スリランカ民主社会主義共和国
認証野菜種子生産システム強化プロジェクト
終了時評価調査報告書

平成 29 年 4 月
（2017 年）

独立行政法人国際協力機構
農村開発部

農村
JR
17-025

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序　　文

日本国政府は、スリランカ民主社会主義共和国からの要請に基づき、認証野菜種子生産システム強化プロジェクトを実施することを決定し、JICA は、スリランカ民主社会主義共和国農業省と 2012 年 2 月 29 日に討議議事録（Record of Discussions：R/D）の署名を行い、5 年間のプロジェクトとして実施しています。

今般、終了時評価調査団を派遣し、スリランカ民主社会主義共和国政府及び関係機関との間で、プロジェクトの進捗の確認と今後の方向性に係る協議を行いました。本報告書は、同調査団による協議結果、評価結果を取りまとめたもので、当プロジェクト及び類似プロジェクトの実施にあたり広く活用されることを願います。

終わりに、本調査に対しご協力とご支援をいただいた内外関係者の皆様に、心からの感謝の意を表します。

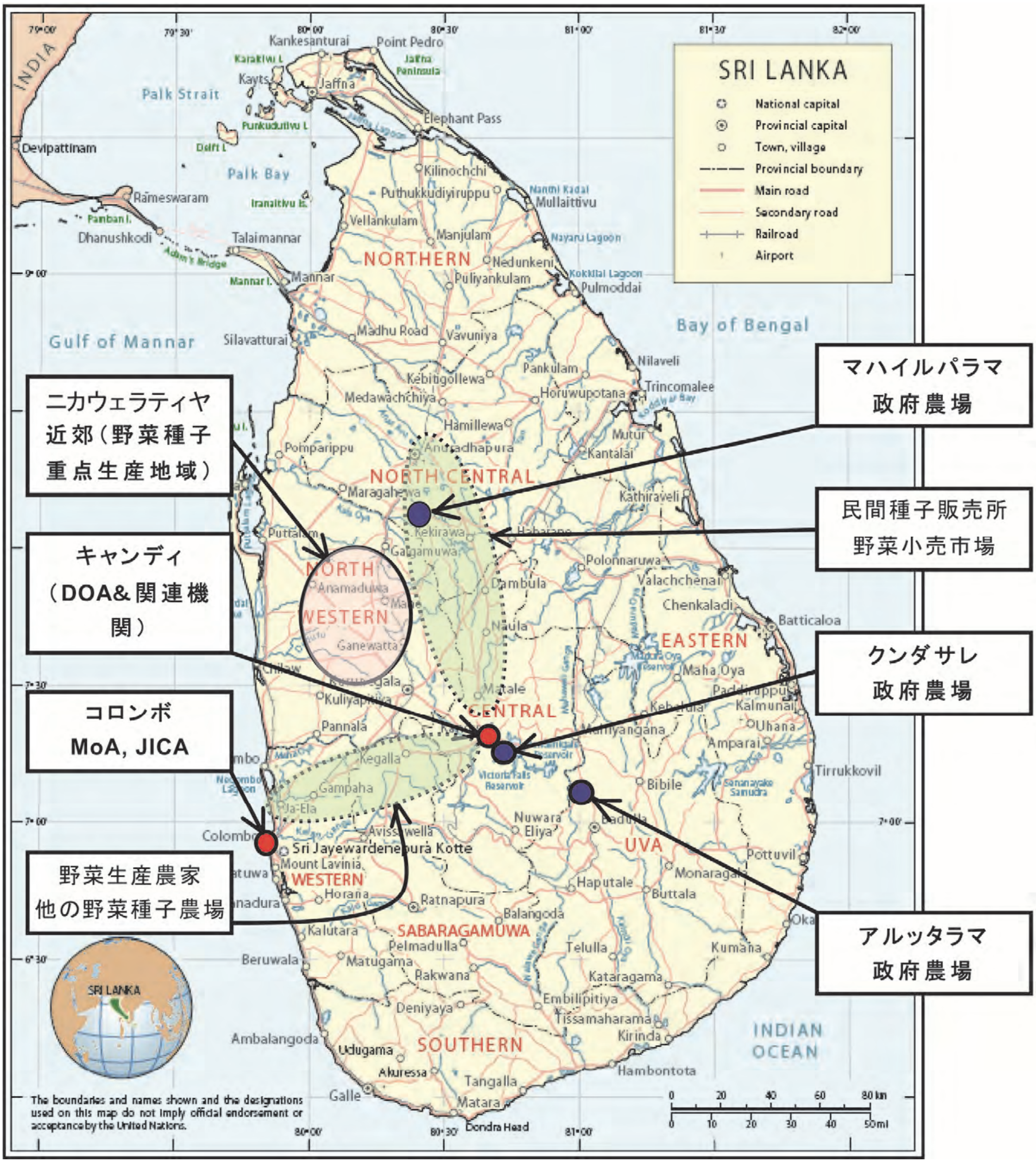
平成 29 年 4 月

独立行政法人国際協力機構

農村開発部長　三次　啓都

目　　次

地　　　　　図



SRI LANKA
National capital
Provincial capital
Town, village
Provincial boundary
Main road
Secondary road
Railroad
Airport
マハイルパラマ
政府農場
民間種子販売所
野菜小売市場
クンダサレ
政府農場
アルッタラマ
政府農場
ニカウェラティヤ
近郊（野菜種子
重点生産地域）
キャンディ
（DOA&関連機
関）
コロンボ
MoA, JICA
野菜生産農家
他の野菜種子農場
NORTHERN
NORTH CENTRAL
NORTH WESTERN
CENTRAL
EASTERN
WESTERN
SABARAGAMUWA
UVA
SOUTHERN
Palk Strait
Palk Bay
Gulf of Mannar
Bay of Bengal
INDIAN OCEAN
INDIA
Jaffna
Trincomalee
Anuradhapura
Batticaloa
Colombo
Galle
Matara
Hambontota
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

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略　語　表

略　語	正式名称	日本語
AI	Agriculture Instructor	農業普及員
DD	Deputy Director	副ディレクター
BFB	Bacterial Fruit Blotch	ウリ科野菜の果実汚斑細菌病
DDA	Deputy Director of Agriculture	農業局副ディレクター
DOA	Department of Agriculture	農業局
ELISA	Enzyme-Linked ImmunoSorbent Assay	エライザ（酵素結合免疫吸着法）
ETC	Extension and Training Centre	普及訓練センター
GSF	Government Seed Farms	政府種子農場
GVSPP	Good Vegetable Seed Production Practice	良い野菜種子の生産実践
HORDI	Horticulture Crop Research and Development Institute	園芸作物研究開発所
ICC	Information and Communication Center	情報通信センター
ICT	Information and Communication Technology	情報通信技術
ISTA	International Seed Testing Association	国際種子検査協会
JCC	Joint Coordination Committee	合同調整委員会
JICA	Japan International Cooperation Agency	独立行政法人国際協力機構
JPPS	Joint Private and Public Seminar	官民合同セミナー
JPY	Japanese Yen	日本円
LKR	Sri Lankan Rupees	スリランカ・ルピー
MT	Metric ton	トン（重量）
NFPP	National Food Production Programme	全国食料生産プログラム
NPQS	National Plant Quarantine Service	全国植物検疫サービス
NSC	National Seed Council	国家種子協議会
OFC	Other Field Crops	その他畑作物
OIC	Officer in Charge	現場責任者
PDM	Project Design Matrix	プロジェクト・デザイン・マトリックス
PO	Plan of Operations	活動計画
R/D	Record of Discussions	討議議事録
RSC	Regional Seed Committee	地方種子委員会
SCPPC	Seed Certification and Plant Protection Centre	種子認証植物防疫センター
SCS	Seed Certification Services	種子認証サービス
SEPC	Sociao-Economic and Planning Centre	社会経済計画センター
SIDCC	Seed Industry Development and Coordinating Committee	種子産業開発調整委員会
SPASL	Seed Producers Association of Sri Lanka	スリランカ種子生産者協会

略　語	正式名称	日本語
SPMDC	Seed and Planting Materials Development Centre	種苗開発センター
SSC	Seed Sales Centre	種子販売所
STL	Seed Testing Laboratory	種子検査室
SHTU	Seed Health Testing Unit	種子病害検査ユニット
VSC	Vegetable Seed Centre	野菜種子センター

評価調査結果要約表

１．案件の概要	
国名：スリランカ民主社会主義共和国	
案件名：認証野菜種子生産システム強化プロジェクト Project for Enhancement of Production System of Certified Vegetable Seed in Sri Lanka	
分野：農業・農村開発	援助形態：技術協力プロジェクト
所管部署：農村開発部第一グループ	協力金額（完了までの見込み）：3.56 億円
協力期間：2012 年 5 月 14 日～ 2017 年 5 月 13 日(5 年間)	先方実施機関：農業省農業局（DOA）
	日本側実施機関：なし

１－１　協力の背景と概要

計画時のスリランカ民主社会主義共和国（以下、「スリランカ」と記す）の中長期国家開発計画では、野菜、コメ以外の穀類や豆類の自給率の改善の重要性が示されており、質の高い種苗が使われていないことが農業分野の重要な課題であると指摘されていた。当時、農業省農業局（Department of Agriculture：DOA）に品質を認証された認証種子の割合は野菜種子の全供給量のうち 4～35%であり、これは種子生産、種子加工、種子認証、販売に関する能力が十分でないためと考えられていた。また当時、スリランカは毎年約 250t/年の野菜種子を輸入しており、国内の種子生産量は 90t/年であった。

このような背景のもとスリランカ政府は、質の高い野菜種子の生産技術を開発・普及し、農業生産性と質を向上させることを目的とした技術協力プロジェクトの実施を日本政府に要請した。その後両者は、①苗開発センター（Seed and Planting Materials Development Centre：SPMDC）による生産計画、②原種種子と標準種子の生産、③種子認証サービス（Seed Certification Service：SCS）による認証、④種子販売の分野において、農家と私企業も視野に入れたプロジェクトを実施するべく合意した。

１－２　協力内容

本プロジェクトは、対象地域における認証種子の生産体制の改善を目的としたものである。

（1）上位目標

市場に出回る野菜種子のうち、DOA が定める基準[1]を満たしている種子の量[2]が増加する。

（2）プロジェクト目標

対象地域の野菜の認証種子の生産体制が改善される。

（3）成果

①SPMDC の種子生産・配付計画策定能力が向上する。

②官民の野菜種子生産技術が向上する。

③官民の野菜種子の品質管理技術が向上する。

[1] 「種苗認証基準」（2009 年種子認証サービス発行）

[2] 農業局による認証種子（農業局の生産種子、民間の生産種子）及び民間による独自の認証種子

（4）投入

1） 日本側

項　目	実　績（完了時までの見込み）
専門家	合計 205 人/月 ・長期：4 名（195.8 人/月） 総括/認証種子生産体制、種子検査、種子生産、業務調整/訓練 ・短期：延べ 7 名（9.4 人/月） 種子生産計画、種子病理、植物病理、種子流通販売、優良種子評価、種子収穫後処理技術
本邦研修/ 第三国研修	・本邦研修 37 名：種子行政、種子検査、野菜種子生産、植物病理、種子病理 ・第三国研修 14 名：国際野菜訓練コース（タイ） ・合計 51 名
機材供与	約 82 百万ルピー（種子生産、種子検査、種子調整機材など）
事業費	3.56 億円

2） スリランカ側[3]

以下の実績はほぼ計画どおり。「その他」で示した項目は追加投入。

①カウンターパート（Counterpart：C/P）職員の配置：延べ 45 名

②プロジェクト事務所

③研修実施に必要な教室、資材、用具など

④プロジェクトのローカルコスト：C/P 職員研修参加時の手当、プロジェクト事務所の電気・水道代（約 0.03 億円程度）、プロジェクトで供与した機材購入にかかる税金など（約 0.06 億円程度）

⑤その他：種子病害検査ユニットの建設、データベースシステム運用に必要な機材・施設の調達、種子調整機材設置用建屋の整備、苗床用ポリトンネルの設置など

２．評価調査団の概要

調査者

＜日本側＞

担当分野	氏　名	所　属
総括	三村　一郎	JICA 農村開発部第一グループ第二チーム　課長
野菜種子生産	宮崎　省次	元（株）サカタのタネ　執行役員
協力企画	田中　智子	JICA 農村開発部第一グループ第二チーム　職員
評価分析	田村　智子	かいはつマネジメント・コンサルティング

＜スリランカ側＞

氏　名	所　属
Mr. W.M.D Wasala	Additional Director, 種子認証植物防疫センター（Seed Certification and Plant Protection Centre：SCPPC）
Mr. H. M. J. K. Herath	Assistant Director, SPMDC
Ms. V. D. N. Ayoni	Agricultural Economist, 社会経済計画センター（Sociao Economic and Planning Centre：SEPC）

[3] 2016 年 12 月末現在の実績

調査期間	2017 年 1 月 9 日（月）～1 月 28 日（土）	評価種類：終了時評価調査

３．評価結果の概要

３－１　実績の確認

（1）成果 1：SPMDC の種子生産・配付計画策定能力が向上する：おおむね達成

指標 1-1　セミナーや定期会議で民間及び政府から提起された課題を解決するための対応策が実施される

指標 1-2　民間セクターのニーズを考慮した、原種種子の生産計画が策定される

指標 1-3　プロジェクトで 2 カ所のモデル DOA 種子販売所の改善がなされたのち、さらに 2 カ所の DOA 種子販売所が改善される

指標 1-1 及び 1-2 の達成度は進捗しているがさらに推進が必要であり、指標 1-3 については 1 カ所のモデル販売所が改善され、さらに 10 カ所の DOA 種子販売所が改善されておおむね達成している。よって、本成果の達成度は中程度である。プロジェクト期間を通じて官民合同セミナー（Joint Private and Public Seminar：JPPS）は定期的に開催され、同セミナーにおける討議を踏まえ JPP アクションプラン[4]がまとめられたこと、JPPS での提案を基に官民の代表者からなる種子産業開発調整委員会（Seed Industry Development and Coordinating Committee：SIDCC）が組織されたことは評価に値する。販売改善に関しても期待どおりの進捗があった。しかし、JPP アクションプランの民間との共有、委員会の第 1 回会合の開催、種子関連データベースシステムの生産・配付計画への活用などの取り組みがまだ実施に至っていない。

（2）成果 2：官民の野菜種子生産技術が向上する：達成

指標 2-1　種子生産研修参加者の 75%が研修後のテストに合格する

指標 2-2　種子生産研修参加者の 80%が研修が有用と考える

指標 2-3　DOA の通達に沿って政府種子農場がプロジェクトで紹介した技術を採用する

成果 2 の 3 つの指標はいずれも達成されており、本成果の達成状況は良好である。中間レビュー時、SPMDC 職員はプロジェクトで導入した技術の適用や効用について消極的な態度であったが、その後、実践を通して多くの職員がこれらの技術の効用や重要性を理解するようになった。これは、JICA 専門家の継続的な技術指導や、国内外の研修機会の提供、DOA の通達発信による技術適用の奨励などの結果である。中間レビューの提言を受けプロジェクト後半は、JICA 専門家に代わって SPMDC の職員が種子生産研修を実施するようになった。研修参加者の満足度や研修内容の理解度も高く、研修が効果的に実施されたといえる。対象地域の政府種子農場（Government Seed Farms：GSF）では、本プロジェクトで導入した技術が積極的に実践されている。民間の種子会社もプロジェクトが主催した国内外の研修で得た知見を生かし、種子生産の改善を図っている。

（3）成果 3：官民の野菜種子の品質管理技術が向上する：達成

指標 3-1　改善計画で提言された対応策が種子検査プロセスで実践される

指標 3-2　種子検査の研修参加者の 75%が研修後のテストに合格する

[4] Joint Private and Public Action Plan.

指標 3-3　種子検査手順のハンドブックが完成し、活用される
指標 3-4　カビとバクテリアの種子病理検査が実施される
指標 3-5　「市場に出回る種子の品質調査」の結果に基づきアクションプランが作成される

成果 3 の 5 つの指標はいずれも達成されており、本成果の達成状況は良好である。SCPPC の下部組織である種子検査室では、JICA 専門家による改善提案が実践され、同専門家により作成されたマニュアル類が活用され、検査手順の合理化や芽生評価の標準化が図られている。JICA 専門家と園芸作物研究開発所（Horticulture Crop Research and Development Institute : HORDI）による植物病害分野の調査の結果、同国における種子伝染性病害蔓延の深刻さが明らかになった。これを受けプロジェクトでは SCPPC や HORDI 職員の種子や植物病害診断の検査技術向上に取り組み、同職員は細菌（バクテリア）、ウィルス、糸状菌（カビ）の種子検査の基本技術を習得することができた。中間レビュー時の提案を受け、市場の種子の品質に関する調査が実施され、調査結果に基づきアクションプランが策定された。

（4）プロジェクト目標達成の見込み：おおむね達成

指標 1. 政府及び民間セクター双方の情報共有が進んだと答える関係者が増加する
指標 2. DOA の職員の 80%以上が「種子データベースによってデータ処理業務が効率化した」と考える
指標 3. 種子生産研修に参加した契約農家の 60%以上がプロジェクトで紹介した技術を適用する
指標 4. SCPPC がプロジェクトで導入した芽生評価検査マニュアルや教材を使って在職者研修や新人研修を継続的に実施する
指標 5.「市場に出回る種子の品質調査」の結果に基づき作成したアクションプランが実施される

本プロジェクトにより官民の情報共有が促進された。種子検査技術が期待されたレベルに向上し、市場の種子の品質向上のためのアクションプランの実践も始まっている。GSF は、導入された技術を積極的に取り入れており、関連の職員は契約農家にこれら技術に関する技術指導もできるようになった。2015 年にプロジェクトで実施した調査では、契約種子生産農家の技術適用状況は指標で目標とした 60%を超えているとの結果が得られているものの、終了時評価時に実施した同農家へのインタビューでは、技術適用は難しいという声も聞かれ、最新状況の確認が必要な状況である。データベースシステム活用による生産計画の改善は未実施であるが、スリランカ側で 2017 年中には対応される見込みである。これらから、プロジェクト目標の達成度は中程度と判断する。

３－２　評価結果の要約

（1）妥当性：高い

2015 年に成立したスリランカの新政権の施策である「全国食料生産プログラム（2016～2018 年）」は、食料生産と生産性の改善、野菜や果物の増産、国民 1 人当たりの野菜の消費量の増加、官民の連携、種子法の施行などをめざしている。本プロジェクトで実施した市場の種子の品質調査では市場の種子の品質の改善ニーズが、野菜病害に関するフィール

ド調査では種子伝染性病害や種子の健全性検査の重要性が裏づけられた。日本の外務省の対スリランカ国別援助計画（2012 年 6 月）では後発開発地域の開発支援が重点分野の 1 つとなっており、農業分野を中心とした産業育成、農業関連インフラの整備を支援する方針である。これらから本プロジェクトは、スリランカの政策や開発ニーズ、日本の援助方針と合致しており、妥当性は高い。

（2）有効性：中程度

本プロジェクトは、野菜種子生産の技術移転に関し、中間レビュー時と比して大きな進捗があった。SPMDC や SCS の地方事務所や GSF の職員は、種子生産研修や農家への指導にリーダーシップを発揮するようになった。プロジェクトで導入した生産技術は GSF でよく活用されている。SCPPC の職員の種子病理分野での能力向上や、市場の種子の品質調査の効果的な実施も特筆に値する。しかし、種子生産計画の分野におけるデータベースの運用の遅れや、農家の生産技術適用状況の確認に関してはやや遅れがみられる。そのため終了時評価時点でのプロジェクト目標の達成度は中程度であり、有効性は中程度と判断する。なお、アウトプットで規定される 3 つの能力向上はいずれもプロジェクト目標である認証種子の生産改善と関連しており、終了時評価時点においてはアウトプットとプロジェクト目標のロジックは適切であった。

（3）効率性：高い

プロジェクト活動はいくつかの遅延を除けば計画どおり実施された。3 つの成果の発現状況にも顕著な進捗があった。専門家派遣、本邦研修などの日本側投入は計画どおり実施され、機材供与は遅れたものもあったが、その他はすべて予定どおりである。事業費及び事業期間も計画内に収まる予定である。データベースが当初想定よりも広範囲のデータベースとなったことなどによりスリランカ側からは予定していたよりも多くの投入があった。これらより効率性は高い。

（4）インパクト：中程度

上位目標の指標 1「市場に出回る野菜種子のうち、DOA の基準を満たしている種子の割合が増加する」については種子の品質調査にて基準値が得られたが、達成可能性については現時点で調査をしておらず、情報がない。指標 2 の「民間の種子生産業者から SPMDC に原種種子の供給要請があった際、90%以上は供給がなされる」は過去 3 年間目標値は未達成である。上位目標は対象地域の市場全体を対象としており、プロジェクトの貢献に加えて官民によるさまざまな努力が必要であり、達成には困難も予想される。一方本プロジェクトでは、スリランカ初の種子病害検査ユニット（Seed Health Testing Unit：SHTU）が設立され、市場の種子の品質調査が初めて実施されるなどいくつかの正のインパクトが発現している。なお、負のインパクトは確認されなかった。これらを勘案しインパクトは中程度とする。

（5）持続性：高い

＜政策・制度＞現行の政策は野菜生産や生産性の改善をめざしており、また農業省が準

備中の種子法の細則は、本プロジェクトの効果の持続性を助長するものである。

＜組織・体制＞SPMDC と SCPPC の組織内の役割や責任分担は明確である。今後、JPPS や種子生産研修をより効果的に実施するための体制も整いつつある。

＜技術＞生産や品質管理にかかわる職員の技術レベルはおおむね良好であり、種子生産技術を指導するマスタートレーナーも養成された。種子病害検査を担当する職員の技術も期待したレベルにあるが、今後引き続き研鑽が必要である。

＜財務＞SPMDC と SCPPS には必要な予算が配賦されており予算執行状況にも特に問題はない。市場の種子の品質調査には 2016～2018 年の 3 年間の予算が付与されており、植物病害診断や種子病害検査のための薬剤や消耗品の予算も確保されている。

以上からプロジェクト効果の持続性は高いと見込まれる。

３－３　効果発現に貢献した要因

（1）計画内容に関すること

特になし

（2）実施プロセスに関すること

1）　DOA による追加投入

必要に応じて DOA から追加の投入がなされ、プロジェクトの効果的な実施を促進した。例として、SHTU の建設、市場における種子の品質調査の結果報告会（フィールドデイ）の開催、データベースシステムの運用に必要なコンピュータやインターネットなどの整備、種子調整機材設置の際に必要となった建屋の改修、政府種子農場における苗床用ポリトンネルの設置などが挙げられる。

2）　JICA 研修参加者の活躍

2003～2007 年に実施された JICA 国別研修に参加した SPMDC の職員が、研修で学んだ知見を生かし、本プロジェクトで導入した生産技術の種子農場での実践や、種子生産研修における技術指導を行い、本プロジェクトの効果的な推進に貢献した。

３－４　問題点及び問題を惹起した要因

（1）計画内容に関すること

1）　データベースシステム開発の遅延

データベースシステムの開発に計画より約 2 年多くの時間が必要となり、同システムの導入が遅れた。そのためプロジェクト期間中に同システムを本格的に運用することはできそうにない。

2）　契約野菜種子栽培の縮小

本プロジェクトでは、SPMDC からの委託で野菜種子栽培をする農家が研修に参加して生産技術を習得し、その後技術を実践することが期待されていた。また SPMDC や SCS の職員は、種子生産を委託した農家を訪問し、技術の実践を支援・確認する計画であった。しかし 2015 年と 2016 年は、SPMDC から農家への種子生産委託がごく少なかったため、研修に参加した農家の技術実践や、職員の農家訪問の機会は限定的であり、同職員による契約農家への技術支援・確認が計画どおり進まなかった。

3） 種子法細則の施行の遅れ

種子を販売する場合に要求される品質基準を含む種子法の細則は 2010 年ごろに施行されると期待されていたが、翻訳等の遅延により実現していない。種子法の細則が施行されていないと、SCPPC や SPMDC による市場における種子の品質向上の働きかけに十分な強制力が働かない。市場における種子の品質向上のためには法整備が必要である。

（2）実施プロセスに関すること

特になし

３－５　結論

プロジェクト目標、成果の指標は一部を除いて達成ないし達成見込みであることから、本プロジェクトは 2017 年 5 月の協力期限をもって予定どおり終了することで合意した。5 項目評価について、妥当性、効率性には特段の課題は見受けられなかった。有効性については、いくつかの点で実施遅延があったことから、中程度となった。インパクトについては、データベースの拡充、市場調査結果の活用、種子病理ラボの建設など、複数のプラスのインパクトが確認されたが、上位目標達成にはいくつかスリランカ側での対応が求められることから中程度になった。持続性については、今後、スリランカ側による対応が必要な点があるもののおおむね事業継続の体制は整備されている。

３－６　提言

（1）DOA への提言（プロジェクト目標、上位目標達成、インパクト関連）

①種子法の細則が早期に施行されるよう農業省を支援すること、具体的には、すみやかに国家種子協議会（National Seed Council：NSC）のメンバーを官報により任命し、法務局による確認が完了したら細則を官報で制定し、その後同カウンシルを開催するよう支援する。

②データベースシステムの運用に必要な機材や施設をできるだけ早く設置すること。

③JPP アクションプランを 2017 年 2 月に開催予定の次回の同セミナーで発表し、同計画における短期、中期、長期的な目標や実施責任者について議論すること。またその後、同計画の全体的な進捗をモニタリングすること。

（2）SPMDC への提言（成果 1 及び成果 2 関連）

①SIDCC の第 1 回ワークショップを 2017 年 2 月に開催すること。

②DOA による JPP アクションプランのモニタリングを支援すること。

③民間セクターとの対話を継続し、過去の販売や需要の分析による需要予測を行うなどして、生産計画のさらなる改善を図ること。

④SCS の支援を得て種子の在庫の適切な回転のための仕組みをつくること。古い在庫の定期的な廃棄についても検討すること。

⑤年 2 回の耕作期ごとの種子生産研修を継続し、プロジェクトで導入した生産技術の普及を図ること。SPMDC の地方事務所は、普及訓練センター（Extension and Training Centre：ETC）や農業開発局の地方事務所、農民組合その他からの情報も得て、技術習得に前向

きな農家を選ぶこと。民間生産者にも研修開催を通知すること。

⑥SPMDC の地方事務所は、研修に参加した契約種子生産農家に的を絞り、技術の適用を奨励すること。技術導入により成功した農家の数を増やし、これらの農家の経験を他の農家とも共有すること。

⑦政府契約種子農家に GVSPP[5]を導入し、SPMDC 地方事務所の農業指導員がこれらの農家を訪問する際に活用すること。将来は GVSPP の実践を契約の条件とするよう検討すること。

⑧SCPPC から適時の協力を得て種子コーティングテストを遅延なく実施し商業生産を始めること。

⑨種子生産研修を担うマスタートレーナーを継続的に確保すべく、マスタートレーナー向けの研修を引き続き実施すること。プロジェクト非対象地域の職員も対象にすること。種子生産に従事するすべての職員がマスタートレーナーとなることを将来の目標にするとよい。

（3）SCPPC への提言（成果 3 関連）

①2017 年 2 月の開催予定の SIDCC 第 1 回ワークショップで種子品質向上のためのアクションプランを周知徹底させるとともに、引き続き同プランの進捗をモニタリングする。

②SCS は引き続き HORDI の植物病理課との協力の下、種子伝染病のなかで最も重要な細菌学に関する最新技術の導入を図ること。

③種子法の細則が早期に施行されるよう法務局に働きかけること。

④非公式な種子生産・流通業者の特定を継続し、それら業者に種子法に則った登録を促し、GVSPP に基づいた生産を奨励する。

⑤SCS は、2015 年ヤラ期[6]に実施した種子の品質調査と同様の手法で、2018 年ヤラ期に品質調査を行い、SEPC の協力を得て両調査を比較分析し、本プロジェクトの上位目標の達成状況を確認すること。

（4）HORDI への提言（成果 3 関連）

①HORDI は引き続き SCS の種子病害検査ユニットとの協力の下、種子伝染性病害の中で最も重要な細菌に関する最新技術の導入を図ること。

３－７　教訓

（1）プロジェクトサイトについて

本プロジェクトは、政府農場 3 カ所を含む 4 カ所の現場をもち、かつプロジェクト活動は種子生産システム全般（生産・加工・検査・貯蔵）にわたることから実施機関が多い。このため、現場活動の推進・フォローを担う C/P は各サイト・各実施機関にそれぞれ分散していた。プロジェクトでは、栽培状況の確認等のため、専門家による巡回指導を行っていたが、各サイトが離れており、負担が大きかった。今後、現場サイトを複数もち、活動

[5] GVSPP は Good Vegetable Seed Production Practice（良い野菜種子生産実践）の略で、プロジェクトにより政府種子農場に導入された種子生産技術向上のためのチェックリストである。

[6] スリランカには年 2 回耕作期がありヤラ期とマハ期と呼ばれている。

範囲が広く実施機関が多い事業を計画する場合は、ローカルコンサルタントの雇用等により、現場活動の促進・フォローをすることも検討すべきである。

(2) 野菜種子プロジェクトについて

上述のとおり、本プロジェクトの活動は種子生産システム全般（生産・加工・検査・貯蔵）にわたっているが、プロジェクト開始当初は普及・販売も成果となっており、対応すべき活動が多かった。また、実際に市場に出回る種子の品質・状況について、スリランカ政府側も認識しきれていない部分があった。その他、野菜種子プロジェクトの特徴としては、次のような点が挙げられる。

・野菜は雑多で、種子の種類が多い。
・日本では民間主導でかつ国内の採種も限られているため、日本が協力するうえでの制限が大きく、課題別研修等の積極活用が有効である。
・官民の連携が不可欠。

野菜種子生産システム全般には多種多様な活動があり、かつ官民ともに関連する機関も多いため、同様のプロジェクトの検討にあたっては、野菜種子生産システムのうち、どの活動にフォーカスをあてるのかより詳細な検討が必要である。また、市場の状況や政府制度についての客観的な分析、加えて国内リソースの状況を加味して計画する必要がある。

第１章　終了時評価調査の概要

１－１　調査団派遣の経緯と目的

スリランカ民主社会主義共和国（以下、「スリランカ」と記す）において農業セクターは、国内総生産（GDP）に占めるシェアは 12%にとどまるが、依然として国内労働人口の 32%を抱えている。また、貧困層の 8 割は農村地域に居住しており、貧困層の所得向上のためには農業セクター振興が重要である。

スリランカ政府は、独立以来、主食であるコメの国内自給達成を目標に掲げ、優先的に取り組んだ結果、2008 年以後は国内自給を達成するようになっている。一方コメ以外の作物は、輸入依存度が高く、食料安全保障の確保、外貨流出の低減、輸出促進の面から、生産性の向上が必要とされている。

認証野菜種子生産システム強化プロジェクト（以下、「本プロジェクト」と記す）計画時のスリランカの中長期国家開発計画[1]では、野菜、コメ以外の穀類や豆類の自給率の改善の重要性が示されており、質の高い種苗が使われていないことが農業分野の重要な課題であると指摘されている。計画時、農業局（Department of Agriculture：DOA）に品質を認証された認証種子の割合は野菜種子の全供給量のうち 4～35%であり、これは種子生産、種子加工、種子認証、販売に関する能力が十分でないためと考えられていた。なお当時、スリランカは毎年約 250t の野菜種子を輸入しており、国内の種子生産量は 90t であった。

このような背景の下、スリランカ政府は質の高い野菜種子の生産技術を開発・普及し、農業生産性と質を向上させることを目的とした技術協力プロジェクトの実施を日本政府に要請した。

本プロジェクトは、種子生産・配付計画策定能力の向上、官民の野菜種子生産技術及び品質管理技術の向上を通じて、スリランカにおける認証種子の生産体制の改善をめざすものである。農業省 DOA をカウンターパート（Counterpart：C/P）機関とし、2012 年 5 月より 2017 年 5 月までの 5 年間の予定で実施されている。

本終了時評価調査は、2017 年 5 月のプロジェクト終了を控え、プロジェクト活動の実績・成果を評価・確認するとともに、今後のプロジェクト活動に対する提言及び今後の類似事業の実施にあたっての教訓を導くことを目的として実施された。

１－２　調査団構成と日程

終了時評価調査団の構成を以下に示した。

（1）日本側

担当分野	氏　名	所　属
総括	三村　一郎	JICA 農村開発部第一グループ第二チーム　課長
野菜種子生産	宮崎　省次	元（株）サカタのタネ　執行役員
協力企画	田中　智子	JICA 農村開発部第一グループ第二チーム　職員
評価分析	田村　智子	かいはつマネジメント・コンサルティング

[1] “*Mahinda Chintana, The Vision for the Future*” (2010-2016)”, 2010.

（2）スリランカ側

氏　名	所　属
Mr. W.M.D Wasala	Additional Director, SCPPC, DOA
Mr. H.M.J.K. Herath	Assistant Director, SPMDC, DOA
Ms. V. D. N. Ayoni	Agricultural Economist, SEPC, DOA

【調査日程】詳細は付属資料 ANNEX 1 を参照のこと。

2017 年 1 月 9 日（月）～1 月 27 日（土）

なお、評価分析団員は 1 週間先行して調査を開始、野菜種子生産・協力企画団員は 1 月 17 日（火）から合流、総括は 1 月 22 日（日）から合流。

１－３　対象プロジェクトの概要（PDM 第 5 版）

本プロジェクトは、対象地域における認証種子の生産体制の改善を目的としたものである。プロジェクト要約は表－１のとおりである。PDM 第 5 版は付属資料 ANNEX 3 を参照のこと。

表－１　プロジェクト要約（PDM 第 5 版）

上位目標	市場に出回る野菜種子のうち、農業局が定める基準[2]を満たしている種子の量[3]が増加する
プロジェクト目標	対象地域の野菜の認証種子の生産体制が改善される
成果	1. SPMDC の種子生産・配付計画策定能力が向上する
	2. 官民の野菜種子生産技術が向上する
	3. 官民の野菜種子の品質管理技術が向上する
協力期間	2012 年 5 月 14 日～2017 年 5 月 13 日（5 年間）
先方実施機関	農業省農業局
日本側実施機関	-
プロジェクト対象地域	1. クンダサレ政府種子農場及びその周辺 2. アルッタラマ政府種子農場及びその周辺 3. マハイルパラマ政府種子農場及びその周辺 4. ニカウェラティヤ SPMDC 地方事務所及びその周辺
ターゲットグループ	・種苗開発センター（Seed and Planting Materials Development Centre : SPMDC）、種子認証植物防疫センター（Seed Certification and Plant Protection Centre : SCPPC）、政府種子農場（Government Seed Farms : GSF）、種子認証サービス（Seed Certification Services : SCS）、種子検査室（Seed Testing Laboratory : STL）、種子販売所（Seed Sales Centre : SSC）を含む DOA 及び関連機関の職員約 100 名 ・政府契約種子農家約 100 世帯 ・民間種子生産会社職員及び民間種子契約農家

[2] 「種苗認証基準」（2009 年種子認証サービス発行）

[3] DOA による認証種子（DOA の生産種子、民間の生産種子）及び民間による独自の認証種子

第２章　終了時評価調査の方法

２－１　評価の枠組みとデータ収集方法

終了時評価調査で確認すべき事柄を評価グリッド（付属資料 ANNEX 4 を参照）にまとめ、これを基に必要なデータを収集し、成果やプロジェクト目標の達成状況を終了時評価時のプロジェクト・デザイン・マトリックス（Project Design Matrix：PDM）及び活動計画（Plan of Operations：PO）第 5 版に照らし合わせて検証し、5 項目評価を行った。

データ収集は以下の方法により実施した。

①プロジェクト報告書・関連資料のレビュー

②プロジェクト・チーム（JICA 専門家チーム及びスリランカ側 C/P）、農業省、DOA、C/P 組織職員、民間種子生産業者、政府契約種子農家、民間契約種子農家とのインタビューやディスカッション（主要面談者は付属資料 ANNEX 2 に示した）

③サイト実査（対象地域政府種子農場、契約種子農家、民間種子生産業者など）

プロジェクトの実施プロセスについては下記のような項目に関する情報を収集した。

・これまでに行われた PDM 改訂の内容
・合同調整委員会（Joint Coordination Committee：JCC）の開催状況
・プロジェクト月例会議の開催状況
・効果発現に貢献した要因
・問題点及び問題を惹起した要因

２－２　データ分析方法

5 項目評価に関しては主な設問項目を表－２のとおり設定した。

表－２　評価 5 項目の設問項目

評価 5 項目	設問項目
妥当性	スリランカの開発政策との整合性 スリランカの開発ニーズとの整合性 日本の援助方針との整合性
有効性	プロジェクト目標の達成見込み プロジェクト目標達成の貢献・阻害要因
効率性	投入 活動実績 成果達成状況
インパクト	上位目標の達成見込み その他の正負のインパクト
持続性	政策・制度面 C/P の組織 C/P の技術 C/P の財務

上述の方法により収集したデータを取りまとめて団内で検証を行い、達成・進捗状況や計画と実績の差異やその原因や背景を分析した。分析結果を日本側終了時評価調査団員が終了時評価報告書案（英文）にまとめ、プロジェクト専門家、スリランカ側終了時評価調査団員及びプロジェクトの C/P 組織の代表者と協議を行った。協議において指摘・合意された事項を同報告書案に反映させ、最終報告書（英文）を作成し、2017 年 1 月 27 日に開催された JCC で承認を得た（付属資料参照）。

本和文報告書は、上述の英文報告書を基に、日本側終了時評価調査団員内での協議、プロジェクト専門家、JICA 農村開発部、JICA スリランカ事務所との協議内容を反映させたものである。

第３章　プロジェクトの実績

３－１　投入実績

３－１－１　日本側投入

表－３は日本側の投入を示す。詳細は付属資料 ANNEX 5 を参照のこと。

表－３　日本側投入

項　目	計　画	実績（完了時までの見込み）
専門家	合計 222 人/月 ・長期 3 名 総括/認証種子生産体制、種子検査/訓練、業務調整/種子生産 ・短期 種子検査、種子病理、植物病理、農家経済経営、市場調査、収穫後処理	合計 205 人/月 ・長期 4 名（195.8 人/月） 総括/認証種子生産体制、種子検査、種子生産、業務調整/訓練 ・短期延べ 7 名（9.4 人/月） 種子生産計画、種子病理、植物病理、種子流通販売、優良種子評価、種子収穫後処理技術
本邦/第三国研修	種子生産と認証 （参加者数の計画なし）	・本邦研修 37 名：種子行政、種子検査、野菜種子生産、植物病理、種子病理 ・第三国研修14 名：国際野菜訓練コース（タイ） ・合計 51 名
機材供与	車両、スプリンクラー灌漑施設、点滴灌漑施設、種子加工・検査機材	約 82 百万ルピー（種子生産、種子検査、種子調整機材など）
事業費	3.6 億円	3.56 億円

（1）JICA 専門家

計画時、長期専門家の派遣は 3 名の予定であったが、2012 年 12 月に開催された第 1 回の合同調整会議で、これを 4 名とすることが決定された。その理由は、計画時、2 カ所の対象地域で活動を始め、中間レビュー時に 4 カ所に拡大することを検討する計画であったが、上述の会議でプロジェクト開始当初より 4 カ所にて活動を実施することになったため、業務調整/種子生産を担当する専門家の業務量が増加したことにあった。4 人目の長期専門家（業務調整/研修）は 2013 年 5 月に着任した。

種子検査を担当する長期専門家の任期が 2014 年 5 月に終了した。プロジェクト開始当初より、SCS は国際種子検査協会（International Seed Testing Association：ISTA）のルールに沿った検査を実施しており、プロジェクトの活動により検査手順の合理化や発芽検査の標準化がさらに進んだことから、長期専門家によるさらなる協力は必要ないとの判断となり、後任は派遣されなかった。プロジェクト後半は、種子検査分野の協力を主に本邦研修・現地研修を通じて、種子病理分野での協力を短期専門家により実施した。

専門家の業務を補佐するため、2013 年 7 月よりローカルコンサルタントを 1 名雇用している。

（2）本邦及び第三国研修

本邦及び第三国研修の実績は表－４のとおりである。

表－４　本邦及び第三国研修（完了時までの計画を含む）

訓練名	参加者数	場　所
Seed administration	8	日本
Vegetable seed production	5	日本
Seed testing	6	日本
Seed health	1	日本
Seed pathology	2	日本
Plant pathology	3	日本
Farm machinery	3	日本
ICT	3	日本
Quality control system of seeds and seedlings	4	日本
Vegetable production technology	2	日本
International vegetable training course	14	タイ
合　計	51	

出所：JICA 専門家チーム

終了時評価調査団は、研修参加者数名にインタビューをする機会を得た。研修参加者は「知識や技能を向上させるために研修は有意義であった」「研修内容が業務と直結しており実用的であった」との意見であった。SCS からは、「種子認証、特に圃場検査を含む種子検査についての知見を得る機会があれば有用であった」との意見もあった。

一方、数カ月後に定年退職する予定でありながら、SCPPC のディレクターと民間企業の社長が本邦研修に参加したのは適切とはいえない。また、研修に参加した民間企業のアシスタントディレクターが退職し、本邦研修に参加したマハイルパラマの農業普及員（Agriculture Instructor：AI）が帰国後 2 週間で配置換えとなったのは遺憾である。ただし、中間レビュー以降はこのようなことは起こっていない。

研修参加者は研修で得た知見を基に帰国後のアクションプランを作成している。研修の成果を確認するために、プロジェクト完了までにこのアクションプランの進捗のフォローアップをすることが望ましい。

（3）機材供与

表－５は主な供与機材を示す。合計金額は 82 百万ルピーである[4]。一部を除き機材は予定どおり調達された。種子調整用のカラーソーター、種子抽出機、種子コーティング機、種子重力選別機の調達が 2014 年度に予定されていたが、調達過程に予想以上に時間を要し 2015 年末の納入となった。2015 年末の短期専門家の派遣に合わせて種子病理検査の機材が設置される予定であったが、納入業者の手続きの遅れにより間に合わなかった。しかしこれらの機材はその後よく活用されておりプロジェクト活動の実施に大きな支障はなかった。

種子コーティング機については 2015 年 10 月に設置されテスト運転及び一部作物での配合試験等が実施されているが、終了時評価時点、SPMDC はカプシカムのコーティング 3 カ月

[4] 本邦調達機材には為替レート 1LKR=0.80193JPY（2017 年 JICA レート）を適用した。

後発芽検査結果で品質に問題がないことを確認し、SCS より半年後、1 年後の発芽検査の必要性が指摘されたためこれを実施すべく検討しているところであった。SPMDC は、他の作物の検査も行うとともに、長期の発芽検査結果を踏まえてコーティング薬品配合、商品の使用期限などの基準を制定する計画であり、本格的に使用されるのは同基準が設定された後となる見込みである。

表－５　主な供与機材

項　目	目　的
Nursery house, a drip and sprinkler irrigation systems with water pump and pump house, planting trays, digital cameras, GPS	種子生産
Seed processing (color sorter, film coating machine, gravity separator and seed extractor)	種子調整
Microscope camera, electric balances, magnifier lamps, optics carrier, PH meters, germination papers and other tools and equipment for seed testing.	種子検査
Testing equipment for seed health, such as cooling incubators, plant growing chamber, ELISA leader	種子病害検査
Microscope digital camera, compact rotary microtome, system microscope, moisture meter and others	植物病理研究
Computers, a photocopy machine, air conditioners, a projector, office furniture and stationeries	プロジェクト事務所

出所：JICA 専門家チーム

（4）事業費

日本側の事業費の計画は 3.6 億円であり、実績（完了までの見込み）は 3.56 億円であり、計画内に収まる予定である（計画比 99%）。

３－１－２　スリランカ側投入

スリランカ側の投入実績は表－６のとおりである。

表－６　スリランカ側投入の実績

項　目	内　容
C/P 職員の配置	延べ 45 名
便宜供与	プロジェクト事務所 研修実施に必要な教室、資材、用具など
プロジェクトのローカルコスト負担	C/P 職員研修参加時の手当、プロジェクト事務所の電気・水道代、プロジェクトで供与した機材購入にかかる税金など
その他の追加投入	種子病害検査ユニットの建設、データベースシステム運用に必要な機材・施設の調達、種子調整機材設置用建屋の整備、苗床用ポリトンネルの設置など

３－２　活動実施状況

成果 1 と成果 2 にかかる活動は、一部遅延したもののおおむね計画どおりに実施された。成果 3 にかかる活動は計画どおりに実施された。各成果にかかる活動の進捗状況を表－ 7 に示した（詳細は付属資料 ANNEX 6 を参照）。

表－７　成果 1 にかかる活動の進捗状況

活　動	進　捗
1-1. 官民が参加する定期的会合及び合同セミナーを開催する	[A] 計画どおり進捗
1-2. 対象地域における市場調査と生産・供給の実態調査を行う	[A] 2012 年に完了
1-3. 官民双方を対象とした、野菜種子の生産、輸入、供給、在庫に関するデータベースを構築する	[B] 2016 年 10 月に完了（遅れあり）
1-4. データベース及び昨期の生産計画のレビューに基づいて、種子の生産計画（マハ期、ヤラ期）[5]を策定する	[C] 1-3 の遅れにより未実施
1-5. 種子配付・販売サービスの現況評価を行い、改善計画を作成する	[A] 2013 年に完了
1-6. DOA モデル種子販売所において、改善計画（1-5）に基づいた活動を実施する	[B] ワーゴッラ販売所の活動は完了。バタラゴダ販売所の活動は 2017 年に実施予定。

[A] 計画どおり完了もしくは継続中
[B] 遅れはあるが進捗中もしくは遅れたが完了
[C] 進捗なしもしくは完了しない予定

表－８　成果 2 にかかる活動の進捗状況

活　動	進　捗
2-1. ハイブリッド種子、原種種子及び標準種子の生産に関する現状レビューを行う（ベースライン調査を含む）	[A] 2012 年に完了
2-2. 政府種子農場の種子生産、調整、品質管理にかかる機材を導入、更新する	[B] 遅れはあったが 2015 年に完了
2-3. 優良種子の生産に関して、政府及び民間の技術職員、普及員、契約農家向けに実技研修を行う	[A] 計画どおり継続中
2-4. 優良種子の生産に関して、生産者向けの技術マニュアルを作成する	[B] 2017 年 2～3 月に完了予定
2-5. 研修を受けた普及員が、研修を受けた契約農家による技術の適用を促すため、フォローアップ訪問を行い圃場で指導する	[B] 2015 年と 2016 年は契約野菜種子生産の委託数が極端に少なく、普及員がフォローアップ訪問を行う機会は限定的であった。

[5] スリランカには年 2 回耕作期がありヤラ期とマハ期と呼ばれている。

表－９　成果 3 にかかる活動の進捗状況

活　動	進　捗
3-1. 種子認証システムの現行手順及び施設の評価調査を実施し、改善計画を作成する	[A] 2013 年に完了
3-2. 種子検査に関する技術マニュアル及び研修教材を作成する	[A] 2013～14 年に完了
3-3. 政府及び民間の技術職員、AI に対して、種子の品質管理（圃場検査と種子検査）に関する研修を行う	[A] 2013～14 年に完了
3-4. 種子生産者に対して、優良種子を準備するための研修を行う	[A] 計画どおり継続中
3-5. 野菜種子マーケットの現状把握のため、種子検査やラベルチェックを含む「市場に出回る種子の品質調査」を実施する	[A] 2016 年に完了

３－３　成果の達成状況

３－３－１　成果 1：SPMDC の種子生産・配付計画策定能力が向上する

生産計画に関する 2 つの指標の達成度は中程度、配付に関する指標の達成度は良好であり、本成果の達成度は中程度である。プロジェクト期間を通じて官民合同セミナー（Joint Private and Public Seminar：JPPS）は定期的に開催され、JPPS における討議を踏まえ JPP アクションプラン（Joint Private and Public Action Plan）がまとめられたこと、JPPS での提案を基に官民の代表者からなる種子産業開発調整委員会（Seed Industry Development and Coordinating Committee：SIDCC）が組織されたことは重要である。販売改善に関しても期待どおりの進捗があった。しかし、JPP アクションプランの民間との共有、委員会の第 1 回会合の開催、種子関連データベースシステムの生産・配付計画への活用などの取り組みが今後必要な状態である。

表－10　成果 1 の達成状況

指　標	達成状況
1-1. セミナーや定期会議で民間及び政府から提起された課題を解決するための対応策が実施される	[B] 順調に進捗しているがさらに推進が必要。
1-2. 民間セクターのニーズを考慮した、原種種子の生産計画が策定される	[B] 進捗しているがさらに推進が必要。
1-3. プロジェクトで 2 カ所のモデル DOA 種子販売所の改善がなされたのち、さらに 2 カ所の DOA 種子販売所が改善される	[A] 1 カ所のモデル販売所が改善され、さらに 10 カ所の DOA 種子販売所が改善された。

指標 1-1：セミナーや定期会議で民間及び政府から提起された課題を解決するための対応策が実施される

（1）JPPS の実施

中間レビュー以降も JPPS は定期的に開催され、同セミナーにおける討議を踏まえ JPP アクションプラン（付属資料 ATTACHMENT-1）がまとめられ、セミナーでの提案を基に官民の代表者からなる委員会（SIDCC）が組織された。アクションプランは DOA の社内文書として各部局に承認されている。SIDCC は準備会議が開かれ、種子の国内生産・輸入に関する方針を検討するワークショップの開催が 2016 年に企画されたが延期された。

（2）ハイブリッド品種のトレーニング

民間セクターの要望に応え、園芸作物研究開発所（Horticulture Crop Research and Development Institute：HORDI）と SPMDC により 2015/2016 マハ期にハイブリッド品種のトレーニングが開催されたことは、JPPS の提案の具体化のもう 1 つの例といえる。

（3）民間代表者の月例会議や JCC ミーティングへの出席

スリランカ種子生産者協会（Seed Producers Association of Sri Lanka：SPASL）の代表者は JPPS に加え、プロジェクトの月例会議や JCC ミーティングへも常時出席し、民間を対象としたプロジェクト活動の企画・調整などに貢献した。

指標 1-2：民間セクターのニーズを考慮した原種種子の生産計画が策定される

（1）JPPS での情報共有

前述の JPPS（開始当初の呼称は、「原種種子生産セミナー」）の開催により両者の間での情報共有が進んだ。例えば SPMDC からは、原種種子の生産量や在庫量に関する情報が提供され、SCPPC 職員や JICA 専門家からは、輸入種子の現状、種子法の施行状況、種子病理などの話題に関するプレゼンテーションが実施され、民間からの参加者にとって重要と思われた。また以前は、民間企業から SPMDC に不定期に提出されていた原種種子の必要量に関するリストが、当セミナー時に一度に提出されるようになり、SPMDC の原種種子生産計画策定の作業効率向上に貢献している。

（2）データベースシステム

種子・種苗情報管理システム“Seed and Planting Material Information System”は 2016 年 10 月に正式に使用が開始された。終了時評価時、いくつかの事務所ではデータ入力が開始されていた。現在ほとんどが手作業で実施されている SPMDC と SCPPC の各事務所での記録や集計・分析、郵便書留を使った報告書送付が、同システムを使用することで効率化される予定である。計画時、プロジェクト対象地域を対象とする野菜種子のデータベースの導入を想定していたが、DOA の強い意向によりコメ、その他畑作物（Other Field Crops：OFC）、野菜を対象とすることになり、対象地域も全国に拡大され、作業範囲も生産、加工、検査、貯蔵、販売及び会計をカバーすることになった。開発に時間はかかったものの、データベースは包括的なものとなった。

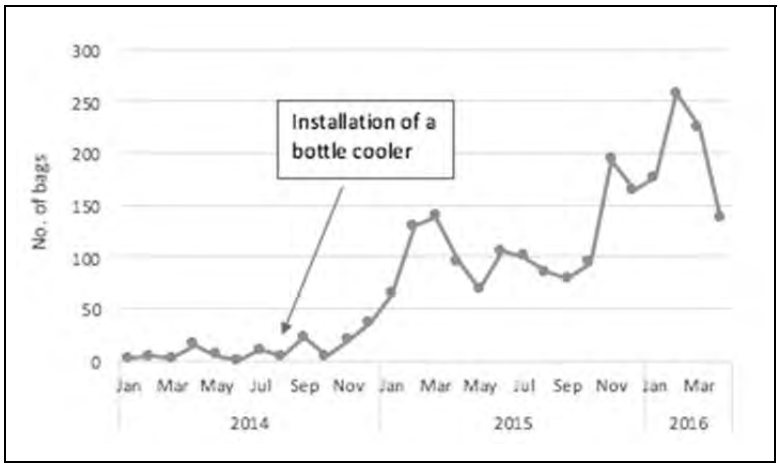
DOA 傘下の情報通信センター（Information and Communication Center：ICC）はデータベースシステムの技術訓練と導入の進捗モニタリングを行っている。終了時評価時、コンピュータが不足していたりインターネットが導入されていない事務所もいくつかあり、これを充足すべく ICC、SPMDC、SCPPC は業者への手配や予算措置を進めている。

（3）地方種子委員会（Regional Seed Committee：RSC）

SPMDC は全国各地で組織されている RSC を原種種子の要請聴取と配付の拠点として活用することを考案しており、2017 年ヤラ期からマハイルパラマで試行する予定である。

指標 1-3：プロジェクトで 2 カ所のモデル DOA 種子販売所の改善がなされたのち、さらに 2 カ所の DOA 種子販売所が改善される

プロジェクト活動の一環としてワーゴッラ種子販売所にボトルクーラー（一種の冷蔵庫）が設置された。ボトルクーラーは主にキノコ種子の保管に使用されている。キノコ種子は常温での保管が困難であり、以前は顧客が買いに来ても販売店では必要数を提供できないことが多かったが、ボトルクーラーの設置によりこれが改善され、キノコ種子の販売数が急増した（図－１）。SPMDC はこれを評価し、他の 10 カ所の販売所にボトルクーラーを設置した。プロジェクトの活動としてバタラゴダ種子販売所に冷蔵室が設置される予定であったが、SPMDC が他の販売所へも冷蔵室の設置を予定していることから、バタラゴダについても SPMDC の一般予算により設置が実施されることになった。設置は 2017 年半ばに完了予定である。



図－１　ワーゴッラ販売所のキノコ種子販売実績

３－３－２　成果 2：官民の野菜種子生産技術が向上する

成果 2 の 3 つの指標はいずれもほぼ達成されており、本成果の達成状況は良好である。中間レビュー時、SPMDC 職員はプロジェクトで導入した技術の適用や効用について消極的な態度であったが、その後、実践を通して多くの職員がこれらの技術の効用や重要性を理解するようになった。これは、JICA 専門家の継続的な技術指導や、国内外の研修機会の提供、DOA の通達発信による技術適用の奨励などの結果である。中間レビューの提言を受けプロジェクト後半は、JICA 専門家に代わって SPMDC の職員が種子生産研修を実施するようになった。研修参加者の満足度や研修内容の理解度も高く、研修が効果的に実施されたといえる。対象地域の GSF では、本プロジェクトで導入した技術が積極的に実践されている。民間の種子会社もプロジェクトが主催した国内外の研修で得た知見を生かし、種子生産の改善を図っている。

表－11　成果 2 の達成状況

指　標	達成状況
2-1. 種子生産研修参加者の 75%が研修後のテストに合格する	[A] ほぼ達成
2-2. 種子生産研修参加者の 80%が研修が有用と考える	[A] ほぼ達成
2-3. DOA の通達に沿って政府種子農場がプロジェクトで紹介した技術を採用する	[A] ほぼ達成

指標 2-1：種子生産研修参加者の 75%が研修後のテストに合格する

表－12 のとおり、種子生産研修参加者の 75%が研修後のテストに合格している。中間レビューの提言を受け、種子生産研修が SPMDC 地方事務所の職員を中心に計画実施されるようになったことは評価に値する。研修の前には計画会議が、のちには評価会が実施されている。

表－12　種子生産研修後に実施したテスト結果

耕作期	地方事務所	テスト受験者数	平均点	合格点	合格者数	合格率（%）
Yala 2014	Aluttarama	15	4.3/7	Pub：>4 Prv：>3.5	13	87
	Kundasale	23	4.4/7	Pub：>4 Prv：>3	22	96
	M.I.	30	4.5/7	>4	26	87
Yala 2015	Aluttarama	18	8.7/10	>5	18	100
	Kundasale	25	47.0/10	>5	19	76
	M.I.	19	7.7/10	>5	15	79
	Nikaweratiya	20	8.0/10	>5	20	100
Maha 2015/16	Aluttarama	訓練中止				
	Kundasale	31	7.3/10	>6	29	94
	M.I.	60	9.1/10	>6	60	100
	Nikaweratiya	31	7.8/10	>6	30	94
Yala 2016	Master Trainers' Training	12	18.8/21	18	10	83

出所：JICA 専門家チーム

注：2015/16 年マハのアルッタラマでの研修は圃場の状況が良好でなかったため実施されなかった。
2014/15 年マハ期に研修が実施されなかったのは、中間評価時の提言を受け、研修実施のリーダーシップを JICA 専門家から SPMDC 職員に移行させる方法が検討されている最中であったため。

指標 2-2：種子生産研修参加者の 80%が研修が有用と考える

表－13 のとおり、種子生産研修実施後のアンケート調査の結果、参加者の 80%以上が研修が有用であったと考えていることがわかる。

当初、研修はすべて GSF で実施されていたが、農民の継続的な参加を促すため、クンダサレ地方事務所の提案により、農村における研修が実施された。これまでクンダサレ事務所はキリワンデニヤ村とリキッラガスカダ村で、ニカウェラティヤ事務所はニカウェラティヤ村とマハワ村で村落における研修を実施した。ニカウェラティヤ事務所は現在ガルガムワ郡のパラクダーウェワ村で研修を実施中である。研修では農民のリーダーや女性組合などが活躍している。このように、農民の継続的な参加が得られる村落ベースの生産研修のモデルが作られたことも重要な成果である。

SPMDC、SCS 職員をマスタートレーナーとして育てるための研修が、JICA 専門家により 2016 年ヤラ期に実施された。研修参加者はその後、種子生産訓練の実施において中心的な役割を担っている。

表－13　種子生産研修実施後のアンケート調査の結果

耕作期	地方事務所	質問数	合格者数	合格者の割合（%）
Yala 2014	Aluttarama	22	17	77
	Kundasale	25	22	88
	M.I.	40	37	93
Yala 2015	Aluttarama	18	16	89
	Kundasale	24	18	75
	M.I.	18	14	78
	Nikaweratiya	19	16	84
Maha 2015/16	Aluttarama	Training Terminated		
	Kundasale	31	31	100
	M.I.	60	55	92
	Nikaweratiya	30	25	83
Yala 2016	Master Training	12	12	100

出所：JICA 専門家チーム

指標 2-3：DOA の通達に沿って GSF がプロジェクトで紹介した技術を採用する

（1）DOA の通達

中間レビューの提言に基づき、プロジェクトで紹介した生産技術を GSF で積極的に適用するべく 2014 年 10 月に SPMDC は通達を発信した（SPD/2/3/JICA/2012）。その後プロジェクトでは、紹介する生産技術の背景を理解することの重要性に立ち返り、良い野菜種子生産実践（Good Vegetable Seed Production Practice：GVSPP）（付属資料 ATTACHMENT-2 参照）を作成した。GVSPP は 21 項目から構成されるチェックリストであり、種子生産過程において生産者が注意すべき点を網羅している。SPMDC はこれを受け、プロジェクト対象 GSF に対してこれに準じて種子生産を実施するよう通達を出した。

（2）GSF における技術の適用

終了時評価では、GSF においてプロジェクトで紹介した技術が積極的に使われていることが確認できた。GVSPP を必須のチェックリストとして活用している農場もあった。中間レビュー時、SPMDC 職員はプロジェクトで紹介した技術の適用や効用について消極的な態度であったが、その後、実践を通して多くの職員がこれらの技術の効用や重要性を理解するようになった。これは、JICA 専門家の継続的な技術指導や、国内外の研修機会の提供、DOA の通達発信による技術適用の奨励などの結果である。すべての農場が育苗の際のトレイとポットの使用、播種や定植前の水撒き、苗床の土壌管理、種苗管理、畝づくり、土壌消毒、定植密度・ナス科植物の一本植え、剪定、ネット使用、種子の適切な乾燥、といった技術を取り入れており、土壌の覆い・マルチングについてもときどき実施されている。クンダサレ農場では、ナスの接ぎ木の成功率が顕著に改善した（30%が 90%に改善）。マハイルパラマ農場は苗床用の土壌の消毒の実施状況が良好である。アルッタラマ農場では苗床用の土壌に燻炭を積極的に活用している。移植時の根の保護の重要さもすべての農場で理解されるようにな

った。

(3) 職員の理解度の向上や経験

対象地域のすべての SPMDC 地方事務所や GSF では、マスタートレーナーを含む研修や農民への指導の核となる職員が数名育っている。SCS 地方事務所の職員も種子生産研修や農民への指導で協力している。

(4) 民間種子生産者

種子生産研修には民間の種子生産者も参加した。民間種子生産者はタイにおける第三国研修にも参加した。終了時評価ではベストシーズ社とヘイレイズ・アグロファーム社にインタビューをした。ベストシーズ社は国内外の研修で得た知見を活用し、種子検査室や種子貯蔵室の改善、農民データベースの構築、各種の生産技術の適用などを実施している。タイでの研修で学んだミツバチによる受粉技術も採用している。ヘイレイズ・アグロファーム社は、ハイブリッド品種の栽培技術トレーニングで得た知見を活用している。

(5) 野菜種子生産マニュアル

野菜種子生産マニュアルが JICA 専門家により作成され、HORDI と SPMDC 職員がこれを確認し英語版が完成した。終了時評価時はシンハラ語への翻訳が終了しており、SPMDC がこれを校正中であった。2017 年の 3 月には印刷と関係機関への配付が完了する計画である。

(6) 種子調整機材

クンダサレ農場に各種の種子調整機材が導入され、種子調整の効率が向上した。以前は、各耕作期の種子調整に約 2 カ月を要していたが、種子調整機材の設置以降はこれが 2 週間で実施できるようになった。種子調整時間の短縮は、種子の品質を保ち、適時の販売を希望する種子販売業者の要求に応えるために重要である。調整時間の短縮にはカラーソーターが大きく貢献している[6]。

クンダサレ農場長によれば、種子調整機材の導入は品質向上にも貢献しているとのことである。同農場長の説明では、調整後の種子の純度が 95%から 99%に、水分含有量が 9%から 5%～7%に、検査室での発芽率が約 10%それぞれ改善したとのことである（平均値）。SPMDC はこれらの機材を民間業者にも貸し出す方針であり、終了時評価時、種子抽出機は既に貸し出しの実績があった。また、終了時評価団の民間業者へのヒアリング時にも企業側から同機材に対する質問があり、民間業者側からの関心も高いことがうかがえた。

種子コーティング機が 2015 年 10 月に野菜種子センター（Vegetable Seed Centre：VSC）に設置された。コーティングはスリランカにとって新しい技術であり、DOA は薬剤・ポリマーの配合やコーティング後の使用期間などの基準をもっていないため、まずこれらを策定する委員会が組織された。終了時評価時はカプシカム種子をコーティングし、水分含有量や発芽率の検査を実施しているところであった。今後は、チリ、メロン、オクラ、ニガウリの検査も予定されている。なお、いずれの機材もスリランカ側により適切にオペレーション・メン

[6] カラーソーターの設置前は 5 名の職員が手作業でソーティングしており、1 人が 1 日にソーティングできる量は約 2kg であった。これに対してカラーソーターは一度に 20～30kg の種子を瞬時にソーティングできる。

テナンスされていた。

３－３－３　成果 3：官民の野菜種子の品質管理技術が向上する

成果 3 の 5 つの指標はいずれも達成されており、本成果の達成状況は良好である。SCPPC の下部組織である種子検査室（Seed Testing Laboratory：STL）では、JICA 専門家による改善提案が実践され､同専門家により作成されたマニュアルやハンドブックは職員研修などで活用されており、これらによる検査手順の合理化や発芽評価の標準化が図られている。

JICA 専門家と HORDI による野菜病害のフィールド調査の結果、同国における種子伝染病拡大の深刻さが明らかになった。これを受けプロジェクトでは、SCPPC や HORDI 職員の種子病理や植物病害診断の検査技術向上に取り組み、同職員は細菌（バクテリア）、ウィルス、糸状菌（カビ）の種子検査の基本技術を習得した。

中間レビュー時の提案を受け、市場の種子の品質に関する調査が実施され、計画どおり、調査結果に基づきアクションプランが策定された。

表－14　成果 3 の達成状況

指　標	達成状況
3-1. 改善計画で提言された対応策が種子検査プロセスで実践される	[A] 達成
3-2. 種子検査の研修参加者の 75%が研修後のテストに合格する	[A] 達成
3-3. 種子検査手順のハンドブックが完成し、活用される	[A] 達成
3-4. カビとバクテリアの種子病理検査が実施される	[A] 達成
3-5.「市場に出回る種子の品質調査」の結果に基づきアクションプランが作成される	[A] 達成

指標 3-1：改善計画で提言された対応策が種子検査プロセスで実践される

種子検査分野の JICA 専門家が、2014 年に以下のような検査手順の改善を提案した。終了時評価調査時に確認したところ、その後、STL はほとんどの提案を実施している。発芽検査用紙については検証の結果、既存のものがスリランカの気候に合っていると判断しており変更していない。

表－15　JICA 専門家による検査手順の改善を提案（2014 年 5 月）

Improvement suggestion & Training	Present situation	Feasibility by May 2014
Computerization of resister procedures	Not complied with, under consideration	△
Repetitive test for a same seed lot	Complied with at Peradeniya STL, Other STLs are under consideration	○
Omission of the lot control test	Not complied with	○
Change of germination paper	Not complied with, under consideration	△
Checking of testing material's pH	Not complied with, Manual is in process of preparation	○
Calibration of the electric balance	Not complied with, Manual was prepared	○
Procedure of seed health test	Not complied with, depend on short term expert	△
Equipment (Table 2, 3)	Some complied with, Others are in process of procurement	○
Training of seed testing procedure	Complied with	○
Seedling evaluation to STL staff	Not complied with, Training material was prepared	○
Seedling evaluation to private	Not complied with, Training material was prepared	△
Basic seed health test	Complied with	○
Applied seed health test	Not complied with, depend on short term expert	△
Field inspection to SCS staff	Currently underway as part of seed production training	○
Field inspection to seed producers	Currently underway as part of seed production training	○

* ○: Complied with or high feasibility △: Depend on situation ×: Low feasibility

出所：JICA 専門家報告書

指標 3-2：種子検査の研修参加者の 75%が研修後のテストに合格する

指標 3-2 は、種子検査分野での研修参加者の理解度を測るものである。種子検査行程や発芽評価検査に関する研修が JICA 専門家により STL 職員に対して実施された。ほとんどの職員が研修終了後のテストに合格したことから当指標は達成されている[7]。

指標 3-3：種子検査手順のハンドブックが完成し、活用される

JICA 専門家は以下のようなマニュアルやハンドブックを作成した。

・電子重量計使用マニュアル
・種苗評価マニュアル
・種苗評価標準化実習マニュアル
・発芽 pH 測定実習マニュアル

SCS や STL の職員はこれらのマニュアルやガイドブックを日常作業や研修実施時に適宜参照している。種苗評価マニュアルが最も活用頻度が高い。

指標 3-4：カビとバクテリアの種子病理検査が実施される

JICA 専門家と HORDI による植物病害、特に種子伝染性病害の発生調査がカルピティヤ、ヌワラエリヤ、キャンディを中心に実施され、同国における種子伝染病、特にトマトかいよう病（Bacterial canker）、スイカ果実汚斑細菌病（Bacterial fruit blotch：BFB）（悪斑細菌病）、アブラナ科野菜黒腐病（Black rot）の蔓延の深刻さが明らかになった。これらは世界的（国際的）な 3 大種子伝染性病害であり、各国とも種子生産や種子の輸出入で非常に警戒している病害である。これを受けプロジェクトでは特に後半、種子や植物病害診断の検査技術の向上に力を入れた。

[7] 研修終業後、研修で学んだことの理解度を確認するためクイズを実施した。58 名の参加者のうち 53 名が正しく回答した。

種子病害検査ユニット（Seed Health Testing Unit：SHTU）が DOA の資金で建設され、プロジェクトにより機材調達設置され 2015 年 8 月にオープンした。SHTU と HORDI の職員は JICA 専門家や本邦研修で種子病理や植物病害診断の技術を集中的に学んだ。その結果、目標であった細菌（バクテリア)、糸状菌（カビ)、ウィルスの基本的な検査ができるようになった。細菌やウィルスの検査ができるのはスリランカで SHTU だけであり、民間業者からも検査依頼が来ている。表－16 は SHTU における検査実績を示す。

表－16　種子病害テスト実施実績（細菌とウィルス）

（2014 年から 2017 年 1 月 15 日まで）

作　物	サンプル数	対象病害	適用技術	検査結果
Tomato	2	Bacterial canker	Agar plate method + inoculation test	Negative
Tomato	2	Virus	Immuno-strips for Cmm	Negative
Cabbage	1	Black rot (bacteria)	Agar plate method + inoculation test	Negative
Beans	2	Seed borne bacterial diseases	Agar plate method + inoculation test and grow out test	Negative

出所：SCS

表－17　種子病害テスト実施実績（カビ）

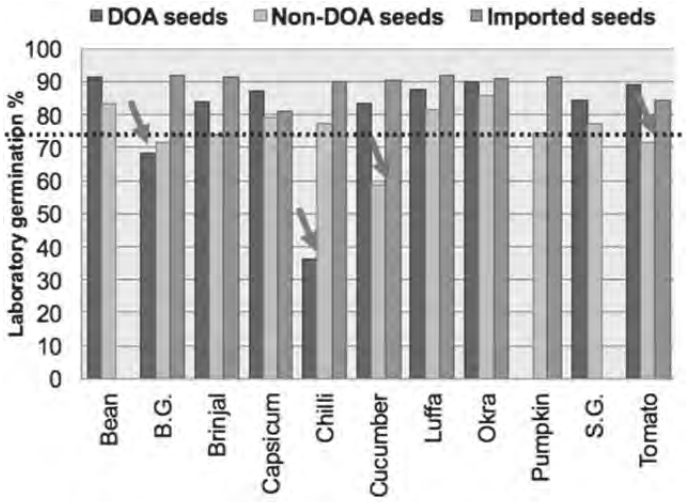
（2014 年から 2017 年 1 月 15 日まで）

作　物	サンプル数	対象病害	適用技術	検査結果
Capsicum	13	Seed borne fungal diseases	Blotter method	Anthracnose; + (in 1 lot) Fusarium spp; + (in 1 lot) Alternaria spp; + (in 1 lot
Bitter gourd	28	Seed borne fungal diseases	Blotter method	Anthracnose; + (in 16 lot) Fusarium spp.; + (in 1 lot) Cercospora spp.; + (in 1 lot)
Tomato	12	Seed borne fungal diseases	Blotter method	Fusarium spp.; + (in 1 lot)
Luffa	3	Seed borne fungal diseases	Blotter method	-
Okra	11	Seed borne fungal diseases	Blotter method	-
Snake gourd	9	Seed borne fungal diseases	Blotter method	Anthracnose; + (in 1 lot) Cercospora spp.; + (in 1 lot)
Brinjal	18	Seed borne fungal diseases	Blotter method	Anthracnose; + (in 1 lot) Fusarium spp.; + (in 2 lot)
Pumpkin	9	Seed borne fungal diseases	Blotter method	-
Cucumber	6	Seed borne fungal diseases	Blotter method	-
Bean	1	Seed borne fungal diseases	Blotter method	-

出所：SCS

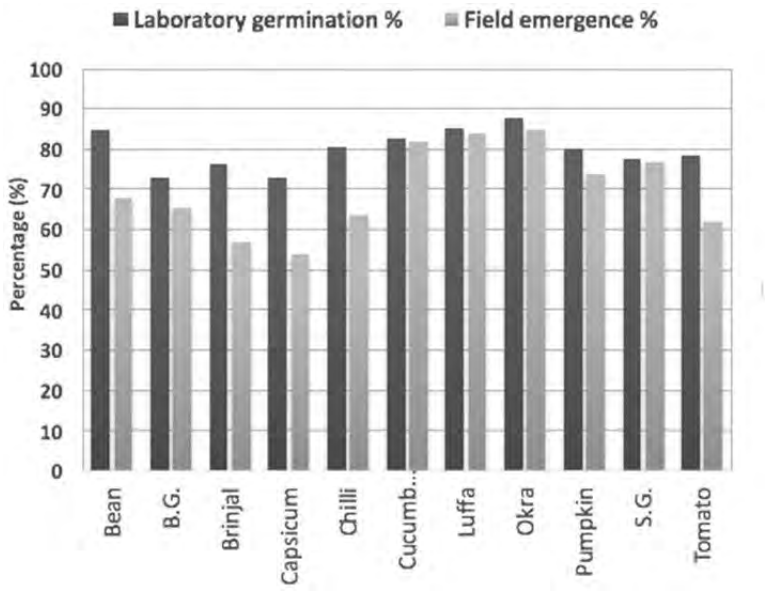
指標 3-5：「市場に出回る種子の品質調査」の結果に基づきアクションプランが作成される

中間レビュー時の提案を受け、市場の種子の品質に関する調査が 2014/15 年マハ期と 2015 年ヤラ期に実施された。この種の調査はスリランカで初めてであった。調査結果は官民の関係者にも公開され、特に、フィールドデーと称する圃場での調査結果発表会では、異品種混入の深刻さなど実例をもって提示することができ、民間の種子生産業者への重要な啓発機会となった。調査報告書では、市場の種子には品質が不十分なものが相当量あることが明らかにされ、改善の必要性のエビデンスとなった。調査結果は市場の種子の品質の現状を示すものであり、本プロジェクトの上位目標の達成度を測る際のベースライン値として活用できる（図－２、図－３及び表－18)。



出所：市場に出回る種子の品質調査 2015 年ヤラ期よりスリランカ側評価者作成
注：点線は SCS の基準である 75%の発芽率を、矢印は発芽率が低く改善が必要な作物を示す。

図－２　市場に出回る種子の品質調査結果–検査室での発芽率



出所：市場に出回る種子の品質調査 2015 年ヤラ期よりスリランカ側評価者作成

図－３　市場に出回る種子の品質調査結果–圃場での発芽率

表－18　検査室での発芽率と圃場発芽率の差異検定結果

Difference between LG and FE				
Crops	LG	FE	t Stat	Pvalue
Bean	84.97	67.85	3.19	0.001**
Bitter gourd	72.81	65.50	1.21	0.115
Brinjal	76.33	56.80	4.05	0.000**
Capsicum	72.86	53.80	3.04	0.001**
Chilli	80.36	63.47	3.75	0.000**
Cucumber	82.89	81.94	0.26	0.399
Luffa	85.21	83.96	0.58	0.279
Okra	87.63	84.59	1.46	0.075*
Pumpkin	80.03	73.96	1.39	0.082*
Snake gourd	77.82	76.82	0.19	0.422
Tomato	78.51	61.93	4.50	0.000**

出所：市場に出回る種子の品質調査 2015 年ヤラ期、p.15

種子品質アクションプラン

上述の市場に出回る種子の品質調査の 2014/15 年マハ期の調査結果に基づきアクションプランが作成され、2016 年 7 月の JCC で承認された（付属資料 ATTACHMENT3 を参照）。

３－４　プロジェクト目標達成の見込み

プロジェクト目標は「対象地域の野菜の認証種子の生産体制が改善される」である。本プロジェクトにより官民の情報共有が促進された。種子検査技術が期待されたレベルに向上し、市場の種子の品質向上のためのアクションプランの実践も始まっている。GSF は、導入された技術を積極的に取り入れており、関連の職員は契約農家にこれら技術に関する技術指導もできるようになった。

表－19　プロジェクト目標の達成状況

指　標	達成状況
1. 政府及び民間セクター双方の情報共有が進んだと答える関係者が増加する	[A] 達成。
2. DOA の職員の 80%以上が「種子データベースによってデータ処理業務が効率化した」と考える	[B] データベースシステムがまだ本格稼働しておらず不明。
3. 種子生産研修に参加した契約農家の 60%以上がプロジェクトで紹介した技術を適用する[8]	[B??] 2015 年の調査結果は良好。近年の情報はない。
4. SCPPC がプロジェクトで導入した芽生評価検査マニュアルや教材を使って在職者研修や新人研修を継続的に実施する	[A] 達成。
5.「市場に出回る種子の品質調査」の結果に基づき作成したアクションプランが実施される	[A] 実施状況は良好。完了時に要確認。

[8] プロジェクトで紹介した技術のうち 1 つ以上を使う。

2015 年にプロジェクトで実施した調査では、契約種子生産農家の技術適用状況は指標で設定した 60%を超えているとの結果が得られているものの、終了時評価時に実施した同農家へのインタビューでは、技術適用は難しいという声も聞かれ、最新状況の確認が必要な状況である。データベースシステム活用による生産計画の改善は未実施である。これらから、プロジェクト目標の達成度は中程度と判断する。

指標 1：政府及び民間セクター双方の情報共有が進んだと答える関係者が増加する

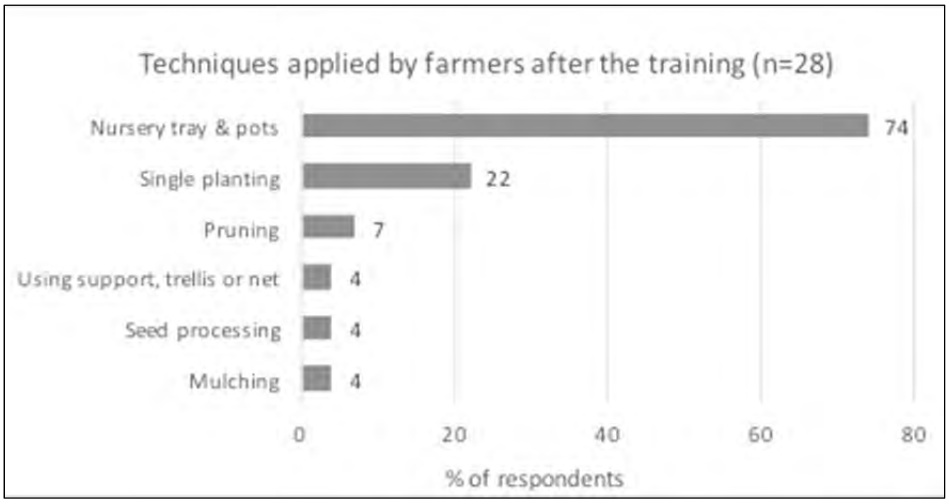
第 6 回官民合同セミナー（2015 年 9 月 11 日）での参加者アンケート調査によれば、同セミナーに複数回参加経験のある回答者 20 名のうち 17 名（85%）が、情報交換が改善した（＝情報共有が進んだ)、と回答している。第 7 回（2016 年 3 月 10 日）では、33 名中 30 名（91%）が改善したと回答しており、セミナーを通じて情報共有が進んだといえる。

指標 2：農業局の職員の 80%以上が「種子データベースによってデータ処理業務が効率化した」と考える

種子データベースの完成が遅延したため、データベースの入力を開始したところであり、利用者の評価は不明である。

指標 3：種子生産研修に参加した契約農家の 60%以上がプロジェクトで紹介した技術を適用する

2015 年にプロジェクトで実施した調査では、契約種子生産農家の技術適用状況は指標で設定した 60%を超えているとの結果が得られている。



出所：JICA 専門家報告書

注：研修に参加した種子生産農家の中から SPMDC が数世帯選び、JICA 専門家がこれを訪問した。

図－４　研修で紹介された技術の農家による適用状況（n=28）

研修を受けた農民のなかには習得した知見をよく活用し、生産技術を向上させ、種子生産を効率化させている例もみられる（以下のコラム参照)。

＜種子生産の改善の経験を語る農民＞

終了時評価調査団は SPMDC ニカウェラティヤ地方事務所長の紹介で、クルネーガラ県バタラゴダ地区のプンチバンダ氏を訪問した。同氏は約 15 年の経験をもつ種子生産者である。

プロジェクトが主催した生産研修に参加し、そこで得た技術を適用しており、大変役に立つことがわかったという。今回の耕作期はキュウリの種子生産を受託し、400g の原種種子を SPMDC 地方事務所から受け取ったが、研修で習ったとおり育苗にトレイとポットを使ったところ原種種子は 200g で足りた。残りの 200g は次のシーズンに自由に使っていいと同事務所から言われて大変得をした気分である。トレイとポットを使って育苗をすると水やりもずいぶん楽である。このやり方だとバケツ 2 杯分くらいの水で足りるが、小さな苗を畑に植えて育てる以前のやり方だと水もたくさん要るし、水やりも重労働である。2015 年のヤラ期は、耕作期の始まりに大雨が降ってそのあと日照りとなった。トレイとポットで育てていた苗は木陰に置いていたため大雨や日照りによる被害を被ることはなかったが、苗床に蒔いた種子は、大雨で流されたのか、その後の日照りで表土が硬くなったのか、いずれにしても発芽しなかった。

一方、終了時評価時に実施した研修参加農家へのグループインタビューでは、以下のような事情から技術適用は難しいという声も聞かれた（アルッタラマ、ニカウェラティヤ、キリワンデニヤ、リキッラガスカダなど)。

・トレイやポットなどを買うために先行投資をする財力がない。
・野菜種子買い上げ価格を考えると手間暇をかけるに十分値するか疑問。
・種もみやコメの生産時期と重なるので忙しくて野菜種子生産に注力する時間がない。
・一本植えや間引きは怖い。理論はわかるが、病害や日照りもあるので、全部なくなってしまったら困る。
・研修で教えられたことを実践しなければいけないとは思っていなかった。
・DOA にはお世話になっているので研修に参加した。
・つい昔のやり方になってしまう。やり方を変えるのはなんとなく怖い。

「３－６－６　問題点及び問題を惹起した要因」で後述するとおり、2015 年と 2016 年は SPMDC から農家への種子生産委託がごく少なかったため、研修に参加した農家の技術実践や、SPMDC 職員の農家訪問の機会は限定的であり、同職員による契約農家への技術支援・確認が計画どおりに進まなかった。そのため当指標にかかる最新の情報はなく、「B??」と疑問符をつけた評価となった。

このため、プロジェクト終了までにマハ期（2016/2017 年）の状況を確認する必要があることをスリランカ側と確認した。なお、終了時評価でのインタビュー方法及び結果、2015 年にプロジェクトが実施した調査方法及び結果を検証し、指標のモニタリング方法については、次の点で議論の余地がある。

・プロジェクトが紹介した技術の適用状況を確認する手段について、PDM では契約農家へのインタビュー結果と提示されているが、タイミングの問題があり、インタビュー時に実際の技術を目視で確認することは困難である。
・実際には研修を踏まえて試行的に技術を試している農家が多いが、「技術を適用しているか」

という問いに対して試行的に試している場合、Yes か No の判断が各農家によって異なる可能性が高い。また、インタビュアーの誘導も同等である。

・プロジェクトでは 21 項目のチェックリスト（GVSPP）の導入を行っているように、種子生産過程において生産者が注意すべき点は多く、1 つの技術に特化したものではない。

これらの点を踏まえ、プロジェクト専門家とマハ期（2016/2017 年）における本指標のモニタリング方法について議論した結果、GVSPP をモニタリングツールとして活用する可能性が提示された。今後、関係機関と協議のうえ、具体的なモニタリング方法を検討することが望まれる。

指標 4：SCPPC がプロジェクトで導入した芽生評価検査マニュアルや教材を使って在職者研修や新人研修を継続的に実施する

表－20 のとおり、SCPPC はプロジェクトで導入した芽生評価検査マニュアルや教材を使って在職者研修や新人研修を継続的に実施している。

表－20　種子検査マニュアル類を活用して実施した職員研修の実績

年	研修タイトル	参加者数	期間（日）
2014	Training programme on seed testing	85	4
	Seed testing training for new seed technicians	14	3
	Preparing meeting for seed testing workshop	30	1
2015	Presentation on quality control of certified seeds and seedlings	23	1
	Guideline preparation for seed testing procedure	18	2
	Guideline preparation for seed testing procedure	18	2

出所：SCS

指標 5：「市場に出回る種子の品質調査」の結果に基づき作成したアクションプランが実施される

表－21 のとおり、アクションプランの一部は実施済みや実施中である。

表－21　種子品質アクションプランの実施状況（短期計画）

項目（短期目標）	実施済み・実施中のもの
1. Training on seed quality	Has been Implemented
2. Awareness creation on seed quality	Six awareness creation meetings on Seed Act for private producers, importers & traders were held in Oct.
3. Expiry date on seed pack	Expiry date were printed on newly produced seed packets Oct. 2017 onward.
4. A mechanism to sample and test all imported seeds	Discussion between SCS & NPQS was held.
5. Fertilizer recommendations for vegetable seed production	
6. Continuation of Market survey	Budget for survey in 2016-18 was allocated. SCS is conducting survey for imported seeds in 2016.

7. Seed production and distribution planning by Regional Seed Committees	
8. Revision of seed germination and moisture level	

出所：JICA 専門家チーム

３－５　上位目標達成の見込み

上位目標は「市場に出回る野菜種子のうち、DOA が定める基準を満たしている種子の量が増加する」である。指標 1「市場に出回る野菜種子のうち、DOA の基準を満たしている種子の割合が増加する」については種子の品質調査にて基準値が得られたが、達成可能性については現時点で情報がない。指標 2 の「民間の種子生産業者から SPMDC に原種種子の供給要請があった際、90%以上は供給がなされる」は過去 3 年間未達成である。上位目標は市場全体を対象としており、プロジェクトの貢献に加えて官民によるさまざまな努力が必要であり、達成には困難も予想される。一方、本プロジェクトではスリランカ初の種子病害検査室が設立され、市場の種子の品質調査が初めて実施されるなどいくつかの正のインパクトが発現している。表－22 は上位目標の達成状況を示す。

表－22　上位目標達成状況

指　標	達成状況
指標 1：市場に出回る野菜種子のうち、DOA の基準を満たしている種子の割合が増加する	情報なし
指標 2：民間の種子生産業者から SPMDC に原種種子の供給要請があった際、90%以上は供給がなされる	過去 3 年間は 90%以上供給されておらず改善もみられない

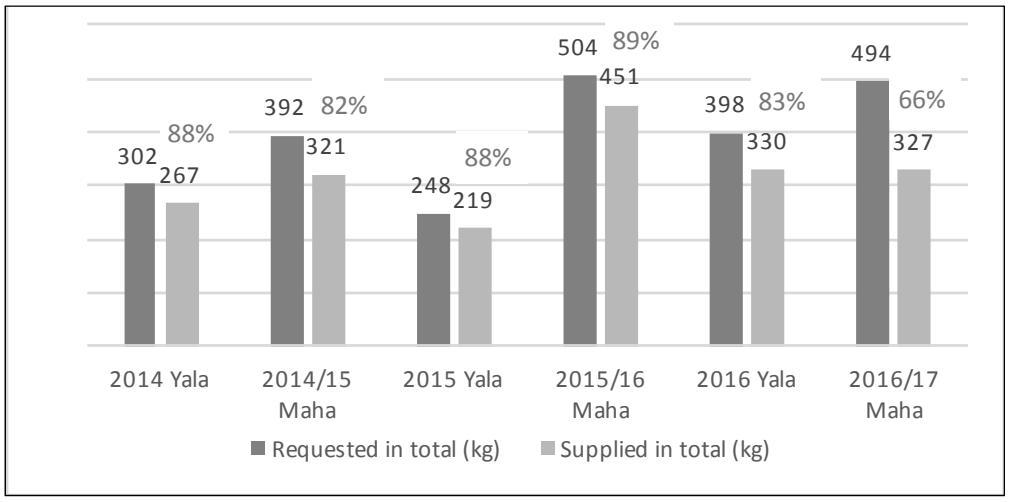
指標 1：市場に出回る野菜種子のうち DOA の基準を満たしている種子の割合が増加する

市場に出回る種子の品質調査が実施され、ベースラインデータが収集された（成果 3 の図－１と表－16 に記した情報が主なベースラインデータとなる）。しかし、同類の調査はその後実施されておらず、種子の品質の改善状況については不明である。提言にも記したように、SCS は、2015 年ヤラ期に実施した種子の品質調査と同様の手法で、2018 年ヤラ期に品質調査を行い、SEPC の協力を得て両調査を比較分析し、本プロジェクトの上位目標の達成状況を確認することが望まれる。比較に足る調査結果とするべく、2018 年の調査では、DOA 種子、非 DOA 種子、輸入種子を対象とし、検査室における発芽率、水分含有率、圃場における発芽率といった項目は必ず含め、サンプリングについても 2015 年ヤラ期の調査と類似の方法で実施する必要がある。なお、本調査の実施について、SCS からは「2018 年ヤラ期の調査予算は確保している。2015 年ヤラ期と同様の方法で調査を実施したい」との回答があった。

指標 2：民間の種子生産業者から SPMDC に原種種子の供給要請があった際、90%以上は供給がなされる

図－５と表－23 が示すとおり、過去 3 年間は重量に関しても、品種数に関しても、要請の 90%以上が供給されておらず改善もみられない。官民のさらなる対話の促進や、データベースシステムや RSC などを活用し販売動向の分析や需要予測を行い、より適切な生産計画を策定することが

望まれる。



出所：SPMDC

図－５　原種種子の要請と供給（kg）

表－23　原種種子の原種種子の要請と供給（品種数）

耕作期	供給リストにある品種	全量供給された品種	要求が充足された品種数（%）	要求があったが供給されなかった品種
2016/17 Maha	27	20	74	TA2, MI Short, Thinneveli, MC43, Thilina, Haritha, BS1
2016 Yala	33	24	73	TA2, Polon, Gannoruwa hawari, A9, Krishna, Thilina, Goraka, Red, BS1
2015/16 Maha	33	24	73	TA2, Krishna, Coraka, Thilina, Asiri, Gannoruwa Ari, Red, BS1, Ruhunu
2015 Yala	19	16	84	Hawari, Thilina, BS1
2014/15 Maha	25	20	80	TA2, Krishna, Thilina, Asiri, BS1
2014 Yala	21	18	86	MC43, Thilina, BS1

出所：SPMDC

SPMDC による説明：

・TA2 の需要は過去 2 年ほど急に高まった。
・Thilina と Krishna は純度に問題があるため近年、生産・供給されていない。
・Ruhunu はウィルスに感染しやすいため生産停止となっている。
・供給のリクエストをした後、取りに来ない業者もいるとのこと。

３－６　実施プロセス

３－６－１　PDM の改訂

当中間レビューまでに、PDM は以下のとおり改訂されている。

（1）第 1 回目のキックオフ・ミーティングで、ベースライン調査の結果を基に、活動、指標、投入が修正された。

（2）2013 年 12 月の JICA 運営指導調査団のプロジェクト訪問の機会に、プロジェクト目標が変

更され、成果 4 が成果 1 の活動に統合された。また、プロジェクトが“Certified Seed”のみならず、“Certified/quality vegetable seed（認証種子及び高品質の種子)”を対象とするとされた。市場に出回る種子の管理の一環として、ランダムサンプル検査の活動のモニタリングが活動として追加された。

(3) 2014 年 7 月の JCC にて、Quality Seed の定義づけが困難であることから、対象種子の表現が“Certified/quality vegetable seed（認証種子及び高品質の種子)”から「認証種子」に変更された。

(4) 2014 年 9 月の中間レビュー調査の結果、PDM 第 4 版の上位目標、上位目標の指標、プロジェクト目標のすべての指標が変更された。成果の指標のうち 1-1、1-3、2-1、2-2、3-2 については表現が修正された。成果の指標の 2-2、2-3、3-3、3-4 が変更され、3-5 が追加された。

３－６－２　合同調整委員会

年 2 回の合同調整委員会（JCC）は予定どおり開催され、プロジェクト活動のモニタリングや意思決定を行った（詳細は表－24 参照)。

表－24　合同調整委員会の内容

開催日	主な討議内容	参加者数
2012 年 12 月 7 日	Revision of R/D and PDM	13
2013 年 6 月 21 日	Project Progress Report and Future Activities	16
2013 年 12 月 9 日	Report of the JICA project consultation team	27
2014 年 7 月 4 日	Report of Prof. Nishikawa, Short-term Expert on Seed Quality Evaluation	23
2014 年 9 月 18 日	Report of Mid-term Review	
2014 年 12 月 15 日	Project Progress Report and Future Activities Progress of Recommendation by Mid-term Review	31
2015 年 6 月 26 日	Project Progress Report and Future Activities Progress of Recommendation by Mid-term Review	27
2016 年 1 月 29 日	Project Progress Report and Future Activities Progress of Recommendation by Mid-term Review	24
2016 年 7 月 5 日	Project Progress Report and Future Activities Progress of Recommendation by Mid-term Review	34

出所：JICA 専門家チーム

３－６－３　プロジェクトマネジメント・ユニット

プロジェクトの計画時、プロジェクト活動の調整とモニタリングのために、プロジェクトマネジメント・ユニットが形成される予定であった。同ユニットは形成されておらず、調整・モニタリングの機能は次項で述べる月例会議で代用している。

３－６－４　月例会議（Monthly Meetings）

プロジェクトの月例会議はほぼ毎月開催された。月例会議では、活動や課題のモニタリングとともに、本邦研修での習得事項の報告、JICA 短期専門家や JICA 運営指導調査団による調査結果、PDM 改訂にかかわる議論などが行われた。スリランカ種子生産者協会（Seed Producers Association of Sri Lanka：SPASL）からも同会議へ継続的に参加があった。

３－６－５　効果発現に貢献した要因

（1）DOA による追加投入

必要に応じて DOA から追加の投入がなされ、プロジェクトの効果的な実施を促進した。例として、種子病害検査ユニットの建設、市場における種子の品質調査の結果報告会（フィールドデイ）の開催、データベースシステムの運用に必要なコンピュータやインターネットなどの整備、種子調整機材設置の際に必要となった建屋の改修、GSF における苗床用ポリトンネルの設置などが挙げられる。

（2）JICA 研修参加者の活躍

2003～2007 年に実施された JICA 国別研修に参加した SPMDC の職員が、研修で学んだ知見を生かし、本プロジェクトで導入した生産技術の種子農場での実践や、種子生産研修における技術指導を行い、本プロジェクトの効果的な推進に貢献した。

３－６－６　問題点及び問題を惹起した要因

（1）データベースシステム開発の遅延

データベースシステムの開発に計画より約 2 年多くの時間が必要となり、同システムの導入が遅れ、プロジェクト期間中に同システムを本格的に運用することができなかった。

（2）契約野菜種子栽培の縮小

本プロジェクトでは、SPMDC からの委託で野菜種子栽培をする農家が研修に参加して生産技術を習得し、その後技術を実践することが期待されていた。また SPMDC や SCS の職員は、種子生産を委託した農家を訪問し、技術の実践を支援・確認する計画であった。しかし 2015 年と 2016 年は、SPMDC から農家への種子生産委託がごく少なかったため、研修に参加した農家の技術実践や、職員の農家訪問の機会は限定的であり、同職員による契約農家への技術支援・確認が計画どおり進まなかった。

（3）種子法細則の施行の遅れ

種子を販売する場合に要求される品質基準を含む種子法の細則は 2010 年ごろに施行されると期待されていたが、実現していない。種子法の細則が施行されていないと、SCPPC や SPMDC による市場における種子の品質向上の働きかけに十分な強制力が働かない。市場における種子の品質向上のためには法整備が必要である。

第４章　評価結果

４－１　評価５項目による評価結果

４－１－１　妥当性：高い

2015 年に成立したスリランカの新政権の施策である「全国食料生産プログラム（2016～2018 年)」は、食料生産と生産性の改善、野菜や果物の増産、国民１人当たりの野菜の消費量の増加、官民の連携、種子法の施行などをめざしている。本プロジェクトで実施した市場の種子の品質調査では市場の種子の品質の改善ニーズが、野菜病害に関するフィールド調査では種子伝染性病害や種子の健全性検査の重要性が裏づけられた。日本の外務省の「対スリランカ国別援助計画（2012 年６月)」では後発開発地域の開発支援が重点分野の１つとなっており、農業分野を中心とした産業育成、農業関連インフラの整備を支援する方針である。これらから本プロジェクトは、スリランカの政策や開発ニーズ、日本の援助方針と合致しており、妥当性は高い。

４－１－２　有効性：中程度

本プロジェクトは、野菜種子生産の技術移転に関し、中間レビュー時と比して大きな進捗があった。SPMDC や SCS の地方事務所や GSF の職員は、種子生産研修や農家への指導にリーダーシップを発揮するようになった。プロジェクトで導入した生産技術は GSF でよく活用されている。SCPPC の職員の種子病理分野での能力向上や、市場の種子の品質調査の効果的な実施も特筆に値する。しかし、種子生産計画の分野におけるデータベースの運用や、農家の生産技術適用状況の確認に関してはやや遅れがみられる。そのため終了時評価時点でのプロジェクト目標の達成度及び有効性は中程度である。

４－１－３　効率性：高い

プロジェクト活動はいくつかの遅延を除けば計画どおり実施された。3 つの成果の発現状況にも顕著な進捗があった。専門家派遣、本邦研修などの日本側投入は計画どおり実施され、機材供与は遅れたものもあったが、その他はすべて予定どおりである。事業費及び事業期間も計画内に収まる予定である。スリランカ側からは予定していたよりも多くの投入があった。これらにより効率性は高い。

４－１－４　インパクト：中程度

上位目標の指標１「市場に出回る野菜種子のうち、DOA の基準を満たしている種子の割合が増加する」については種子の品質調査にて基準値が得られたが、達成可能性については現時点で情報がない。指標２の「民間の種子生産業者から SPMDC に原種種子の供給要請があった際、90％以上は供給がなされる」は過去３年間未達成である。上位目標は対象地域の市場全体を対象としており、プロジェクトの貢献に加えて官民によるさまざまな努力が必要であり、達成には困難も予想される。一方、本プロジェクトではスリランカ初の種子病害検査ユニットが設立され、市場の種子の品質調査が初めて実施されるなどいくつかの正のインパクトが発現している。これらを勘案しインパクトは中程度とする。

４－１－５　持続性：高い

＜政策・制度＞現行の政策は野菜生産や生産性の改善をめざしており、また農業省が準備中の種子法の細則は、本プロジェクトの効果の持続性を助長するものである。

＜組織・体制＞SPMDC と SCPPC の組織内の役割や責任分担は明確である。今後、JPPS や種子生産研修をより効果的に実施するための体制も整いつつある（付属資料 ATTACHMENT-4 参照）。

＜技術＞生産や品質管理にかかわる職員の技術レベルはおおむね良好であり、種子生産技術を指導するマスタートレーナーも養成された。種子病害検査を担当する職員の技術も期待したレベルにあるが、今後引き続き研鑽が必要である。

＜財務＞SPMDC と SCPPS には必要な予算が配賦されており予算執行状況にも特に問題はない。市場の種子の品質調査には 2016～2018 年の 3 年間の予算が付与されており、植物病害検査や種子病害診断のための薬剤や消耗品の予算も確保されている。

以上からプロジェクト効果の持続性は高いと見込まれる。

４－２　結論

プロジェクト目標、成果の指標は一部を除いて達成ないし達成見込みであることから、本プロジェクトは 2017 年 5 月の協力期限をもって予定どおり終了することで合意した。

5 項目評価について、妥当性、効率性には特段の課題は見受けられなかった。有効性については、いくつかの点で実施遅延があったことから、中程度となった。インパクトについては、データベースの拡充、市場調査結果の活用、種子病理ラボの建設など、複数のプラスのインパクトが確認されたが、上位目標達成にはいくつかスリランカ側での対応が求められることから中程度になった。持続性については、今後、スリランカ側による対応が必要な点があるもののおおむね事業継続の体制は整備されている。

第５章　提言と教訓

５－１　提言

（1）DOA への提言

①　種子法の細則が早期に施行されるよう農業省を支援すること、具体的には、すみやかに国家種子協議会（National Seed Council：NSC）のメンバーを官報により任命し、法務局による確認が完了したら細則を官報で制定し、その後同協議会を開催するよう支援する。

②データベースシステムの運用に必要な機材や施設をできるだけ早く設置すること。

③JPP アクションプランを 2017 年 2 月に開催予定の次回の同セミナーで発表し、同計画における短期、中期、長期的な目標や実施責任者について議論すること。またその後、同計画の全体的な進捗をモニタリングすること。

（2）SPMDC への提言

①SIDCC の第 1 回ワークショップを 2017 年 2 月に開催すること。

②DOA による JPP アクションプランのモニタリングを支援すること。

③民間セクターとの対話を継続し、過去の販売や需要の分析による需要予測を行うなどして、生産計画のさらなる改善を図ること。

④SCS の支援を得て種子の在庫の適切な回転のための仕組みをつくること[9]。古い在庫の定期的な廃棄についても検討すること。

⑤年 2 回の耕作期ごとの種子生産研修を継続し、プロジェクトで導入した生産技術の普及を図ること。SPMDC の地方事務所は、ETC や農業開発局の地方事務所、農民組合その他からの情報も得て、技術習得に前向きな農家を選ぶこと。民間生産者にも研修開催を通知すること。

⑥SPMDC の地方事務所は、研修に参加した契約種子生産農家に的を絞り、技術の適用を奨励すること。技術導入により成功した農家の数を増やし、これらの農家の経験を他の農家とも共有すること。

⑦政府契約種子農家に GVSPP を導入し、SPMDC 地方事務所の農業指導員がこれらの農家を訪問する際に活用すること。将来は GVSPP の実践を契約の条件とするよう検討すること。

⑧SCPPC から適時の協力を得て種子コーティングテストを遅延なく実施し商業生産を始めること。

⑨種子生産研修を担うマスタートレーナーを継続的に確保すべく、マスタートレーナー向けの研修を引き続き実施すること。プロジェクト非対象地域の職員も対象にすること。種子生産に従事するすべての職員がマスタートレーナーとなることを将来の目標にすると良い。

（3）SCPPC への提言

①2017 年 2 月の開催予定の SIDCC 第 1 回ワークショップで種子品質向上のためのアクションプランを周知徹底させるとともに、引き続き同プランの進捗をモニタリングすること。

[9] 在庫の最適化はプロジェクト活動の結果策定された「種子の品質向上のためのアクションプラン」の中期目標でも挙げられている。

②SCS は引き続き HORDI の植物病理課との協力の下、種子伝染病のなかで最も重要な細菌学に関する最新技術の導入を図ること。
③種子法の細則が早期に施行されるよう法務局に働きかけること。
④非公式な種子生産・流通業者の特定を継続し、それら業者に種子法に則った登録を促し、GVSPP に基づいた生産を奨励すること。
⑤SCS は、2015 年ヤラ期に実施した種子の品質調査と同様の手法で、2018 年ヤラ期に品質調査を行い、SEPC の協力を得て両調査を比較分析し、本プロジェクトの上位目標の達成状況を確認すること。

(4) HORDI への提言
①HORDI は引き続き SCS の種子病害検査ユニットとの協力の下、種子伝染病のなかで最も重要な細菌学に関する最新技術の導入を図ること。

５－２　教訓

(1) プロジェクトサイトについて

本プロジェクトは、政府農場 3 カ所を含む 4 カ所の現場をもち、かつプロジェクト活動は種子生産システム全般（生産・加工・検査・貯蔵）にわたることから実施機関が多い。このため、現場活動の推進・フォローを担う C/P は各サイト・各実施機関にそれぞれ分散していた。プロジェクトでは、栽培状況の確認等のため、専門家による巡回指導を行っていたが、各サイトが離れており、負担が大きかった。今後、現場サイトを複数もち、活動範囲が広く実施機関が多いプロジェクトを計画する場合は、ローカルコンサルタントの雇用等により、現場活動の促進・フォローをすることも検討すべきである。

(2) 野菜種子プロジェクトについて

上述のとおり、本プロジェクトの活動は種子生産システム全般（生産・加工・検査・貯蔵）にわたっているが、プロジェクト開始当初は普及・販売も成果となっており、対応すべき活動が多かった。また、実際に市場に出回る種子の品質・状況について、スリランカ政府側も認識しきれていない部分があった。その他、野菜種子プロジェクトの特徴としては、次のような点が挙げられる。

・野菜は雑多で、種子の種類が多い。
・日本では民間主導でかつ国内の採種も限られているため、日本が協力するうえでの制限が大きく、課題別研修等の積極活用が有効である。
・官民の連携が不可欠。

野菜種子生産システム全般には多種多様な活動があり、かつ官民ともに関連する機関も多いため、同様のプロジェクトの検討にあたっては、野菜種子生産システムのうち、どの活動にフォーカスを当てるのかより詳細な検討が必要である。また、市場の状況や政府制度についての客観的な分析、加えて国内リソースの状況を加味して計画する必要がある。

５－３　団長所感

終了時評価の結果、プロジェクト目標、成果の指標は一部を除いて達成ないし達成見込みであ

ることから､本プロジェクトは 2017 年 5 月の協力期限をもって予定どおり終了することが合意された。

今後、プロジェクト終了にあたり、取り組むべき具体的な事項は「５－１ 提言」にまとめているが、特に以下の観点に留意し、プロジェクト活動を継続していくべきである。

(1) 導入された技術の活用

日本人専門家からの技術移転を通じて SPMDC は主体的に種子生産トレーニングを実践できるようになった。また、本プロジェクトにより導入された生産技術は、GVSPP として取りまとめられ、同技術は政府生産農場で前向きに受け入れられ、実践されていることが確認された。これは 2014 年 9 月に行われた中間レビューからの急速な進歩であり、今後、プロジェクト終了後、さらにマスタートレーナー等を通じた他地域への展開が期待される。

(2) 官民連携

スリランカ国内における野菜種子生産を強化するにあたり、同国内民間企業と政府間の情報交換や討議機会をより多くもつことが有益であることから、さらに官民連携を強化することが望まれる。

(3) 種子病理

日本人専門家による技術移転、スリランカ側とわが方との協同により、必要とされる資機材及び施設が整備されたことから、スリランカ側の病理検査体制が強化された。今後、各種関係機関との関係をさらに強化し、検査体制の充実を図ることが重要である。

(4) スリランカ側のオーナーシップ

本プロジェクト実施期間を通して、スリランカ側は特に実施意義が高く認められる内容について、プロジェクト実施上のオーナーシップを高めた。例えば、市場における野菜種子の品質調査については、プロジェクトでの調査実施を通じて、必要性を理解し、今後 3 年間、スリランカ側で予算化を図り実施される予定であり、プロジェクト活動を通じてスリランカ側のオーナーシップが醸成された点は評価される。

(5) 種子法

種子法細則である“Regulation & Standard, Seed Act”の決定は種子品質の向上を図るうえで、政府基準・規則の制定が必要であることからスリランカ側による対応が求められる。

５－４ 野菜種子生産団員所感

(1) 野菜種子生産現場の技術指導について

プロジェクトの実績としては次のような点が確認できた。

・トレイ、ポット育苗技術の導入で生育の安定、効率性が改善され原種使用量も半減した。
・東南アジアに多い混植、過株数植えの慣行栽培から 1 株植栽培の優位性が認識された。
・放任栽培から摘芯、整枝、摘果などの栽培管理により採種量や種子の品質が改善された。
・完熟堆肥の使用で生育のバランス、欠乏症生理障害予防などが認識された。

・スプリンクラーやドリップ灌水の試験的導入で良い結果が得られていた。

これらの指導普及には大変な苦労があったと推察する。特に種子生産に長く従事した農家は慣行の栽培に自信もあり、概して保守的なため、意識改革、慣行法からの変革は苦労するところであったろうが、多くの現場で日本人専門家や本邦研修を終えた研修員の努力の成果がみられ、好感的かつ向学的な意見も随所で聞かれた。

視察時に聞こえてきた「農薬をいくら濃くしても効かない」との農家の声は深刻で危険。プロジェクト専門家も同様の指摘をしているが、「濃くして銭は減っても病気や虫は減らない。農薬使用は予防であり散布のタイミングと散布の仕方が肝心。それに農家の身体がもたない」ことを指摘したい。ある地域で腎臓病の異常な増加があるといい農薬や地下水を疑う声も聞くとのこと。農薬はインド製が多い。

ニガウリ種子生産で大型ポット・ドリップ灌水、ササゲマメ生産で露地ドリップ灌水栽培は今後のロックウール・ドリップ灌水栽培に適用できる。ロックウール・ドリップ灌水栽培は土壌改良の必要がない、大幅な節水、養分コントロールが容易、青枯れ病・かいよう病・線虫などの土壌病害虫などからの回避など利点も多く、東南アジアのトマト種子生産やヨーロッパ、日本などのトマト青果栽培でも増えている。今回の聞き取りでは「ドリップ灌水は目詰まりする」と簡単に否定するスリランカ側関係者もいたが、ドリップ灌水を唯一導入していたクンダサレ農場の結果を認識すべき。

スリランカは、現時点で政府による種子生産、認証が行われているが、ここで将来的な参考として、日本の野菜種子の現状とその課題について述べる。

日本の営利野菜栽培農家は枝豆やレタスなどまだ F1 品種が開発されていないものや一部の地方特産品種などは別にして、主要野菜はほぼ 100%F1 品種を利用する。ハイブリッド品種（F1）の特徴は遺伝的形質の安定、同一種子の供給、生育揃い、収量性、耐病性や抵抗性をつけやすい、植物の品種保護を必要としないなど多くのメリットがある。一方で品種開発に長い年月を要し、種子生産性については両親の開花合わせ、原種維持などで高度な技術を要し、種子価格も高い。そして日本の野菜品種は世界市場でも極めて評価が高く、多く利用されている。そのような背景のなかで日本の野菜種子生産は圧倒的に海外に依存し、欧米、中国、アジア、アフリカ、南米などあらゆる国で生産され、比較的生産の容易な固定種（OP）から技術を要する F1 まで種類、品種数も極めて多い。種子生産には日長、気温、湿度、土壌、水、風虫媒交配種ではロケーション、人手と人件費、親系統のセキュリティーなどが制限要素となる。日本国内での生産も原種生産や一部の F1 採種は行われているが、生産農家の平均年齢は還暦ぐらいの高齢で、若い人が少ない。

(2) 本邦研修及び第三国研修について

日本で 37 名、タイで 14 名に、技術研修が行われている。約 10 カ月間各地方で種子生産、品質管理、病理など幅広い研修を受けた DOA 職員、普及員などは自信にあふれ、帰国後リーダーシップを発揮しているようであった。日本の農業や文化への理解も深めてもらい、将来の交流発展に大きく貢献するだろうと聞き取り調査でも感じられた。研修事業に協力していただいた日本・タイ両国関係各位への敬意も忘れてはならないだろう。

民間企業でも以前は多くの研修生を受け入れていたが最近では減少している。（株）サカ

タのタネでも「青年海外協力隊」の派遣前研修を受け入れた経験がある。今は日本の種苗界もグローバル化し、企業内での相互研修や海外の大学や研究機関への留学研修は盛んに行われているが、日本受入れについては官民の協力をもう少し増やしても良いと思う。

(3) データベース管理システム（以下データベースと記載）について

本プロジェクトでは「官民双方を対象とした野菜種子の生産、輸入、供給、在庫に関するデータベースを構築する」を活動内容としているが、多少範囲が広すぎると感じる。

・この規模のデータベース構築には多くのパソコン、周辺機器類、ソフト、コンサルタント経費などで多分億単位のスリランカ・ルピーの投資が必要であろう。
・DOA 局長から進展が遅いと指摘されていたが、DOA 職員、研究者などができるものではなく、ソフトエンジニアや専門のコンサルタントによるところが多いと思う。
・種子産業に関するデータベースは必要であるが、フォーカスを決め、まずは販売会計管理から順次手がけるのが妥当であると思う。
・第一に販売実績と販売予想並びに財務会計管理、在庫管理では品質別ランクづけと量などと種子加工管理のデータベースを確立し、第二に商品生産計画、原種量と原種生産計画のデータベース、最終的に品種ごとの生産性や生産農家のデータベースという順序で取り組むべき。

今回の調査では、民間のデータが手にいらないとの声が聞こえたが野菜生産地や市場調査などで全体種子量、品種別シェア、輸入種子、国内種子などのデータを集積し、分析するしかない。

わが国日本でも種苗民間企業のデータシステムの状況はほとんどわからないが、おそらく生産計画ぐらいまでは構築され利用管理されていると思う。生産技術現場においては、人が紙に書いて蓄積したデータや豊富な経験と観察から頭脳にあるデータシステムがものをいう世界であり、その双方が肝要である。

(4) 高品質野菜種子について

きれいな種面（たねづら)、ぷりぷりした種を収穫した後は種子加工の出番である。

本プロジェクトにおいても日本製やオランダ製の選別機やコーティング機が導入されて活用が始まっている。

・種子の均一性が問題になるという。偽の認証種子で交雑種子、異種混合種子が多いとのこと。現実的には法があっても法的統制は難しく、不法業者はマーケット原理による淘汰を待つしかない。
・発芽率で検査室と圃場での差が大きいという。野菜の種類により発芽率と発芽勢との違い、その相関関係をもう少し勉強する必要がある。
・クンダサレ農場では色彩選別機（日本製服部製作所)、重量選別機（オランダ製）などが導入され品質のレベルアップ、精選作業の飛躍的な効率化が図られていた。圃場ではトマトF1 品種生産交配作業やドリップ灌水システムがうまく作動していた。当農場のオパリ場長は今回の訪問でもピカイチの能力を発揮されていて、「JICA と今後も協力したい」との熱意も大変ありがたく思った。
・フィルムコート種子加工は今後重要となるので今は準備期間として考えたい。今、スリラ

ンカの認証種子 OP 品種ではコート加工種子の必要性はないと思うが、将来に備えて必要となる技術であろう。

なお、日本の野菜種子の品質は世界的にもハイレベルな水準にあるといえ、この点について日本としての協力の意義は大きい。多種多様な選別機械、高い発芽勢、病害検定、フィルムコート薬剤処理によるクリーン種子、播種機対応のための種子の大きさをそろえるコート加工などさまざまな要因で種子加工は進歩している。

(5) 種子伝染病害について

種子伝染病害は非常に重要な課題で、植物病理短期専門家 Dr.加来の指導がスリランカの官界上部に十分理解され、政策としても対応されることを強く望みたい。

野菜の病害については耐病性・病害抵抗性品種の育成で多く病害発生を防いでいる事実もあるが、品種改良では防ぐことができない病害も多く存在する。

・トマトのかいよう病、スイカの果実汚斑細菌病 BEB、キャベツの黒腐病はスリランカでも発生が確認されているバクテリアの世界的病害である。
・販売種子の病理検定と殺菌剤、温湯浸漬、乾熱消毒の実施は不可欠。
・種子生産現場においては原種種子の薬剤消毒も欠かしてはならない。
・輸入種子への植物検疫法の確立も急務。
・プロジェクトにより新しいインキュベーターやオートクレーブが設置され貢献していた。
・今後も病理実験機器類、分子レベル検定に必要な PCR、クリーンな実験室などへの投資は必要で、投資額は年間数千万単位のスリランカ・ルピーになるであろう。

なお、日本の種苗界においても種子伝染性病害対策は極めて重要な課題としてとらえられている。野菜種子の多くは海外で生産され、国内はもとより全世界で販売されており、そのリスクは大きく、耐病性育種と合わせて病理部門の充実は盛んに進められている。

(6) まとめ

野菜消費大国韓国でも激辛のキムチは減り、肉の消費量が多いブラジルでも国をあげて野菜の種類、消費を増やす運動が展開され、インドネシアでは健康野菜としてスルフォラファン含有の高いブロッコリー栽培と消費が急増した。スリランカの野菜消費は日本の三分の一、インドの半分との自覚はスリランカ国民にはないと思う。しかし野菜はおいしい肉や魚をたくさん食べられることを助け、体調を整え、成人病を減らし、寿命を伸ばすと知る国民は多いと思う。

本プロジェクトの技術協力が稲作や圃場基盤整備などではなく野菜の種子に向けられただけでもめずらしく、立ちあげた人たちの勇気と先見の明には敬意と感謝を表したい。スリランカの経済成長が伸び、グローバル化すれば、現状の認証野菜種子は衰退し、民間種子、輸入種子そして F1 種子が増えるだろう。それはそれで良いし、農家のため、国民の健康のために野菜の種類と消費量を増やすことも国の大切な仕事であろう。認証種子の育種の再開も一部の種類ではあり得るが、ブリーダーの養成から始まり、容易ではないと思う。

プロジェクトは終了を迎えるが、総括としてスリランカの野菜事情はまだまだこれから、と感じた。スリランカは日本にとって、ライフラインでも重要な位置にある。

日本は環境保全や小規模農業技術に優れ、安全でおいしい野菜の種と栽培技術をもつ。スリランカ国、日本国双方のために、これからも JICA の果たす役割は大きいと考える。例えば集約的野菜生産地の育成とともに、栄養改善に関連して野菜消費を推進することも取り組みとして興味深い。

スリランカの元気な若人を見るにつけ、わたしのような老人の観光客もよいが、日本の若人がここにきて、上記のような取り組みを推進してほしいとも強く思った。

付　属　資　料

１．終了時評価協議議事録及び英文報告書

MINUTES OF MEETINGS ON THE TERMINAL EVALUATION FOR THE PROJECT FOR ENHANCEMENT OF PRODUCTION SYSTEM OF CERTIFIED VEGETABLE SEED IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Terminal Evaluation mission, headed by Mr. Ichiro MIMURA, to the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "Sri Lanka") from 9th to 27th of January 2017, in order to conduct terminal evaluation for the Project for Enhancement of Production System of Certified Vegetable Seed in Sri Lanka (hereinafter referred to as "the Project").

The Japanese and Sri Lankan sides formed the Joint Terminal Evaluation Team (hereinafter referred to as "the Team") and evaluated performance and achievements of the Project through field visits, interviews and had a series of discussions in respect of desirable measures to be taken for the successful implementation of the Project.

The Team presented the outline of the Joint Terminal Evaluation Report (hereinafter referred as "the Report") in the Joint Coordinating Committee (hereinafter referred to as "JCC"), and JCC accepted the contents of the Report and took note of the recommendations by the Team.

Kandy,
27th, January, 2017

Ichiro MIMURA
Director
Team 2, Agricultural and Rural Development Group 1,
Rural Development Department
Japan International Cooperation Agency

Rohan Wijekoon
Director General
Department of Agriculture
Ministry of Agriculture

Attachment

1. Adoption of the Report

- The JCC examined thoroughly the contents of the Report in the ANNEX and took note of the recommendations made in the Report.
- The JCC confirmed that counterpart personnel of Sri Lankan side together with JICA expert team should make joint efforts to take necessary actions to follow up the recommendations included in the Report towards and even after the completion of the Project.

2. Project Cooperation Period

- The JCC confirmed that the Project would be terminated in May 2017 in accordance with the Record of the Discussions dated on 29 February, 2012.

END

ANNEX

Joint Terminal Evaluation Report

ANNEX

Joint Terminal Evaluation Report
On
The Project for Enhancement of Production System of Certified Vegetable Seed in Sri Lanka

Kandy,
27th, January, 2017

Ichiro MIMURA

Leader
Japanese Terminal Evaluation Team
Director
Team 2, Agricultural and Rural Development Group 1
Rural Development Department
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W.M.D Wasala
Member
Sri Lankan Terminal Evaluation Team
Additional Director
Seed Certification and Plant Protection Centre
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H.M.J.K. Herath
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Assistant Director
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V. D. N. Ayoni
Member
Sri Lankan Terminal Evaluation Team
Agricultural Economist
Socio Economic and Planning Centre
Department of Agriculture

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Abbreviation

AI	Agriculture Instructor
DD	Deputy Director
BFB	Bacterial Fruit Blotch
DDA	Deputy Director of Agriculture
DOA	Department of Agriculture
ELISA	Enzyme-Linked ImmunoSorbent Assay
ETC	Extension and Training Centre
GSF	Government Seed Farms
GPS	Global Positioning System
GVSPP	Good Vegetable Seed Production Practice
HORDI	Horticulture Crop Research and Development Institute
ICC	Information Information and Communication Center
ICT	Information and Communication Technology
ISTA	International Seed Testing Association
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
JPPS	Joint Private and Public
JPY	Japanese Yen
LKR	Sri Lankan Rupees
MT	Metric ton
NFPP	National Food Production Programme
NPQS	National Plant Quarantine Service
OFC	Other Field Crops
OIC	Officer in Charge
PDM	Project Design Matrix
PO	Plan of Operations
R/D	Record of Discussions
RSC	Regional Seed Committee
SCPPC	Seed Certification and Plant Protection Centre
SCS	Seed Certification Services
SEPC	Sociao-Economic and Planning Centre
SIDCC	Seed Industry Development and Coordinating Committe
SPASL	Seed Producers Association of Sri Lanka
SPMDC	Seed and Planting Materials Development Centre
SSC	Seed Sales Centre
STL	Seed Testing Laboratory
VSC	Vegetable Service Centre

1. Introduction

1.1. Objectives of the Terminal Evaluation

The objective of this Terminal Evaluation was, (a) to confirm the progress of the activities of Project for Enhancement of Production System of Certified Vegetable Seed in Sri Lanka (hereinafter referred as 'the Project') and its process of implementation based on Project Design Matrix (PDM) and Plan of Operation (PO) of the Project, (b) to confirm the degree of achievement of the Project and to identify problems and issues on any aspects of the project implementation, (c) to analyze the Project achievement as per the five evaluation criteria; relevance, effectiveness, efficiency, impact, and sustainability and (d) to make recommendations for the necessary actions and measures to be taken by Sri Lankan Counterpart agencies and the Project Team.

1.2. Members of the Terminal Evaluation Team

The Terminal Evaluation was jointly conducted by the Japanese side and by the Sri Lanka side. The members of the Terminal Evaluation Team (hereinafter referred as 'the Team') as shown in Table 1 and 2.

Table 1 Members of the Terminal Evaluation Team – Japanese side

Name	Title	Assigned area
Ichiro MIMURA	Director, Team 2, Agricultural and Rural Development Group 1, Rural Development Department, Japan International Cooperation Agency (JICA)	Team Leader
Seiji Miyazaki	Specialist for vegetable seed breeding	Vegetable Seed Production
Tomoko TANAKA	Deputy Director, Team 2, Agricultural and Rural Development Group 1, Rural Development Department, JICA	Cooperation Planning
Tomoko TAMURA	Consultant, Kaihatsu Management Consulting, Inc.	Project Analysis and Evaluation

Table 2 Members of the Terminal Evaluation Team – Sri Lankan side

Name	Title
Mr. W.M.D Wasala	Additional Director, Seed Certification and Plant Protection Centre (SCPPC), Department of Agriculture (DOA)
Mr. H.M.J.K. Herath	Assistant Director, Seed and Planting Materials Development Centre (SPMDC), DOA
Ms. V. D. N. Ayoni	Agricultural Economist, Socio Economic and Planning Centre (SEPC), DOA

1.3. Schedule of Activities of the Terminal Evaluation

The Terminal Evaluation was conducted from 9th of January, 2017 to 27th of January, 2017. The detailed schedule is shown in ANNEX 1.

2. Outline of the Project

2.1. Background of the Project

At the project planning, the mid- and long-term national development plan of "Mahinda Chintana, Vision for a New Sri Lanka (2006-2016)" emphasizes importance of improvement of self-sufficient rate of vegetables and other field crops (OFC) in Sri Lanka, and placed priority for increasing production and productivity.

The plan also stated that: (a) one of the problems the agriculture sector faces was inadequate use of quality seeds and planting materials, (b) one of the goals of the government's agriculture policy was to realize use of high yielding seeds and improved water management and (c) shortage of quality seeds and planting material remain a major issue in increasing production and productivity.

At the time of project planning, it was understood that only 4-35% of the total vegetable seed requirement is supplied as quality certified seeds due to limitation of seed growers' capacity, poor processing and certifications system, under-developed seed distribution, and that Sri Lanka annually imports almost 250 MT vegetable seeds, whereas domestic vegetable seed production remains low level as of 90 MT.

In these circumstances, Government of Sri Lanka requested a technical cooperation project to government of Japan, which aims to improve agricultural productivity and quality through development and disseminating applicable production technology for farmers of qualified vegetable seeds.

Through a series of discussion and fields surveys, both sides agreed that the Project shall be focused to 1) planning stage of annual seed production by SPMDC, 2) multiplication stage for

basic and standard seeds, 3) seed certification stage at mainly SCS and 4) Seed distribution stage with attention to farmers and private sectors' participation.

It was also agreed that the Project should facilitate Public-Private Partnership for achieving the national target and effective collaboration with other relevant initiatives to be taken by the Government of Sri Lanka.

2.2. Summary of the Project

The Project is implemented with the objective of improving the production system of certified vegetable seed in the target areas. It is expected that the after completion of the Project, it will contribute to increase availability and use of certified vegetable seeds in the country. Table 3 shows the outline of the Project.

Table 3 **Outline of the Project (PDM Ver. 5)**

Overall Goal	Quantity of vegetable seeds* in the market up to minimum standards stipulated by DOA** is increased
Project Purpose	Production system for certified vegetable seed is improved in the target areas
Outputs	1. Planning capacity of SPMDC for seed production and distribution is improved
	2. Vegetable seed production techniques are improved in both public and private sector
	3. Vegetable seed quality control techniques are improved in both public and private sector
Period of cooperation	14 May 2012 to 13 May 2017 (Five years)
Implementing Agency	Department of Agriculture
Cooperation Agency in Japan	Ministry of Agriculture, Forestry and Fishery
Project area	1. Kundasale Government Seed Farm and surrounding area 2. Aluttarama Government Seed Farm and surrounding area 3. Mahailuppallama Government Seed Farm and surrounding areas 4. Nikaweratiya, SPMDC Regional Office and surrounding areas
Target Groups	- Around 100 staff of DOA and other related institutions, including SPMDC, SCPPC, government seed farms, SCS, STL, seed sales centers - Around 100 households of government contract seed growers - Staff of private companies and contract seed growers

*DOA certified seeds (produced by DOA and the private sector) and self-certified seeds of the private sector

**'Recommended seed certification standards for seed and planting materials' issued by SCS in 2009

Implementing Structure of the Project

The project is led by the Director General of Agriculture of DOA. The core counterpart organizations of the Project are; Seed and Planting Material Development Centre (SPMDC) together with its Regional offices of Deputy Director of Agriculture (DDA) of SPMDC, Government Seed Farms (GSF), DOA Sales Outlets; and Seed Certification Service (SCS) and Seed Testing Laboratories (STL) under Seed Certification and Plant Protection Centre (SCPPC). Project activities are carried out in collaboration with Horticultural Crop Research and Development Institute (HORDI), Extension and Training Centre (ETC) and Socio Economic and Planning Centre (SEPC) of DOA.

Participation of Private Sector to the Project

Private companies engaging in seed production and handling play a significant role in vegetable seed production industry in the country. It is expected that the private companies would play an important role in the project and also to be benefitted by the project.

Project Areas

At the time of project planning, both Japanese and Sri Lankan sides agreed that field activities shall be started at Kundasale and Aluttarama, since highest priority was given to these two areas by DOA for seed production in the country; and project areas of Mahailuppallama and/ or Nikaweratiya shall be considered as additional project area(s) from the 3rd year of the Project in accordance with the Project progress[1]. However, at the first JCC meeting on December 2012, it was decided that the field activities of the Project would be conducted at the four places from the beginning because Mahailuppallama and Nikaweratiya have many contract growers for vegetable seed and it was important to provide training programme for them from the beginning of the Project.

3. Methodology of Evaluation

3.1 Method of data collection analysis

The Team reviewed relevant documents and collected information through interviews and discussions with JICA experts, officers of the Sri Lankan counterpart agencies and other stakeholders of the Project. The Team confirmed the progress of the Project based on the PDM version 5 and the PO version 5, which were approved at JCC meeting on September 19, 2014 (see ANNEX 3), which was the latest version at the time of the Terminal Evaluation, and analyzed the Project from the viewpoints of (a) achievements of the Project, (b) implementation process and (c) the five evaluation criteria as per the following table:

[1] Record of Discussion signed by JICA Sri Lanka Office, Ministry of Agriculture of Sri Lanka, Ministry of finance and Planning of Sri Lanka on 29th, February 2012.

Table 4 **Five Evaluation Criteria**

Criteria	Definition
1. Relevance	Degree of consistency of the Project with respect of development assistance and priority of policies of the target group, the recipient, and JICA.
2. Effectiveness	A measure of the extent to which the Project attains its objectives.
3. Efficiency	Efficiency measures the outputs -- qualitative and quantitative – in relation to the inputs. It is an economic term which is used to assess the extent to which aid uses the least costly resources possible in order to achieve the desired results. This generally requires comparing alternative approaches to achieving the same outputs, to see whether the most efficient process has been adopted.
4. Impact	The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. This involves the main impacts and effects resulting from the activity on the local, social, economic, environmental and other development indicators.
5. Sustainability	Sustainability is concerned with measuring whether the benefits of an activity are likely to continue after donor funding has been withdrawn. Projects need to be environmentally as well as financially sustainable.

3.2 Items Evaluated and Indicators

Achievements of the Project were measured in terms of Inputs, Outputs, Project Purpose, and Overall Goal in light of the objectively verifiable indicators of the PDM version 5.

4. Project Performance and implementation process

4.1 Input

(1) Japanese side

Table 5 shows plan and actual input from Japanese side. See details in ANNEX 5.

Table 5 Input – Japanese side

Inputs	Plan	Actual (including planned input until completion of the Project in May 2017)
(1) Experts	222 man-months in total Long-term: 3 persons • Chief advisor/Certified seed production system • Seed testing/ Training • Project coordinator/ Seed production Short-term: • Seed testing • Seed health • Plant pathology • Farmers economy and farm management • Market analysis • Post harvesting technology of seed and others	205 man-months in total Long-term: 4 persons (195.8 man-months) • Chief advisor/ Certified seed production system • Seed testing • Seed production[2] • Project coordination/ Training Short-term: (9.4 man-months) • Vegetable seed production planning • Seed health • Plant pathology • Seed distribution and sales • Plant pathology • Quality seed evaluation • Post harvesting technology of seed
(2) Training in Japan/ third countries	Field of training: Seed production and certification (No plan for the numbers)	Training in Japan: 37 persons Training in Third Countries (Thailand): 14 persons Total 51persons
(3) Equipment	Vehicles, sprinkler irrigation systems, drip irrigation systems, equipment for seed processing and testing	Tools and equipment for seed production, seed testing and research, seed processing and others. 82 million LKR in total
(4) Project Cost	360 million JPY	356 million JPY (provisional)

[2] Mr. K Iizuka served as "Project coordinator/Seed production", "Seed production/ sales" and "Seed production".

Experts

JICA planned to dispatch three long-term JICA experts for the Project. However, it was decided to increase the number of experts into four at the first JCC meeting held on December 2012. It was because volume of work for the expert on Project coordinator/Seed production had been increased as a result that the Project started working at four sites, instead of two, which was originally planned. The new expert on project coordination/ training assumed her duty in May 2013.

The long-term JICA expert on seed testing/ training completed his assignment in May 2014. It was decided not to assign his successor as technical transfer from Japanese side to SCS had been completed mostly as seed testing was conducted by STL according to the rules of ISTA (International Seed Testing Association) and further improvement was made in their work as a result of suggestions and training conducted by the long-term expert. Therefore, it was decided that thereafter, technical cooperation would be conducted mainly to the area of seed health by short-term JICA experts.

A Sri Lankan consultant was employed from July 2013 to assist the JICA Experts.

Training in Japan/ third countries

As Table 6 shows, 37 persons participated in training in Japan and 14 persons participated in Thailand. This is the figure includes training to be conducted in future until the end of the project period.

Table 6 Training in Japan and Thailand

Name of the training course	No. of participants	Training conducted in:
Seed administration	8	Japan
Vegetable seed production	5	Japan
Seed testing	6	Japan
Seed health	1	Japan
Seed pathology	2	Japan
Plant pathology	3	Japan
Farm machinery	3	Japan
ICT	3	Japan
Quality control system of seeds and seedlings	4	Japan
Vegetable production technology	2	Japan
International vegetable training course	14	Thailand
Total	51	

Source: JICA Expert Team

The Team obtained opportunities to have interviews with some of the participants of the training and found that the training was useful for them to update their knowledge and improve their skills. Some showed their appreciation saying that the training was directly job-related, intensive and fruitful. Some SCS staff expressed their opinion that they liked to have more opportunities to widen their knowledge on certification, especially post control test, and seed testing.

It was a disappointment for JICA that two participants, Director of SCPPC and a General Manager of a private company, were retired several months after the training. An Assistant Manager of a private company was resigned. An AI of Mahailuppallama, who participated in the training in Japan was transferred to non-project area after two weeks he came back to Sri Lanka from the training. There is no such case after the Mid-term Review.

It is recommendable to conduct follow-ups for the action plans developed by the foreign training participants before the end of the Project.

Equipment

Table 7 shows equipment purchased by JICA. All the equipment planned to be provided was procured and installed at the time of the Terminal Evaluation. Total cost for the equipment was 82 million Sri Lanka Rupees.[3]

JICA planned to procure seed grinders and an incubator for seed testing by the end of 2014 and in 2015 respectively; however, they were actually installed in August 2016 and February 2016 respectively. A color sorter, a seed extractor, a seed coating machine and a gravity separator for seed processing were planned to be purchased in 2012; however, they were actually installed at the end of 2015. It was due to many correspondences/ discussions on finalizing specifications by Technical Committee for purchasing of equipment of DOA, and time consuming process of securing budget allocation for import taxes and duties by DOA, and obtaining price quotation for import items by JICA Expert Team. Equipment for seed pathology and seed health testing was planned to be installed during the time the Short-term JICA Experts on seed health were

[3] Exchange rate of 1LKR=0.80193JPY (JICA Exchange Rate in January 2017) was applied for the equipment purchased in Japan.

dispatched to Sri Lanka in December 2015 to January 2016; however, they were delivered only after that period because the suppliers needed more time than it was planned originally.

It was mutually decided by DOA and JICA Expert Team that they were not going to purchase vehicles as it was found to be difficult for DOA to obtain budget allocation for import taxes and duties for the time of vehicles needed for the Project.

All equipment and tools are utilized well and maintain in a good condition. Seed coating machine, which was installed at the end of 2015, was not fully used, at the time of the Terminal Evaluation, as SPMDC has to firstly conduct coating tests and analyze the result. SPMDC is conducting coating tests for several crops and plans to utilize the machine fully by the end of 2017. See detail in ANNEX 5.

Table 7 Equipment procured by JICA

Items	Purpose
Nursery house, a drip and sprinkler irrigation systems with water pump and pump house, planting trays, digital cameras, GPS	Seed production at government seed farms of SPMDC
Seed processing (color sorter, film coating machine, gravity separator and seed extractor),	Seed processing at the Vegetable Seed Center, and Kundasale firm of SPMDC
Microscope camera, electric balances, magnifier lamps, optics carrier, HP meters, germination papers and other tools and equipment for seed testing.	Seed testing at STL of SCS
Testing equipment for seed health, such as cooling incubators, plant growing chamber, ELISA reader	Seed health testing at Seed Health Testing Unit of SCS
Microscope digital camera, compact rotary microtome, system microscope, moisture meter and others	Research conducted by HORDI
Computers, a photocopy machine, air conditioners, a projector, office furniture and stationeries	Usage of JICA Experts at the project office

Source: JICA Expert Team

Project cost

Project cost of Japanese side was planned as 360 million Japanese yen. Actual project cost, including those to be expended until the end of the Project, will be 356 million Japanese yen. The actual amount was within the plan (99% vs. the plan).

(2) Input – Sri Lankan side

Table 8 shows plan and actual input from Sri Lankan side.

Table 8 Input – Sri Lankan side

Inputs	Plan	Actual (as of mid-Jan. 2017)
(1) Assignment of Counterpart officers	<Project Director and Managers> - Project director: Director-General of DOA - Project managers: Directors of SPMDC and SCPPC <SPMDC> Staff of VSC, government seed farms, regional centers and seed processing centers and deputy directors of the regional centers <SCPPC> Staff of SCS head office and SCS regional centers and STL <Others> Staff of HORDI, SEPC, ETC, Agrarian Service Center under Ministry of Agrarian Services and Wildlife and others	As planned 45 persons in total
(2) Project Office	Project office in the premises of DOA, electricity, office furniture and internet connection	Project office in the premises of SCPPC. Basic office furniture and electricity and internet connection for the office.
(3) Facilities and equipment	Training space, equipment, instruments, tools, spare parts and any other facilities and equipment necessary for project implementation other than those provided by Japanese side	Classrooms, tools and materials for training, including seeds, pots, fertilizer, tea and refreshment and others necessary for training. A new building for Seed Health Unit Equipment and facility necessary for operation of the data base. Facility improvement for installing seed processing machinery

Inputs	Plan	Actual (as of mid-Jan. 2017)
		Printing cost of Seed Production Manual.
(4) Project cost	Local cost necessary for project implementation, including per-diem and travel allowance for domestic training for counterpart officers, electricity for project office and others	Total 4.5 million LKR as of the end of December 2016, including actual expenses for electricity, water and a security guard for the project office, and value for office rent. Per-diem and travel allowance for domestic training was provided. Necessary taxes and duties for equipment and facility purchased by the Project (7.4 million LKR).

Assignment of counterpart officers

Counterpart officers were assigned almost as planned. However, there was 3-months delay for them to start participating in the project activities, because they were busy for preparation of an event for celebrating 100 years anniversary of DOA and arrangement of around 150 million numbers of seed packs for Divi Neguma programme[4]: and had difficulty in finding a time to arrange and participate in a kick-off meeting.

The post of an Additional Director of SPMDC is vacant for the last five months at the time of the Terminal Evaluation, which made the workload of the Director heavier.

Information and Communication Center (ICC) of DOA played an important role throughout the process of introduction of the seed-related database.

Facilities and equipment

Classrooms, tools and materials for training, including seeds, pots, fertilizer, tea and refreshment and others, which are necessary for conducting training programme and seminars were provided by relevant organization of Sri Lanka as planned.

It should be emphasized that DOA constructed a building for Seed Health Unit, for the purpose of expanding its capacity on testing of seed health. The decision of the investment was made after a staff of seed health unit submitted a proposal for the expansion as a result of their training in Japan.

[4] Devi Negma: a livelihood programme conducted by Ministry of Economic Development of Sri Lanka.

DOA procured equipment and facility necessary for operation of the database system at Deputy Directors' offices, seed farms and seed sales centers under SPMDC; and National Plant Quarantine Service (NPQS) office, SCS regional offices under SCPPC in all over the country.

SCPPC is going bear cost of printing of Seed Production Manual, which is going to be distributed by the end of March 2017.

Project cost

Project local cost, including per-diem and travel allowance for domestic training for counterpart officers, electricity for project office and others were provided by DOA as planned.

There was extra input by DOA as mentioned in "4.6 Implementation Process"

4.2 Activities

Project activities for Output 1 and 2 were conducted; however with some delays. Project activities for Output 3 were conducted as planned. Delay in commencement of the project activities and delays in procurement of some equipment and machineries gave a negative influence to the progress of the project activities. (See ANNEX 6 for detail)

Activities for Output 1

Six activities were planned to be conducted for Output 1 "Planning capacity of SPMDC for seed production and distribution is improved". Table 9 shows a summary of progress of the activities.

Table 9 Progress of the Activities for Output 1

Activities	Progress
1-1. Conduct regular meetings and joint seminars between the government and private sector	[A] In progress as planned.
1-2. Conduct a marketing survey and review the current balance between production and distribution in the target areas	[A] Completed in 2012
1-3. Establish a database on vegetable seed production, imports, distribution, and stock position for both the government and private sector	[B] Completed in Oct. 2016 with delay.
1-4. Develop Maha and Yala programmes for seed production based on the database and review of the previous season plan	[C] Not conducted yet due to the delay of 1-3.

Activities	Progress
1-5. Evaluate the present situation of seed distribution and sales, and develop an improvement plan	[A]Completed in 2013
1-6. Implement activities at model DOA Seed Sales Centres based on the plan (1-5)	[A] Activities for Wagolla SSC were completed. Activities for Batalagoda SSC will be completed by mid 2017 by Sri Lankan budget.

[A] Completed in time/ being continued as planned.
[B] In progress / Completed but with delay.
[C] No progress/ a long delay / will not be completed by the end of the Project.

Activities for Output 2

Five activities were planned to be conducted for Output 2 "Vegetable seed production techniques are improved in both public and private sector". Table 10 shows a summary of progress of the activities.

Table 10 Progress of the Activities for Output 2

Activities	Progress
2-1. Review the present situation of hybrid, basic and standard seed production (including baseline survey)	[A] Completed in 2012
2-2. Introduce and up-grade appropriate equipment and facilities for seed production, processing and quality control at the Government Seed Farm	[B]Completed in 2015 with delay.
2-3. Conduct practical training on seed production for technical officers from the government and private sectors, and contract seed producers	[A] Being continued as planned.
2-4. Develop a technical manual on seed production for seed producers	[B] To be completed by Feb-March 2017 with delay.
2-5. The trained AIs in DD office conduct follow-up visits and give on farm guidance for contract farmers who participated in the seed production trainings to facilitate application of technique introduced by the seed production trainings	[B] Unfortunately, number of contract growing programme was very few in 2015 and 2016. Therefore, AIs were given limited opportunities to visit the

	ex-participants of the training in these years.

[A] Completed in time/ being continued as planned.
[B] In progress / Completed but with delay.
[C] No progress/ a long delay / will not be completed by the end of the Project.

Activities for Output 3

Five activities were planned to be conducted for Output 3 "Vegetable seed quality control techniques are improved in both public and private sector". Table 11 shows a summary of progress of the activities.

Table 11 Progress of the Activities for Output 3

Activities	Progress
3-1. Conduct an evaluation survey on the present procedures and facilities in seed certification system, and develop an improvement plan	[A] Completed in 2013
3-2. Develop technical manuals and teaching materials on seed testing & certification	[A] Completed in 2013/14.
3-3. Conduct training on seed quality control (field inspection, seed sampling and seed testing) for technical officers from the government and private sectors	[A] Completed in 2013/14.
3-4. Provide training for seed producers to prepare quality seed lots	[A] Being continued as planned.
3-5. Conduct a survey on seed quality available in the market (Seed Quality Survey)' including seed testing and labeling check to understand the current situation of vegetable seed market	[A] Conducted as planned.

[A] Completed in time/ being continued as planned.
[B] In progress / Completed but with delay.
[C] No progress/ a long delay / will not be completed by the end of the Project.

4.3 Output

4.3.1 Output 1

Output 1 is "Planning capacity of SPMDC for seed production and distribution is improved". As the follow table shows, level of achievement of Output 1 is moderate. It is appreciated that opinion and information sharing between private and public sectors in seed industry was promoted

as a result of the activities conducted by the Project. However, some more effort would be needed to realize remarkable improvement in planning of SPMDC for seed production and distribution, such as operation of the database system in full-scale, steadily implementation of Joint Private and Public Action Plan and continuous improvement of function of seed sales centers.

Table 12 Progress of Output 1

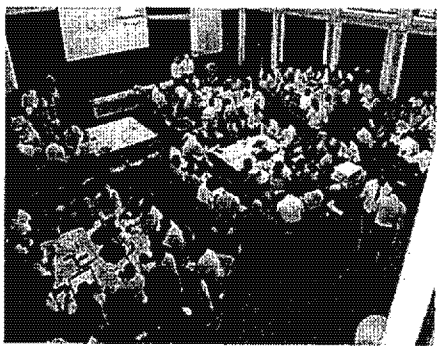
indicators	Progress
1-1.Actions are taken to solve the issues raised by the private and public sectors in the seminars and regular meetings.	[B] In good progress, but need further actions.
1-2.Seed production plan for basic and standard seed are formulated considering need of private sector.	[B] In progress, but further cooperation of private sector is needed.
1-3.Additional two DOA Seed Sales Centers are improved after the improvement of two model DOA Seed Sales Centers by the Project.	[A] 10 more SSC were improved. No. of SSC was increased.

Indicator 1-1 Actions are taken to solve the issues raised by the private and public sectors in the seminars and regular meetings

Indicator 1-1 aims at promoting active communication between private and public sectors on seed production. It also expects that DOA responds to the request from the private sector in a responsible way.

JPP Seminars

As a result of periodical meetings of Joint Private and Public Seminars (JPP Seminars) initially organized by the Project, staff of DOA and representatives from private sector were provided opportunities for sharing information, expressing their ideas and problems and making request to other party on production of seed.



Joint Private and Public Seminar

JPP Seminars were organized regularly throughout the project period. After the Mid-term Review, it was held in February and September 2015 and

March 2016. SPMDC took an initiative for the seminars, instead of JICA Expert Team, according to the recommendation made at the time of the Mid-term Review.

Formation of SIDCC

Formation of SIDCC (Seed Industry Development and Coordinating Committee) is one of the important outcomes of series of JPP Seminars. It was proposed at the JPP Seminar in February 2015. It is consisted of members from public and private sectors and serves as a focal point for overall seed industry coordination. Members were approved by Director General of DOA in march 2016[5]. SIDCC was planning to hold the first workshop of SIDCC in September 2016. The objective of the workshop it to have an intensive discussion about seed policy framework and strategies for selected crops (Vegetables and OFC) with an intention to reduce imported varieties in future. This policy issue was raised at JPP Seminars in September 2015 and March 2016. The workshop was not realized because it tool longer time than expected for private companies to submit requested information to SPMDC, and busy schedule of key persons.

Training programme on Hybrid Varieties

Other example of actions taken by DOA by responding to the request by private sector participants to the JPP Seminars, was the training programme on hybrid varieties, which was organized by HORDI and SPMDC in 2015/16 Maha.

JPP Action Plan

An Action Plan (JPP Action Plan) was compiled, based on the discussions in the JPP Seminars, with an initiative of JICA Expert Team. It was conducted especially because same topics were discussed in JPP Seminars again and again, however without remarkable progress. The JPP Action Plan was shard at the Monthly Meeting of the Project in August 2016. Thereafter, it was finalized after each director of responsible organizations had given their consent for implementation. The Action Plan will be share with the private sector at JPP seminar in February 2017. See JPP Action Plan in ATTACHMENT 1.

Continuous Participation of Private Sector to Project Monthly Meetings and JCC

Representatives of SPASL participated not only JPP Seminars, but also in the Project Monthly Meetings and the Joint Coordination Committee meetings throughout the project period; and contributed implementation of the project activities, especially those organized for private sector.

[5] Members of SIDCC are, Additional Director of DOA (development and research), Directors of SCPPC, SPMDC, HORDI,S EPC, ICC and ETC, representatives of Mahaveli Development Authority, Provincial Agriculture Department of two provinces, 3 members from SPASL(3) and 2 members from Non-SPASL seed producers.

Indicator 1-2. Seed production plan for basic and standard seed are formulated considering need of private sector.

Information sharing in JPP Seminars

As stated in the report of the Mid-term Review, after the Project, DOA became able to develop the basic seed production programme more accurately and efficiently, by obtaining lists of requirement of basic seed from the private companies in time at JPP seminars around one month before the cultivation seasons. However, to meet the need of private sector exactly, at the time of production planning, SPMDC needs information from private companies, such as requirement of basic seed in longer-term or at least next season, amount and forecast of sales.

Database system

It was expected that accuracy and efficiency of SPMDC on planning of basic seed and standard seed production programme as well as their daily work of information management, will be improved by introduction of a database system.

Seed and Planting Material Information System was officially launched with attendance of Minister of Agriculture in October 2016. Data input started in some offices under SPMDC and SCPPC. It is a comprehensive database system, covering production, certification, storage, distribution and sales of seed and planting materials in all over the country for paddy, OFC and vegetable. It was unfortunate that development of the database system took more than the plan[6]; however, impact of the database would be much more than JICA expected originally[7].

The Team found that various sections under SPMDC and SCPPC, including seed sales centers, DD offices, SCS and others conduct data management mainly by hand writing. The workload of producing bills, notes, reports, summary, including financial information, is very complex and time consuming. As it is mainly conducted by manual, there can be mistakes in writing and calculation. Summary reports and other documents were sent from place to place mainly by registered post. It takes at least 2 – 3 days for delivery, and longer time in case the Postal Department goes on strike as it did in December 2016. The database system is expected to reduce

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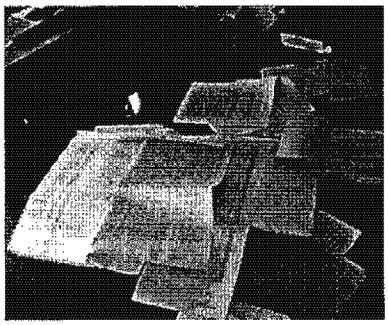
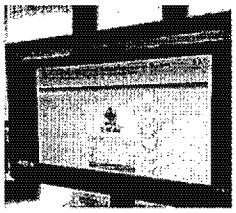
[6] Database development was planned to be completed in 2014; however actually completed in 2016. It was mainly because of expansion of scope of the system, complexity of work flow, and number of organizations involved in data input.

[7] JICA expected development of smaller scale of database system for vegetable seed in the target area. The project budget for the database development was around one million rupees.

and streamline these manual works and make data management, including reporting and analysis, planning and evaluation, more efficient.

		
Documents produced at Aluttarama DD office and seed sales center	Outlook of the database system	Input of data to the new database system at Aluttarama DD office

At the time of Terminal Evaluation, training was provided to the staff working in the offices with necessary facilities. Most of them started data input. Some of the offices, such as seed sales centers, were waiting for necessary facilities, such as computers, printers and internet facility, to be installed; and thereafter, training is given. The following figures show progress of the work presented by staff of ICC to the Team on January 11, 2017. ICC is undertaking training provision and overall monitoring of progress of the work. ICC, SPMDC and SCPPC had made several arrangements to provide computers and internet facilities to the relevant institutions.

Seed And PM Database
Total Training progress -2016

Name Of Institute	Number of Training Officers
Seed Certification Service	74
Seed and Planting Material Development Center	62
National Plant Quarantine Service	49
Total Training Officers	185

Number of participants to the initial training

Seed And PM Database Data Entry Progress From 201 October 18 To 2016 December 18 For SPMDC

SPMDC Office Name	Number Of Record Enter Into T Database
Mahailukpallama DD Office	127
Balaatha DD Office	16
Balaatha Farm Office(AMB FM STO)	18
Mahailukpallama Farm Office	241
Aluththrama Farm Office(Mip-fm-sto)	640
Colombo DD Office	1
Colombo (ABT-RFM-STO)	71
NuwaraEliya Farm Office(UDRFM-sto)	21
Vavniya Farm Office(MRU FM STO)	1
Telligiviia Farm Office(ABT-RFM-STO)	8

Number of record of SPMDC entered into the database

SCPPC Office Name	Number Of Report Enter Into T Database
NPQS Office- Katunayaka	70

Number of records of NPQS entered into the database

SCS Office Name	Number Of Report Enter Into T Database
Mahailukpalama	240
Kundasale	119
Head Office -Gannoruwa	1
Nikavaratiya	5
Colombo	56
Matara	44
Aluttharama	59

Number of records of SCS entered into the database

☑	Name of the agency	New Internet Requirement		Number of Existing Computers			New PCs and Laptops Requirement			
		Wired	Wireless (Dongal, 4G)	No of PCs	No of Laptops	No Of Printers	No of PCs	No of Laptops	No Of Printers	Data Storage Server- Rack-mount- 10TB Capacity
01	Seed and Planting Material Development Centre(SPMDC)	29	29	84	17	45	66	55	76	1
02	Seed Certification & Plant Protection Centre(SCPPC)	4	5	32	0	30	31	4	35	1
03	National Agriculture Information & Communication Centre(NAICC)	01	2	01	0	0	2	3	1	1
	Total	34	36	117	17	75	99	62	112	3

Requirement of internet and computers

Source: ICC (as of January 11, 2017)

RSC (Regional Seed Committee)

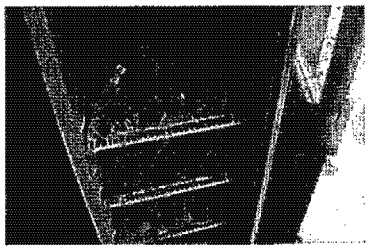
Regional Seed Committees were identified by SPMDC as a regional focal point for production and distribution planning. A pilot implementation of production and distribution planning will be conducted in Mahailuppallama in 2017 Yala.

Indicator 1-3. Additional two DOA Seed Sales Centres are improved after the improvement of two model DOA Seed Sales Centres by the Project.

Improvement of two Seed Sales Centers (SSC) at Wagolla and Batalagoda was planned to be conducted under the Project. It was expected that two more SSC would be improved by refereeing the result of improvement in Wagolla and Batalagoda.

Installment of a bottle cooler for mushroom seeds and vegetable seed was proposed for a project activity for improvement of Wagolla SCC. A bottle cooler was procured by project budget allocation and installed to the SSC in September 2014. As expected, the SCC became able to store

mushroom seed in bulk; and provide consumers with necessary amount at the time they visit the center. Before the installation, customers could not buy necessary amount of seeds when needed, and was often asked to visit the center again after several days or weeks when the seeds were delivered to the center. As shown in Figure 1, sales volume of mushroom seed at the SCC became around 10 times more as a result of the improvement.



Bottle cooler

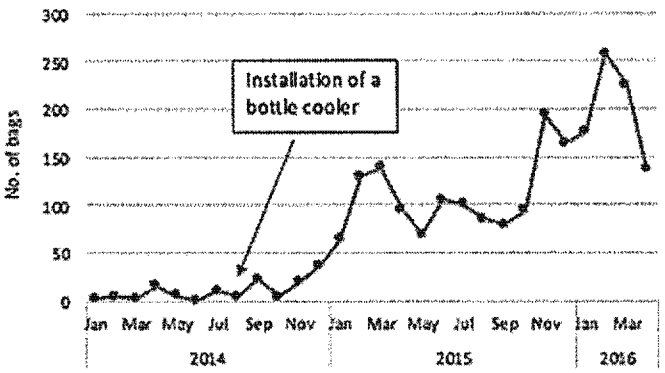


Figure 1 Sales of Mashroom Seed at Wagolla SCC

SPMDC installed bottle coolers to ten other SCC in 2015 and 2016 by appreciating positive result at Wagolla SCC.

On behalf of the Project, SPMDC decided to provide their own fund to improve SSC in Batalagoda by installing a cool room. SPMDC secured necessary budget for the installation; and is going to implement it in mid- 2017, as soon as the budget allocation is released.

SPMDC conducted other improvement for seed sales, too, in reference to the recommendations made by Short-term JICA Expert in 2013. For example, number of SSC was increased from 20 to 33 in 2013 September and in 2017 January respectively.

4.3.2 Output 2

Output 2 is "Vegetable seed production techniques are improved in both public and private sectors". As shown in the following table, there was a remarkable progress in Output 2 especially in terms of leadership of SPMDC in training programme, acceptance and adoption of the production techniques in three government seed farms, leadership and experience gained by the staff of DD offices and seed farms. Activities relate to the three indicators of Output 2 are still on-going; however, it was evaluated that that the indicators were almost achieved taking current level of achievement into consideration.

Table 13 Progress of Output 2

Indicators	Progress
2-1. 75% of participants who attended trainings on vegetable seed production pass the evaluation test	[A] Almost achieved
2-2. 80% of participants of seed production trainings find the trainings was useful.	[A] Almost achieved
2-3. Government Seed Farms adopt the techniques introduced by the Project in accordance with DOA Circular.	[A] Almost achieved

Indicator 2-1. 75% of participants who attended trainings on vegetable seed production pass the evaluation test

Indicator 2-1 expects that the participants of the seed production training programme understood what was taught in the training well. The level of understanding was measured by the evaluation tests, which were conducted at the end of the training. The minimum pass marks were determined by the DDs. As shown in Table 14, more than 75% of participants passed the evaluation test in every programme. The result of 2016/17 Maha training has not known yet, as it is going on at the time of the Terminal Evaluation. Therefore, it is concluded that this indicator was almost achieved.

It should be noted that the after the Mid-term Review, the training programme were conducted by initiatives of DD office, together with relevant SCS office. Planning meetings were conducted before the training, and evaluation meetings were conducted after the training.

Table 14 Result of Evaluation Tests Conducted at the end of Production Training

Season	DD office	No. of Test Takers	Ave. Score	Pass Score	No. of Passed Participants	Pass (%)
Yala 2014	Aluttarama	15	4.3/7	Pub:>4 Prv: >3.5	13	87
	Kundasale	23	4.4/7	Pub: >4 Prv: >3	22	96
	M.I.	30	4.5/7	>4	26	87
- Yala 2015	Aluttarama	18	8.7/10	>5	18	100
	Kundasale	25	47.0/10	>5	19	76
	M.I.	19	7.7/10	>5	15	79
	Nikaweratiya	20	8.0/10	>5	20	100
- Maha 2015/16	Aluttarama	Training terminated				
	Kundasale	31	7.3/10	>6	29	94
	M.I.	60	9.1/10	>6	60	100
	Nikaweratiya	31	7.8/10	>6	30	94

Season	DD office	No. of Test Takers	Ave. Score	Pass Score	No. of Passed Participants	Pass (%)
- Yala 2016	Master Trainers' Training	12	18.8/21	18	10	83

Source: JICA Expert Team

Note: The training in Aluttarama in Maha 2015/16 was terminated due to unfavorable condition of training field.

Indicator 2-2. 80% of participants of seed production trainings find the trainings was useful.

A questionnaire survey to the participants was conducted at the end of the production training programme. As shown in Table 15, more than 80% of participants satisfied with the training by appreciating its usefulness. Same as Indicator 2-1, it is concluded that this indicator was almost achieved.

Table 15 Result of Questionnaire Survey conducted at the end of Production Training

Season	DD office	No. of Questions	No. of Participants Satisfied	
Yala 2014	Aluttarama	22	17	77%
	Kundasale	25	22	88%
	M.I.	40	37	93%
Yala 2015	Aluttarama	18	16	89%
	Kundasale	24	18	75%
	M.I.	18	14	78%
	Nikaweratiya	19	16	84%
Maha 2015/16	Aluttarama	Training Terminated		
	Kundasale	31	31	100%
	M.I.	60	55	92%
	Nikaweratiya	30	25	83%
Yala 2016	Master Training	12	12	100%

Source: JICA Expert Team

Village-based seasonal production training was proposed by Kundasale DD office, and conducted in Kiriwandeniya and Rikillagaskada. Nikaweratiya DD office conducted village-based training in Nikaweratiya and Mahawa. The office is currently conducted the same in Parakudawela in Galgamuwa. The DD offices found that continuous participation of farmers can be expected in the village-based training. The Team found farmer and women leaders of the villages were playing important role in the training by encouraging other participants and providing demonstration fields for the training.

Village-based production training in Galgamuwa, organized by Nikaweratiya DD office

Indicator 2-3 Government Seed Farms adopt the techniques introduced by the Project in accordance with DOA Circular.

DOA Circular

According to the recommendation made by the Mid-term Review, the production techniques introduced by the Project[8] was summarized in DOA circular and issued by SPMDC on October 24th, 2014 (SPD/2/3/JICA/2012) to all the government seed farm managers. After the visit of Mr. Koyama, JICA Short-term Expert on seed production, SPMDC accepted the recommendations by the expert and issued a reminder of the said circular along with an attachment of GVSPP (Good Vegetable Seed Production Practice), which is a self-checklist for government seed farm, on February 5th, 2016 (SPD/3/2/JICA/2012) to the farm managers in the target area (See ATTACHMENT 2 for GVSPP). GVSPP was explained to staff and workers of the three government seed farms after the issue of the reminder.

Acceptance and practice of the techniques in all Seed Farms

The Team found that the production techniques introduced by the Project were accepted very well and practiced in the three government seed farms in the target area at the time of the Terminal Evaluation, although it was adopted in a limited scale at the time of the Mid-term Review. This was mainly because the staff of DD offices were convinced of the importance and benefit of the techniques after they had adopt some of the techniques in the demonstration plot in the farm.

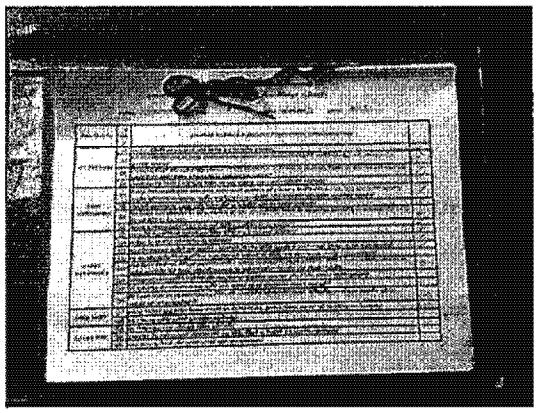
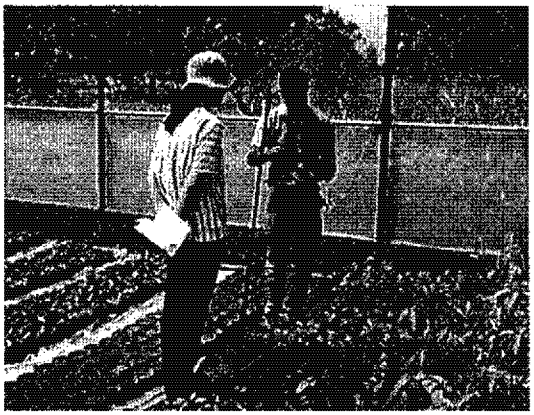
[8] Sowing and raising nursery using seedling holders (trays and pots), watering before sowing or transplanting, composition of nursery soil medium, nursery management, raised beds, soil sterilization, crop rotation, planting density (single planting), application of soil cover (mulching), application of additional fertilizer in line, training and thinning, using of net, artificial pollination, etc.

Training in Japan and Thailand, as well as the Master Trainer's Training was also effective for them to understand the logic of the techniques and necessity of them. They also found GVSPP as essential check list for production improvement.

All farms practice sowing and raising nursery using seedling holders (trays and pots), watering before sowing or transplanting, composition of nursery soil medium, nursery management, raised beds, soil sterilization, planting density (single planting of solanaceous crops), application of soil cover (only sometimes), thinning, using of nets, and drying of seeds. Success rate of grafting of eggplant was improved significantly (from 30% to 90%) in Kundasale seed farm. Preparation of nursery soil, including sterilization, is conducted in Mahailuppallama. Aluttarama utilized *kuntan* for nursery soil. Importance of root protection for transplanting is widely acknowledged in every farm.

Staff were well-trained and experienced

The Team recognized there were set of active and well-trained staff, including master trainers, in every DD office and seed farm, who are playing leading role in the training and production in the seed farms with a good understanding and experience of the techniques. Staff of SCS in relevant offices worked closely with staff of DD office in production training and provision of advice to contract farmers.

	
GVSPP used as a check list at Kundasale Seed Farm	Nursery at Aluttarama Seed Farm

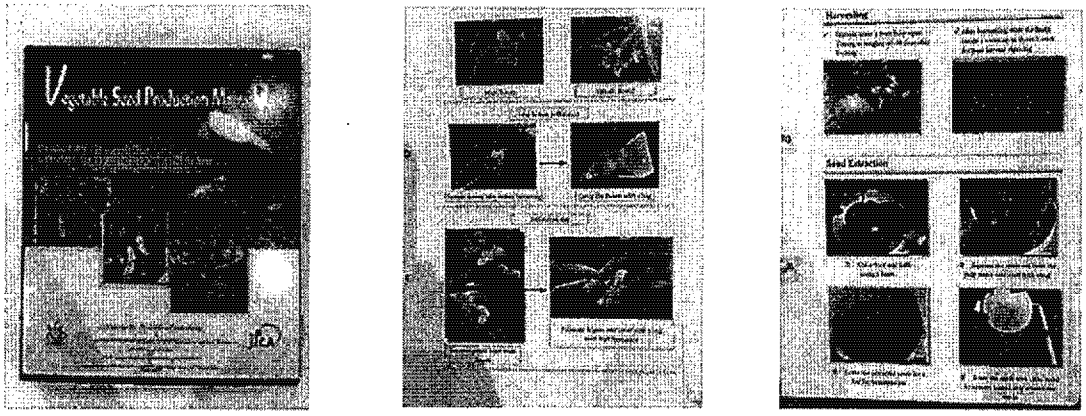
Actions taken by Private Sector

SPMDC invited staff of private companies to the production training. Some of them participated in training in Japan and Thailand. The Team had interviews with Best Seeds (Pvt.) Ltd. and Haylays Agro Firms (Pvt.) Ltd. Best Seeds (Pvt.) Ltd. improved their seed laboratory, seed storage

facility, farmer database, malting, application of organic fertilizer, nursery management by learning them in the local and foreign training. They had introduced bee-keeping for pollination, too. Haylays Agro Firms (Pvt.) Ltd. has utilized knowledge they gained in the training of hybrid varieties. They appreciated the field days organized by SCS for sharing the result of Seed Quality Survey.

Vegetable Seed Production Manual

The manual for vegetable seed production was compiled by JICA experts and checked by HORDI and SPMDC. Sinhala translation was completed in mid-January 2017. Currently it is proof-read by SPMDC. SPMDC plans to complete printing and distribution by March 2017. The manual is expected to be used in training programme.



Vegetable Seed Production Manual (English Version)

Seed Processing process

The seed processing machines installed at Kundasale seed farm made the seed processing process more efficient and precise. For example, Kundasale seed processing center needed around two months for processing of vegetable seeds in a season. However, they need only two weeks for the same after the installation of the machineries. Quicker processing contributes improvement of seed quality in market, and meets the needs of private seed producers, who like to ensure timely distribution and sale of the products. The Color sorting machine contributed mainly for the shortening of processing time[9].

[9] Before installation of the color sorter, it was conducted manually by five staff. A staff member was able to sort 2kg of seed for a day. The color sorter can sort 20 – 30 kg of seed a time.

The farm manager of Kundasale mentioned that, purity of their product was improved from 95% to 99%; moisture was improved from 9% to 5.5% – 7%: and laboratory germination was increased by 10 % after installation of the machinery. This was a result of his observation of sample test results conducted by STL. SPMDC started sharing the seed processing machine with private companies.

A seed film coating machine was installed to Vegetable Seed Center in October 2015. A committee for developing recommendation for film coating was formed, as SPMDC needs a set of recommendations to start commercial production. At the time of Terminal Evaluation SPMDC had conducted film coating tests of capsicum. They are going to conduct the tests for chili, melon, okra and bitter gourd in 2017.

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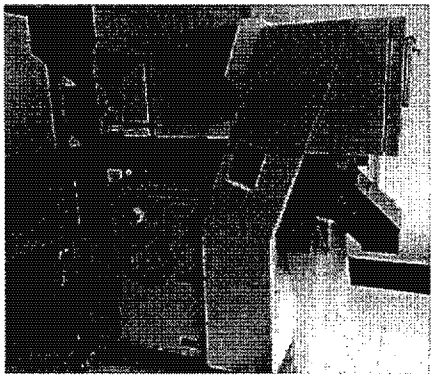
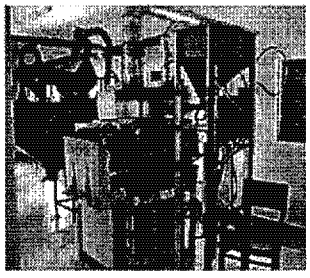
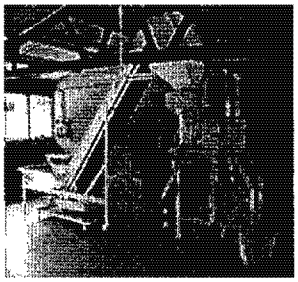
<tr><td>  </td><td>  </td></tr>
<tr><td>Manual color sorting conducted in 2014</td><td>Color sorting machine installed in 2015</td></tr>
<tr><td>  </td><td>  </td><td>  </td></tr>
<tr><td>Gravity separator</td><td>Seed extractor</td><td>Coating machine</td></tr>
</table>

4.3.3 Output 3

Output 3 is "Vegetable seed quality control techniques are improved in both public and private sector". As shown in the following table, five indicators for Output 3 were achieved; and therefore, Output 3 was achieved.

Table 16 Progress of Output 3

Indicators	Progress
3.1. Solutions proposed in the improvement plan are implemented in seed testing process	[A] Achieved
3.2. 75% of participants who attended trainings on seed testing pass the evaluation test	[A] Achieved
3.3. Handbook on Seed testing procedure is completed and utilized.	[A] Achieved
3.4. Seed health testing of bacteria and fungi are conducted	[A] Achieved
3.5. Action plan for improvement of quality control is developed based on the result of the 'survey on seed quality available in the market (Seed Quality Survey)'	[A] Achieved

Indicator 3-1. Solutions proposed in the improvement plan are implemented in seed testing process

This indicator was achieved as STL has been implemented most of the suggestions made by Mr. Ishikawa, JICA Long-term Expert in 2013, which are shown in Table 17. STL keeps on conducting lot control tests for some crops they see it necessity. They did not change germination paper, which they think it fit climate of the country, after several experiments.

Table 17 Improvement suggested by JICA Expert on Seed Testing in May 2014

Improvement suggestion & Training	Present situation	Feasibility by May 2014
Computerization of reaister procedures	Not complied with, under consideration	△
Repetitive test for a same seed lot	Complied with at Peradeniya STL, Other STLs are under consideration	○
Omission of the lot control test	Not complied with	○
Change of germination paper	Not complied with, under consideration	△
Checking of testing material's pH	Not complied with, Manual is in process of preparation	○
Calibration of the electric balance	Not complied with, Manual was prepared	○
Procedure of seed health test	Not complied with, depend on short term expert	△
Equipment (Table 2, 3)	Some complied with, Others are in process of procurement	○
Training of seed testing procedure	Complied with	○
Seedling evaluation to STL staff	Not complied with, Training material was prepared	○
Seedling evaluation to private	Not complied with, Training material was prepared	△
Basic seed health test	Complied with	○
Applied seed health test	Not complied with, depend on short term expert	△
Field inspection to SCS staff	Currently underway as part of seed production training	○
Field inspection to seed producers	Currently underway as part of seed production training	○

* ○: Complied with or high feasibility △: Depend on situation ×: Low feasibility

Source: Report of Mr. Ishikawa, JICA Expert in 2014.

Indicator 3-2. 75% of participants who attended trainings on seed testing pass the evaluation test

Indicator 3-2 is to measure level of understanding of staff of STL on the contents of the training programme conducted by the JICA Expert in 2013 - 2014. The trainings on seed testing procedures, seedling evaluation and seed health were organized by JICA Expert Team for the staff of STL. This indicator was achieved as almost all the staff passed the exam[10].

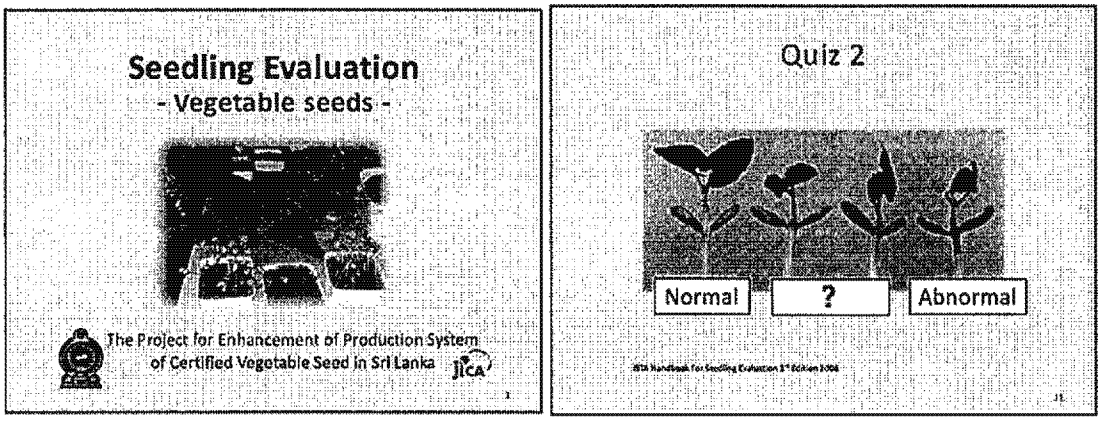
Indicator 3-3. Handbook on Seed testing procedure is completed and utilized.

JICA Expert on seed testing produced the following four kinds of manuals/ teaching materials:

Operational manuals on (a) electronic balance and (b) seedling evaluation;

Teaching materials on (c) standardizing seedling evaluation and (d) measuring pH of germination media.

SCS and STL mentioned that these manuals and materials were referred to in their daily work and training programme. They utilize "Operation manual on Seedling evaluation" most often.



Seedling Evaluation Manual
Source: Report of JICA Expert

Indicator 3-4. Seed health testing of bacteria and fungi are conducted

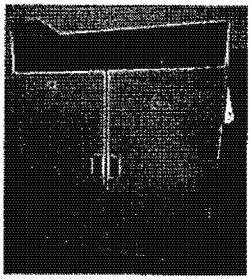
A well-equipped seed health testing lab was established by a joint effort of DOA and JICA first time in the country. Building of the Unit was constructed by DOA and equipment was procured by JICA. It was officially launched in August 2015. Staff of STL and HORDI obtained intensive training by Short-term JICA Experts. Some of them participated in one and half month training in Japan. Tests of seed borne fungal, bacteria pathogens and virus are now conducted at the Seed

[10] A quiz was given to the participants to evaluate their knowledge at the end of the training programme. Fifty three participants out of 58 in total answered correctly.

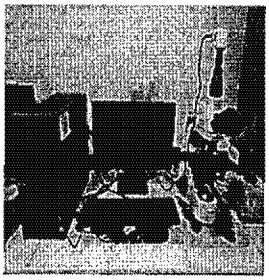
Health Unit. SCS sends samples to the Unit when they have doubt about seed-borne diseases at the inspection process of SCS and the airport quarantine unit. They can produce evidence of diseases by a lab report, which was not available earlier. Some private companies had sent samples, too.

Dr. Sato, JICA Expert on seed health reported their ability of conducting basic testing in his report in November 2016. According to Dr. Kaku, JICA Expert on plant pathology, as well as the two laboratory technicians in the Unit, their skills on testing and accuracy will be improved further more by practicing testing again and again in future. See Table 18 and 19 for number of seed health tests conducted as of January 15, 2017.

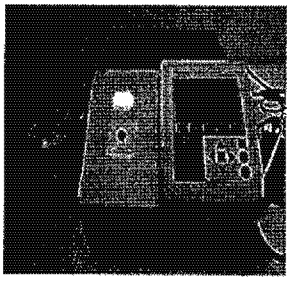
Autoclave



Incubator



Microscope and computer



Eliezer reader

Equipment for Seed Health Testing

Table 18 Number of seed health tests on bacteria and virus conducted by Seed Health Testing Unit (from 2014 to January 15, 2017)

Crop	Number of samples tested	Disease tested	Technique used	Results
Tomato	02	Bacterial canker	Agar plate method + inoculation test	Negative
Tomato	02	Virus	Immuno-strips for Cmm	Negative
Cabbage	01	Black rot (bacteria)	Agar plate method + inoculation test	Negative
Beans	02	Seed borne bacterial diseases	Agar plate method + inoculation test and grow out test	Negative

Source: SCS

Table 19 Number of seed health tests on Fungi conducted by Seed Health Testing Unit (from 2014 to January 15, 2017)

Crop	Number of samples tested	Disease tested	Technique used	Results: (positive +/ negative -)
Capsicum	13	Seed borne fungal diseases	Blotter method	Anthracnose; + (in 1 lot) Fusarium spp; + (in 1 lot) Alternaria spp; + (in 1 lot
Bitter gourd	28	Seed borne fungal diseases	Blotter method	Anthracnose; + (in 16 lot) Fusarium spp.; + (in 1 lot) Cercospora spp.; + (in 1 lot)
Tomato	12	Seed borne fungal diseases	Blotter method	Fusarium spp.; + (in 1 lot)
Luffa	03	Seed borne fungal diseases	Blotter method	-
Okra	11	Seed borne fungal diseases	Blotter method	-
Snake gourd	09	Seed borne fungal diseases	Blotter method	Anthracnose; + (in 1 lot) Cercospora spp.; + (in 1 lot)
Brinjal	18	Seed borne fungal diseases	Blotter method	Anthracnose; + (in 1 lot) Fusarium spp.; + (in 2 lot)
Pumpkin	09	Seed borne fungal diseases	Blotter method	-
Cucumber	06	Seed borne fungal diseases	Blotter method	-
Bean	01	Seed borne fungal diseases	Blotter method	-

Source: SCS

Field survey has been conducted by Dr. Kaku, JICA Short-term Expert and staff of Plant Pathology Division of HORDI in the major areas of vegetable production, including Kalpitiya, Nuwara Eliya and Kandy districts. As a result of the survey, it was found that globally important seed-borne diseases, such as bacterial canker of tomato, bacterial fruit blotch (BFB) of watermelon or black rot of crucifers were widely observed in the country.

Indicator 3-5. Action plan for improvement of quality control is developed based on the result of the 'Survey on seed quality available in the market (Seed Quality Survey)'

In accordance to the recommendations made by the Mid-term Review, Seed Quality Survey was conducted by SCS and SCPC. Samples were taken in 2014/15Maha and 2015 Yala. It was the first of its kind survey in the country. Findings of the survey, as shown below, were "eye opening" to the stakeholders of vegetable seed industry. Objectively analyzed reports were

produced. The report produces firm evidence that considerable amount of inferior quality seed is in the market.

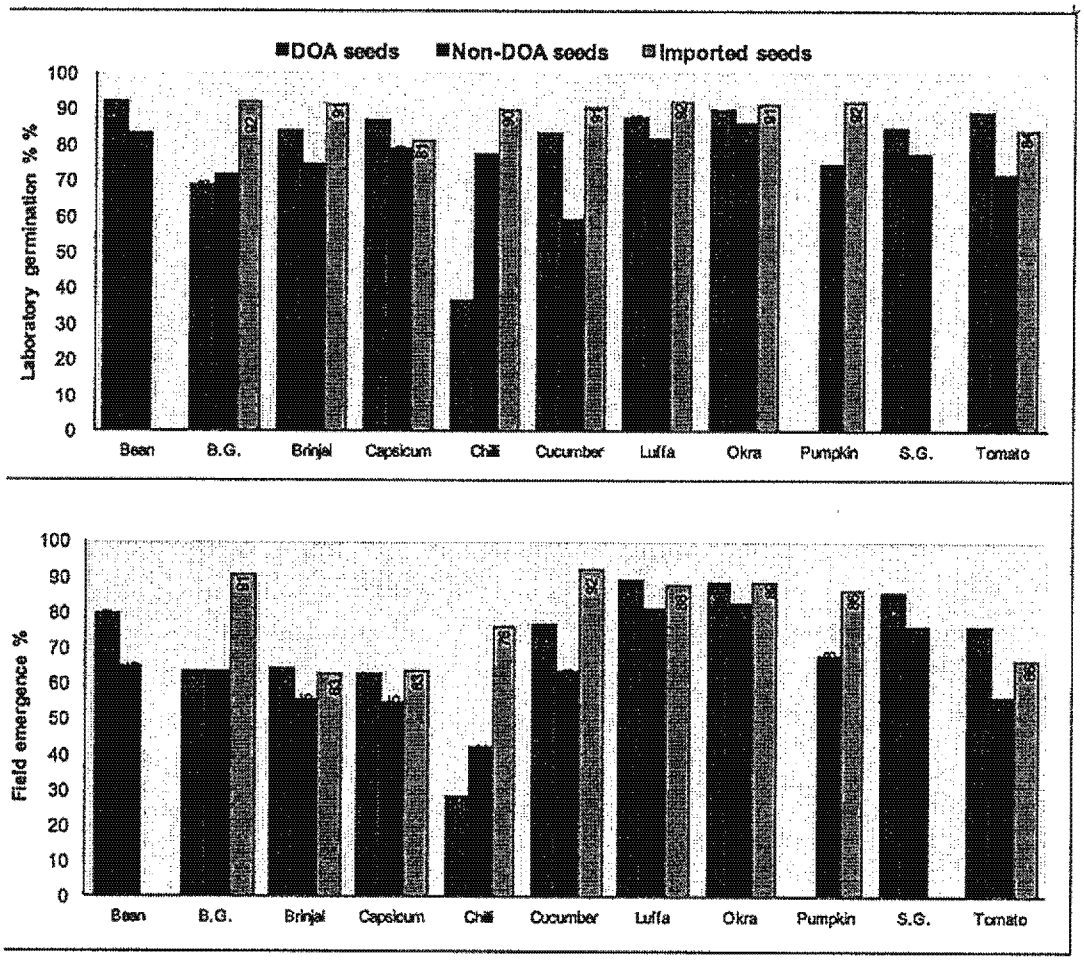


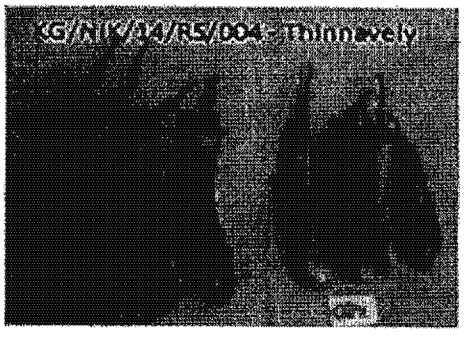
Figure 2 Laboratory germination (above), and Field emergence (below)

Source: P28, 2014/15 Maha report on Seed Quality Survey

Difference between LG and FE				
Crops	LG	FE	t Stat	Pvalue
Bean	84.97	67.85	3.19	0.001**
Bitter gourd	72.81	65.50	1.21	0.115
Brinjal	76.33	56.80	4.05	0.000**
Capsicum	72.86	53.80	3.04	0.001**
Chilli	80.36	63.47	3.75	0.000**
Cucumber	82.89	81.94	0.26	0.399
Luffa	85.21	83.96	0.58	0.279
Okra	87.63	84.59	1.46	0.075*
Pumpkin	80.03	73.96	1.39	0.082*
Snake gourd	77.82	76.82	0.19	0.422
Tomato	78.51	61.93	4.50	0.000**

Table 20 Difference between Laboratory germination and Field Emergence

Source: P15, 2015 Yala report



Off types of Thinnavely (eggplant)

Source: P 19, 2014/15 Maha report

Seed Quality Action Plan

Seed Quality Action Plan was developed based on the survey result of 2014/15 Maha and authorized at JCC on July 4, 2016. (See ATTACHMENT 3 for Seed Quality Action Plan)

4.4 Project Purpose

Project purpose is "Production system for certified vegetable seed is improved in the target areas". The followings are five indicators for Project Purpose and their status of achievement.

Table 21 Progress of Project Purpose

Indicators	Progress
1. Number of respondents of both public and private sectors who expressed that information sharing between both sectors is increased.	[A] Achieved.
2. More than 80% of DOA officials express that Seed related database make their data processing work efficient.	[B] No information, as the database system is not fully functioning yet.
3. More than 60% of contract farmers who attended seed production trainings apply* techniques introduced by the Project. * Use more than one of the techniques introduced by the Project.	[B??] A study conducted in 2015 showed a good result. Not certain about latest situation. Need an update in 2016/17 Maha season.
4. SCPPC continuously conduct in-service and induction trainings on seed certification using seedling evaluation manual and teaching materials introduced by the project.	[A] Achieved.
5. Actions are taken in accordance with the action plan developed based on the results of 'the survey on seed quality available in the market (Seed Quality Survey)	[A] In good progress. Need an update by the end of the Project.

Indicator-1 Number of respondents of both public and private sectors who expressed that information sharing between both sectors is increased.

As per the questionnaire survey conducted by the Project, 17 out of 20 (85%) and 30 out of 33

(91%) participants responded that "information sharing between both sectors was increased", at the time of the JPP seminars conducted on September 9th, 2015 and October 3rd, 2017 respectively. Updated is needed in the next JPP seminar in February 2017; however this indicator is considered to have been achieved by the high level of positive response as mentioned above.

Indicator-2 More than 80% of DOA officials express that Seed related database make their data processing work efficient.

The database system has not yet been functioning in full scale; therefore, DOA officials are not able to express whether it made their work efficient. The development of database was delayed long (planned to be completed in July 2014, but actually completed in March 2016) unfortunately.

Indicator-3. More than 60% of contract farmers who attended seed production trainings apply[11] techniques introduced by the Project.

A study conducted in 2015 by Mr. Koyama, a JICA Short-term Expert, showed a good result as below figure. More than 60% of farmers interviewed in the study applied nursery tray and pots.

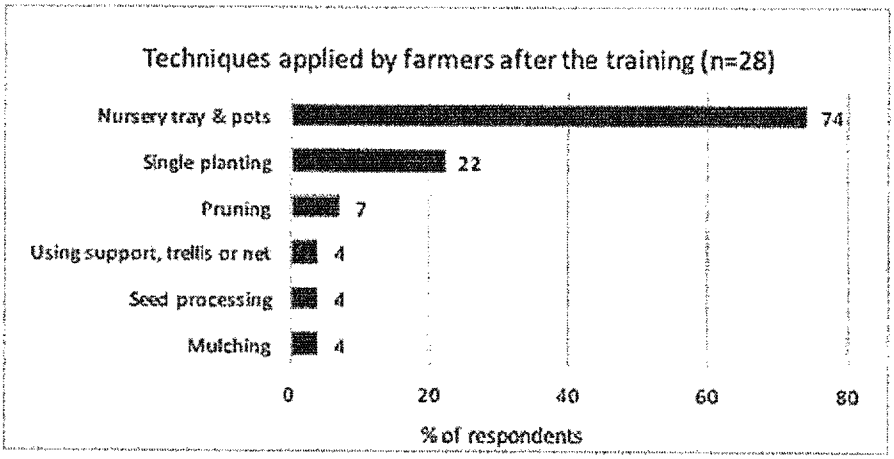


Figure 3 Techniques applied by farmers after the training (n=28)

Source: Final Report by Mr. Koyama, JICA Expert, November 2015.
Note: Farmers who participated in the training and had experience of contract growing were recommended for interview by SPMDC.

There is no update about the status of application after 2016 mainly because DOA contract programme for vegetable seed production was very few in 2015 and 2016; therefore, a limited number of seed growers, who participated in the training, obtained contract programme. As a

[11] At least one technique.

result, staff of DD offices obtained limited opportunities to visit vegetable seed farmers and observe status of application of the techniques in this period.

The Team conducted group interviews to the farmers who participated in the training programme at four DD offices in the target area, and villages in Kiriwandeniya and Rikillagaskada, where village-based training were conducted. There were several farmers who mentioned that they were adopting techniques learned in the training. The Team found a remarkable example of positive application as described in the column below.

<A farmer talked about value of the techniques with evidence >

The Terminal Evaluation Team visited Mr. Punchibanda in Batalagoda, Kurunegala district, by an introduced of DD office, Nikaweratiya. He is an experienced seed farmer, who has been in the profession for the last 15 years.

He participated in the production training conducted by the Project. Since last season, he applied several techniques he learned in the training and found them very useful. This cultivation season, he needed only 200g of basic seeds for his cucumber seed production; while he was provided 400g from the DD office, because of using trays and pots. He was happy that he would be able to use the balance next season free of charge. He also mentioned that watering seedlings became much easier by using trays and pots. He needs only two buckets of water for the watering when he uses them; whereas he needed whole lot of water when he plants small seedlings on the ground. In the last Yala season, he experienced that seedlings in the nursery were protected under a shed in pots at the time of sudden heavy rain and hot sun after that; whereas those in the field were damaged, and thus, they were not germinated at all

Some farmers the Team interviewed have not changed their usual practice in the field, although they understood a need of the techniques introduced in the training very well and they could even explain value of them with reasons. According to them, reasons they were not able to change their usual farm practices by applying techniques introduced by the Project were as below:

- Limited financial capacity to invest upfront
- Profit from vegetable seed production is limited.
- Very busy at the beginning of cultivation season. More attention is given to seed paddy or OFC, not vegetable
- Being afraid of reducing number of plants/ fruits by anticipating risks of natural disaster, pest and diseases.

- Did not think those taught in the training should be practiced.
- Participated in the training because they liked to keep a good relationship with DOA.
- General reluctance for a change

As described above, there was no quantitative information after 2015, and the result of the group interviews and field visits were mixture of positive and negative. To conclude level of achievement of this indicator, updated information is needed by the end of the Project, an observation of AIs of DD offices in 2016/17 Maha season about the level of application of the techniques of the contract vegetable seed growers, who participated in the production training.

Indicator-4. SCPPC continuously conduct in-service and induction trainings on seed certification using seedling evaluation manual and teaching materials introduced by the project.

SCPPC was continuously conducted in-service and induction trainings on seed certification, by using seedling evaluation manual and teaching materials introduced by the Project. Table 22 shows such training conducted by SCS in 2014 and 2015. There was no opportunity to conduct a training in 2016; however, SCS is planning to conduct several training in 2017.

Table 22 In-service training on seed certification using manuals and materials introduced by the Project

Year	Title of training	No. of participants	Duration (days)
2014	Training programme on seed testing	85	04
	Seed testing training for new seed technicians	14	03
	Preparing meeting for seed testing workshop	30	01
2015	Presentation on quality control of certified seeds and seedlings	23	01
	Guideline preparation for seed testing procedure	18	02
	Guideline preparation for seed testing procedure	18	02

Source: SCS

Indicator 5. Actions are taken in accordance with the action plan developed based on the results of 'the survey on seed quality available in the market (Seed Quality Survey)

As of January 2017, actions were taken for the five items in the "short-term" plan in the Seed Quality Action Plan, as shown in Table 23.

Table 23 Progress of actions for Seed Quality Action Plan (short-term items)

Seed Quality Action Plan (short-term)	Actions taken
1. Training on seed quality	Has been Implemented
2. Awareness creation on seed quality	Six awareness creation meetings on Seed Act for private producers, importers & traders were held in Oct.
3. Expiry date on seed pack	Expiry date were printed on newly produced seed packets Oct. 2017 onward.
4. A mechanism to sample and test all imported seeds	Discussion between SCS & NPQS was held.
5. Fertilizer recommendations for vegetable seed production	
6. Continuation of Market survey	Budget for survey in 2016-18 was allocated. SCS is conducting survey for imported seeds in 2016.
7. Seed production and distribution planning by Regional Seed Committees	
8. Revision of seed germination and moisture level	

4.5 Overall Goal

Overall goal of the Project is "Quantity of vegetable seeds in the market, up to minimum standards stipulated by DOA, is increased". It was defined that the "seeds in the market" should be "DOA certified seeds, which were produced by DOA and the private sector, and self-certified seeds of the private sector", and "minimum standards stipulated by DOA should be the one "Recommended seed certification standards for seed and planting materials, which was issued by SCS in 2009". The following table are the two indicators for Overall Goal and their status of achievement.

Table 24 Status of Achievement of Overall Goal

Indicators	Progress
1. The percentage of vegetable seeds available in the market, which is up to the minimum standards stipulated by DOA, is increased.	No information about the progress.
2. Over 90% of the requested basic seeds by the private sector seed producers is supplied by SPMDC.	No sing of being achieved. Less than 90% was supplied in the last 3 years.

Indicator 1 for Overall Goal: The percentage of vegetable seeds available in the market, which is up to the minimum standards stipulated by DOA, is increased

Baseline data was obtained in the Seed Quality Market Survey conducted in 2015/16; however, no way to find the progress as there is no updated information.

The Team identified that data shown in Figure 1 and Table 20 in Output 3, which are the findings of the Seed Quality Survey conducted in 2015 Yala, are important as a baseline data for the indicator. One can find progress if a same kind of survey is conducted in three years later, 2018 Yala. Information on laboratory germination, moisture level, field emergence and difference of these two, for DOA, non-DOA and imported seeds, should be included in the survey.

Indicator 2 for Overall goal: Over 90% of the requested basic seeds by the private sector seed producers is supplied by SPMDC.

As Figure 4 and table 25 show, less than 90% of the requested basic seeds by the private sector seed producers was supplied by SPMDC in recent three years, in terms of weight and varieties. It is expected that situation would be improved in future, as a result that private and public sectors of the seed industry further promote information sharing by SIDCC and JPP seminars, utilization of RSC, utilization of the database system for production planning by analyzing trend of sales and requirement.

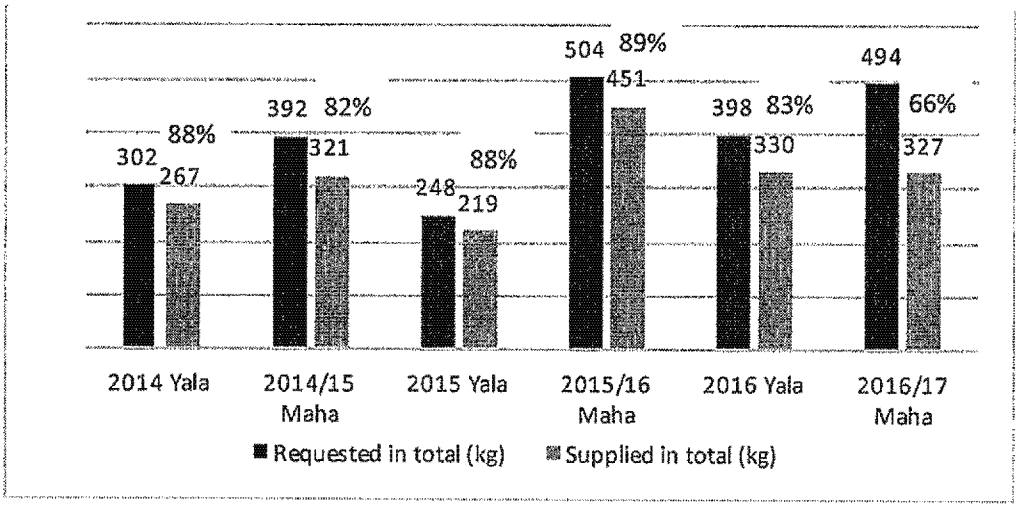


Figure 4 Vegetable Basic Seed Requested & Supplied (kg)

Source: SPMDC

Table 25 **Vegetable Basic Seed Requested & Supplied (Number of varieties)**

Season	No. of variety in the list	No. of variety supplied in full amount	Supplied/ requested (%)	Variety in shortage
2016/17 Maha	27	20	74%	TA2, MI Short, Thinneveli, MC43, Thilina, Haritha, BS1
2016 Yala	33	24	73%	TA2, Polon, Gannoruwa hawari, A9, Krishna, Thilina, Goraka, Red, BS1
2015/16 Maha	33	24	73%	TA2, Krishna, Coraka, Thilina, Asiri, Gannoruwa Ari, Red, BS1, Ruhunu
2015 Yala	19	16	84%	Hawari, Thilina, BS1
2014/15 Maha	25	20	80%	TA2, Krishna, Thilina, Asiri, BS1
2014 Yala	21	18	86%	MC43, Thilina, BS1

Source: SPMDC

Notes:

- Demand for TA2 was increased suddenly in the last 2 years.
- Thilina and Krishna were not supplied for the past few years because of purity problem.
- Ruhunu is no more produced as it is highly susceptible for virus.
- Allocated amount was not taken by private companies, sometimes.

4.6 Implementation Processes

(1) Revisions of PDM

PDM of the Project was revised mainly in the following manner:

(a) Several activities and indicators in the PDM were modified at the Kick-off Meeting of the Project held in August 2012, as a result of baseline survey.

(b) Project Purpose was revised, Output 4 was integrated in the activities of Output 1, and an activity of monitoring random sampling was added in December 2013, at the time the JICA Consultation Mission was visited the Project.

(c) "Certified/quality vegetable seed" in the narrative summary of Project Purpose was revised as "certified vegetable seed" in the JCC meeting held in July 2014.

(d) As a result of the Mid-term Review conducted in September 2014, Overall Goal and its indicators, all indicators for Project Purpose in PDM Ver. 4 were replaced. Editorial changes were made for output indicators of 1-1, 1-3, 2-1, 2-2, 3-2.in PDM Ver.4. Output indicators of 2-2, 2-3, 3-3, 3-4 in PDM Ver. 4 was replaced. Output indicator 3-5 was added.

(2) JCC Meetings

JCC meetings were conducted two times a year as planned and chaired by the Secretary of MOA or his representative. Table 26 shows the date, major topics and number of attendants of the meetings.

Table 26 Summary of JCC meetings

Date	Major topics	No. of attendants
2012/12/7	Revision of R/D and PDM	13
2013/6/21	Project Progress Report and Future Activities	16
2013/12/9	Report of the JICA project consultation team	27
2014/7/4	Report of Prof. Nishikawa, Short-term Expert on Seed Quality Evaluation	23
2014/9/18	Report of Mid-term Review	
2014/12/15	Project Progress Report and Future Activities Progress of Recommendation by Mid-term Review	31
2015/6/26	Project Progress Report and Future Activities Progress of Recommendation by Mid-term Review	27
2016/1/29	Project Progress Report and Future Activities Progress of Recommendation by Mid-term Review	24
2016/7/5	Project Progress Report and Future Activities Progress of Recommendation by Mid-term Review	34

(Source: JICA Expert Team)

(3) Monthly Meetings

The meetings were held every month thereafter, except a few. Discussion on progress and issues of the Project, presentation on the findings in the trainings in Japan, presentation and discussion on findings of the JICA short-term Experts and the JICA Consultation Mission and discussion on revision of PDM were conducted in the meetings. Representative of SPASL participated in the meeting regularly.

(4) Factors Contributed to Progress of Project Implementation

(a) Extra input by DOA to the project activities

DOA provided fund, human resources and others to the project activities more than what was expected at the time of planning of the Project. These inputs from Sri Lankan side, as follows, were essential to complete these activities successfully:

- Seed Health Testing Unit

  DOA constructed a building for Seed Health testing Unit, for expanding its capacity on seed health testing, especially after a staff of seed health unit submitted a proposal for the expansion after her training in Japan.

- Seed Quality Survey

  For implementing the Seed Quality Survey, JICA provided cost for purchasing seeds, fuel, allowance for assistant staff for testing. DOA/SCS bared necessary cost for preparation and implementation of the Field Days conducted for presenting result of the survey to public and private sector.

- Database system

  JICA had provided initial fund for developing the database system. DOA invested necessary facility for operation, such as computers, printers and internet facilities.

- Improvement of building for seed processing machinery

  SPMDC undertook improvement and rehabilitation of buildings and facility in Kundasale farm for installment of seed processing machinery.

- Construction of rain sheds

  SPMDC constructed rain sheds for nursery management at Aluttarama and Mahailuppallama seed farm.

(b) Ex-trainees of JICA training played an active role in the Project

As described in the Mid-term Review report, the Team found that some of the ex-trainees of the Country Focused Training of JICA conducted during 2003-2007, was playing an active and important role in a practical session in the seed production training programme. Some of them are serving as "master trainers" in the training.

(5) Factors Hindered Progress of Project Implementation

(a) Delay in database development

Development of the database system was delayed for 2.5 years due to several reasons. The IT company which was awarded the development work was not able to conduct the task; therefore, the Project had to select the second candidate at the tender and re-start the work from the beginning. The selected IT company took longer time than expected for developing the database system, mainly because changed programmer in-charge of the development 3 times during the work period, and cue to complexity of work flow conducted by number of institutions. Therefore, the Project could not introduce the database system on time.

(b) Downscale of Contract Growing Programme in 2015 and 2016

There was very few numbers of vegetable seed contract growing programme in 2015 and 2016. Therefore, only a few seed growers who participated in the training obtained contract

programme and practice what they learned. Thus, AIs of DD offices and SCS regional offices could not obtain many opportunities to visit these farmers and follow-up adoption of techniques introduced by the training.

(c) Slow progress of enforcement of Regulations of Seed Act

Regulations of the Seed Act, including required standard of seed quality for sale, had been expected to be enforced in around 2010; however, it has not. Without the enforcement of the regulations of the Seed Act, there is a limitation of enforceability for SCPPC/ SPMDC in their effort of improving seed quality in the market. In order to improve quality of the seed available in the market, legal provision is essential.

5. Analysis by the Five Evaluation Criteria

5.1 Relevance <High>

(1) Consistence with Development Policy of Sri Lanka

At the time of Terminal Evaluation, "NFPP: National Food Production Programme (2016 – 2018), which was produced by the new government elected in 2015, agriculture sector is regarded as one of the most important sector, and aims at enhancement of food crop production and productivity. Objective of the Crop Production Programme in NFPP is to take actions for productivity development as to enhancement of production and productivity of vegetable and fruits, by adopting good agricultural methodologies, suitable water management systems, pest control methods, use of fertilizer, equipment and technological knowledge. It also aims at increase of vegetable production and increase consumption of vegetables, for achieving per capita vegetable consumption of 200g per day in 2018 (75% more than that of in 2015). NFPP also mentions importance of partnership of public and private sectors, by way of dissemination of modern technology and mechanization, conducting research and others. It encourages research on vegetables, fruits and seed production; and emphasizes necessity of endorsement of Seed Act, Pesticide Control Act and others.

(2) Consistence with Development Needs of Sri Lanka

The Seed Quality Survey conducted in 2015 and 2016 as a prat of project activities has produced clear evidences for a need of improving quality of the seed in the market. For examples, 32% of the tested seed samples were exceeded maximum moisture level. There was a relationship between seed moisture content and seed germination. Bean, brinjal, capsicum, chilli, okra, pumpkin and tomato seed germination at the laboratory were significantly higher than field emergence. None of the non-DOA seeds have remarkable laboratory germination or field

emergence with compared to that of the DOA or imported seeds. The total seed sample of cucumber Vr. Shivayee 393F1, which is an import variety, was affected by diseases. In contrast, none of the local cucumber samples were affected by diseases.

As a part of the project activities, field survey on plant diseases was conducted by Dr. Kaku, JICA Expert, in collaboration with Plant Pathology Division of HORDI, in the major areas of vegetable production, including Kalpitiya, Nuwara Eliya and Kandy. The survey found that globally important seed-borne diseases, such as bacterial canker of tomato, bacterial fruit blotch (BFB) of watermelon or black rot of crucifers were widely observed in Sri Lanka. This finding confirmed a significant need of strengthening seed health test and plant quarantine, because the globally important seed-borne diseases were distributed mainly through imported vegetable seeds.

The results of these two activities, Seed Quality Survey and field survey on plant diseases, confirmed the needs of quality improvement and control of the seed in the market, which is the objective of the Project.

(3) Consistence with Japanese Assistant Policy

"Sri Lanka Country Assistance Policy" (June 2012) of Ministry of Foreign Affairs of Japan, which is the Japanese policy of assistance to Sri Lanka at the time of the Terminal Evaluation stated the following three most important areas for assistance; (a) advancement of economic development, (b) assistance for development of less-developed area and (c) Reduction of vulnerability. Assistance for industrial development with more emphasis on agriculture; and development of agriculture-related infrastructure were included in the above-mentioned (b). "Development of agriculture, fishery and rural villages programme" was planned to be implemented for improving productivity and profitability in rural areas, as a part of "Project Implementation Plan" (2012), in accordance with the policy of "(b) assistance for development of less-developed area". This Project is implemented as a part of the above-mentioned programme.

Japan had been assisting Sri Lanka in vegetable seeds for a long time in various ways; therefore, this Project has consistency with the preceding programme.

In this way, at the time of Terminal Evaluation, Project Purpose of the Project has consistency with development policy and development needs of Sri Lanka and assistance policy of Japan. Therefore, relevancy of the Project remains high.

5.2 Effectiveness <Fair>

The Project has made remarkable progress especially regarding vegetable seed production techniques in comparison with the status at the time of Mid-term Review. It should be appreciated that leadership was developed in DD offices and government seed farms of SPMDC as well as regional SCS offices for carrying out the production training and disseminating the production techniques to farmers. The techniques introduced by the Project is well accepted and practiced in every government seed farms in the project area. It was a great achievement that SCPPC developed its capacity in seed health testing; and conducted the first seed quality survey and utilized its result for quality control and improvement. However, there were some delays and incompletion in terms of improvement of production planning; operation of database system; and contract farmers' application of the production techniques due to various reasons. Thus, at the time of Terminal Evaluation, level of achievement of Project Purpose, "Production system for certified vegetable seed is improved in the target area" is moderate. Therefore, effectiveness of the Project is fair.

5.3 Efficiency <High>

The planned activities, except a few, were conducted as planned. There was a remarkable improvement in terms of three Outputs, although there are some more room for improvement. Input from Japanese side, including dispatch of JICA Expert, training in Japan and overseas, were conducted as planned. Equipment was provided as planned; although there was some delay for some items. Project cost of JICA will not exceed the planned amount. As described in "4.6 Implementation Process", extra input made by Sri Lankan side, facilitated smooth implementation of the project activities. The project period was planned as five years, and is going to be the same. Therefore, in general, efficiency of the Project is high.

5.4 Impact <Fair>

Overall goal of the Project is "Quantity of vegetable seeds in the market up to minimum standards stipulated by DOA is increased". As mentioned in "4.5 Overall Goal", we do not know progress of the first indicator, "the percentage of vegetable seeds available in the market, which is up to the minimum standards stipulated by DOA, is increased"; however, a baseline data was identified. Nevertheless, Project commenced several initiatives, which would directly contribute improvement of quality of the seed in the market, such as introduction of good practices for vegetable seed production, implementation of Seed Quality Survey and utilization of its result for

the purpose of encouraging public and private institutions producing quality seeds; commencement of seed health testing on fungi, bacteria and viruses. In addition to these project activities, SCPPC has been conducted various kinds of awareness creation programme and training for quality improvement of seeds in the market in accordance to the Seed Act. However, there are lot more thing to be done according to Seed Act to improve quality of the seed in the market, especially those seeds, which are not in certification process nor self-quality management system, which occupies large portion in the market.[12]

As for the second indicator, "Over 90% of the requested basic seeds by the private sector seed producers is supplies by SPMDC", there is not yet a sign of improvement as explained in "4.5 Overall Goal". There is a problem about purity of some varieties of basic seed, such as Thilina and Krishna. SPMDC will not be able to supply these varieties, although there is demanded, until purification process is completed. There might be a sudden change of amount of requirement of seed because of commencement or ending of government campaigns of seed/ plant distribution.

However, there is expectation that production planning of SPMDC would be improved after a full-scale operation of the database system as it will enable SPMDC to analyze past demand and sales trend and make demand prediction more precisely.

It was found in the Seed Quality Survey that there was a considerable difference between laboratory germination and field emergence for all kind of samples of DOA, non-DOA and imported seed for some crops. As for DOA seeds, it was probably because SPMDC stores old seeds if they pass C-sample tests at SCS because there is no year limit for storage. Reduction or disposal of old stock should be considered for supplying of quality seed to the private sector, and would contribute attainment of Overall Goal.

As mentioned in "4.6. Implementation Process" of this report, extra input from Sri Lankan side contributed creation of extended impact of Seed Health Testing and Database System. It should be highlighted that the Project established the first seed health testing laboratory. Seed Quality Survey created remarkable impact by producing firm evidence for a need of improving quality of seed in the market. It was also effective for convincing private sector that SCS is the only one public institution that can implement this type of survey with an objective of overall uplifting of the seed market.

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[12] According to the survey conducted the local consultant of the JICA Expert Team of the Project, composition of the seed used by farmers was, DOA seed (7%), imported seed (28%), SPASL seed (8%), non-SPASL seed (23%), self-production seed (34%).

As mentioned above, there are several extra positive impacts created by the Project. However, there are lot more things to be done for improving quality of the vegetable seed in the market, to achieve Overall Goal; therefore, Impact of the Project is fair.

5.5 Sustainability <High>

(1) Policy

As mentioned "5.1 Relevance", National Food Production Programme (2016 – 2018), provides policy support to the Project Purpose and Overall Goal of the Project. There is a long delay in enforcement of the regulation, however, currently, MOA and relevant institution under the ministry are working on enforcement of the regulations for full-implementation of the Seed Act. Enforcement of Seed Act by setting up the regulations is essential for supporting sustainability of the effect of the Project.

(2) Institutional Aspect

Roles and responsibility of the counterpart institutions, such as SPMDC and SCPPC to the project activities are clearly defined in general. There are persons in-charge of the activities and responsible for monitoring the result. Improved mechanism for public and private partnership and training, including objectives, frequency, relationship of SIDCC, JPP Seminars and RSC, was discussed and agreed in the monthly meeting of the Project as per ATTACHMENT – 3.

All the equipment provided by the Project is utilized well at present, except the film coating machine. It was provided by the Project to SPMDC and installed at the Vegetable Seed Center in 2015 October. However, it is not utilized yet. SPMDC is taking steps for utilization by forming a committee for developing a regulation, conducting laboratory tests for capsicum. In future, periodical germination tests, after 3, 6 and 12 months from the day of coating, needs to be conducted. The laboratory tests should be conducted for other four crops, such as chili, melon, okra and bitter gourd. Sales strategy and market survey may be needed. There should be more prioritized work arrangement, so that SPMDC and SCS to implement these tasks as a priority.

(3) Technical aspect

SPMDC staff in DD offices and seed farms, as well as regional SCS offices obtained experience and knowledge necessary to continue GVSPP and techniques introduced by the Project. There are project coordinator, master trainers and others, who are going to play crucial role after the project

for sustainability. Technical capacity of SPMDC staff regarding production techniques was enhanced as expected in general. For future expansion and continuation of the activities, including seasonal production training, instruction and follow-up for farmers, etc., more master trainers and leadership need to be developed.

Staff of the Seed Health Testing Unit became able to conduct test for fungi, bacteria and viruses as expected. They need to continue their effort for improving their techniques on the testing with Plant Pathology Division of HORDI.

(4) Financial aspect

Figure 5 and 6 show budget allocation and actual expenditure of SPMDC and SCPPC for the last 3 years. Necessary budget was allocated and there was no critical shortage for the amount.

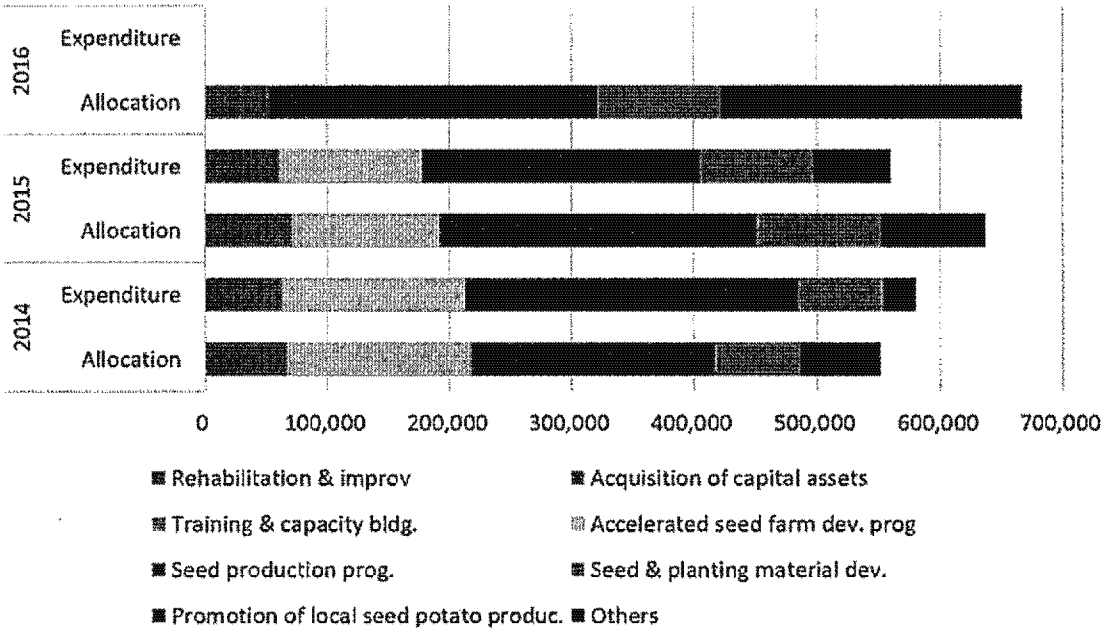
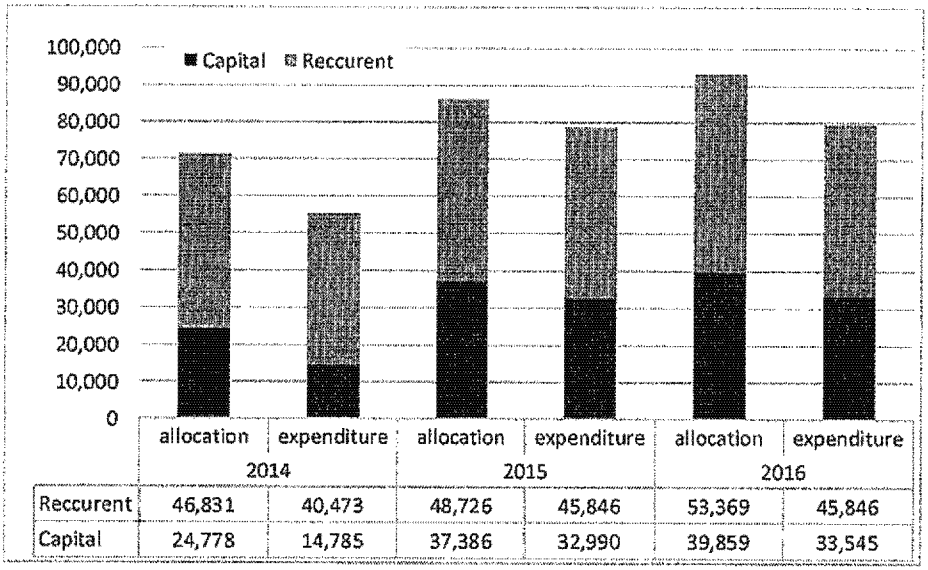


Figure 5 Budget Allocation and Actual Expenditure of SPMDC

Source: SPMDC



	allocation	expenditure	allocation	expenditure	allocation	expenditure
	2014		2015		2016	
Reccurent	46,831	40,473	48,726	45,846	53,369	45,846
Capital	24,778	14,785	37,386	32,990	39,859	33,545

Figure 6 Budget Allocation and Actual Expenditure of SCPPC

Source: SCPPC

Financial arrangement of the JPP seminars and the production training programme as necessary expenditure for them had been borne by SPMDC. There is no problem about future arrangement for the same.

SCPPC appreciated the result of the Seed Quality Survey conducted in 2015/16 and had obtained budget allocation for conducting Seed Quality Survey for three years from 2016 to 2018, 1.45 million Rupees per year. SCPPC is conducting seed quality survey of exotic varieties in the Central Province in 2016 by using the budget. SCPPC was provided 5 million Rupees in 2017 for purchasing chemicals, equipment and experimental materials for seed health testing. They were also provided special budget for seed health, 4 million Rupees for field survey, testing, reporting and research. Necessary budget for maintenance of equipment was also provided for SCS under recurrent budget. HORDI obtained budget of 1.2 million for "Diversity of *Ralstonia Solanasearum* (bacterial wilt) of solanaceaus crops in Sri Lanka)" for 2016 and 2017. Necessary material, including chemical and others were purchased in 2016. They can spend for consumables, allowance of field assistance and fuel for field survey from the allocation of 2017.

Effect of the Project would be sustained at high level in general, therefore, sustainability of the Project is high.

6. Conclusion

Through the Terminal Evaluation, such as report analysis, field survey and discussion with officials and staff members concerned, the Joint Evaluation Team has found that the Project has almost achieved the Project Purpose by both the Japanese and Sri Lankan side utmost endeavors.

In terms of five evaluation criteria, relevance, efficiency and sustainability are evaluated as high and effectiveness and impact are as fair.

The Team particularly points out following important points as conclusion;

- Through technical transfers from the Japanese experts, SPMDC, now, can conduct seasonal production training and GVSPP introduced by the Project is utilized at government seed farms. The seasonal production training should continue and to be expected to expand to other areas.
- To strengthen domestic vegetable seed production, it is indispensable to tighten the tie between government and private sector. To have more information exchange and discussion & meeting between them are necessary.
- Capacities of the Sri Lankan counterpart staff of seed health and plant pathology are consolidated through technical transfers from the Japanese experts. The joint efforts from the Sri Lankan & Japanese side made for establishing a well-equipped seed health testing lab and expect to deepen the Sri Lankan side testing capacity by strengthening relations among other related organizations.
- Throughout the Project period, the Sri Lankan side made great contribution such as allocation of budget for additional three-year consecutive seed quality surveys and facility and equipment for the data base system. It is highly evaluated that the Sri Lankan side deepened its ownership throughout the Project activities.
- To gazette the members of National Seed Council and Regulation & Standard of Seed Act should be done soon in order to improve quality of vegetable seed.
- Through the seed processing machines installed at Kundasale farm, the processing process has become efficient and precise, which would improve the seed quality available in the market.

7. Recommendations

(1) Recommendations to DOA

(a) Seed Act: Facilitate MOA in the process of enforcement of the regulations of the Seed Act to gazette members of National Seed Council very soon; gazette the regulation as soon as the legal review is finalized; and hold the meeting of the council as soon as the regulation is gazetted.

(b) Database: DOA to Ensure installment of necessary equipment and facility for database system as soon as possible.

(c) JPP Action Plan:

- DOA to present the "JPP Action Plan" in the next public-private joint seminar at the end of Feb. 2017.
- Discuss and identify short-, medium- and long-term targets to be achieved by the responsible parties in the action plan.
- DOA to monitor overall progress of the JPP Action Plan.

(2) Recommendations to SPMDC

(a) SIDCC: Make sure to hold the first SIDCC workshop in February 2017.

(b) JPP Action Plan: Facilitate DOA to monitor overall progress of the JPP Action Plan.

(c) Production Planning: Further enhance production planning by keep on promoting dialogue with the private sector and making analysis of sales and requirement trend in the past and making more precise demand prediction.

(d) Seed Storage: Develop a strategy for appropriate turnover of seed in stock, as mentioned in the medium-term Seed Quality Action Plan, with cooperation of SCS. Consider setting a rule for periodical disposal of old stock.

(e) Seasonal Training: Continue seasonal practical training programme on vegetable seed production twice a year by utilizing the master trainers to popularize the technique. DD offices to select motivated farmers by getting information from regional ETC, Agrarian Development Department, FOs and others. Keep on informing the private sector about the training.

(f) Production techniques of contract farmers: Identify groups of trained contract seed growers in each DD regions, and intensively encourage them to start adopting new techniques even in a small scale. Create more success stories and share their experience with other farmers.

(g) Introduction of GVSPP to contract farmers: Introduce GVSPP as a check list to the government contract seed growers. AIs of DD offices will utilize the check list at the time of their regular follow-up visits. Try to make it mandatory in future.

(h) Complete film coating test without delay by obtaining timely cooperation from SCPPC; and start commercial production.

(i) Master Trainers: Train more number of master trainers, including staff working in other regions. Formulate a panel of master trainers, who serve as resource persons in production training. Try to make all the seed-related officers as master trainers in future.

(3) Recommendations to SCPPC

(a) Seed Quality Action Plan: SCPPC to create more awareness about the Seed Quality Action Plan at the time of the first workshop of SIDCC in early March 2017. Keep on monitoring the progress of the plan.

(b) Seed Health: SCS to further collaborate with the Plant Pathology Division in HORDI for introducing modern technology of bacteriology, which is the most important subjects in seed-borne pathogens.

(c) Seed Act: SCPPC to send reminder regularly to the Dept. of Legal Draftsman on their process of finalizing the regulations, and inform

(d) Informal seed producers/ traders: SCPPS/ SCS to take further actions to identify informal seed producers and traders; encourage them to register in accordance to the Seed Act; and to produce quality seeds based on the GVSPP check-list.

(e) Seed Quality Survey for comparison: SCS to conduct a seed quality survey in 2018 Yala, by a methodology similar to the one in 2015-Yala, so that SEPC to make comparative analysis of the two and find out degree of achievement of Overall Goal of the Project.

(4) Recommendation to HORDI

(a) Seed Health: HORDI to further collaborate with Seed Health Unit of SCS for introducing modern technology of bacteriology, which is the most important subjects in seed-borne pathogens.

ANNEX-1 Schedule of the Terminal Evaluation

Schedule for the Terminal Evaluation Mission for VSP

No.	Date		Sri Lankan members/ Project Analysis and Evaluation (Ms. Tamura)	Leader of Japanese Team (Mr. Mimura)	Cooperation Planning (Ms. Tanaka)	Vegetable Seed Production (Mr. Miyazaki)
1	1/9	Mon	travel to Kandy 12:30 Seed Sales Centre (Wagolla) 14:00 Kundasale training farm (Kiriwandeniya)			
2	1/10	Tue	9:00 Explanation of Evaluation method and schedule among the joint evaluation team International Meeting with JICA Project Experts 14:00 Interview to HORDI 15:00 Interview to SCPPC			
3	1/11	Wed	9:00 Interview to SPMDC 10:30 Interview to SCS 11:30 Interview to ICC 14:00 Interview to SEPC 15:00 Interview to STC(Peradenia)			
4	1/12	Thu	Documentation			
5	1/13	Fri	9:00 Field visit and Interviews in Aluttarama			
6	1/14	Sat	Documentation			
7	1/15	Sun	Documentation			
8	1/16	Mon	9:30 Field visit and Interviews in Nikaweratiya, & Seed Sales Centre (Bataragoda)			
9	1/17	Tue	Field visit and Interviews inRikillagaskada Interview to SPMDC Interviews in Vegetable Seed Center (Gannoruwa) Interviews in Seed Health Testing Unit		23:55 Arrive in Colombo (SQ468)	
10	1/18	Wed	14:00 Vegetable Seed Centre 14:30 STL, Peradeniya 15:00 Seed Health Testing Unit 15:30 Meeting with the Experts		8:30 Meeting at JICA Sri Lanka Office Travel to Kandy (Colombo-Kandy) 15:30 Meeting with the Experts	
11	1/19	Thu	Travel to Mahailluppallama 11:00- Field Visit and Interview in Mahailluppallama		Travel to Mahailluppallama 11:00- Field Visit and Interview in Mahailluppallama	
12	1/20	Fri	10:00 Field Visit and Interview at Hayleys (Private Seed Company) 14:00 Field Visit and Interview in Kundasale		10:00 Field Visit and Interview at Hayleys (Private Seed Company) 14:00 Field Visit and Interview in Kundasale	
13	1/21	Sat	Internal Meeting Documentation		Internal Meeting Documentation	Internal Meeting Documentation
14	1/22	Sun	Internal Meeting Documentation	23:55 Arrive at BIA (SQ468)	Internal Meeting Documentation	Internal Meeting Documentation
15	1/23	Mon	8:30 Meeting with SCS 9:00 Meeting with SCPPC 10:00 Meeting with SPMDC 15:00 CC to DG Internal Meeting	8:30 Courtesy Call: Embassy of Japan 10:00 Courtesy Call on Secretary of Ministry of Agriculture Travel to Kandy 15:00 Courtesy Call to DG Internal Meeting	8:30 Meeting with SPMDC 10:00 Meeting with SCPPC 15:00 CC to DG Internal Meeting	Field visit (Aluttara,ama GSF)
16	1/24	Tue	10:00 Meeting with the experts PM Documentation	10:00 Meeting with the experts 11:30 Field Visit to SCS farm PM Field Visit to Seed Sales Center, Vegetable Seed Center, SCS lab		Field visit (Nikawaratiya)
17	1/25	Wed	9:30 Meeting with the experts	9:30 Meeting with the experts		
			14:00 Discussion among Joint Evaluation Team on draft final report			
18	1/26	Thu	9:00 Discussion among Joint Evaluation Team on draft final report 11:00 HORDI			
			Final Revision of the Report			
19	1/27	Fri	9:00-13:00 JCC			
			Travel to Colombo	Travel to Airport 22:15 Depart from Colombo (SQ467)		

ANNEX-2 List of persons consulted

List of Persons consulted (Tentative)

As of Jan.25, 2017

Organization	Title	Name
DoA	Director General	Dr. R.R.A. Wijekoon
DOA	Addl. Director General	Mr. R.M. Nandasiri
HORDI	Director	Mr. D.N. Sirisena
HORDI	Deputy Director (Breeding)	Ms. P. Malathy
HORDI	Assistant Director of Agriculture (ADA) (Plant Pathology)	Ms. W.A.P. Weeraratne
HORDI	Programme Assistant (Plant Pathology)	Ms. D.M.K.K. Disanayake
SCPPC	Director	Dr. K. Hettiarachchi
SCPPC	Addl. Director	Mr. W.M.D. Wasala
SCS	Deputy Director	Dr. M.G.D.L. Priyantha
SCS	ADA (Certification)	Mr. S.A.M.R. Abeykoon
SCS	ADA (Post control)	Ms. K.K.S.D. Pradeepika
SCS	ADA (Database)	Ms. R.A.I.S. Ariyarathne
SCS/STL	ADA/Officer in Charge (OIC), Peradeniya Seed Testing Laboratory	Ms. Y.M.H. Liyanage
SCS	OIC, Alutharama Regional Office	Mr. K.A. Piyaratna

SCS/STL	ADA/OIC, Alutharama Seed Testing Laboratory	Mr. J.W.K. Samaranayake
SCS	OIC, Nikaweratiya Regional Office	Mr. E.M.R.A. Ekanayaka
SCS	Agriculture Instructor (AI), Nikaweratiya Regional Office (Master Trainer)	Mr. M.A.P.C. Edirisinghe
SCS	OIC, Mahaillupallama Regional Office	Mr. L.H.P. Kulathunga
SCS	TA, Mahaillupallama Regional Office	Mr. J.K.G.G.U. Priyadarshana
SCS	TA, Mahaillupallama Regional Office	Mr. D.A.A.N. Sudarshana
SCS	AI, Mahaillupallama Regional Office	Mr. H.M.V. Rathnayake
SCS	AI, Mahaillupallama Regional Office	Mr. B.T.C.R. Jayarathne
SCS	Research Assistant, Seed Health Testing Unit	Ms. A Rasika J Athulorala
SCS	AI, Seed Health Testing Unit	Ms. J A V J Jayasinghe
SPMDC	Director	Mr. H.P. Thilakarathna
SPMDC	Deputy Director of Agriculture (DDA)	Mr. H.M.J.K. Herath
SPMDC	DDA (Progress & Monitoring)	Mr. W.M.I. Weerasekara
SPMDC	AI (Training & Media)	Mr. M.G.W.S. Kariyawasarn
SPMDC	AI (Sales Promotion)	Mr. A.S. Rathnayake
SPMDC	DDA, Alutharama Regional Deputy Director's Office	Mr. A.W.A Samasrasinghe
SPMDC	AI, Alutharama Regional Deputy Director's Office (Master Trainer)	Mr. H.R. Karunarathne
SPMDC	Farm Manager, Alutharama Government Seed Farm (GSF)	Mr. H.M.J. Deshapriya

SPMDC	Assit. FM, Alutharama GSF (Master Trainer)	Mr. A.M.S.E. Dissanayake
SPMDC	DDA, Nikaweratiya Regional Deputy Director's Office	Mr. H.D.K.D. Jayawardhana
SPMDC	DDA, Mahaillupallama Regional Deputy Director's Office	Mr. H.M.J.K. Herath
SPMDC	AI, Mahaillupallama Regional Deputy Director's Office	Mr. S.D.L.U. Singhapura
SPMDC	Mahaillupallama Regional Deputy Director's Office (Master Trainer)	Ms. S.A.S.P. Senevirathna
SPMDC	AI, Mahaillupallama Regional Deputy Director's Office	Mr. M.W.K.P. Silva
SPMDC	AI, Mahaillupallama Regional Deputy Director's Office	Mr. K.M. Pushpakumara
SPMDC	Farm Manager, Mahaillupallama GSF	Mr. M.G. Senewirathna
SPMDC	Technical Assistant (TA), Mahaillupallama GSF	Mr. M.A.D.I. Roopasinghe
SPMDC	Assit, FM, Mahaillupallama GSF	Mr. R.B.C.J. Ekanayaka
SPMDC	TA, Mahaillupallama GSF	Mr. R.I.M.C. Rajakaruna
SPMDC	AI, Mahaillupallama GSF	Mr. D.W.D.C. Bandara
SPMDC	DDA, Kundasale Regional Deputy Director's Office	Mr. T.M.A.K.B. Tennakoon
SPMDC	ADA, Kundasale Regional Deputy Director's Office	Ms. D.N.M.C.K. Nawarathne
SPMDC	Farm Manager, Kundasale GSF	Mr. H.M.U. Gnanathilaka
SPMDC	TA, Kundasale GSF	Mr. Chandima
SPMDC	TA, Kundasale GSF	Mr. N.K.C.P. Seenadeera
SPMDC	AI, Kundasale GSF	Mr. I.R. Jayasinghe
SPMDC	TA, Kundasale GSF	Ms. W.M.L.S. Ratnayake

SPMDC	OIC, Vegetable Seed Centre, Gannoruwa	Ms. S.H.I.U. Gunawardane
NAICC	Director	Mr. W.A.G. Sisira Kumara
NAICC	Development Officer	Mr. B.R. Ranathunga
SEPC	Addl. Director	Mr. H.U. Warnakulasooriya
SEPC	ADA (Econ.)	Ms. V.D.N. Ayoni
SEPC	ADA (Econ.)	Mr. K.G.C.D.B. Wijesinghe
Agrarian Service Dept.	Agriculture Research and Production Assistant, Divisional Officer, Agrarian Service Center, Pinnawala	Mr. Wipula
Best Seeds Co.(Pvt) Ltd	Representative of Secretary, SPASL	Mr. P.B. Puswella
Best Seeds Co.(Pvt) Ltd	Assistant Manger	Mr. Thilina Banadaranayaka
Best Seeds Co.(Pvt) Ltd	Seed Production & Extension Officer	Mr. Charith Prasanna
Hayleys	Assistant Manager, Haylays Agro Farms (Pvt.) Ltd.	Mr. Jayantha Dissanayake,
Hayleys	Production In charge, Seed Paddy division	Mr. Chaminda Mihiruk
Hayleys	Officer in charge R&D	Mr. Indunil Dammika Perera
Farmers	Farmers who have participated in the Seed Production Training in Alutharama	Mr. A.M. Wijepala, Mr. Punchibanda, Mr. G.H. Jayarathne, Ms. Kumudukumari, Ms. Siriyalatha
Farmers	Farmers who have participated in the Seed Production Training in Nikaweratiya	Mr. Punchibanda, Mr. Rathnayake, Mr. Thennakoon, Mr. Thissa, Mr. Chandrarathna
Farmers	Farmers who have participated in the Seed Production Training in Mahailuppallama	Mr. W.M.S.B. Wanninayaka, Mr. W.M.B.W. Thilakarathna, Mr. A.W. Priyantha Kumara, Mr. D.K.P.

		Dissanayaka, Mr. K.K. Sarath Ananda
JICA Expert Team	Chief Advisor	Mr. Shiro Nabeya
JICA Expert Team	Seed Production	Mr. Kyota Iizuka
JICA Expert Team	Project Coordinator/Training	Ms. Namiko Yamada
JICA Expert Team	Plant Pathology	Dr. Hisatoshi Kaku
JICA Expert Team	Local Consultant	Dr. Sarath Weerasena

AI: Agriculture Instructor, AO: Agriculture Officer

OIC, Officer in-charge, TA: Technical Assistant, GSF: Government Seed Farm

NAICC: National Agriculture Information and Communication Centre

ANNEX-3 PDM and PO (Ver. 5)

Target Areas: Kundasale, Aluttarama, Mahailluppallama, and Nikaweratiya
Beneficiaries: DOA Officers (SPMDC, SCPPC, Government Seed Farms, and etc.), Private Companies, Government and Private Contract Farmers, and related Government Institutions (Provincial Department of Agriculture Officers)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal			
Quantity of vegetable seeds* in the market up to minimum standards stipulated by DOA** is increased *DOA certified seeds (produced by DOA and the private sector) and self-certified seeds of the private sector **'Recommended seed certification standards for seed and planting materials' issued by SCS in 2009	1. The percentage of vegetable seeds available in the market which is up to the minimum standards stipulated by DOA is increased 2. Over 90% of the requested basic seeds by the private sector seed producers is supplied by SPMDC.	Records of 'A survey on seed quality available in the market (Seed Quality Survey)' conducted by DOA Stock Information of SPMDC Reports by SPMDC	1. The Seed Policy is not changed
Project Purpose			
Production system for certified vegetable seed is improved in the target areas	1 Number of respondents of both public and private sectors who expressed that information sharing between both sectors is increased	Questionnaire survey with SPASL	
	2 More than 80% of DOA officials express that Seed related database make their data processing work efficient	Interview to main users of database of DOA	
	3 More than 60% of contract farmers who attended seed production trainings apply* techniques introduced by the Project * Use more than one of the techniques introduced by the Project	Interview to contract farmers	
	4 SCPPC continuously conduct in-service and induction trainings on seed certification using seedling evaluation manual and teaching materials introduced by the project	Records of SCPPC	
	5 Actions are taken in accordance with the action plan developed based on the results of 'the survey on seed quality available in the market (Seed Quality Survey)'	Progress reports of action plans	

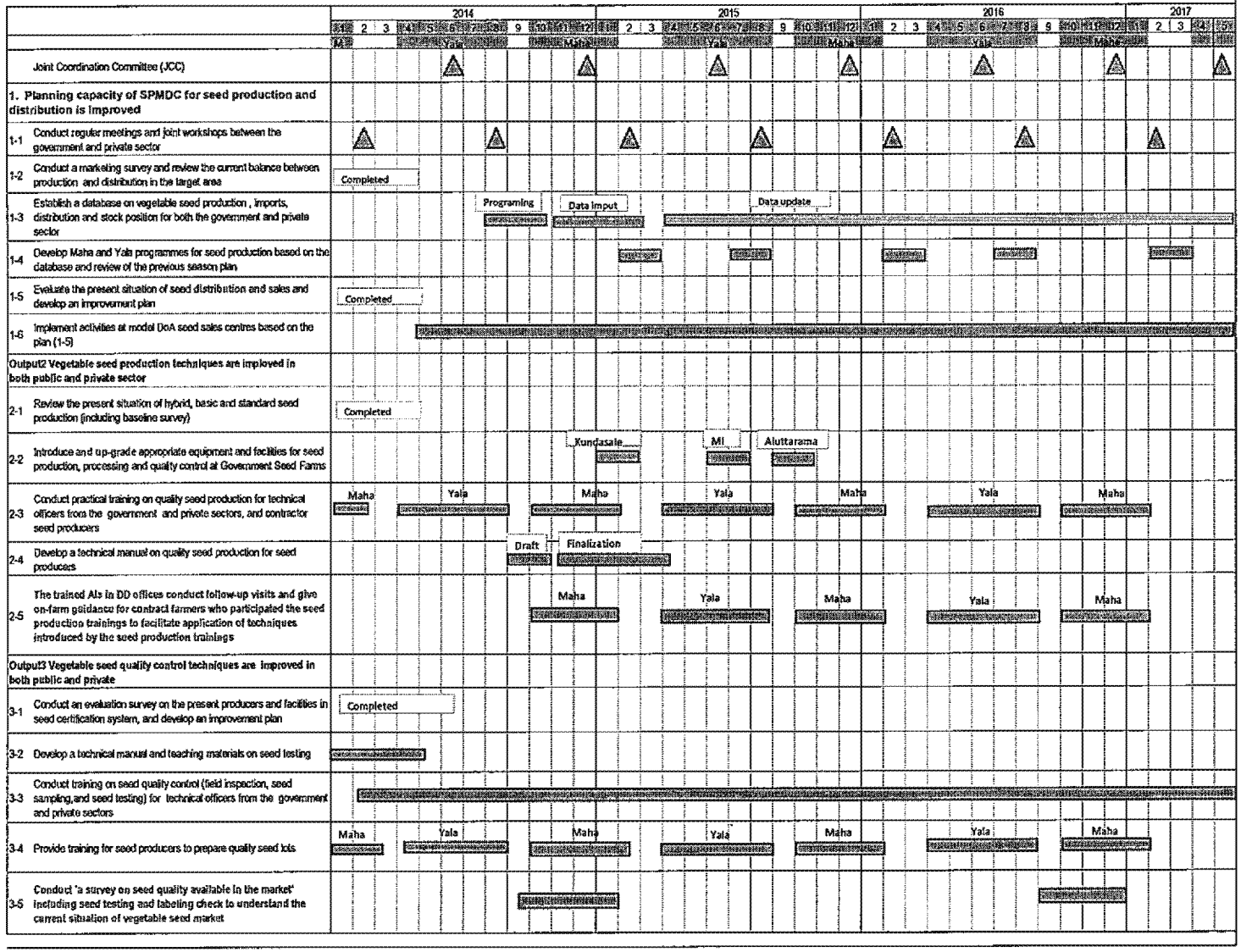
Outputs				
1. Planning capacity of SPMDC for seed production and distribution is improved	1-1	Actions are taken to solve the issues raised by the private and public sectors in the seminars and regular meetings	1-1 Records of the Project	Necessary budgets and personnel for seed production,quality control and promotion, are allocated by the Ministry of Agriculture during the Project implementation
	1-2	Production plan for basic seeds are formulated considering needs of private sector	1-2 Records of SPMDC	
	1-3	Additonal two DoA Seed Sales Centres are improved after the improvement of two model DoA Seed Sales Centres by the Project	1-3 Records of SPMDC	
2. Vegetable seed production techniques are improved in both public and private sectors	2-1	75% of participants of seed production trainings pass the evaluation test	2-1 Evaluation test conducted at the end of the trainings	
	2-2	80% of participants of seed production trainings find the trainings was useful	2-2 Questionnaire survey conducted at the end of the trainings	
	2-3	Government Seed Farms adopt the techniques introduced by the Project in accordance with DoA Circular	2-3 DoA Circular Interview to Government Seed Farm staff	
3. Vegetable seed quality control techniques are improved in both public and private sectors	3-1	Solutions proposed in the improvement plan are implemented in seed testing process	3-1 Records of the Project	
	3-2	75% of participants who attended trainings on seed testing pass the evaluation test	3-2 Evaluation test conducted at the end of the trainings	
	3-3	Handbook on Seed testing procedure is completed and utilized	3-3 Handbook on Seed testing procedure Interview to SCS/STL staff	
	3-4	Seed health testings of bacteria and fungus are conducted	3-4 Record of SCS/STL	
	3-5	Action plan for improvement of quality control is developed based on the result of the 'survey on seed quality available in the market (Seed Quality Survey)'	3-5 Action plan	

Activities	Inputs		Pre-Conditions
	Japanese Side	Sri Lankan Side	
1-1 Conduct regular meetings and joint seminars between the government and private sector	1. Dispatch of Japanese Experts (1) Long-term Expert: 4 persons (a. Chief Advisor/Certified Seed Production System, b. Seed Testing, c. Seed Production/Seed Sales, and d. Project Coordinator/Training) (2) Short-term Expert: Seed Testing (including field inspection), Seed Health, Plant Disease, Farmers Economy, Farm Management, Market Analysis, Post Harvesting Technology for Seed, and others (if necessary)	1. Assignment of Personnel (1) Director General, DOA (2) Directors, SPMDC and SCPPC (3) C/Ps (4) Staff in related government institutions (as needed, ex. HORDI researchers)	1. Large natural calamities do not happen 2. Major pest and disease do not occur 3. The trained technical officers continue to extend acquired skills and knowledge to farmers
1-2 Conduct a marketing survey and review the current balance between production and distribution in the target areas			
1-3 Establish a database on vegetable seed production, imports, distribution, and stock position for both the government and private sector			
1-4 Develop Maha and Yala programmes for seed production based on the database and review of the previous season plan			
1-5 Evaluate the present situation of seed distribution and sales, and develop an improvement plan	2. Facilities and Equipment Necessary equipment for the project activities (equipment for seed production, seed processing, seed testing, and etc.)	2. Project Office Necessary facilities such as electricity connection, furniture, Internet lines in the office space	
1-6 Implement activities at model DoA Seed Sales Centres based on the plan (1-5)			
2-1 Review the present situation of hybrid, basic and standard seed production (including baseline survey)			
2-2 Introduce and up-grade appropriate equipment and facilities for seed production, processing and quality control at the Government Seed Farms	3. Training Costs C/P Training in Japan/third countries	3 Facilities and Equipment Necessary training space, machinary, equipment, instruments, tools, spare parts, and any other necessary for the implementation of the Project other than one(s) provided by Japanese side	
2-3 Conduct practical training on seed production for technical officers from the government and private sectors, and contract seed producers			
2-4 Develop a technical manual on seed production for seed producers	4. Others Cost for Local Consultants and Local Staff	4. Local Costs Necessary budget for the implementation of the Project (ex. Per diem & travel allowance for domestic training for C/P, electricity for the Project Office, and etc.)	Participation of private sector in vegetable seed industry is ensured and promoted
2-5 The trained AIs in DD office conduct follow-up visits and give on farm guidance for contract farmers who participated in the seed production trainings to facilitate application of technique introduced by the seed production trainings			
3-1 Conduct an evaluation survey on the present procedures and facilities in seed certification system, and develop an improvement plan			
3-2 Develop technical manuals and teaching materials on seed testing			
3-3 Conduct training on seed quality control (field inspection, seed sampling and seed testing) for technical officers from the government and private sectors			
3-4 Provide training for seed producers to prepare quality seed lots			
3-5 Conduct 'a survey on seed quality available in the market (Seed Quality Survey)' including seed testing and labeling check to understand the current situation of vegetable seed market			

<Target Vegetable Crops>
1. Beans 2. Bitter gourd 3. Brinjal 4. Capsicum 5. Cucumber 6. Luffa 7. Okra 8. Pumpkin 9. Snake gourd 10. Tomato

PLAN OF OPERATION

Revised on Sept 18, 2014



ANNEX-4 Evaluation Grid

Narrative Summary	Indicators	Progress
Overall Goal Quantity of vegetable seeds in the market, up to minimum standards stipulated by DOA, is increased	1. The percentage of vegetable seeds available in the market, which is up to the minimum standards stipulated by DOA, is increased.	No information about the progress.
	2. Over 90% of the requested basic seeds by the private sector seed producers is supplied by SPMDC.	No sign of being achieved. Less than 90% was supplied in the past 3 years.
Project Purpose: Production system for certified vegetable seed is improved in the target areas	1. Number of respondents of both public and private sectors who expressed that information sharing between both sectors is increased.	[A] Achieved.
	2. More than 80% of DOA officials express that Seed related database make their data processing work efficient.	[B] No information yet.
	3. More than 60% of contract farmers who attended seed production trainings apply* techniques introduced by the Project. * Use more than one of the techniques introduced by the Project.	[B??] A study conducted in 2015 showed a good result. Not certain about latest situation. Need an update in 2016/17 Maha season.
	4. SCPPC continuously conduct in-service and induction trainings on seed certification using seedling evaluation manual and teaching materials introduced by the project.	[A] Achieved.
	5. Actions are taken in accordance with the action plan developed based on the results of 'the survey on seed quality available in the market (Seed Quality Survey)	[A] In good progress. Need an update by the end of the Project.

Narrative Summary	Indicators	Progress
Output 1: Planning capacity of SPMDC for seed production and distribution is improved	1-1. Actions are taken to solve the issues raised by the private and public sectors in the seminars and regular meetings.	[B] In good progress, but need further actions
	1-2. Seed production plan for basic and standard seed are formulated considering need of private sector.	[B] In progress, but further cooperation of private sector is needed.
	1-3. Additional two DOA Seed Sales Centers are improved after the improvement of two model DOA Seed Sales Centers by the Project.	[A] Achieved. 10 more SSC were improved.
Output 2: Vegetable seed production techniques are improved in both public and private sectors	2-1. 75% of participants who attended trainings on vegetable seed production pass the evaluation test	[A] Almost achieved
	2-2. 80% of participants of seed production trainings find the trainings was useful.	[A] Almost achieved
	2-3. Government Seed Farms adopt the techniques introduced by the Project in accordance with DOA Circular.	[A] Almost achieved
Output 3: Vegetable seed quality control techniques are improved in both public and private sector	3.1. Solutions proposed in the improvement plan are implemented in seed testing process	[A] Achieved
	3.2. 75% of participants who attended trainings on seed testing pass the evaluation test	[A] Achieved
	3.3. Handbook on Seed testing procedure is completed and utilized.	[A] Achieved
	3.4. Seed health testing of bacteria and fungi are conducted	[A] Achieved
	3.5. Action plan for improvement of quality control is developed based on the result of the 'survey on seed quality available in the market (Seed Quality Survey)'	[A] Achieved

ANNEX-5 List of Input

(1) Dispatch of Experts

1. Dispatch of Experts

1-1 Short-term

No.	Name	Specialty	Period_from	Period_to	Days	Affiliation
1	Atsushi Suzuki	Vegetable Seed Production Planning	2012/8/28	2012/10/16	49 days	A&M Consultant Co., LTD
2	Masatoshi Sato	Seed Health	2012/12/17	2013/1/15	29 days	National Centre for Seeds and Seedlings
3	Hisatoshi Kaku	Plant Pathology	2013/1/6	2013/2/5	30 days	Sakata Seed Corporation
4	Nobuki Toyooka	Seed Distribution and Sales	2013/7/3	2013/9/3	62 days	Chuo Kaihatsu Corporation
5	Hisatoshi Kaku	Plant Pathology	2013/12/22	2014/2/8	48 days	Sakata Seed Corporation
6	Yoshiaki Nishikawa	Quality Seed Evaluation	2014/6/28	2014/7/4	6 days	Ryukoku University
7	Hisatoshi Kaku	Plant Pathology	2014/8/3	2014/9/30	58 days	Sakata Seed Corporation
8	Shouji Miyazaki	Breeding	2015/9/5	2015/9/13	8 days	Sakata Seed Corporation
9	Kouichi Matsumoto	Seed Production	2015/9/5	2015/9/13	8 days	Sakata Seed Corporation
10	Shinichi Koyama	Seed Production	2015/10/18	2015/11/27	40 days	Overseas Agricultural Development Association
11	Masatochi Sato	Seed Pathology	2015/12/10	2016/1/8	29 days	National Centre for Seeds and Seedlings
12	Hisatoshi Kaku	Plant Pathology	2015/12/10	2016/2/25	77 days	Sakata Seed Corporation
13	Hiroki Takahashi	Seed Pathology	2015/12/17	2016/1/15	29 days	National Centre for Seeds and Seedlings
14	Kosuke Sawada	Vegetable Seed Postharvest Technology	2016/2/7	2016/3/19	41 days	Appropriate Agriculture International Co. Ltd
15	Masatoshi Sato	Seed Test and Laboratory Management	2016/11/2	2016/11/22	20 days	National Centre for Seeds and Seedlings
16	Hisatoshi Kaku	Plant Pathology	2016/12/14	2017/3/13	89 days	Sakata Seed Corporation
					282 days	

1-2 Long-term

	Name	Specialty	Period_from	Period_to	Days	Affiliation
1	Juniji Takahashi	Chief Advisor/Certified Seed Production System	2012/5/14	2014/11/13	913 days	Japan International Cooperation Agency
2	Shiro Nabeya	Chief Advisor	2014/10/29	2017/5/13	927 days	Japan International Cooperation Agency
3	Kimikazu Ishikawa	Seed Testing	2012/5/14	2014/5/13	729 days	Ministry of Agriculture, Forestry and Fisheries
4	Kyota Iizuka	Coordination/Seed Production	2012/5/14	2013/5/13	364 days	
5	Kyota Iizuka	Seed Production/ Sales	2013/5/14	2015/5/13	729 days	
6	Kyota Iizuka	Seed Production	2015/5/14	2017/5/13	730 days	
7	Asano Usui	Coordination/Training	2013/5/22	2015/8/31	831 days	M & Y Consultants Co., Ltd.
8	Namiko Yamada	Coordination/Training	2015/8/3	2017/5/13	649 days	

(2) Assignment of Counterpart Personnel

No.	Name	Affiliation	Areas of Speciality	Assigned Period	Remarks
1	K.G. Sriyapala	Department of Agriculture	Supervision	From 14 May 2012 to 10th August 2013	
2	R. Wijekoon	Department of Agriculture		From 12th August 2013	
3	G.M.W. Chitral	SPMDC	Seed production	Till July 2013	SPMDC till July 2013
4	D. J. L. Sunil Govinnage			From August 2013 till July 2016	SPMDC from August 2013 till July 2016
5	H.P. Thilakarathna			From August 2016	From August 2016
6	Gamini de Silva	SCPPC	Seed Certification	From May 2012 to February 2013	
7	O.P.K. Chandrasiri			From February 2013	
8	G. M. W. Chitral			From March 2013 till May 2016	
9	K. Hettiarachchi			From June 2016	
10	K.B.Wahundeniya	HORDI	Horticulture Research/Variety Development		Retired in May
11	H.H.D. Fonseka			Till August 2016	
12	D. N. Sirisena				
13	T.H.C.S. Perera	SEPC	SEPC		
14	W.G.M.Dayawansa	ETC	ETC		ETC till October
15	R.S. Wijesekara				ETC from November
16	H.P.Thilakarathne	SPMDC	Seed production		Till June 2016
17	Gamini Weerakoon			Till January 2015	
18	H.M.J.K. Herath			From January 2015	From January 2015
19	M.M.S. Bandara	DDA, Kundasale			
20	Tennakoon				
21	H.M.Upali Gnanathilaka	GSF, Kundasale			
22	W.M.I. Weerasekara	DDA, Aluttharama			
23	R.A.P.S. Wimalasena				
24	A.W. A. Samarasinghe				
25	W.A.Karunarathna	GSF, Aluttharama			
26	W.M.L.B. Wijekoon	GSF, Aluttharama		Till April 2015	
27	H.M.J. Deshapriya	GSF, Aluttharama		From April 2015	
28	H.M.J.K. Herath	DDA, Mahailluppallama			
29	Priyantha	DDA, Mahailluppallama			
30	T.M.K. Tennakoon	GSF, Mahailluppallama			
31	S.A.C.C. Subasinghe	DDA, Nikaweratiya			
32	H. D.K.D. Jayawardhana	DDA Nikaweratiya		From till February 2016	
33	R.Nanayakkara	SCS	Seed Certification	Till August 2015	
34	M.G.D.L. Priyantha			From August 2015	
35	S.A.M.R. Abeykoon	SCS			
36	H.M.W.A. Herath	SCS, Kundasale		Till September 2015	
37	W. Kusumalatha			From September 2015	
38	P.W.G. Jayarathne	SCS, Aluttharama			
39	L.H.P. Kulathunga	SCS, Mahailluppallama			
40	A.M.R.A. Ekanayake	SCS, Nikaweratiya			
41	Y.M.H. Liyagage	STL, Gannoruwa			
42	R.M.S. Ratnayaka	STL, Aluttarama			
43	J.W.K. Samaranayake				
44	T.D.M. Ramyalatha	STL, Mahailluppallama			
45	A.R.J. Athukorala	Seed Health Testing Unit			
46	Leo Nanayakkara	SPASL	PPP		

(3) Counterpart Staff Training

	Name of participant	Affiliation	Position at that time	Current Position	Field of training/ Name of the Course		Period_from	Period_to	Days
1	G. De Silva	DOA	Director, SCPPC	Retired	Seed Administration (Seed Production, Technology and Policy)	Visit and observation of seed related institutions in Japan	2012/10/13	2012/10/25	12 days
2	G.W.R. Weerakoon	DOA	Assistant Director, SPMDC	Retired	Seed Administration (Seed Production, Technology and Policy)	Visit and observation of seed related institutions in Japan	2012/10/13	2012/10/25	12 days
3	U.M. Gunasinghe	Ceylon Agro Development Co.	General Manager	Retired	Seed Administration (Seed Production, Technology and Policy)	Visit and observation of seed related institutions in Japan	2012/10/13	2012/10/25	12 days
4	R.Nanayakkara	DOA	Deputy Director, SCS	Retired	Seed Testing	Practices on seed testing	2012/10/13	2012/10/27	14 days
5	Y.H.M. Liyanage	DOA	Officer in Charge, STL Peradeniya	Same	Seed Testing	Practices on seed testing	2012/10/13	2012/10/27	14 days
6	R.M.S. Rathnayake	DOA	Officer in Charge, STL Aluttarama	Leave of Absence	Seed Testing	Practices on seed testing	2012/10/13	2012/10/27	14 days
7	G.M.W. Chitral	DOA	Director, SPMDC	Retired	Seed Administration (Seed Production, Technology and Policy)	Visit and observation of seed related institutions in Japan	2013/6/30	2013/7/10	10 days
8	O.P.K. Chandrasiri	DOA	Acting Director, SCPPC	Same	Seed Administration (Seed Production, Technology and Policy)	Visit and observation of seed related institutions in Japan	2013/6/30	2013/7/10	10 days
9	P.W.N. Galagama	Hayleys Agriculture Holdings	Assistant Manager	Resigned	Seed Administration (Seed Production, Technology and Policy)	Visit and observation of seed related institutions in Japan	2013/6/30	2013/7/10	10 days
10	H.P. Thilakarathne	DOA	Additional Director, SPMDC	Director, SPMDC	32nd International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2013/9/15	2013/10/12	27 days
11	S.M.S.B.S. Koralegedara	DOA	Agricultural Instructor, SPMDC (Kundasale Seed Farm)	Same	33rd International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2013/9/15	2013/10/12	27 days
12	M.G.D.L Priyantha	DOA	Research Officer, Seed Health Testing Unit	Deputy Director, SCS	Seed Health	Management for seed health testing	2013/9/16	2013/11/2	47 days
13	D.A.P.G. Weerarathne	DOA	Research Officer, HORDI	Same	Plant Pathology	Visit universities and institutions dealing with plant disease	2013/9/29	2013/10/12	13 days
14	I.R. Jayasinghe	DOA	Agricultural Instructor, SPMDC (Kundasale)	Assistant Farm Manager (Kundasale)	Vegetable Seed Production	Lectures and practical works on vegetable seed production	2013/10/20	2013/11/2	13 days
15	A.P. Dikkumbura	DOA	Agricultural Instructor, SPMDC (Mahailluppallama)	Agricultural Officer, SPMDC (Kantale)	Vegetable Seed Production	Lectures and practical works on vegetable seed production	2013/10/20	2013/11/2	13 days
16	R.A.P.S. Wimalasena	DOA	Agricultural Officer, SPMDC (Aluttarama)	Futher study in Thailand	Vegetable Seed Production	Lectures and practical works on vegetable seed production	2013/10/20	2013/11/2	13 days
17	W.K.A. Karunarathna	DOA	Farm Manager, SPMDC (Aluttarama)	Farm Manager, SPMDC (Polonnaruwa)	Vegetable Seed Production	Lectures and practical works on vegetable seed production	2013/10/20	2013/11/2	13 days
18	H.A. Karunarathna	DOA	Agricultural Instructor, SPMDC (Nikaweratiya)	Same	Vegetable Seed Production	Lectures and practical works on vegetable seed production	2013/10/20	2013/11/2	13 days
19	R.M.D.B Meegasmulla	MOA	Secretary	Secretary of Sustainable Development and Wildlife	Seed Administration (Seed Production, Technology and Policy)	Visit and observation of seed related institutions in Japan	2014/7/27	2014/8/2	6 days

20	R.R. Wijekoon	DOA	Director General of Agriculture	Same	Seed Administration (Seed Production, Technology and Policy)	Visit and observation of seed related institutions in Japan	2014/7/27	2014/8/2	6 days
21	H.M.U. Gnanathilaka	DOA	Farm Manager, SPMDC (Kundasale)	Same	33rd International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2015/9/15	2015/10/10	25 days
22	Mr. W. M. L. B. Wijekoon Mudiyanselge	DOA	Farm Manager, SPMDC (Aluttarama)		33rd International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2015/9/15	2015/10/10	25 days
23	C.P. Somananda	Best Seed Co. (Pvt) Ltd	Seed Production & Extension Officer		33rd International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2015/9/15	2015/10/10	25 days
24	I.R. Dammullage	CIC Seeds Pvt Ltd	Executive Research & Development		33rd International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2015/9/15	2015/10/10	25 days
25	M. Sanjeewani	DOA	Agriculture Officers	Same	Quality Control System of Seeds and Seedlings to Facilitate Distribution of High Quality Seeds	Lectures and practical works on seed testing	2014/7/13	2014/10/12	91 days
26	J.W.K. Samaranayake	DOA	Officer in Charge (STL, Aluttarama)	Same	Seed Testing	Lectures and practical works on seed testing	2014/11/9	2014/11/22	13 days
27	T.D.M. Ramyalatha	DOA	Officer in Charge (STL, Mahailluppallama)	Same	Seed Testing	Lectures and practical works on seed testing	2014/11/9	2014/11/22	13 days
28	P.K.K. Vijayanthi	DOA	Agriculture Instructor (STL, Peradeniya)	Same	Seed Testing	Lectures and practical works on seed testing	2014/11/9	2014/11/22	13 days
29	A.M.D.A.A.D.A. Abeysekara	DOA	Research Assistance (HORDI)	Same	34th International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2015/9/14	2015/10/9	25 days
30	S. D. L Upul Sinhapura	DOA	Assistant Farm Manager (GSF, Mahailluppallama)	Same	34th International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2015/9/14	2015/10/9	25 days
31	S.M.G.T.D. Bandaranayake	Best Seed Co. (Pvt) Ltd	Seed Production	Same	34th International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2015/9/14	2015/10/9	25 days
32	W. M. Thilakarathne	All Lanka Seed Producers Association	Chairman	Same	34th International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2015/9/14	2015/10/9	25 days
33	S. A. M. R. Abeykoon	DOA	Assistant Director of Agriculture, SCS	Same	Quality Control System of Seeds and Seedlings to Facilitate Distribution of High Quality Seeds	Lectures and practical works on seed testing	2015/6/14	2015/9/12	90 days
34	M. C. Perera	DOA	Agriculture Instructor (SCS)	Same	Quality Control System of Seeds and Seedlings to Facilitate Distribution of High Quality Seeds	Lectures and practical works on seed testing	2015/6/14	2015/9/12	90 days
35	W. M. I. Weerasekara	DOA	Assistant Director of Agriculture, SPMDC	Same	Vegetable Seed Production Technology for Livelihood Improvement of Small Scale Farmers	Lectures and practical works on vegetable seed production	2015/2/8	2015/11/7	272 days
36	A.R.J. Athukorala	DOA	Research Assistant (SHTU)	Same	Seed Pathology	Lectures and practical works on seed testing	2015/10/4	2015/11/7	34 days

37	R.G.A.S. Rajapaksha	DOA	Assistant Director (research, HORDI)	Same	Plant Pathology	Lectures and practical works on plant pathology	2015/10/18	2015/10/24	6 days
38	P. N. K. Weerasooriya	DOA	Media Assistant	Same	ICT	Lectures and practical works on ICT	2015/2/15	2016/5/22	462 days
39	G.A.M.A. Wijethunga	DOA	Agricultural Engineer, FMRC	Same	Development of Farm Machinery for Small Scale Farmers	Lectures and practical works on Farm Machinery	2015/3/8	2015/10/17	223 days
40	A.M.S.E. Dissanayake	DOA	Technical Assistant (GSF, Aluttarama)	Same	35th International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2016/9/4	2016/10/1	27 days
41	S.A.S.P. Senawirathna	DOA	Agriculture Instructor (GSF, Mahailluppallama)	Same	35th International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2016/9/4	2016/10/1	27 days
42	M.A.P.C. Edirisinghe	DOA	Agriculture Instructor (SCS, Regional Office Nikaweratiya)	Same	35th International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2016/9/4	2016/10/1	27 days
43	W.P.S.K. Karunarathna	DOA	Agriculture Instructor (SCS, Regional Office, Kundasale)	Same	35th International Vegetable Training Course in Thailand	Lectures and practical works on vegetable production	2016/9/4	2016/10/1	27 days
44	K.K.S.D. Pradeepika	DOA	Assistant Director of Agriculture (SCS)	Same	Quality Control System of Seeds and Seedlings to Facilitate Distribution of High Quality See d s	Lectures and practical works on seed testing	2016/6/11	2016/9/23	104 days
45	H.D.K.D. Jayawardhana	DOA	Assistant Director of Agriculture (DDA, Nikaweratiya)	Same	Vegetable Production Technology for Livelihood Improvement of Small Scale Farmers	Lectures and practical works on vegetable seed production	2016/2/7	2016/11/5	272 days
46	J.A.V.J. Jayasinghe	DOA	Agriculture Instructor (SHTU)	Same	Seed Pathology	Lectures and practical works on seed testing	2016/9/10	2016/10/23	43 days
47	D.M.K.K. Disanayake	DOA	Programme Assistant (HORDI)	Same	Plant Pathology	Lectures and practical works on plant pathology	2016/10/15	2016/11/20	36 days
48	D.R.B.R.Ranathunga	DOA	Develop,emt Officer (ICC)	Same	ICT	Lectures and practical works on ICT	2016/2/16	2016/5/21	95 days
49	H.M.J.J. Hemachandra	DOA	Agricultural Engineer, FMRC	Same	Development of Farm Machinery for Small Scale Farmers	Lectures and practical works on Farm Machinery	2016/3/5	2016/10/23	232 days
50	M. N. C. Videna	DOA	Agricultural Engineer, FMTC	Same	Development of Farm Machinery for Small Scale Farmers	Lectures and practical works on Farm Machinery	2016/3/5	2016/10/23	232 days
51	Nadeeshani Jayathilaka	DOA	Technical Assistant (ICC)	Same	ICT	Lectures and Practical Works on ICT	2017/2/19	2017/5/27	97 days

(4) Training Courses implemented by the Project

	Year	Name of the Course	Period_from	Period_to	No. of Session	No. of Participants	Target Participants	Remarks
1	2012	Seed health in Peradeniya	2012/12/19	2013/1/10	1	129	AIs (STL, SCS and Seed Farm), Research officer (HORDI)	
2	2013	Seed Testing Procedure in Peradeniya	2013/5/6	2013/5/6	1	27	AIs (SCS), AIs (STL)	
3	2013	Yala Seed Productioin in Kundasale	2013/5/7	2013/9/13	5	116	AIs (Seed Farm), AIs (DDA), AIs (SCS), Contract Seed Producers	Crops: Tomato, Capsicum
4	2013	Yala Seed Production in Mahailluppallama	2013/5/8	2013/9/25	5	188	AIs (Seed Farm), AIs (DDA), AIs (SCS), AIs (STL), Contract Seed Producers, Private Company Officers	Crops: Tomato, Brinjal, Snake gourd
5	2013	Yala Seed Production in Aluttarama	2013/5/14	2013/9/11	5	103	AIs (Seed Farm), AIs (DDA), AIs (SCS), AIs (STL), Contract Seed Producers	Crops: Brinjal, Snake gourd, Watermelon
6	2013	Seed Testing Procedure in Aluttarama	2013/6/7	2013/6/7	1	15	AIs (SCS), AIs (STL)	
7	2013	Inspection of Electrical Balance	2013/6/12	2013/6/12	1	2	OIC, AI (STL)	
8	2013	Seed Testing Procedure in Mahailluppallama	2013/8/1	2013/8/1	1	35	AIs (SCS), AIs (STL) and other staff	
9	2013	Seed Testing Procedure in Mahailluppallama	2013/8/10	2013/8/10	1	35	AIs (SCS), AIs (STL)	
10	2013	Hybrid Seed Production for Public Officers	2013/8/15	2013/8/15	1	21	Officers from DDAs & Seed Farms	Crops: Tomato, Brinjal
11	2013	Seed Testing Procedure in Bataatha	2013/9/16	2013/9/16	1	14	AIs (SCS), AIs (STL) and other staff	
12	2013/2014	Maha Seed Production in Kundasale	2013/10/10	2014/3/11	4	85	AIs (Seed Farm), AIs (DDA), AIs (SCS), Contract Seed Producers	Crops: Cucumber, Bitter gourd
13	2013/2014	Maha Seed Production in Mahailluppallama	2013/11/7	2014/5/20	4	117	AIs (Seed Farm), AIs (DDA), AIs (SCS), AIs (STL), Contract Seed Producers, Private Company Officers	Crops: Capsicum, Okra
14	2013/2014	Maha Seed Production in Aluttarama	2013/11/14	2014/5/9	5	117	AIs (Seed Farm), AIs (DDA), AIs (SCS), AIs (STL), Contract Seed Producers	Crops: Brinjal, Bitter gourd
15	2013	Seedling Evaluation in Peradeniya	2013/11/18	2013/11/18	1	21	AIs and other officers (STL)	
16	2013/2014	Maha Seed Production in Nikaweratiya	2013/11/22	2014/5/13	4	99	AIs (DDA), Contract Seed Producers, Seed Producers, AIs (Provincial DoA)	Crops: Tomato, Brinjal
17	2014	Training on Seed production for new Technical Assistants	2014/1/28	2014/1/31	1	54	New recuruites officers	
18	2014	Training on Palnt Pathology	2014/1/28	2014/1/28	1	18	Research officer and programme assistant in HORDI	
19	2014	Training on Palnt Pathology	2014/2/5	2014/2/5	1	18	Research officer and programme assistant in HORDI	
20	2014	Training on Seed production for new Technical Assistants	2014/3/4	2014/3/7	1	31	New recuruites officers	

21	2014	Yala Seed Production in Kundasale	2014/4/30	2014/9/11	7	187	AIs (Seed Farm), AIs (DDA), AIs (SCS), Contract Seed Producers, AIs (Provincial DoA)	Crops: Tomato, Brinjal
22	2014	Seedling Evaluation in Mahailluppallama	2014/5/5	2014/5/5	1	18	AIs (STL) and other staff	
23	2014	Seedling Evaluation in Mahailluppallama	2014/5/7	2014/5/7	1	31	AIs (STL) and other staff	
24	2014	Yala Seed Production in Aluttarama	2014/6/10	2014/11/18	4	102	AIs (Seed Farm), AIs (DDA), AIs (SCS), AIs (STL), Contract Seed Producers, AIs (Provincial DoA), AIs (Inter-provincial Office)	Crops: Snake gourd, Brinjal
25	2014	Yala Seed Productioin in Mahailluppallama	2014/6/19	2014/9/30	6	197	AIs (Seed Farm), AIs (DDA), AIs (SCS), AIs (STL), Contract Seed Producers, AIs (Provincial DoA), AIs (Inter-provincial Office)	Crops: Bitter gourd, Cucumber
26	2014	Hybrid Seed Production for Private Officers	2014/7/23	2014/7/23	1	23	Officers from Private Seed Companies	Crops: Tomato, Brinjal
27	2015	Yala Seed Production in Aluttarama	13/05/2015	21/10/2015	6	128	AIs (Seed Farm), AIs (DDA), AIs (SCS), AIs (STL), Contract Seed Producers, AIs (Provincial DoA), AIs (Inter-provincial Office)	Brinjal, Snake gourd
28	2015	Yala Seed Production in Kundasale	07/04/2015	30/09/2014	7	278	Contract Seed Producers, Seed Producers, AIs (SCS)	Tomato, Brinjal, B.gourd
29	2015	Yala Seed Production in Nikaweratiya	06/04/2015	09/10/2015	6	137	AIs (DDA), Contract Seed Producers, Seed Producers, AIs (Provincial DoA)	Brinjal, Bitter gourd
30	2015	Yala Seed Productioin in Mahailluppallama	23/04/2015	08/10/2015	5	76	AIs (Seed Farm), AIs (DDA), AIs (SCS), AIs (STL), Contract Seed Producers, AIs (Provincial DoA), AIs (Inter-provincial Office)	Brinjal, Capsicum
31	2015/2016	Maha Seed Production in Aluttarama	22/12/2015	11/03/2016	3	70	AIs (Seed Farm), AIs (DDA), AIs (SCS), AIs (STL), Contract Seed Producers, AIs (Provincial DoA), AIs (Inter-provincial Office)	Training Terminated
32	2015/2016	Maha Seed Production in Kundasale	10/12/2015	29/04/2016	6	227	Seed Producers, AIs (Provincial DoA)	Brinjal, Bitter gourd
33	2015/2016	Maha Seed Production in Nikaweratiya	19/11/2015	21/07/2016	8	184	Contract Seed Producers, Seed Producers, AIs (Agrarian Service Centre), AIs (Provincial DoA)	Snake gourd, Capsicum, Brinjal
34	2015/2016	Maha Seed Production in Mahailluppallama	18/03/2016	05/08/2016	4	264	AIs (DDA), AFMs (Seed Farm), Contract Seed Producers, Seed Producers, AIs (Provincial DoA), Officers (Private Company)	F1 Capsicum
35	2016	Yala Master Training	16/05/2016	17/10/2016	5	60	AIs (DDA), AFMs (Seed Farm), AIs (SCS), PAs (HORDI)	Brinjal, Bitter gourd
36	2016/2017	Maha Seed Production in Aluttarama	22/11/2016	on-going			Contract Seed Producers, Seed Producers, ROs (Research Station), AIs (Provincial DoA), AIs (Inter-provincial Office)	Capsicum, Melon
37	2016/2017	Maha Seed Production in Kundasale	15/12/2016	on-going			Contract Seed Producers, Seed Producers, AIs (Agrarian Service Centre)	Tomato, Bitter gourd
38	2016/2017	Maha Seed Production in Mahailluppallama	16/11/2016	on-going			AIs (DDA), AFMs (Seed Farm), Contract Seed Producers, Seed Producers, AIs (Provincial DoA), Officers (Private Company)	F1 Bitter gourd
39	2016/2017	Maha Seed Production in Nikaweratiya	14/12/2016	on-going			Contract Seed Producers, Seed Producers	Capsicum, Mae

(5) Provision of Equipment

No.	Arrival Date to Sri Lanka	Name of Equipment	Unit/ set	Unit Price	Total Price	Total Price in LKR	Purpose of Use	Installation Place	Frequency fo U	Conditi
2	22 January 2012	Microwave Oven	1	LKR 12,990.00	LKR 12,990.00	LKR 12,990.00	Plant pathology	Horticultural Crop Research and Development Institute	A	A
3	5 October 2012	Petri Dishes (Glass)	100	LKR 285.00	LKR 28,500.00	LKR 28,500.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
4	19 July 2012	Digital camera	5	LKR 18,750.00	LKR 93,750.00	LKR 93,750.00	Data collection	Farms and Project office	A	A
5	18 December 2012	Black light	2	LKR 3,020.00	LKR 6,040.00	LKR 6,040.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
6	20 December 2012	Optics carrier	1	JPY 314,685	JPY 314,685	LKR 392,409.56	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
7	20 December 2012	Inclined binocular Tube 45°	1	JPY 63,105	JPY 63,105	LKR 78,691.41	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
8	20 December 2012	Focus drive coarse/fine 420mm	1	JPY 112,035	JPY 112,035	LKR 139,706.71	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
9	20 December 2012	Objective Planapo 1.0X	1	JPY 107,520	JPY 107,520	LKR 134,076.54	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
10	20 December 2012	LED5000 SLI, Spotlight illumination 2-arm	1	JPY 61,320	JPY 61,320	LKR 76,465.53	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
11	20 December 2012	ICB80 HD Microscope camera/w software integrated device for Leika	1	JPY 399,840	JPY 399,840	LKR 498,597.13	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
12	20 December 2012	Incident light base	1	JPY 26,200	JPY 26,200	LKR 32,671.18	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
13	20 December 2012	Eyepiece 10X/23B	1	JPY 42,300	JPY 42,300	LKR 52,747.75	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
14	20 December 2012	Dust Cover	1	JPY 4,200	JPY 4,200	LKR 5,237.36	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
15	20 December 2012	23 inch HD Monitor	1	JPY 37,200	JPY 37,200	LKR 46,388.09	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
16	31 December 2012	Programme timer	1	LKR 1,350.00	LKR 1,350.00	LKR 1,683.44	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
18	8 January 2013	Extension outlet	1	LKR 1,000.00	LKR 1,000.00	LKR 1,246.99	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
19	7 March 2013	Test sieve	1	LKR 13,500.00	LKR 13,500.00	LKR 16,834.39	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
20	18 April 2013	Calibration Weight 10g	1	LKR 24,300.00	LKR 24,300.00	LKR 24,300.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
21	18 April 2013	Calibration Weight 100g	1	LKR 25,342.99	LKR 25,342.99	LKR 25,342.99	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
22	18 April 2013	Calibration Weight 200g	1	LKR 29,480.62	LKR 29,480.62	LKR 29,480.62	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
23	18 April 2013	Magnigier Lamp	2	LKR 224,107.14	LKR 448,214.28	LKR 448,214.28	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
24	23 April 2013	Planting Tray	100	LKR 95.00	LKR 9,500.00	LKR 9,500.00	Seed Production	Government Seed Farms	A	A
25	22 May 2013	Digital Thermometer	1	LKR 39,780.00	LKR 39,780.00	LKR 39,780.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A

26	22 May 2013	Immersion Probe	1	LKR 0.00	LKR 0.00	LKR 0.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
27	22 May 2013	Bottle-top Dispenser	2	LKR 46,480.00	LKR 92,960.00	LKR 92,960.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
28	14 June 2013	Presenter Wireless	1	LKR 6,500.00	LKR 6,500.00	LKR 6,500.00	Meeting and training	Project office	A	A
29	13 August 2013	pH meter	1	LKR 194,000.00	LKR 194,000.00	LKR 194,000.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
30	9 October 2013	Portable pH meter	1	LKR 17,400.00	LKR 17,400.00	LKR 17,400.00	Seed Production	Project office	A	A
31	9 October 2013	Germination paper	4000		LKR 433,024.00	LKR 433,024.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
32	9 October 2013	Germination paper	4000			LKR 0.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
33	9 October 2013	Germination paper	1500			LKR 0.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
34	28 October 2013	Planting Tray	100	LKR 82.00	LKR 8,200.00	LKR 8,200.00	Seed Production	Government Seed Farms	A	A
35	14 December 2013	Compact Rotary Microtome	1	JPY 450,000	JPY 450,000	LKR 561,146.23	Plant pathology	Horticultural Crop Research and Development Institute	A	A
36	14 December 2013	Microtome holder	1	JPY 70,000	JPY 70,000	LKR 87,289.41	Plant pathology	Horticultural Crop Research and Development Institute	A	A
37	14 December 2013	Spare knife	1				Plant pathology	Horticultural Crop Research and Development Institute	A	A
38	14 December 2013	Paraffin expander	1	JPY 240,000	JPY 240,000	LKR 299,277.99	Plant pathology	Horticultural Crop Research and Development Institute	A	A
39	14 December 2013	Staning jar	20	JPY 1,680	JPY 33,600	LKR 41,898.92	Plant pathology	Horticultural Crop Research and Development Institute	A	A
40	14 December 2013	Staning jar	10	JPY 1,250	JPY 12,500	LKR 15,587.40	Plant pathology	Horticultural Crop Research and Development Institute	A	A
41	14 December 2013	Staning jar	10	JPY 1,350	JPY 13,500	LKR 16,834.39	Plant pathology	Horticultural Crop Research and Development Institute	A	A
43	29 January 2014	Sysem Microscope	1	JPY 372,000	JPY 372,000	LKR 463,880.89	Plant pathology	Horticultural Crop Research and Development Institute	A	A
44	29 January 2014	Microscope digital camera, Plan Achromat Objectie 20x, 2million pixel high resolution CCD, Cable to desktop computer and aoftware with compatible branded desktop	1	LKR 1,160,000.00	LKR 1,160,000.00	LKR 1,160,000.00	Plant pathology	Horticultural Crop Research and Development Institute	A	A
45	10 March 2014	Electric balance	6	LKR 82,900.00	LKR 497,400.00	LKR 497,400.00	Seed Testing	Seed Testing Laboratory, Aluttharama, Bataatha, Mahailluppallama and Peradeniya	A	A
46	1 March 2014	Poly House	2		2,204,520.18	LKR 2,204,520.18	Seed Production	Government Seed Farm, Kundasale	A	A
47	01 May 2014	Drip Irrigation			6,435,215.00	LKR 6,435,215.00	Seed Production	Government Seed Farm, Kundasale	A	A
48	30 May 2014	Petri Dishes (Glass)	100	LKR 276.270	27,627.00	LKR 27,627.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
49	06 June 2014	Petri Dishes (Glass)	100		27,627.00	LKR 27,627.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
50	07 July 2014	Grain Moisture Meter	1	LKR 114,500.00	114,500.00	LKR 114,500.00	Seed Production	Horticultural Crop Research and Development Institute	A	A

51	21 July 2014	GI pipe	75		77,250.00	LKR 77,250.00	Seed Production	Government Seed Farm	A	A
52	05 August 2014	Sprayer	1		495.00	LKR 495.00	Seed production	Horticultural Crop Research and Development Institute	A	A
53	14 August 2014	Pipe Structure	1		211,595.00	LKR 211,595.00	Seed Production	Government Seed Farm, Aluttarama	A	A
54	09 September 2014	Conical Flask	10		6,400.00	LKR 6,400.00	Seed Production	Horticultural Crop Research and Development Institute	A	A
55	09 September 2014	Beaker	5		2,100.00	LKR 2,100.00	Seed Production	Horticultural Crop Research and Development Institute	A	A
56	13 September 2014	Sand box	400		400,000.00	LKR 400,000.00	Seed Testing	Seed Testing Laboratories	A	A
57	16 September 2014	Petri Dishes (Glass)	100		90,000.00	LKR 90,000.00	Seed Production	Horticultural Crop Research and Development Institute	A	A
58	16 September 2014	Mortar with pestle	10		14,500.00	LKR 14,500.00	Seed Production	Horticultural Crop Research and Development Institute	A	A
59	19 September 2014	Sprayer	1		445.00	LKR 445.00	Seed Production	Horticultural Crop Research and Development Institute	A	A
60	20 September 2014	Bottle Cooler	1		64,900.00	LKR 64,900.00	Seed Sales	Seed Sales Centre, Wagolla	A	A
61	23 September 2014	Paraffin oven	1		422,280.00	LKR 422,280.00	Seed Production	Horticultural Crop Research and Development Institute	A	A
64	16 January 2015	Calibration weight	1		27,658.54	LKR 27,658.54	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
65	16 January 2015	Calibration weight	1		28,887.80	LKR 28,887.80	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
66	23 January 2015	Forceps	50		20,869.00	LKR 20,869.00	Seed Testing	Seed Certification Service	A	A
67	21 May 2015	Dial Spring Scale	1		2,000.00	LKR 2,000.00	Post control	Post Control Unit I	A	A
68	21 May 2015	Black Light Bulb	5		18,000.00	LKR 18,000.00	Seed Health Testing	Seed Health Testing Unit	A	A
69	11 August 2015	Petri Dishes PS	500		17,760.00	LKR 17,760.00	Seed Testing	Seed Testing Laboratory, Peradeniya	A	A
70	11 August 2015	Finnpipette	1		28,146.00	LKR 28,146.00	Seed Health Testing	Seed Health Testing Unit	A	A
71	11 August 2015	Finnpipette	1		28,146.00	LKR 28,146.00	Seed Health Testing	Seed Health Testing Unit	A	A
72	11 August 2015	Finnpipette	1		28,146.00	LKR 28,146.00	Seed Health Testing	Seed Health Testing Unit	A	A
73	11 August 2015	Finnpipette	1		28,146.00	LKR 28,146.00	Seed Health Testing	Seed Health Testing Unit	A	A
74	11 August 2015	Finnpipette	1		28,146.00	LKR 28,146.00	Seed Health Testing	Seed Health Testing Unit	A	A
75	11 August 2015	Fintip	100		862.00	LKR 862.00	Seed Health Testing	Seed Health Testing Unit	A	A

76	11 August 2015	Fintip	100		681.00	LKR 681.00	Seed Health Testing	Seed Health Testing Unit	A	A
77	11 August 2015	Fintip	100		660.00	LKR 660.00	Seed Health Testing	Seed Health Testing Unit	A	A
78	11 August 2015	Fintip	100		2,212.00	LKR 2,212.00	Seed Health Testing	Seed Health Testing Unit	A	A
79	03 September 2015	Polythene	1		9,750.00	LKR 9,750.00	Post control	Post Control Unit I	A	A
80	03 September 2015	Polythene	1		3,300.00	LKR 3,300.00	Post control	Post Control Unit I	A	A
81	30 September 2015	Colour Sorter	1	12,650,569.34	12,650,569.34	LKR 12,650,569.34	Seed Processing	Government Seed Farm, Kundasale	A	A
82	16 October 2015	Film Coating Machine	1	6,287,000.00	6,287,000.00	LKR 6,287,000.00	Seed Processing	Vegetable Seed Centre, Gannoruwa	A	A
83	22 October 2015	Refrigerator	1		492,973.00	LKR 492,973.00	Seed Health Testing	Seed Health Testing Unit	A	A
84	02 November 2015	LDPE Black Bag	1000		1,400.00	LKR 1,400.00	Seed Production	Government Seed farm, Alutarama, Kundasale, Mahailluppallama, Nikaweratiya	A	A
85	13 November 2015	Cocopeat	4		1,700.00	LKR 1,700.00	Seed Production	Government Seed farm, Alutarama, Kundasale, Mahailluppallama, Nikaweratiya	A	A
86	18 November 2015	White board	1		1,050.00	LKR 1,050.00	Seed Production	Project Office	A	A
87	18 November 2015	White board eraser	1		65.00	LKR 65.00	Seed Production	Project Office	A	A
88	18 November 2015	Permanent marker	30		1,800.00	LKR 1,800.00	Seed Health Testing	Seed Health Testing Unit	A	A
89	19 November 2015	Autoclave	1		801,500.00	LKR 801,500.00	Seed Health Testing	Seed Health Testing Unit	A	A
90	19 November 2015	ELISA Reader	1		1,150,213.00	LKR 1,150,213.00	Seed Health Testing	Seed Health Testing Unit	A	A
91	19 November 2015	Water Purification System	1		871,800.00	LKR 871,800.00	Seed Health Testing	Seed Health Testing Unit	A	A
92	10 December 2015	Gravity Separator	1	LKR 6,324,000.00	6,324,000.00	LKR 6,324,000.00	Seed Processing	Government Seed Farm, Kundasale	A	A
93	10 December 2015	Water Bath	1		JPY 59,000.00	LKR 73,572.51	Plant Pathology	Horticultural Research & Development Institute	A	B
94	10 December 2015	Low Temperature Incubator	1		JPY 326,360.00	LKR 406,968.19	Plant Pathology	Horticultural Research & Development Institute	A	A
95	10 December 2015	Down Transformer	1		JPY 31,390.00	LKR 39,143.07	Plant Pathology	Horticultural Research & Development Institute	A	A
96	10 December 2015	Immumno Strip	4		JPY 92,160.00	LKR 114,922.75	Plant Pathology	Horticultural Research & Development Institute	A	A
97	10 December 2015	Immumno Strip	8		JPY 184,320.00	LKR 229,845.50	Plant Pathology	Horticultural Research & Development Institute	A	A
98	14 December 2015	Nursery tray	30		3,000.00	LKR 3,000.00	Seed Production	Government Seed farm, Alutarama, Kundasale, Mahailluppallama, Nikaweratiya	A	A
99	14 December 2015	Slide Glass	10		6,800.00	LKR 6,800.00	Seed Health Testing	Seed Health Testing Unit	A	A
100	14 December 2015	Cover Glass	50		14,750.00	LKR 14,750.00	Seed Health Testing	Seed Health Testing Unit	A	A

101	14 December 2015	Tube rack	2		2,900.00	LKR 2,900.00	Seed Health Testing	Seed Health Testing Unit	A	A
102	14 December 2015	PH paper	1		1,500.00	LKR 1,500.00	Seed Health Testing	Seed Health Testing Unit	A	A
103	15 December 2015	Nursery tray	400		40,000.00	LKR 40,000.00	Seed Production	[illegible]	A	A
104	21 December 2015	Finnpipette	1		28,146.00	LKR 28,146.00	Seed Health Testing	Seed Health Testing Unit	A	A
105	21 December 2015	Forceps	3		1,461.00	LKR 1,461.00	Seed Health Testing	Seed Health Testing Unit	A	A
106	21 December 2015	Wash Bottle	5		1,965.00	LKR 1,965.00	Seed Health Testing	Seed Health Testing Unit	A	A
107	21 December 2015	Compound Microscope with Camera	1		552,450.00	LKR 552,450.00	Seed Health Testing	Seed Health Testing Unit	A	A
108	22 December 2015	Seeds			3,605.00	LKR 3,605.00	Seed Health Testing	Seed Health Testing Unit	A	A
109	28 December 2015	Seed Extractor	1	12,927,000.00	12,927,000.00	LKR 12,927,000.00	Seed Processing	Government Seed Farm, Kundasale	A	A
110	29 December 2015	Spray Bottle	9		3,915.00	LKR 3,915.00	Seed Health Testing	Seed Health Testing Unit/HORDI	A	A
[illegible]										
113	18 January 2016	Plant Growth Chamber	1		2,943,500.00	LKR 2,943,500.00	Seed Health Testing	Seed Health Testing Unit	A	A
114	25 January 2016	Tube Holder	10		32,000.00	LKR 32,000.00	Seed Health Testing	Seed Health Testing Unit	A	A
115	01 February 2016	Sample Bottle (30ml)	100		13,500.00	LKR 13,500.00	Plant pathology	Horticultural Research and Development Institute	A	A
116	01 February 2016	Sample Bottle (15ml)	100		8,500.00	LKR 8,500.00	Plant pathology	Horticultural Research and Development Institute	A	A
117	02 February 2016	Cooling Incubator	2		2,712,500.00	LKR 2,712,500.00	Seed Health Testing	Seed Health Testing Unit	A	A
118	02 February 2016	Filter Paper	10		9,963.00	LKR 9,963.00	Seed Health Testing	Seed Health Testing Unit	A	A
119	05 February 2016	nylon Tape	1		4,200.00	LKR 4,200.00	Post control	Post Control Unit III, Mahailluppallama	A	A
120	10 February 2016	Supporting Sticks	3500		59,550.00	LKR 59,550.00	Post control	Post Control Unit III, Mahailluppallama	A	A
121	12 February 2016	Filter Paper	48		86,688.00	LKR 86,688.00	Seed Health Testing	Seed Health Testing Unit	A	A
122	18 February 2016	Sieve and Buket	1		2,732.00	LKR 2,732.00	Plant pathology	Horticultural Research and Development Institute	A	A
123	03 March 2016	Filter Paper	5		9,225.00	LKR 9,225.00	Seed Health Testing	Seed Health Testing Unit	A	A
124	04 March 2016	Coir Roap	450kg		76,500.00	LKR 76,500.00	Post control	Post Control Unit III, Mahailluppallama	A	A
125	08 March 2016	Filter Paper	50		3,684.24	LKR 3,684.24	Seed Health Testing	Seed Health Testing Unit	A	A

126	08 March 2016	Petri Dishes	1000		22,674.60	LKR 22,674.60	Seed Health Testing (500), Plant	Seed Health Testing Unit (500)/Horticultural Research & Development Institute (500)	A	A
127	08 March 2016	Finnpipette	1		106,072.00	LKR 106,072.00	Seed Health Testing	Seed Health Testing Unit	A	A
128	08 March 2016	Finnpipette	1		106,072.00	LKR 106,072.00	Seed Health Testing	Seed Health Testing Unit	A	A
129	08 March 2016	Finnpipette	1		106,072.00	LKR 106,072.00	Seed Health Testing	Seed Health Testing Unit	A	A
130	08 March 2016	Finntip	100		862.00	LKR 862.00	Seed Health Testing	Seed Health Testing Unit	A	A
131	08 March 2016	Finntip	100		660.00	LKR 660.00	Seed Health Testing	Seed Health Testing Unit	A	A
132	08 March 2016	Finntip	100		681.00	LKR 681.00	Seed Health Testing	Seed Health Testing Unit	A	A
133	08 March 2016	Parafilm	2		11,694.00	LKR 11,694.00	Seed Health Testing	Seed Health Testing Unit	A	A
134	08 March 2016	Spatula	20		9,460.00	LKR 9,460.00	Seed Health Testing	Seed Health Testing Unit	A	A
135	08 March 2016	Test Tube	50		1,450.00	LKR 1,450.00	Seed Health Testing	Seed Health Testing Unit	A	A
136	08 March 2016	Magnetic Steering bar	1		498.00	LKR 498.00	Seed Health Testing	Seed Health Testing Unit	A	A
137	08 March 2016	Vortex Mixer	1		37,536.00	LKR 37,536.00	Seed Health Testing	Seed Health Testing Unit	A	A
138	16 March 2016	Threads, pipes,			1,940.00	LKR 1,940.00	Post control	Post Control Unit III, Mahailluppallama	A	A
139	16 March 2016	Growing pot	500		700.00	LKR 700.00	Seed Production	Government Seed Farm, Aluttarama, Kundasale, Mahailluppallama, Nikaweratiya	A	A
140	24 March 2016	Clean Bench	1		399,900.00	LKR 399,900.00	Plant pathology	Horticultural Research and Development Institute	A	A
141	28 July 2016	Sprinkler System	2		5,793,990.00	LKR 5,793,990.00	Seed Production	Government Seed Farm, Aluttarara, Mahailluppallama	A	A
142	24 August 2016	Seed Grinder	4		5,584,000.00	LKR 5,584,000.00	Seed Testing	Seed Testing Laboratories, Aluttarama, Batatha, Mahailluppalla, Peradeniya	A	A
143	29 September 2016	Micro Tube	3		JPY 6,426.00	LKR 8,013.17	Seed Health Testing	Seed Health Testing Unit	A	A
144	29 September 2016	Violamo, Centrifuge tubes	2		JPY 18,900.00	LKR 23,568.14	Seed Health Testing	Seed Health Testing Unit	A	A
145	29 September 2016	Violamo, Centrifuge tubes	2		JPY 13,230.00	LKR 16,497.70	Seed Health Testing	Seed Health Testing Unit	A	A
146	29 September 2016	IBIS Cryopreservation tubes	2		JPY 47,040.00	LKR 58,658.49	Seed Health Testing	Seed Health Testing Unit	A	A
147	29 September 2016	Rack for Vial MP holder	1		JPY 2,730.00	LKR 3,404.29	Seed Health Testing	Seed Health Testing Unit	A	A
148	29 September 2016	Rack for tubes	1		JPY 5,880.00	LKR 7,332.31	Seed Health Testing	Seed Health Testing Unit	A	A
149	29 September 2016	MARUEM Test Tube with Screw mouth	1		JPY 8,190.00	LKR 10,212.86	Seed Health Testing	Seed Health Testing Unit	A	A
150	29 September 2016	MARUEM Test Tube with Screw mouth	1		JPY 9,965.00	LKR 12,426.27	Seed Health Testing	Seed Health Testing Unit	A	A

151	29 September 2016	MARUEM Test Tube with Screw mouth	1		JPY 12,558.00	LKR 15,659.72	Seed Health Testing	Seed Health Testing Unit	A	A
152	29 September 2016	Personal Burner	2		JPY 42,524.00	LKR 53,027.07	Seed Health Testing	Seed Health Testing Unit	A	A
153	29 September 2016	Interlock syringe	2		JPY 2,220.00	LKR 2,768.32	Seed Health Testing	Seed Health Testing Unit	A	A
154	29 September 2016	Sringe Filter	3		JPY 18,963.00	LKR 23,646.70	Seed Health Testing	Seed Health Testing Unit	A	A
155	29 September 2016	Pipette tips	1		JPY 3,859.00	LKR 4,812.14	Seed Health Testing	Seed Health Testing Unit	A	A
156	29 September 2016	Pipette tips	4		JPY 6,932.00	LKR 8,644.15	Seed Health Testing	Seed Health Testing Unit	A	A
157	29 September 2016	Pipette tips	1		JPY 4,570.00	LKR 5,698.75	Seed Health Testing	Seed Health Testing Unit	A	A
158	29 September 2016	Quality Pipette tips	2		JPY 3,936.00	LKR 4,908.16	Seed Health Testing	Seed Health Testing Unit	A	A
159	29 September 2016	Aac Immuno Strip Kit	1		JPY 27,641.00	LKR 34,468.10	Seed Health Testing	Seed Health Testing Unit	A	A
160	31 October 2016	Microtome blade	2		JPY 91,800.00	LKR 114,473.83	Plant pathology	Horticultural Research and Development Institute	A	A
161	31 October 2016	Histosec	2		JPY 8,640.00	LKR 10,774.01	Plant pathology	Horticultural Research and Development Institute	A	A
162	31 October 2016	Slide Glass	10		JPY 12,600.00	LKR 15,712.09	Plant pathology	Horticultural Research and Development Institute	A	A
163	31 October 2016	Cover Glass	1		JPY 20,480.00	LKR 25,538.39	Plant pathology	Horticultural Research and Development Institute	A	A
164	31 October 2016	Cover Glass	1		JPY 7,880.00	LKR 9,826.29	Plant pathology	Horticultural Research and Development Institute	A	A
165	31 October 2016	Screw Bottle	4		JPY 16,320.00	LKR 20,350.90	Plant pathology	Horticultural Research and Development Institute	A	A
166	31 October 2016	Screw cap test tube	2		JPY 20,400.00	LKR 25,438.63	Plant pathology	Horticultural Research and Development Institute	A	A
167	31 October 2016	Media bottle	20		JPY 22,400.00	LKR 27,932.61	Plant pathology	Horticultural Research and Development Institute	A	A
168	31 October 2016	Ammuno Strip Aac	2		JPY 54,000.00	LKR 67,337.55	Plant pathology	Horticultural Research and Development Institute	A	A
169	31 October 2016	Ammuno Strip Cmm	4		JPY 108,000.00	LKR 134,675.10	Plant pathology	Horticultural Research and Development Institute	A	A

(6) Local Cost borne by Japanese Side

JPY	Amount(JPY)*	Amount(LKR)
2012	3,410,488	4,402,334
2013	10,084,440	13,017,220
2014	11,860,701	15,310,057
2015	12,212,700	15,764,425
2016 (provisional)	11,300,000	14,586,291
Total	48,868,329	63,080,327

*Exchange rate in December 2016: JPY 1 = LKR 0.7747

(7) Local Cost borne by Sri Lankan Side

JFY 2012 (May 2012 to March 2013			
	Contents	**Amount(JPY)***	**Amount(LKR)**
	Electricity	57,294	72,800
	Water	16,134	20,500
	Office rent	432,850	550,000
	Office security	432,850	550,000
Total		**939,127**	**1,193,300**
JFY 2013 (April 2013 to March 2014)			
	Contents	**Amount(JPY)***	**Amount(LKR)**
	Electricity	68,469	87,000
	Water	24,791	31,500
	Office rent	472,200	600,000
	Office security	472,200	600,000
Total		**1,037,660**	**1,318,500**
JFY 2014 (April 2014 to March 2015)			
	Contents	**Amount(JPY)***	**Amount(LKR)**
	Electricity	17,314	22,000.00
	Water	8,185	10,400.00
	Office rent	118,050	150,000.00
	Office security	118,050	150,000.00
Total		**261,599**	**332,400.00**
*As of August 2014	LKR 1=JPY 0.787		
JFY 2015 (April 2015 to March 2016)			
	Contents	**Amount(JPY)***	**Amount(LKR)**
	Electricity	224,436	320,485.56
	Water	66,570	95,059.33
	Office rent	122,553	175,000.00
	Office security	260,512	372,000.00
Total		**674,070**	**962,544.89**
*As of October 2016	LKR 1=JPY 0.7003		
JFY 2016 (April 2016 to October 2016)			
	Contents	**Amount(JPY)***	**Amount(LKR)**
	Electricity	128,785	183,900.20
	Water	61,540	87,876.06
	Office rent	140,060	200,000.00
	Office security	151,965	217,000.00
Total		**482,350**	**688,776.26**
*As of October 2016	LKR 1=JPY 0.7003		

ANNEX-6 Progress of the Activities

As of December 19, 2017 (A: Good, B:Fair, C: Bad – Observation by the Project Team at the Monthly Meeting on Dec. 19, 2017)

Activities	After Mid-term Review (from Oct.2014 to Oct.2016)	Problems in this term	Prospects for Achievements
Output-1 Planning capacity of SPMDC for seed production and distribution is improved			
1-1. Conduct regular meetings and joint seminars between the government and private sector [A]	- The Project Monthly meeting was held regularly. (2014: Oct., Nov., 2015: Feb., Mar., May, June, July, Sept., Oct.,Nov.,Dec.,2016:Mar.,May,June,Aug.,Spt., & Oct.) - Joint Coordination Committee was held regularly. (2014: Dec., 2015: June,,2016 Jan., July) - Joint Public and Private Seminar (JPPS) was held regularly (2015: Feb., Sept., 2016 Mar.,), however - JPPS for 2016/17 Maha was not held. - Draft Action plan was developed based on previous JPPSs and shared at Monthly Meeting in August, however no action was taken so far. SPMDC has been looking forward to ETC's comments on the Draft Action Plans. - It was proposed to set up a coordinating centre for the seed industry at the Joint Public and Private Seminar (JPPS) in Feb, 2015 and SIDCC (Seed Industry Development and Coordinating Committee) was set up in DOA. -SIDCC has decided to have a workshop regarding seed supply of eleven (11) major crops in July, however the workshop was not yet held due to lack of seed information from private sector.	- Almost same problems and opinions were raised in previous JPPSs. So it is sufficient to have JPPS annually (once a year). Some actions should be taken before next JPPS in Feb., 2017.	

	- The 1st& 2nd meeting of SIDCC's committee were held on Feb.8 & June 14, 2016 to discuss about committee member and Terms of Reference of SIDCC. Any quarterly meeting on SIDCC was not held.		
1-2. Conduct a marketing survey and review the current balance between production and distribution in the target areas [A]	A local consultant of JICA Expert Team completed a baseline survey, including survey on usage and marketing of seeds, in September 2012. A short-team JICA expert on vegetable seed production planning completed a marketing survey in September 2013. → Completed in 2012		Completed in 2012
1-3. Establish a database on vegetable seed production, imports, distribution, and stock position for both the government and private sector [A] but delayed	- Database on vegetable seed production, imports, distribution, and stock position for both the government and private sector was accepted by DoA and launched officially on Oct.14th, 2016. - Trainings for SPMDC/SCS/NPQS on database usage have been conducted.		
1-4. Develop Maha and Yala programmes for seed production based on the database and review of the	- SPMDC has started to enter the seed data in October, 2016.	- Due to delay of database development and lack of computers and internet facilities	- SPMDC is planning to develop the first seed production programme for some crops using the

previous season plan [C]		- Further training for officers is needed	database for 2017-Yala in March 2017.
1-5. Evaluate the present situation of seed distribution and sales, and develop an improvement plan[A]	A short-team JICA expert conducted a survey and review present situation of seed distribution and sales. Considering the recommendations of the JICA expert, SPMDC submitted a report including a plan for improvement of sales and distribution in September 2014. → Completed in 2013		Completed in 2013
1-6. Implement activities at model DoA Seed Sales Centres based on the plan (1-5) [B]	- DoA Seed Sales Centres (SSC) in Wagolla and Batalagoda were specified as model Seed Sales Centres. - Wagolla SSC was installed with one(1)bottle cooler in Sept., 2014. Three(3) seed sales centres in Kundasale, Bataatha & Ambalanthota were installed with bottle coolers in reference to Wagolla centre. - Improvement plans for two SSCs in Batalagoda and Kahagollla were developed by SPMDC, however only Kahagolla's improvement work was awarded to the contractor due to budget shortage in 2016.Improvement of Batalagoda SSC will be done in early 2017.		Batalagoda SSC improvement will be conducted under the DOA development plan.
Output-2 Vegetable seed production techniques are improved in both public and private sectors			
2-1. Review the present situation of hybrid, basic and standard seed production (including baseline survey) [A]	JICA Expert Team and counterpart officers visited the government seed farms, private seed companies and seed producer's farms to study present situation and technical levels. A local consultant of JICA Expert Team completed a baseline survey, including survey on use and marketing of seeds, in September 2012. → Completed in 2012		Completed in 2012

2-2. Introduce and up-grade appropriate equipment and facilities for seed production, processing and quality control at the Government Seed Farm [A] but delayed	- Colour sorter, Seed Extractor, Gravity Separator and Film coating machine were delivered and installed at Kundasale GSF and Gannoruwa VSC in the 4th quarter of 2015. - Film coating machine has not been fully utilized as film coating standards/recommendations should be made available before doing it commercially. Testing for capsicum has been proceeded with good results and testing for other crops will be started soon. - Irrigation (Sprinkler) systems for Maha-illupallama and Aluththarama were installed in July, 2016.		
2-3. Conduct practical training on seed production for technical officers from the government and private sectors, and contract seed producers [A]	**[for 2015 Yala]** - Practical seed production trainings for Yala 2015 were implemented by Kundasale, Aluttarama, Nikaweratiya, and M.I. DDA offices and Government Seed Farms. - Kundasale DDA office took the first endeavor to implement the training programme outside the Government Seed Farm. The programme was held in Pallewela, the community of contract growers. - Demonstration and practical training on tube and approach grafting was held at Kundasale Government Seed Farm. **[for 2015/16Maha]** - Kundasale DDA office implemented the training programme outside the Government Seed Farm. The programme was held in Kiriwandeniya, the community of contract growers. - M.I.DDA office implemented the training programme on F1 capsicum production.	- There is not enough consideration for training preparation - There was lack of understanding by demonstration farmer. DDA AI.'s monitoring should be strengthened.	

	- Aluttarama & Nikaweratiya, DDA offices implemented training at demonstration farmers' fields. **[for 2016 Yala]** - The Master Trainers training was proposed and started in May, 2016. Eleven (11) participants from SPMDC-DDA offices, SCS-Regional offices, and Government Seed Farm in Kundasale, Aluttarama, Nikaweratiya, and M.I have participated.		
2-4. Develop a technical manual on seed production for seed producers [B] due to delay	- A technical manual **(in English)** was completed after editing by HORDI & VSP consultant. - A technical manual (in English) was printed and distributed to DoA related offices in January, 2016. - Translation from English to Sinhala for the technical manual has been conducting and expected to be completed before end of December 2016.	- Some of the proper photos to incorporate into the manual were missing - Delay in appointing translators	- First Sinhala translation draft will be ready by the end of January, 2017.
2-5. The trained AIs in DD office conduct follow-up visits and give on farm guidance for contract farmers who participated in the seed production trainings to facilitate application of technique introduced	- Mr. Koyama, a short-term expert in seed production, conducted a survey in technique adoption by the past training participants in November 2015. The survey result showed that the majority of participants utilize the techniques but in a small scale. - Little follow- up visit were made by the AIs due to few numbers of contract growing programme by SPMDC for the seasons.	- There were very few contract seed growers for 2015/16-Maha & 2016-Yala due to reduced seed production programme with available seed stocks	- Continue follow-up visits - Provide further instructions to the farmers who have difficulty to apply production techniques for 2016/17 Maha.

by the seed production trainings [C]			
Output-3 Vegetable seed quality control techniques are improved in both public and private sector			
3-1. Conduct an evaluation survey on the present procedures and facilities in seed certification system, and develop an improvement plan [A]	JICA Expert Team and counterpart officers of SCPPC visited seed testing laboratories of public and private sectors. The JICA Expert made an observation of testing activities at STL at Peradeniya for a few months. Documentation of a paper on suggestions for improvement was completed by November 2013. → Completed in 2013		Completed in 2013
3-2. Develop technical manuals and teaching materials on seed testing & certification [A] delayed to print Seedling evaluation manual	The following manuals and documents were prepared by the JICA Expert Team: (1) manual on (a) Calibration manual on Electronic balance, (b) Guideline on Seedling evaluation (2) teaching document on (c) Standardizing seedling evaluation, (d) Measuring pH of germination media.	—	
3-3. Conduct training on seed quality control (field inspection, seed sampling and seed testing) for technical	(resource from 7th JCC document) (1) Practical training on seed sampling (Oct.2014), (2) Seed testing training for new seed technicians (Nov.2014), (3) Training program on seed testing (Dec,2014), (4) Quality seed production (June 2015) (5) Training on weed seed identification for quality seed production (Apr/June,2015)	- Annual Training for Seed Testing Staffs in 2015 and 2016 have not conducted.	Annual Training for Seed Testing Staffs in 2017 will be held.

officers from the government and private sectors [B+]	(6) Workshop on pest control & issues of seed vegetable production (May 2015) (from 8th JCC) [Kundasale] Seed Handling for officers (100 participants,Nov.,2015), [Nikaweratiya] Vegetable seed production and certification (100, Nov.,2015) [Aluttarama] Vegetable seed production and certification for officer (65, Oct.,2015), - Vegetable seed postharvest & certification for officers (50, Dec.,2015) (from 9th JCC) (1) Two (2) training programmes on seed quality control were conducted at Aluttarama Seed Farm in January and February, 2016. Participants were from SCS, government and private companies		
3-4. Provide training for seed producers to prepare quality seed lots [A]	(from 7th JCC) Nothing (from 8th JCC) [STL, Peradeniya] Seed Testing Training for three(3) seed companies (7, July 15～17, 2015) [M.I.] Seed Production & seed handling for farmers (95, Aug. 2015) [Kundasale] Vegetable seed production and certification for farmers (65, Nov. 2015) [Nikaweratiya] Seed handling & production for farmers (65, Mar. 2015) - Seed certification procedure awareness for farmers (80, Apr. 2015) -Vegetable seed production and certification for farmers (39/Apr., 22/May, 25/June, 13/July, 24/Aug., 20/Oct., 22/Nov., 44/Nov., 14/Nov.) - Vegetable seed postharvest & certification for farmers (50, Dec., 2015) [Aluttarama] Vegetable seed production and certification for farmers (60, Nov., 2015)	—	

	(From 9th JCC) Two (2) training programmes on seed quality control were conducted at Aluttarama Seed Farm in January and February, 2016. Participants were seed producers.		
3-5. Conduct 'a survey on seed quality available in the market (Seed Quality Survey)' including seed testing and labeling check to understand the current situation of vegetable seed market [A]	***[for 2014/15 Maha]*** - Seed Quality Survey for 2014/15 Maha was conducted since December 2014. - 350 seed samples were collected in the market (four districts) and tested in the laboratory and post control fields. -- The draft final report for 2014/15 Maha was submitted in January 2016 and the revised report with comments was finalized in June 2016 ***[for 2015 Yala]*** - Seed Quality Survey for 2015 Yala was conducted since February 2015. - 585 seed samples were collected in the market (six districts) and tested in the laboratory and post control fields. -- The draft final report for 2015 Yala was submitted in September 2016 and the revised report with comments will be finalized by end of November. ***[for 2014/15 maha& 2015 Yala]*** -The consolidated report for 2014/15 Maha& 2015 Yala will be submitted by end of December 2016. -Action plans for 014/15 Maha& 2015 Yala will be developed, if necessary ***Mr.Wasala, Addl.Director of SCPPC, was appointed as overall coordinator on December 2, 2016 to facilitate and monitor the action plans developed based on Seed Quality Survey for 2014/15 Maha and 2015 Yala..***	—	***[for 2015 Yala]*** - The final report for 2015 Yalais submitted by end of November., 2016 ***[for 2014/15 maha & 2015 Yala]*** -The final report for 2014/15 Maha & 2015 Yala is submitted by end of December 2016. -Action plans for 2014/15 Maha & 2015 Yala are developed if necessary

ATTACHMENT - 1 : Joint Private and Public Action Plan

Action Plans to be taken based on the JPP Seminars
on 24/02/2015, 11/9/2015, & 10/03/2016

11.January .201

Statements or Requests from Participants at JPP Seminars on 24/02/2015, 11/9/2015, & 10/03/2016	Responsible DOA Office	Stake Holders	Actions to be taken
A. Seed Policy Blue 1/8, Short 2/8, Red 4/8 UK 1/8			
1. Seed Policy should be updated.	SPMDC/SIDCC	SCPPC	1&2 SIDCC will organize the workshop on development of seed policy framework and strategies for seed supply in selected crops on Aug.11th.
2.A national programme to produce all vegetable seeds which can be produced locally is not available			
3. Importation of vegetable seeds should be minimized.			3.As agreed at the informal seed producers' meeting on Sep.7th, importation of bean seeds would be restricted, importation of cucumber seeds would be stopped, okra and brinjal importation could be stopped totally, but for that seed producers should provide correct production data.. Import can be minimized if private sector collaborates with actual production data and if farmers are satisfied with local seed quality.
4. Means to monitor seed industry should be developed.	SPMDC/SIDCC		4. SIDCC will become the unit to monitor seed imports and private seed production by formal and semi-formal sector. Regional level monitoring of local industry by RSCs. SPMDC coordinate with RSCs to develop national mechanism for monitoring local seed production and SPMDC and SIDCC jointly monitor total seed industry.
5.Informal seed sector should be formalized	SPMDC/SCPPC	Private sector	5.DOA encourages informal seed sectors into formal sector through awareness programme of seed act
6. Mechanism to take actions against low quality seed production and marketing should be available.	SCPPC		6. Regulation and Standard of Seed Act should be approved as soon as possible.
7. Seed production of non-SPASL should be paid more attention.	SCS/SPMDC		7.
8. Private companies are willing to invest in large scale production on own lands, but they are afraid that the government would acquire the land forcefully. Therefore, the constitution should provide land security to investors.	MOA	Private sector	8.No evidence for this. In fact, government land have been leased to companies.
B. Breeding Blue 1/10, Short 8/10, UK 1/10			⇒To develop the guidelines 1~6 and conduct awareness programme
1.Stakeholders should meet at least once every 2 years to streamline breeding objectives	HORDI	①Companies/Farmers/ Extension officers/ Traders (eg. Cargills)	1. HORDI will coordinate meeting once every two years.
2. Public and private sector should collaborate in germplasm distribution.	HORDI/PGRC	②Companies/Farmers	2. Provision of inbred lines and OPV's of DOA varieties to stake holders for mass scale seed production.
3. The varietal purity of some of the farmer varieties/ private sector producers should be certified by DOA.	HORDI/SCS		3. HORDI/SCS are ready to support private sector producers.
4. Private sector varieties should be incorporated, in the official varietal release procedure	HORDI/VRC		4. Varieties developed by private sector should be tested along with DOA varieties in the National Co-ordinated varietal Trial. DUS test to be carried out at SCS.
5. Development of new local varieties should be promoted.	HORDI		5.HORDI has been developing new varieties ,but the program has to be strengthened
6. Local hybrid seeds should be released with proper testing <Popularizing local varieties>	HORDI		6. Hybrid seeds should be tested for the hybridity before releasing for commercial cultivation.
7. Publicity programme on local varieties should be carried out.	HORDI	ETC/Provincial/Inter	7. HORDI will support to conduct awareness and media programmes

8. Farmers should be allowed to produce seeds of traditional varieties without official harassments	SCS	Provincial ETC/Provincial/Inter Provincial	8. SCS develops norms
9. Programmes to raise and market seedlings of traditional varieties should be implemented.	SPMDC	Provincial/Inter Provincial/SPMDC/SCS/	9. SPMDC develops and implements awareness creation for seed companies and nursery men.
10 Farmer communities in producing special local varieties should be encouraged.	ETC	ICC	10. Conducting awareness programme.
C.Basic Seed Short 1/3, Red 2/3			
1. Basic seed should be given to companies for multiplication in greenhouse and under supervision of DOA.	HORDI	RSCs	1. Two bean varieties of farmers origin in Capri group were purified by HORDI and hand over to farmers for multiplication. RSCs take notice.
2. Accessibility of DOA basic seed should be easier.	SPMDC		2. RCSs(Regional seed Committee) should be active and basic seeds should be issued only through RSCs. It should make mandatory to follow DoA procedures/guidelines by seed producers who obtain basic seeds Requests and issues of basic seeds based on accountability should be streamlined.
3. Demand for basic seeds of DOA is low because local varieties are unable to provide sufficient income to farmers unlike improved hybrid.	HORDI		3. Some varieties such as snake gourd, brinjal, bean, cowpeas, chili have good demand. Seed programme should be focused on the local varieties having demand.
D. Seed Production Blue 5/10, Short 3/10, Red 1/10 UK1/10			
1. Seed Data Base should be prepared.	ICC		1. Seed database was developed in March,2016.
2. Seed village programme should be strengthened.	ETC/Provincial Ext	HORDI	2. Insted of seed vilage programme introduce small scale seed production plots for individual farmers.
3. Useful information, e.g. remarks on cultivation, should be attached to distribute DOA new varieties in the market	HORDI	SPMDC/ICC/ETC	3.HORDI will provide relevant information on new varieties
4. Fertilizer recommendations for seed production should be introduced.	HORDI		4. Studies are ongoing. Information will be availablein near future
5. Maintain buffer seed stocks	SPMDC		5. SPMDC has buffer seed stocks, however, should have feedback mechanism on the period of storage, methods of storability etc. of the seeds issued by them which could directly or indirectly influence on the seed quality.
6. Improve storage house	SPMDC		6. SPMDC develops storage infrastructure plan.
7. Local hybrid seeds should be released with proper testing	HORDI	SPMDC	7. Given huge number of imported varieties, local varieties, etc, it is doubtful to conduct this research.
8. Study on effect of farmers' income vs whether he uses imported seeds, seeds of 2nd generation or locally produced seeds	SEPC		8. Perhaps importers are already doing this kind of study to promote imported varieties.
9. DOA and private sector must get together and samples of hybrid developed by DOA should be given to companies to compare them with imported hybrids.	HORDI	SPMDC	9. DOA can give parent lines of hybrid developed by DOA to stakeholders. As the initiative, Parent lines of new hybrids were already given to some stakeholders . HORDI can give samples of hybrids to the stakeholders to test them in their fields.
10. AgStar company requested technology on hybrid seed production	HORDI		10. SPASL and All Lanka Association can take training from HORDI in collaboration with SPMDC. A technical bulletin will be produced by HORDI to assist stakeholders to produce the hybrid seed using the parent lines.
E. Seed Quality Blue 4/9, Short 4/9, UK 1/9			
1. SCS infrastructure should be developed.	SCS		1. SCS established the building of Seed Health Testing Unit in August 2015. Infrastructure for seed science

2.Vigour testing for old seed lots should be conducted 3. Random seed sampling should be carried out and notificatied if found to be below norm 4.Imported seed testing should be strengthened 5. Accurate seed lot numbers should be inserted. 6. To register Laboratories of private sector should be registered and license be issued 7. Seed importers should follow seed standards 8. Seed samples of local and imported seeds should be planted in government lands and demonstrated to emphasize trading quality seeds 9.Seed certification services should be provided for local producers	SCS SCS NPQS/SCS SCS SCS	SPMDC	and technology is needed as well as human resource development 2. SCS undertakes research for all kinds of seeds and develop standards and protocols for vigour testing 3. DOA is looking forward to Seed Act Regulation and Standards. SCS continues Seed Quality Survey from 2016 to 2018. 4.Strengthening imported seed testing is one of action plans based on the market survey. Sampling all imported seeds and testing at STL/SHTU should be regularized. 5. 6. SCS conduct preliminary inspections and prepare guidelines for improvement of private laboratories. 7. Seed Act implementation is awaited and testing all imported seed. 8. SCS organizes field days to demonstrate performance of seeds collected in the market to the seed producers, importers, traders, farmers 9. SCS should be proactive for seed certification service. Varieties need acceptance by VRC/DOA for certification.
F Public & Private Participation Blue 5/10, Short 5/10 1. The seed market in relation to seed production should be monitored. 2. A coordinating centre for seed industry should be set up. 3. Necessary facilities, human resource, basic seeds, seed technology 4. New varieties should be demonstrated. 5. Private sector should provide correct data/information. 6. Ideas and suggestions of private sector should be received by SPMDC in once or twice a year through regional offices. Effective ideas and suggestions should be discussed further in this kind of seminars. 7. DOA should open a unit to collect ideas, information, problems of seed producers 8.Pre-seasonal discussion programme should be organized at field level 9. Seed pelletizing should be produced. 10. Training on seed production, post harvest,storage, seed certification producing new hybrid varieties should be provided to private sector.	SPMDC/SIDCC SPMDC DOA HORDI SPMDC/SIDCC SPMDC/SIDCC SPMDC/SIDCC SPMDC SPMDC	SEPC SPMDC/SCS /HORDI Provincial ext./ICC/Agro Park	1. SPMDC in collaboration with SIDCC will monitor the seed industry 2. SIDCC is set up to coordinate a centre for seed industry 3. DOA develops infrastructure, human resources, basic seed storage and technology improvement. 4.Collaboration in demonstrating new varieties at various locations 5. SPMDC should critically analyze this issue. RSCs take lead on data collection in addition to voluntary private sectorsubmition. 6. Selective ideas need action plan for implementation with time frame 7. SIDCC can be a unit. 8. Regional Seed Committee can contribute to pre-seasonal discussion programme at field level. 9. SPMDC has been testing coating seed since 2016. 10. SPMDC/SCS/HORDI have been conducting training for private sector, however awareness programme for training should be promoted.

ATTACHMENT - 2: GVSPP (Good Vegetable Seed Production Practice)

Good Vegetable Seed Production Practice (Self-checklist)

This checklist is designed to produce quality vegetable seeds at the Gov. Seed Farms. It provides basic steps that the Gov. Seed Farms can implement to increase seed quantity and quality. The checklist allows the farm staff to go over their operation step-by-step to identify possible deficiencies in production practices and make the necessary adjustments to ensure that the best practices are being followed for quality seed production.

Production Stage	Question	Critical Control Point for Quality Seed Production	Complies (Yes/No)	
			Self	Farm Manager
Pre-cultivation	Q1	Do you use the certified seeds with lot number as a planting material?		
	Q2	Do you select suitable field for seed production: access to water, good drainage, soil fertility, isolation distance?		
	Q3	Do you have a record of the land history to meet the SCS land history requirement and to avoid cultivating same species of plants continuously (crop rotation)?		
	Q4	Do you apply organic matter/compost to improve soil physical property?		
Nursery management	Q5	Do you consider appropriate composition of nursery soil physically (good aeration, drainage and water retention), chemically (enough nutrient) and biologically (free from pest & disease) for healty seedlings production?		
	Q6	Do you sow seeds in adequate distance and depth for uniform germination?		
	Q7	Do you supply seedlings with adequate sunshine, fertilizer and water? The seedlings need to be thinned out if they are too crowded and elongated.		
	Q8	Do you try to avoid root damage of seedlings when transplanting?		
Field management	Q9	Do you raise bed/hill for plants to avoid soil compaction and enhance good root development?		
	Q10	Do you control weeds in the field regularly and timely?		
	Q11	Do you undertake appropriate fertilizer application practices: timeliness, type and rate of application according to the plant requirement?		
	Q12	Do you provide supports to the plant (net or stick) in order to prevent the fruits from direct contact with soil and to reduce the risk of rottened fruits?		
	Q13	Do you promote fruit setting through one or more of the following practices: hand pollination, vibration, introduction of insect pollinators, and reduce chemical spray during flowering stage that could eliminate pollinators?		
	Q14	Do you maintain apropriate plant spacing for good ventilation among the plants so that pest & disease infection can be minimized?		
	Q15	Do you regulate number of branches and fruits to harvest quality seeds?		
	Q16	Do you use integrated pest management (IPM) for pest & disease control: combination of cultural, biological and chemical control?		
Harvest	Q17	Do you determine appropriate harvesting timing by observing color, size, texture and/or firmness of the fruits?		
	Q18	Do you practice appropriate post-harvest ripening?		
Seed processing	Q19	Do you use an appropriate seed extraction method?		
	Q20	Do you use an appropriate seed cleaning and drying method for quality seed production?		
	Q21	Do you store the processed seeds under appropriate conditions?		

ATTACHMENT - 3 : Seed Quality Action Plan

Action Plans based on Market Survey Report on Vegetable Seed Quality for 2014/15 Maha Season

14.07.2016

Short term (formulate a plan & start to do by Dec. 2016) (◎Main Actor)

Actions to be taken	Responsible Institution(◎) & Stake holders	Name of Responsible officer
1. Training Programme should be conducted for seed companies/ producers on good quality seed production including the followings ; 1. seed production including disease 2. post-harvest technologies including drying and packaging 3. using GVSPP (Good Vegetable Seed Production Practice)(S-M) as well as VSP seed production technology "good quality seed" is defined as seed with good germination and vigor in the field	SPMDC ◎ SCS HORDI ETC/Provincial office	Ms. Geetani Weerarathna
2. Awareness Creation Programme should be promoted including the followings ; 1. ensuring seed quality 2. encouraging companies to use DoA testing facilities 3. promoting DoA seeds 4. conducting regular Seed Fairs, Open Days ,seed farms of DOA	SPMDC ◎ SCS ETC Provincial Ext. Private sector	
3. The expiry date in the seed pack in the DOA seeds should be mentioned.	VSC/SPMDC	Ms.Inoka/OIC
4. A mechanism to sample and test all imported seeds should be established.	SCS	

	NPQS ◎	
5. Fertilizer recommendations for vegetable seed production should be given.	HORDI ◎	Dr. P. Weerasinghe
6. Market survey on Vegetable Seed Quality should be continued.	SCS ◎ SEPC	Mr.Abeykoon/ADA
7. Better seed production and distribution planning should be carried out by Regional Seed Committees from basic seed issue to company-nominated, verifiable seed producers using seed demand information	SPMDC ◎ SCS Regional Seed Committees/ SPASL/ Non-SPASL/ SIDCC/ HORDI	Mr. xxx
8. Standard of seed germination and moisture should be revised.	SCS◎	

Medium term (formulate a plan by June, 2017 & take action by Dec. 2017)

Actions to be taken	R.I	N.R.O
1. According to the Seed Act, minimum seed standards have to be maintained by seed handlers who are responsible for placing seeds in the market.	SCPPC in collaboration with SHTL	
2. A mechanism in storage and quick marketing of DOA seeds should be re-established. (Rapid turnover of seeds should be encouraged and storage time under ambient conditions should be minimized.)	VSC/SPMDC ◎	
3. Mandatory vigor testing of seed lots older than several years should be conducted in addition to	SCS/SHTL ◎	

germination test before marketing. Minimum vigor standard has to be determined by each crop		
4. Premium seeds with high germination levels higher than 90% should be produced and be marketed.	SPMDC ◎ Private sector	
5. Seed Vigor testing protocols for market survey should be developed.	SCPPC ◎	
6. Seed Act Regulations should be approved and gazetted.	SCPPC ◎	

Long term (formulate a plan by Dec.2017 & take action after January 2018)

Actions to be taken	R.I	N.R.O
1. A mechanism to improve quality of seeds produced and marketed by all stakeholders should be established.	SCPPC SPMDC ◎ private sector	
2. Storage facilities of buffer stocks should be improved	SPMDC ◎	

R.I.(Responsible Institution), N.R.O(Name of Responsible officer)

◎:Main actor among R.Is

ATTACHMENT-4 : Mechanisms for Public & Private Partnership and Production Training

Mechanism on Public & Private Partnership

Committee/Seminar	Objective	Frequency of Meeting per year	Relationships	Secretariart
SIDCC(Seed Industry Development and Coordination Committee)	√To serve as the focal point for overall seed industry coordination	Quarterly	Among proposals from JPPS, to discuss issues related to SIDCC's TORs ↕ ↕ ↕ ↕	SPMDC(Peradeniya)
JPPS (Joint Public and Private Seminar on Vegetable Seed Production)	√To get the contribution from the public and private sector for the development of the vegetable seed industry in SL (refer from the invitation letter for 6th JPPS)	1~2 times (Before Maha & Yala)	To discuss about the development of vegetable seed industry, and related issues and request from RSCs ↕ ↕ ↕ ↕	SPMDC(Peradeniya)
RSC (Regional Seed Committee)	√To coordinate seed production using DOA Basic seed √To streamline Basic seed distribution and utilization √To promote quality assurance during seed production & marketing √To create regional seed database	2~4 times (preliminary meeting before Maha & Yala,, & progress meeting during seasons, if necessary)	To discuss Basic Seed & other issues to be solved and send RSC's request and opinion to JPPS	SPMDC-Regional DDAs SCS-Regional OICs

Mechanism on Training

	Vegetable Seed Production Training
SPMDC(Peradeniya) SCS(Gannoruwa)	✓Direction, Facilitation & Coordination including securing budget ✓Approval ✓Evaluation & Feedback ↕ ↕ ↕ ↕
SPMDC Regional Deputy Director Office SCS Regional Office	✓Discussion of training framework ✓Training Needs Assessment ✓Training design & development ✓Implementation ✓Evaluation & Feedback ↕ ↕ ↕ ↕
RSC (Regional Seed Committee)	✓Discussion of training framework ↕ ↕ ↕ ↕
Private companies/producers	✓Request of training needs through RSC ✓Participation & Cooperation of training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