6 Lecturers, 4-5 Demonstrators with Common Area						
Department of Animal Science								
Animal Nutrition Laboratory	1119	Capacity of 20 Students, & Room for Technical Officer						
Staff Room	108	Rims for Head, 6 Secturers, 4-5 Demonstrators with Common Area						
Reproductive Physiology Laboratory	176	Including 1 Room for Technical Officer						
Oupertment of Agri - Chemistry								
Soil testing and bio femilizer (aboratory	300	Capacity of 20 Students, 1 Room for Technical Officer						
Staff Room	E3	Root for Head, 6 Lecturers, 4-5 Demonstrators with Company Area						
Food analysis and processing Laboratory	200	Capacity of 20 Students, 1 Room for Technical Officer						
Staff Room	1.3	Rms for Head, 6 Lecturers, 4-5 Demonstrators with Common Area						
Department of Agri - Biology	W -							
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 floors for Technical Officer						
Staff Room	135	Rm for Head, 6 Lecturers, 4-5 Demonstrators with Common Area						
Department of Agri - Economics	10-7							
Econometrics Laboratory	100	Capacity of 25 Students,						
Staff Room	156	Rm for Head, 6 Lecturers, 4-5 Demovstrators with Common Area						
Only/ Must/ Food Processing Unit	324							
ICC Zode								
Multi-Purpose Training Room	112	Capacity of 75 people						
Display Area	205							
Cortimore								
tecture Halft	.56	Capacity of \$0 students						
Common Meeting Room	41							
Anelhical Room	54							
Lobby	182	Including Business Unit						
WC/Mechanical Rount/Sturage	637							
Total	3848							
Corrider (Ouedoor)	1170							

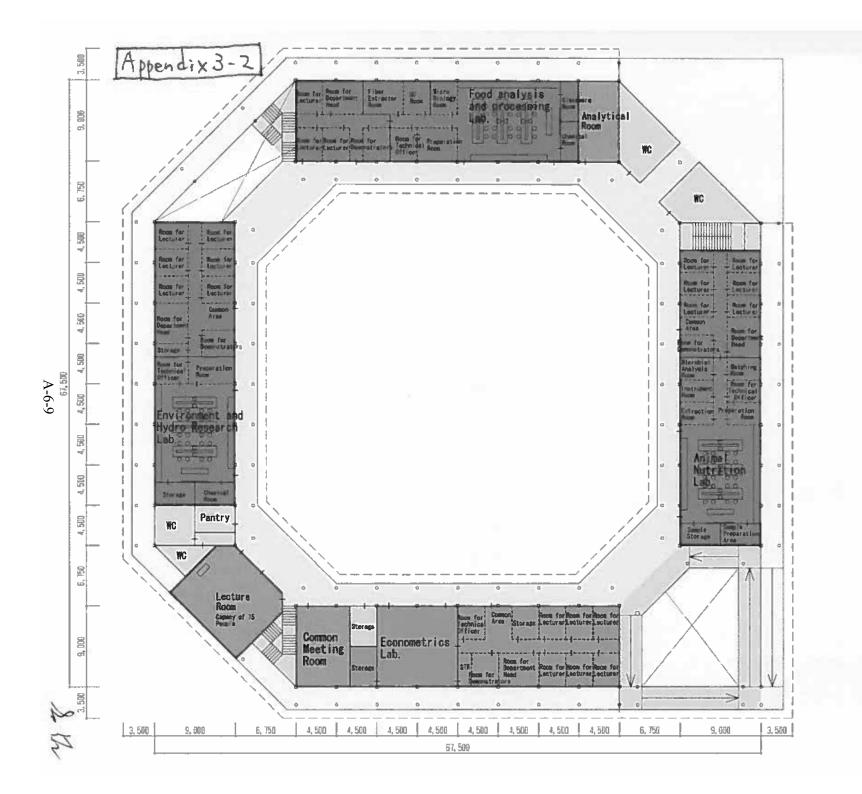
Form Related Facilities	Earl San	Remerks
Crop Harvest Processing Unit	64	
Primary sample preparation Room	64	
Farm Machinery Storage	128	
Farm Machinery Workshop	96	
Farm Lecture Room	128	
Office/WC/Storage/Gas Room	87	
Total	967	

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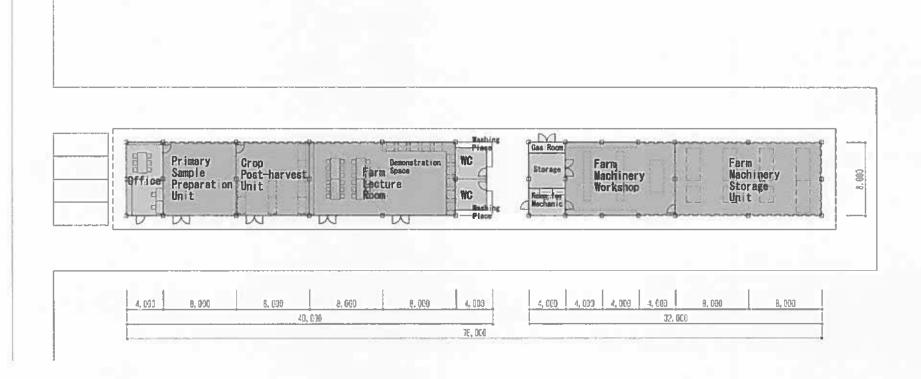




Reserch & Training Complex

1st Floor Plan Scale 1/400





Farm Management Center

Ground Floor Plan Scale 1/400



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Appendix-4 Farm area schedule

Farm Area Schedule

Unit	Size	in Ac	Remarks			
	Requested	Modified	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s			
Crop, Horticulture and Agroforestry Research	and Training F	arm				
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 (A gr. Business Centre)	3.00	0.45	(ii) Office (iii) 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	g Farm					
1. Goat-rearing Unit	10.00	5.00	Including Goat Shed			
Total	10.00	5.00				
Grand Total	100.00	19.30				

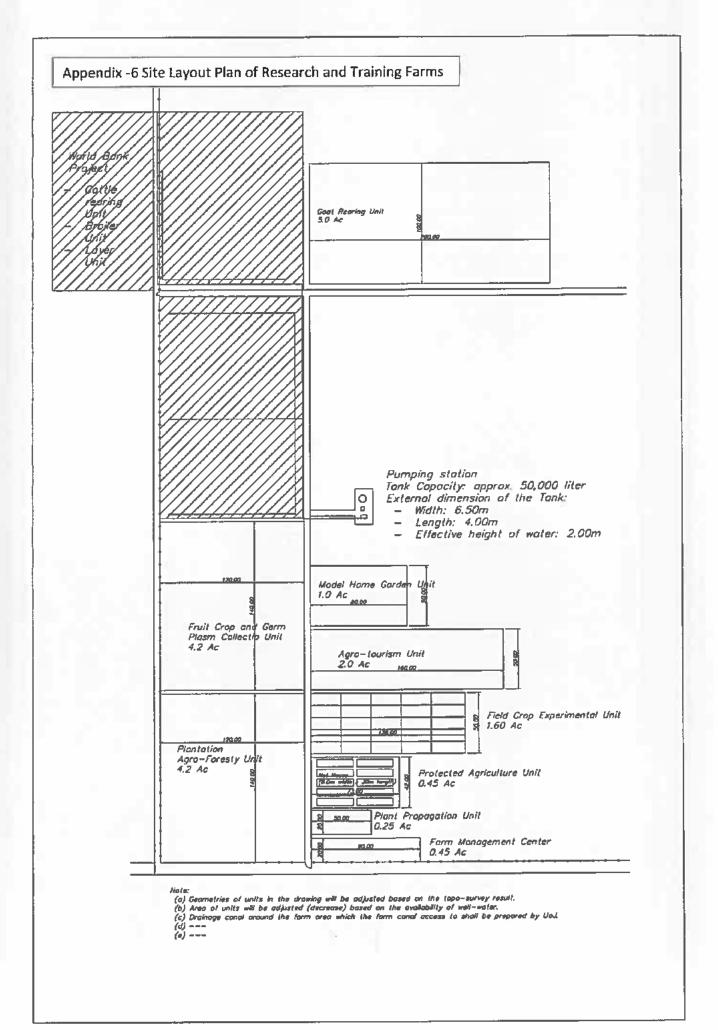
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Appendix-5

Scope or the Land Leveling Work for Farms

Unit	Clearing	Plowing	Leveling
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

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APPENDIX-7

Schedule of Utilities per Room

Research and Training Complex

Floor	Acres	Docupants		A/C	Mechenical		Ligh	nting		t Outlet	Telephone	LAN Outlet	Water	Dra	inage	LPG	Remarks
	пΖ	(Persons)		Split type	Ventilation	Fan	Туре	Lux	230V	400V			-	Waste	Chemical		
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		2	Technical Officer's Room	-	-	0	A	300	0	-	O×1	O×1	-	-	-		
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		. 1	Department Head Room	Δ		0	Α	300	0	_	Ox1	Ö×1	-	_			
		1 x6	Lecturer's Room-1.2,3.4.5.6	Δ	- =	Ō	A	300	0	_	Oxi	O×1	*	-		-	
		. 4	Demonstrator's Room	Δ	_	Ô	A	300	Ö	_	O×1	Öxi	-	_		-	
$\neg \neg$		-	Common area for Legturers		-	0	A	300	Ō	-	Oxi	O×1	G	Ω	-	-	One lavatory
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一			Storage B	-	-		D	100	_	-	-	-	-	_	-		
			Storage C			Note Chamical Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Color Co	-										
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-			Common area for Lecturers	-	-	ŏ	Ā	300	ŏ	-	O×1	0×1					One lavatory
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Revi,1 30,May,2015

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Department	Floor	Floor	Occupants	Room Name	A/C	Mechanical		Ligh	Lighting		t Outlet	Telephone	LAN Outlet	Water		inage	LPG	Remarks
1		m2	(Persons)		Split type	Ventilation	Fan	Type	Lux	230V	400V		-		Waste	Chemical		
	16		21	Food Analysis & Processing Laboratory	0	Ш		A	400	0	O(If any)	Ox1	O×1	0	-	0 1	_	Emergency show
				Gas Chromatography Room	ŏ	Ī		A	400	ŏ	-	Ox1	Oxi	ŏ	-	ŏ	_	Enter Benefit and
				Fiber Extractor Room	ŏ	· iii		Ā	400	ŏ		<u> </u>		ŏ	_	ŏ		
			2	Micro biology room	ŏ	Ī		Â	400	ŏ	_	-	_	~	-	-		
	_		-	Glass Ware Room		-	-	D	100	8	-	-	_	_	-	-		
					_	-	-			8					-			
				Chemical Room				D	100						_	-		1
				Preparation Room		ш_	Ŏ	D	300	Ŏ	-		-	0	 -			
			2	Technical Officer's Room				A	300	0	-	Ox1	O×1		-	-		
											4				-			<u> </u>
Agro-Biology	GF		21	Plant Protection & Bio-control Lab.	0	10 -	=	A	400	<u> </u>	O(If any)		O×1	0	<u> </u>			Emergency show
			-	Inoculation Room	0	H		A	400	Ö	O(lf uny)				-		<u> </u>	
			-	Glass Ware Room	-		-	D	300	0					-		-	
				Chemical Room	_	-	-	D	300	0	0	_		_		-	0	
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	1F		21	Bio-technology & Tissue Culture Lab.	0	H	-	Α	400	Ö	O(If any)	O×1	O×1	0	-	Ο.	-	
			_	Research Space	0	Ш		Α	400	0	O(If any)	-		-	-	-		
1			2	Preparation Room	-	-	0	D	300	Ō.	_		-	0	-	Ö	-	
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Agro-Engineering	GF		21	Environment & Hydro Research Rm.	0	Щ	-	A	400	0	O(If any)	O×1	O×1	0	_	0	-	Emergency show
			-	Storage			-	P	100	0	_	_		_		-	-	
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1			2	Preparation Room		Ш	0	D	300	0	-	-	-	_	_	-	-	
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1	-		1	Department Head Room	Δ	-	Ö	A	300	ŏ		O×1=	O×1	-	-	-		
	\vdash	\vdash	1 x6	Lecturer's Room-1,2,3,4,5,6	$\overline{\Delta}$		ŏ	A	300	ŏ	-	Ox1	O×I		-	-	_	
	├──		4	Demonstrator's Room	$\overline{\Delta}$	-	ŏ	Â	400	ŏ		O×1	Ö×I		i -			
	⊢—	-	-	Common area for Lecturers	-	-	8	Ā	300	ŏ	-	O×1	O×1	0	0	-	-	One lavatory
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	├	-	_	Storage A	- -	-			100			- -		_				
A	AF.		21	Multi-purpose Training Room	- <u>A</u>	1	0	В	400	0		O×1	O×1	_	-	_	_	
Agro-economics	UF.	⊢	_		-		-	D	100		-	0.71	Ų A I		-	-	-	
1	<u> </u>	┡	-	Storage for Chair		 - -	-	D	100	-	-	-	-	-	 	-	-	
l .	-		-	Storage for Equipment						0		0×1	O×I	-	-	-		
	<u> 1F</u>	<u> </u>	26	Econometries Laboratory	0		Q	A	400		-				_	-		
	<u></u>		2	Preparation Room	_	ш	0	D	300	O	-	-	-	-	-			
		_	2	Technical Officer's Room	-	-	0_	A	300	9		O×1	Ox1	-	-	-	-	
			1	Department Head Room	Δ	-	10	Α	300	Q	-	O×1	O×1	_		_		
			1 x6	Lecturer's Room-1,2,3,4,5,6	Δ		Q	_ A	300	0	-	OXI	O×1	-	<u> </u>	-		
			4	Demonstrator's Room	Δ	-	0	Α	300	0	-	0×1	O×1	-	_			
			-	Common area for Lecturers			0	Α	300	0	-	O×1	O×1	0	-0	=		One lavatory
				Storage	-	-	-	D	100	-	-	-		· -	_	-	-	
			_				1									1		1

-1	Department	Floor		Docupants	Room Name	A/C	Meshanical	Cailing	الوقا	nting	Sockel	Outlet	Telephone	LAN Outlet	Water	Dra	inage
┙		<u> </u>		(Persons)		Split type	Ventilation	Fan	Тура	Lux	230V	400V				Waste	Chemic
71	Common		100		Toilet	-		-	D	150	-	-	-	-	0	0	-
- {					Pantry		П	_	D	200	0		_	-	0	0	-
- 1				ĭ	Corridor		-	-	D	100	0	_		. .	-		_
- 1					Entrance Hall	_			CF	200	0		_	_	-	744	_
-					Electrical Room	_	I		D	100	0	O(If any)	-		+	(-1)	-
- 1			l	<u> </u>	Water Reservoir Room	-	I	_	D	100	0	Q(If any)		_		0	_
I			I										i .				
Ţ.	Farm Managem	ent Co	mter														
\neg			1														

П	Department	Floor	Floor	Оссираны	Room Name	A/C	Mechanical	Cailing	Ligh	iting	Socket	Outlet	Talaphone	LAN Outlet	Water	Dra	inage	LPG	Remarks
			Ares m2	(Persons)		Split type	Ventilation	Fan	Type	Lux	230V	400V				Wasto	Chemical		
П	Training Farm	GF			Office	Δ	Ī	0	D	300	0	-		0	0	0	-	373	Lavatory
					Preliminary Sample Preparation Un	-			D	200	0				0	0	1111	_	Utility sink
Ш					Crop Post-harvest Unit	-	-		D	200	0	-	_		0	0	<u> </u>	-	Utility sink
ш					Farm Lecture Room	Δ	_	Ö	D	200	0	-	0	0	-			_	
Ш					Toilet	-	-	_	٥	150	.		_	-	0	0		-	WC, Urinal, Lavatory
ш					Room for Mechanics	Δ		Q	D	300	0_		Q =	0	Q	l Q			Lavatory
ш					Storage	-	j –		D	100			-		-	_		-=	
ш					Cylinder's Storage	+	- (+)		_ D	100	-		-	_				-	
ш					Farm Machinery Workshop	-	-	-	D	300	0	O(If any)		5945	0	0	- 1	_	Lavatory
					Farm Machinery Storage	_			Ď	200	Ö	_	-	-	-		_	-	
Ш																			

Abbreviation

Lighting Fixture

Recessed Mount Type W/Louver FL or LED

Recessed Mount Type FL or LED

Down Light FL or LED

Surface Mount V-Shaped Type FL or LED

Surface Mount Type W/Reflector FL

Wall Light FL or LED

Mechanical Ventilation

Mechanical Ventilation
I:Supply & Exhaust Fan

Air—conditioning system
O:Installed by the Pwfeth
A:To be installed in future

- Not installed

LAN System

SW: Switching Hub O:RJ45 LAN outlet FAP:

Fire Alarm Control Panel

LPG

_ - Remarks

WC,Urinal, Lavetory

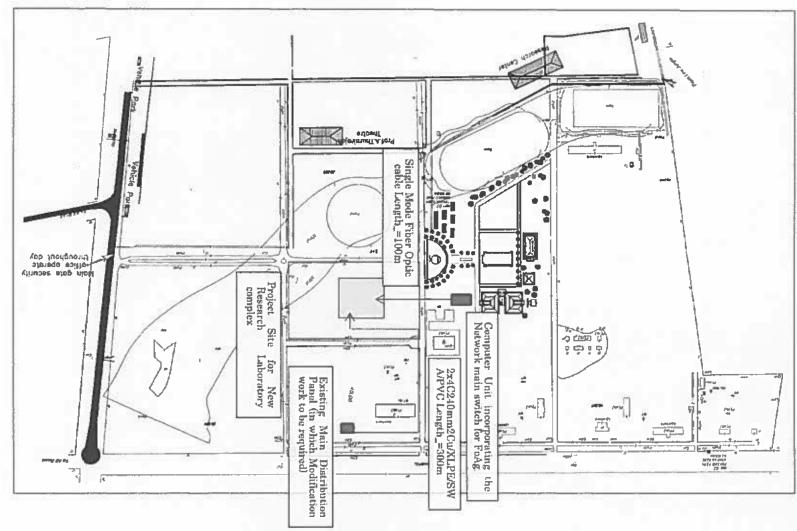
FAP, SW

LPG

Liquid Petroleum Gas

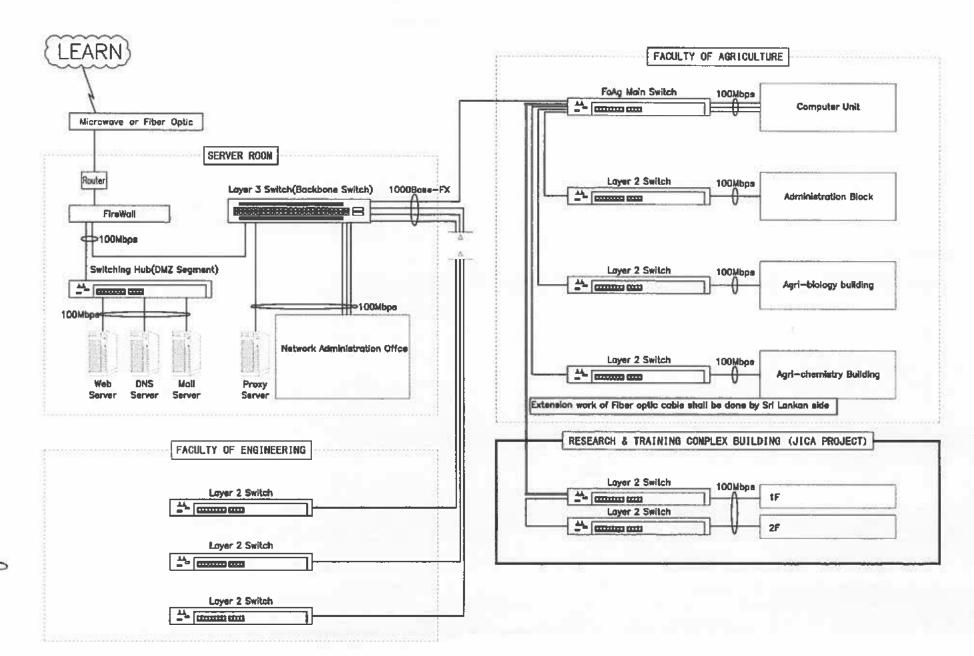
APPENDIX -8

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



No of

NETWORK EXTENSION PLAN FOR RESEARCH AND TRAINING COMPLEX



A-6-18

Appendix-10(1) List of Candidate Equipment

Department of Agronomy

No.	Equipment	Spec.
	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	
	Grain moisture meter	
9	Oven	
10	Electronic balance	
11	Weighing balance	
	Seed germination incubator	
	Refrigerators	
	Grafting knife	
	Budding knife	
	Garden scissors	
	Polyethylene sealer	plastic pot making
_	Packing machine	plants pot making
	Digital leaf area mete	portable
	Green leaf area meter	table-top
	Chlorophyll meter	labic top
	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
_	Thermometer	
28	Soil moisture meter	
	CO2 dissolved sensor	
$\overline{}$	Root scanner	
	Vanier caliber	
_	Clinometer	
_	Diameter tape	
	Increment borer	
	GPS	
_	Digital camera	
	ArcView (ArcGIS)	software
_	WinRHIZO	software
_	Statistica	software
_	Minitab	software
_	SPSS	software
_		
	Real Time Landscaping Plus Review	software
_	Water stirilizer	
_	Water bath	
	Magnetic stirrer	
40	Dispenser pipette	



47	Autoclave	
	Kjeldahl digestion and distillation unit	
_	Auto fiber analyzer	
	Muffle furnace	
51	Membrane filter	
	PCR	
53	Clean bench (laminar flow)	
	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)	
	2W tractor	
68	Attachnent of 2W tractor	rotator cultivator, trailer
	Power sprayer	
$\overline{}$	Sprinkler unit	
_	Transplanter	
	Combine harvester	
	Maximum and minimum thermometer	
	Wet & dry bulb thermometer	
-	Rain-gauge	tipping bucket
<u>, -</u>	Barometer	
	Wind anemometers	
_	Soil thermometer	
	Open pan evaporimeter	
	Sun shine recorder	
81	Hygrometer	



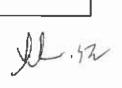
Appendix-10(2) List of Candidate Equipment

Department of Animal Science

-	F-v/	
No.	Equipment	Spec.
1	Animal models of cattle	
	Animal models of poultry	
-	Animal models of rabbit	
-	Animal models of pig	
	Animal models for monogastric (pig)	
	Animal models for ruminants digestive system (cattle)	
7	Animal models for digestive system of poultry	
	Reproductive system of male and female ruminant models	
	Reproductive system of male and female pig models	
	Reproductive system of male and female poultry models	
	General animal models for nervous system	
	General animal models for circulatory system	
13	General animal models for respiratory system	
\vdash	Dissection set (for small animals)	
=	RBC counting chamber	
	WBC counting chamber	
	CMT kit	
	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	
	Weigh bridge for cattle	
	Animal weighing scale (small animals)	
	Milking machine	
29	Binocular microscope (x400)	
30	Warm stage microscope - 100x	
31	Warm stage microscope - 400x	
32	Phase contrast microscope	
	Florescent microscope	
	Microtome	
	Microtpme sample processer	
	Electronic balance	200g, 0.5mg
37	Electronic balance	500g, 0.1g
38	Analytical balance	
39 1	Drying cabinet	
_	Autoclave	
41 (Centrifuge	3000 rpm
42 (Centrifuge, refrigirated	
	Micro centrifuge	refrigirated
44 1	lematocrit centrifuge	
_	Gerber centrifuge	milk centrifuge
46	Water distillation unit	
47	ol-l meter	desk top
		·

Mik

48	Feed crushing mill	
	Grinder	labo type
	Mixer	labo type
	Homogenizer	labo type
	Oven	laso type
	Water bath with shaker	
	Shaker	agitator
	Voltex mixer, test tube	agnator
	Magnetic stirrer	
-	Dispenser	
	Feed fiber analyzer	Fiber tec
$\overline{}$	Micro Kjeldhal apparatus	Fiber tec
	Macro Kjeldhal apparatus	
	Soxhlet apparatus	
	Muffle Furnace	
	Vaccume pump (Lab.)	Car Elfavino
	Fume hood	for filtering
	Bomb calorimeter	
	Milk fat tester	electronic
	Fatty acid analyzer	electronic
	Ultrasonic milk analyzer	Lacto Scan
	Alcohol gun	
	Refractometer	milk inspection
-	Texture analyzing machine (meat & fish)	
	Haemocytometer	
	Bovine sperm photometer	
	Sperm motility analyzer	
=	Flame photo meter	
	Amino acid analyzer	
	Incubator	general & biological
	Low temperature incubator	general & biological
-	Laminar flow cabinet	
\vdash	PCR	
	Electrophoresis	Gel, horizontal
	UV illuminator	Ger, norizoniai
ightarrow	Colony counter	
=	ELISA kit	
	ELISA reader	
-	Al kit for the field	for cattle Pt aget
	Artificial vagina for cattle	for cattle & goat
	Artificial vagina for goat	-
	Artificial vagina for poultry	
	Artificial vagina for pig	
	Ultra sound pregnancy detector	for cattle & goat
	Kamar Pressure-Sensitive Mount Detectors(Heat detection	
	aids)	
	Electronic Mount Detectors(Heat detection aids)	
	Pedometer(Heat detection aids)	
_	Chin ball detector(Heat detection aids)	
	Semen processor	
70	ourse, prosector	



97	Single straw filling and sealing machine	
	Straw printer	
99	Diluter of semen	
100	Liquid nitrogen gas container (10 L)	
	Thawing device for frozen semen	
	Vaginal speculum for cow	
	Flow cytometer machine	
	Automatic irrigator for embryo flushing	
	Catheter for removing vagina mucous	
	Embryo collector 10 pcs./set	for cattle & goat
	Dilating bougie for cow and heifer, sugie-type	
	Program freezer	
	Liquid Nitrogen gas container (30L) with square canister	
	Thawing device for frozen tube	
	Embryo transporter	for cattle & goat
	Embryo transplanter	for cattle & goat
	Cabinet type poultry incubator	Tot value de gout
	Electronic vernier (egg measurement)	
=	Egg candling light	
	Chick brooder	
	De-beaker (for poultry)	
	Yolk color fan (checking egg color)	
	Sphero meter (measuring egg, internal size)	
	Fish model to illustrate the internal and external anatomy	
	of fish	
	Fish measuring board	
	Sacchi dish (water transparency)	
	Water sampler	different depth
	Ekmnman grab sampler	bottom soil sampling
	pH meter, portable	occom son sumpring
$\overline{}$	EC meter, portable	
	Thermometer, portable	
	BOD meter, portable	
	Salinity meter, portable	
\rightarrow	Plankton nets	zoo plankton & phyto plankton
=	Homogenizer (for Yoghurt & ice cream)	200 plankton de priyto plankton
	Incubator for Yoghurt making	
	Butter churner (5 – 10 lit.)	electric
	Cheese presser	
-	Cream separator	
	Pasteurizing milk processer	
	Sterilizing milk processer	-
	Flavored milking machine	
-	ce cream maker	
\rightarrow	Steam sterilizer	spices
-	Meat mincer	
-	Meat grinder	
$\overline{}$	Bowl chopper	
	Linking machine	
	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	
-	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	

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Appendix-10(3) List of Candidate Equipment

Department of Agri. Chemistry

No.	artment of Agri. Chemistry	Const
		Spec.
	GPS	
	Sampling equipment (Soil auger)	
	Soil sieves	
	Binocular microscope	x 1000, oil emersion lens
	pH meter	
	Electrical conductivity meter	Harrie H.
	Soil texture analyzer	
	Pressure plate apparatus	
	Wet sieving equipment	wet aggregate stability study
	Soil grinder	
	Water still (double distilled water apparatus)	
	Water deionizer	
13	Conventional free-swinging equal arm balance	
	Top loading balance	2kg, 10g
15	Electronic balance	
16	Analytical balance	
17	Autoclaye	
18	Oven	
19	Centifuge	3000 rpm
20	Mixer grinder	
	High speed blender	
	Magnetic stirrer	
	Vortex stirrer	
	Shaker	
25	Shaking water bath	
	Water bath	
27	Hot plate	
	Rotary Evaporator	
	Fume hood (draft chamber)	
	Macro kjeldal	
	Micro kjeldal	
_	Soxhlet appratus	
_	Fibre anayzer	fibre tec
$\overline{}$	Muffle furnace	I I I I I I I I I I I I I I I I I I I
	Flame photometer	
\rightarrow	Spectrophotometer	
	High Performance Thin Layer Chromatography (HPTLC)	
30	Nitrogen & Carbon Analyser	
	GC (Gas chromatography)	
_	AA spectrometer	
_	Colori meter	
\rightarrow	Bomb calorimeter	
\rightarrow		
	Water activity measuring meter	food material
_	Rapid visco analyzer	8 11 1
	Texture analyzer	food hardness
	Fruit firmness tester (hardness meter)	
47	Salinometer	



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

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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 attac	ched 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	5
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
TO COMPARE SOLUTION	IMITOTO GENE de DIASE

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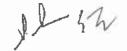
44 Laminar flow cabinet	double electrical socket, vacuum tab, gas tap with solenoid valve high level UV lamp, UV shield spare HEPA filter set, stand with casters
45 Inoculation needle	
46 Incubator	
47 Cooled incubator	Temp10 - 40 Co
48 Plant growth chamber	
49 Shelves with lighting	Incubation/culture room (Temp. 25 Co)
50 Net house	

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Appendix-10(5) List of Candidate Equipment

Department of Agri. Engineering

No.	Equipment	Spec.
1	Drawing board A3 with T square	Брее.
	Instrument box, set square 600 /300	
	Instrument box, set square 45 o	
	Rainfall meters	
	Current meter	
	Staff for water elevation	
	Sun shine recorder	
	Anemometers	
	Wet & dry bulb thermometer	
	Engine cut models and spares	
	4 wheel tractor	
	2 wheel tractor	
	Work shop tools and welding equipment	
10	Dip meter(sounding apparatus for water level measurement) Sieve set with shaker	
ιŏ	pump (open impeller, semi open impeller, close impeller)	
10	submersible pump	
	Water sampler	
	EC meter	
	DO meter	
	Spectrophotometer	
	Dumpy level	
	Theodolite	
	Tri pod	
	Plane table	
	Alidade	
_	Compass	
	Soil moisture measurement instrument (tensiometer, gypsum block,	
	neutron probe)	
	Auger	No.
	Strainer pipe	
_	Pan evaporimeter	
	Lysimeter	
	Milling machines	
	Penitrometer and Measuring tools	
	Thermometers and humidifiers	
	Evaporators and Heat exchangers	
	Cyclone	
	Calorimeter	
	oH meter	
	Gas chromatography	
	Model for land fill	
	Drip irrigation set	
	Sprinkler irrigation set	1
	Primary tillage implement	
	Second tillage implement	
	Combine harvester	



5	l Knapsack sprayer	
	Power sprayer	
	B Duster	
54	Reaper	
	Thresher	
	Seeder	
	Planter	
	Trickling filter	
	Sewage plant design	
	Bio mass burner	
	Sedimentation tank	
	Aerator	
	Separation unit	
	Gasifier	
	Bio filter	
	Activator	
	Sludge chamber	
	Single and multi-effect evaporators	
	bomb calorimeter	
	Electronic balance	
_	Freezer	
_	Ruttner Water sample collector	
	Refrigerator	
	Turbidity meter	
	Sun drying	
	Drier or Oven	
	Oven	
	Analytical balance (four digits)	
79	Potable colori meter(DR 2700)	
	Incubator (26 - 50oC) and manifold filter with vacuum pump	
80	(eight filtering unit)	
	BOD Incubator (0 – 20oC)	
	Thermo stable Water bath 30 - 120 o C	
83	Re-circulatory soaking setup – Water pump and sprinkler head	
	Auto clave (15 psi)	
	Pressure cooker	
	Steamer	
	A laboratory-scale rice huller	
	Polisher	
89	Rice Grader	Labo-type, Indent Cylinder
90	Cyclone cylinder (seed cleaning)	Labo-type
	Seed paddy divider	Labo-type
	Electrical Rice cooker	77-
95	Volumetric flask	
96	Electronic taste analyzer	
	Gluco-meter kit	
98	Kjeldhar apparatus (Digestion, distillation and titration)	
	Venire caliber	
103	Micro meter	

104	Potable grain moisture meter
	Microwave oven
	Digital image analyzer
107	Eureka bucket
108	Fruit penetro meter (Digital)
109	Colorimeter (Digital)
110	Refractor meter (Digital)
	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

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



		П	Portions by the Sr	ilani	ran Side
			Items		Budget (Rough Estimation in Rs.)
c)	tank, pumps, piping and fixtures Sewerage system including piping works within the Project site Waste water treatment facility (Septic tanks and	a)	_ ×	a)	Will be estimated based on the total project cost.
e)	soaked pits) Storm drainage piping to the existing open ditch inside the Project site	l.	Banking Arrangement (B/A) namely the advising commission of the Authorization to Pay (A/P) and payment commission		project cost.
(f) g)	Fire extinguishing facility (Fire extinguishers) Air conditioning system and Mechanical Ventilation system		Smooth customs clearance, tax exemptions, and prompt internal transportation for the imported construction materials and equipment	b)	
(5)	External Work for the Building Road, path and parking lots within the site	-	Governmental works including the application and obtaining of governmental approvals and permissions	c)	Rs. 169,630 for Planning Clearance (UDA) Rs. 1,500 for Building Construction Application (Kilinochchi Pradesasava)
(6)	Equipment				
	Equipment for Research	(5)	<u>Tax exemptions and necessary preferential</u> <u>treatment</u> 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)	
		Afte	er the Constrtuction		
		(8)	Management, operation and maintenance cost for the new building and facilities	(8)	



Appendix-12

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මිමේ අංකය உழுது මුහ. Your Number

<u>දුරකටිනය:</u> නොකොම්පාණ 021 206 0175 Telephone :

Fax: 021 206 0175

(IA)

பாற்பாணப் பல்கலைக்கழகம் - இலங்கை UNIVERSITY OF JAFFNA - SRI LANKA

> OFFICE OF THE DEAN FACULTY OF AGRICULTURE ARIVIYAL NAGAR, KILINOCHCHI

තෑ.මෙ ,අංකය-57 තිරුනෙල්වේලී , යාපනය

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

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 personals are 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.

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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

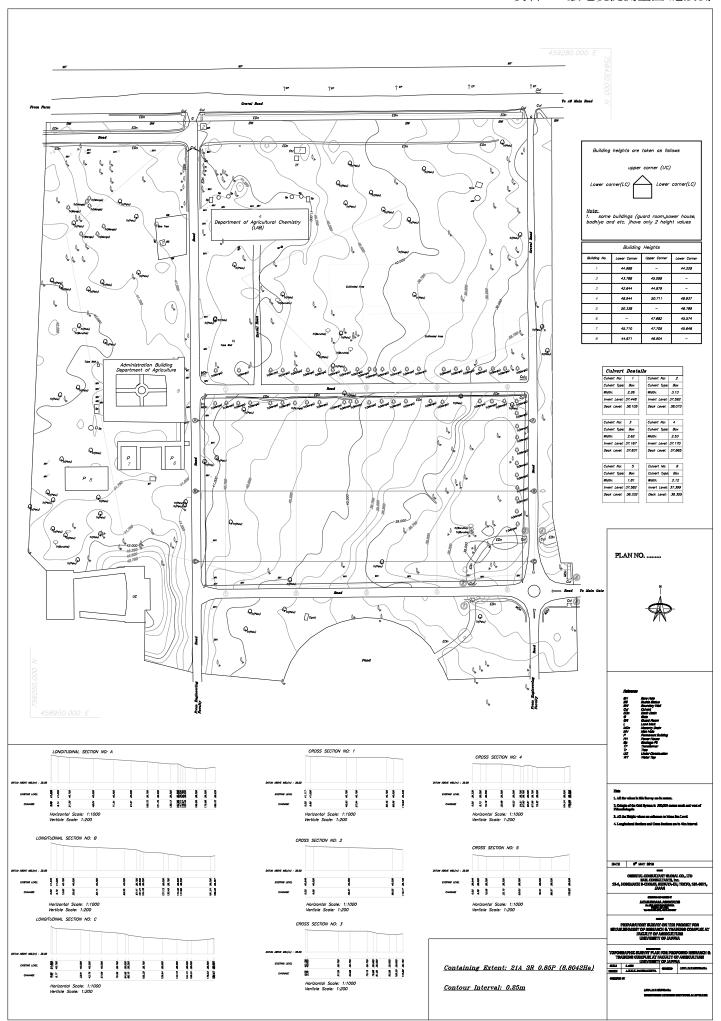
Vice Chancellor/University of Jaffna

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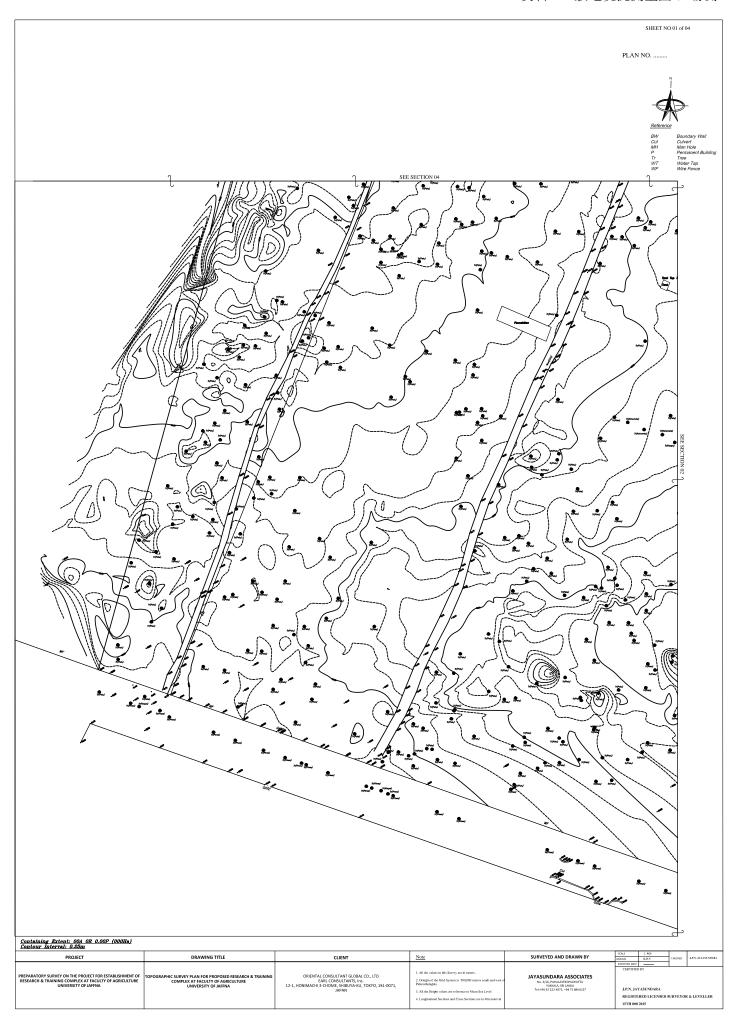
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1	Electricity Tariff	Ceylon Electricity Board	紙媒体	1					JR•CR()•SC	
2	Electricity Bill Copy Data of University	Ceylon Electricity Board/ University of Jaffna	紙媒体	1					JR•CR()•SC	
3	Quotation for Power Supply to the R & T Farm	Ceylon Electricity Board/ 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	·	Department of Government Printing	紙媒体	1					JR•CR()•SC	
7	·	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	

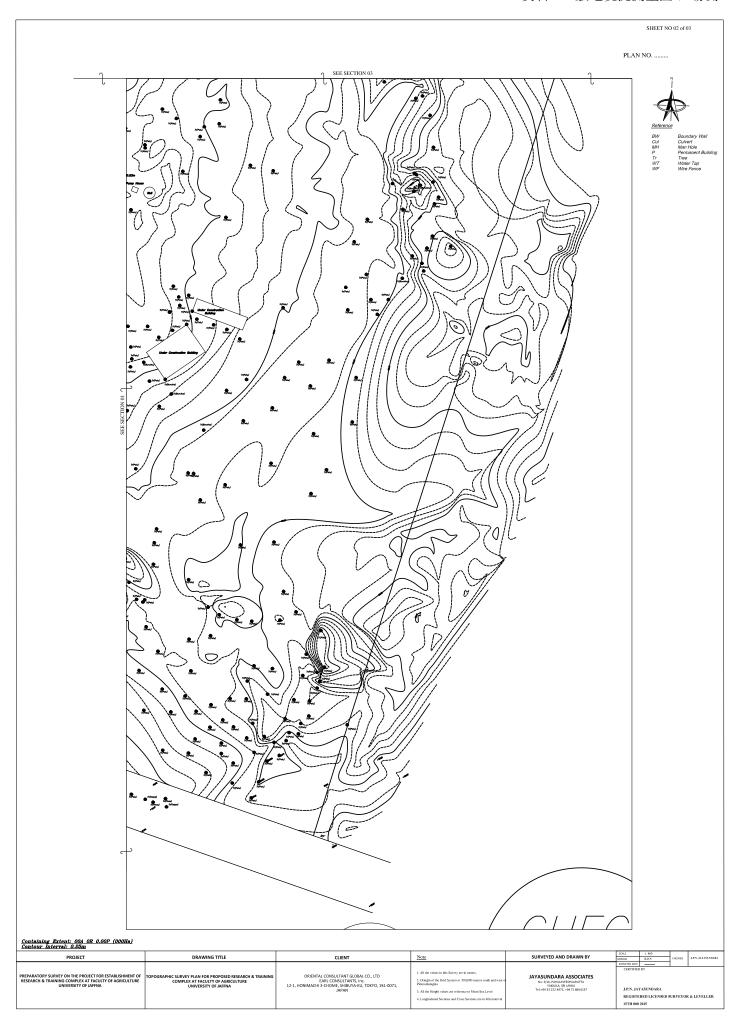
ジャフナ大学農学部研究施設等建設計画準備調査 収集資料リスト

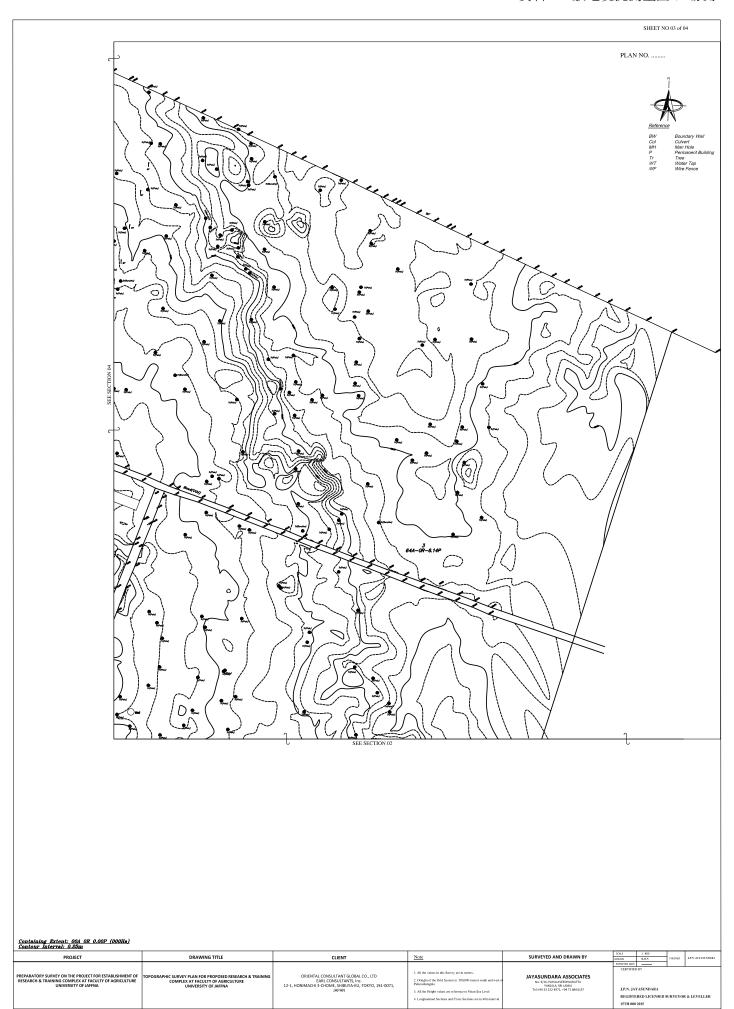
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20	General layout plan of Sports Complex	University of Jaffna	紙媒体	1					JR•CR()•SC	
21	Indian Buildings	University of Jaffna	電子データ	1					JR•CR()•SC	
22	M.Sc in Environmental Management 2011/12 (Batch 1) Dissertation Title	University of Jaffna	紙媒体	1					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	
	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	
	Meteorogical Data on JAFFNA (Daily maxi/min temperature, Daily relative humidity, Daily wind	Ministry Disaster Management, Department of Meteorology	電子データ	1					JR•CR()•SC	

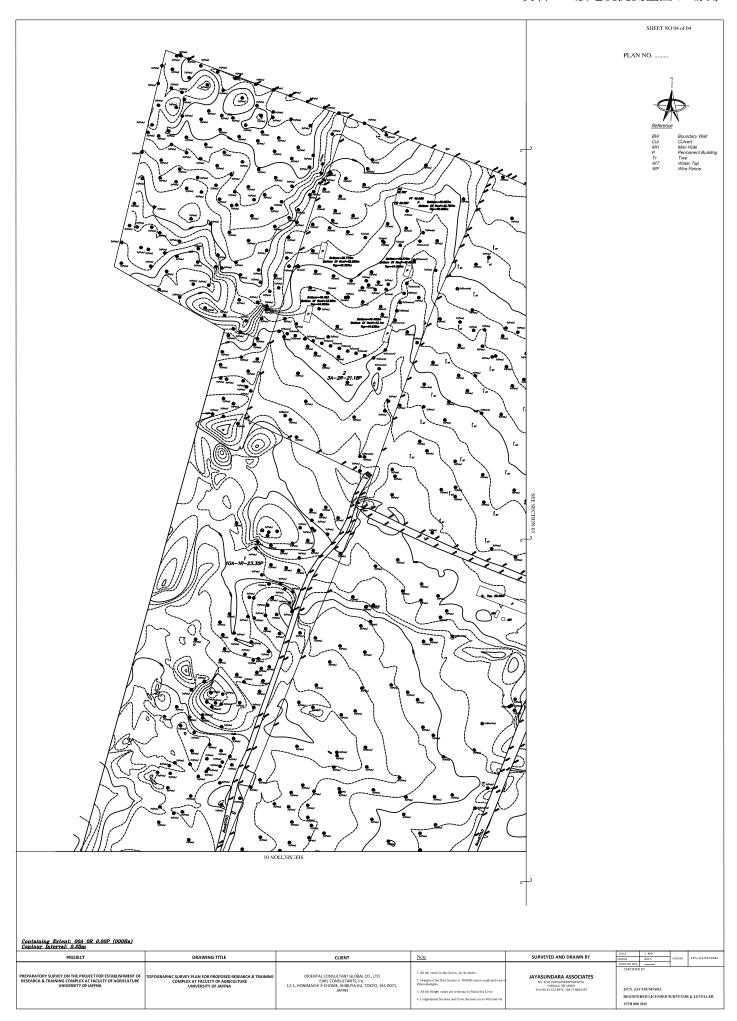


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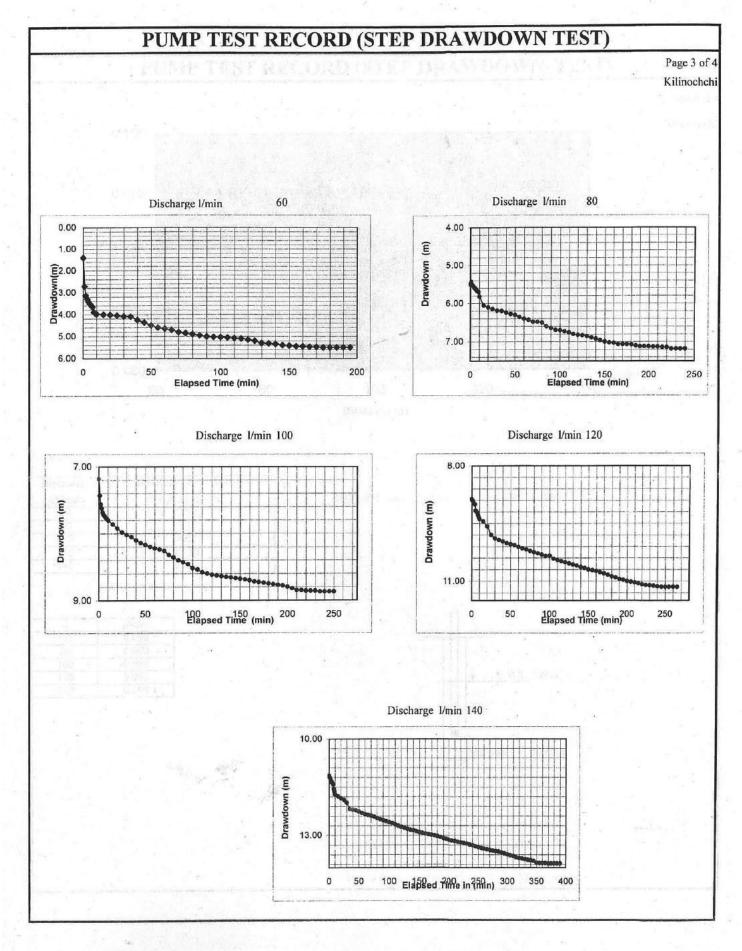
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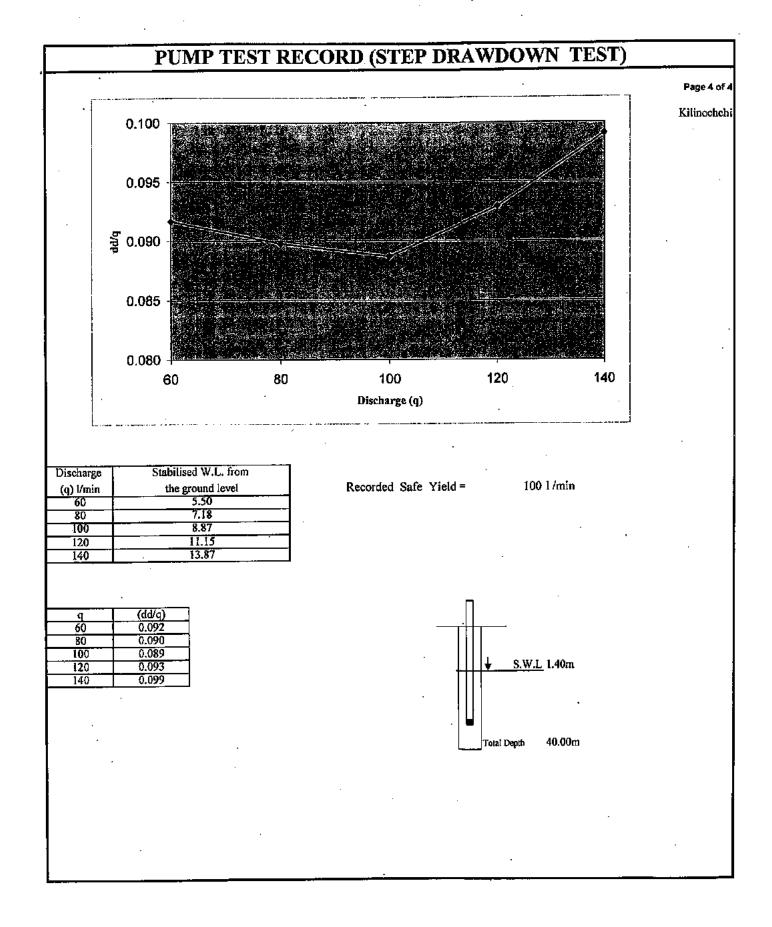
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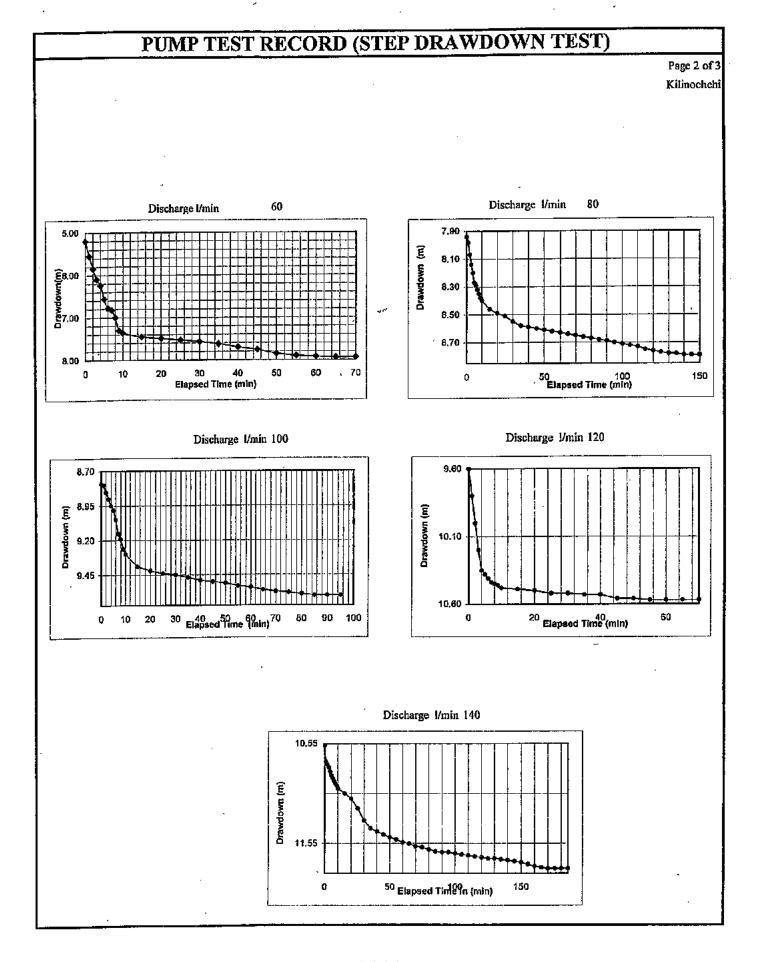
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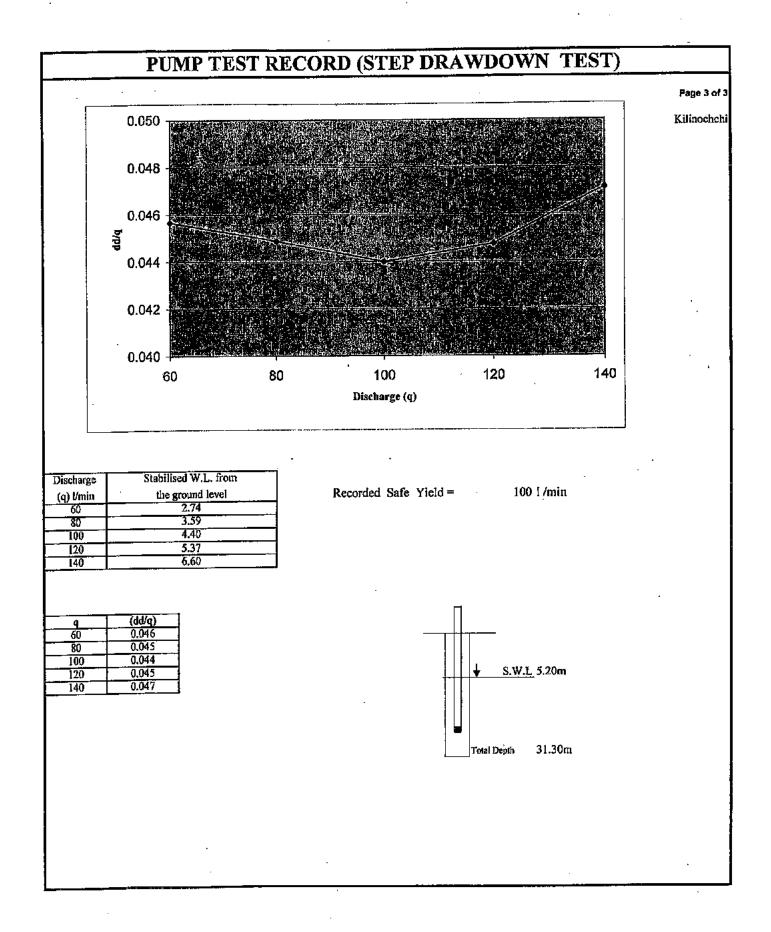
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NMAC//RMAO/OPS	}	දිනය නිසනි නාயவந	} 23rd June 2015

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 දිසාපති / දිස්තික් ලේකම් Govt.Agent / District Secretary

ලෝකහරියන් දුරකථනය Telephone

021 - 228 3965

ලිනැතුහල සහ) ෆෑක්ස් Fax

021 228 3966

ගිණුණුණ gakili@sltnet.lk විද්පුත් තැපෑල E-mail



போதுத்தொலைபேசி ` පොළු දුරකටිනය General Telephone .

021 - 228 3945

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021 - 228 5456

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

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KN/DPS/D.M/2015

உழது இல මමේ අංකය Your No නිසනි 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,

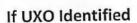
Govt. Agent/District Secretary,

Kilinochchi District.

S. Mohanabayan

Director Planning

Director of Plann:
District Secretariat
Kilinochchi





Inform to RMA

Mr.Karunathilaga Mine Action officer District Secretariat ,Kilinochchi

0719779279



Mr.Dilhan

Operation Officer

District Secretariat ,Kilinochchi

0710929925



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

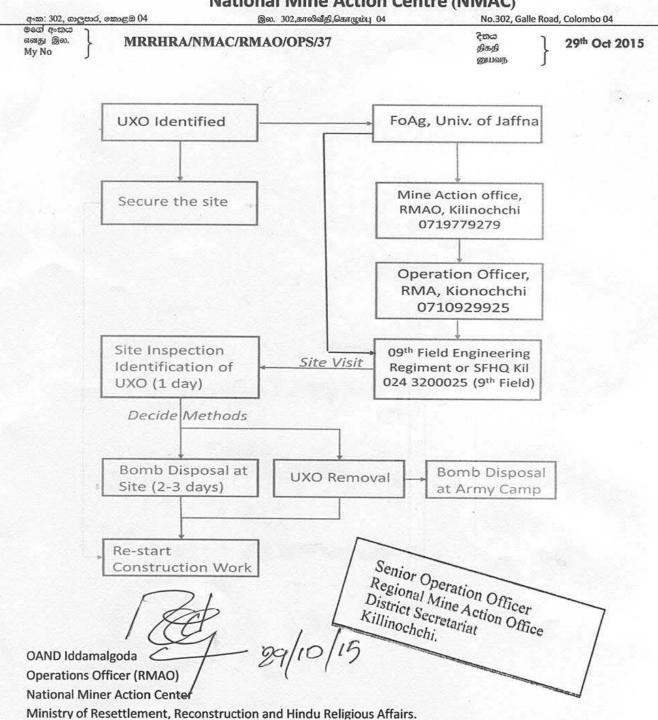


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Ministry of Resettlement, Reconstruction and Hindu Religious Affairs

வெடுவி கடிய விக்கையில் கூறிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய விக்கிய

National Mine Action Centre (NMAC)



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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







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