

シエラレオネ共和国
農業森林食糧安全保障省

シエラレオネ国
持続的稲作開発プロジェクト

事業完了報告書

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独立行政法人
国際協力機構（JICA）

株式会社レックス・インターナショナル
NTC インターナショナル株式会社

要約

プロジェクト目標：シエラレオネ国全土に適用可能な稲作技術及び普及手法が確立する

指標	結果
1. MAFFS が稲作技術パッケージ (TP-R) と普及手法を公式に推奨する。	1. 2014年7月、MAFFS、研究機関、シエラレオネ政府関係者、ドナー関係者等、約50名を招待し、SRDP フォーラムを開催した。プロジェクト実施概要、TP-R の技術的内容、TP-R 適用農民の経験共有、普及ガイドを活用した TP-R 普及の考え方について説明が行われ、TP-R を MAFFS の標準稲作技術とすることが、参加者により合意された。
2. 研修を受講した各県の MAFFS 職員の 80% 以上が TP-R 及びその普及手法の有効性を確認する。	2. 2014年3月から4月にかけて、全国の MAFFS 県職員 102 名を対象に TP-R 研修を実施した。研修後に実施したアンケート調査の結果、99%の参加者が TP-R の有効性を認めた。

成果 1：農民圃場での実証試験を通じて、より高い収量と収益を実現可能な TP-R に改訂される

指標	結果
1-1 改訂 TP-R を適用した実証農家圃場の 80% の場所において、2013 年栽培シーズンまでに 3.0 Mt/ha 以上の収量が得られる。	1-1 実証農家圃場のうち、3.0 Mt/ha 以上を達成したのは約 50% であった。これは、自然肥沃度が高く、適切な水管理が可能な IVS 水田の確保が困難であったこと、農民の農作業技術が熟練していなかったことによる。
1-2 適切な施肥量と収益性を説明する改訂 TP-R が作成される。	1-2 収量と収益性を両立させ得る改訂版 TP-R を作成した。推奨施肥量は $N-P_2O_5-K_2O = 40-40-40$ kg/ha とした。
1-3 普及員が利用する TP-R マニュアルが作成される。	1-3 TP-R の内容を分かりやすく説明した TP-R マニュアルを作成し、普及員がいつでも参照出来るよう、普及ガイドと合冊した。

成果 2：カンビア県の農民組織を通じて小規模農家に対し TP-R が普及される

指標	結果
2-1 300 名以上の FBO 農民が TP-R に関する研修を受講する。	2-1 延べ 512 名の FBO 農民及び 10 名の普及促進農家が本プロジェクトの研修 (TP-R、圃場視察等) に参加した。また、延べ 129 名の農民が小規模灌漑開発の研修・実地演習に参加した。
2-2 研修を受けた FBO 農民の 50% 以上が TP-R の複数の技術を適用する。	2-2 2013 年 11 月から 12 月にかけて、165 名の農民を対象に実施した TP-R 適用度調査によれば、18 の推奨技術のうち、14 技術が 50% 以上の農民によって採用されており、11 技術は 80% 以上の適用度を示した。
2-3 改訂 TP-R を普及するための普及教材が作成される。	2-3 写真や図表を多用した普及教材を作成し、SRDP フォーラムの参加者及び全国の普及員に配布した。
2-4 TP-R に基づく稲作に関する農民学校 (FFS) 実施ガイドラインが作成される。	2-4 FFS を通じて TP-R の要点を説明するための稲作技術普及ガイドライン (FFS 実施ガイドラインと同義) を作成し、最終フォーラムの参加者及び全国の普及員に配布した。

成果 3：カンビア県以外の MAFFS 県事務所職員に改訂 TP-R と普及手法が普及される

指標	結果
3-1 30 名の職員が TP-R と普及手法に関する知識・スキルを身につける	3-1 102 名の MAFFS 県職員が研修を受講し、このうち 30% の参加者は研修後の達成度テストにおいて、30 点満点中 15 点以上を獲得した。

プロジェクト位置図



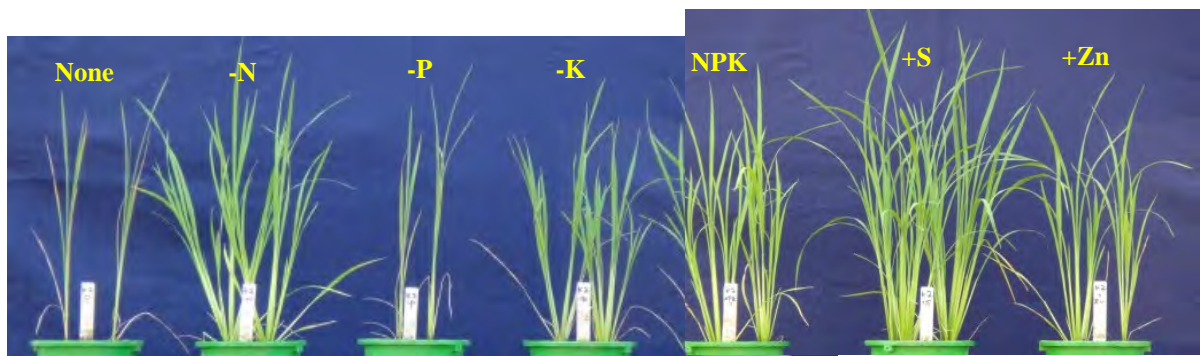
プロジェクト活動写真 (1/2)



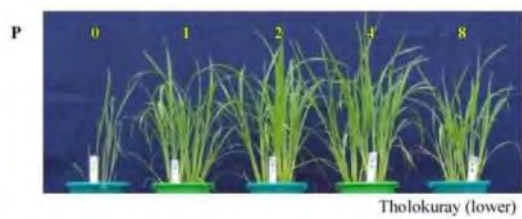
RARC に設置されたポット試験用温室



温室にて実施中のポット試験



様々な養分欠如処理で栽培されたイネ (Bombali 県 Kamaranka II 村の IVS 土壌使用)



養分施用量を変化させて栽培されたイネ
(カンビア県 Tholokuray 村の IVS 土壌使用)



RARC との共同施肥試験の概観
(上：カンビア県 Laya 村、下：同 Masineh 村)

プロジェクト活動写真 (2/2)



FBO 圃場における雨季稲作
(カンビア県 Masineh 村)



FBO 圃場における乾季稲作
(カンビア県 Rotifunk 村)



FBO 農民に対する TP-R 研修
(カンビア県 Masiaka 村)



MAFFS-K 普及員に対する TP-R 実地研修
(カンビア県 Masineh 村)



MAFFS 県事務所職員による
TP-R 適用 FBO 圃場の視察
(カンビア県 Masineh 村)



カンビア県にて開催した MAFFS 県事務所職員に
対する TP-R 研修

シエラレオネ国
持続的稲作開発プロジェクト
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略語表

略称(英語名称)	和 訳
AAG (Agricultural Advisory Group)	農業顧問グループ
ABC (Agricultural Business Centre)	農業ビジネスセンター
AfDB (African Development Bank)	アフリカ開発銀行
ASREP (Agricultural Sector Rehabilitation Project)	農業セクター修復プロジェクト
BES (Block Extension Supervisor)	ブロック普及監督官
BRAC (Bangladesh Rural Advancement Committee)	バングラデシュ農村発展委員会
CAADP (Comprehensive Africa Agriculture Development Programme)	包括的アフリカ農業開発プログラム
CARD (Coalition for African Rice Development)	アフリカ稲作振興のための共同体
CF (Community Facilitator)	コミュニティ・ファシリテーター
DAO (District Agricultural Officer)	県農業事務所長
EU (European Union)	欧州連合
FAO (Food and Agriculture Organization)	国際連合食糧農業機関
FBO (Farmer Based Organization)	農民組織
FEW (Frontline Extension Worker)	前線普及員
FFS (Farmer Field School)	農民学校
FS (FFS Supervisor)	FFS 監督官
GAFSP (Global Agriculture and Food Security Program)	世界農業食糧安全保障プログラム
GIZ (German Federal Enterprise for International Cooperation)	ドイツ連邦国際協力公社
IFAD (International Fund for Agricultural Development)	国際農業開発基金
IVS (Inland Valley Swamp)	小規模内陸低湿地
JCC (Joint Coordinating Committee)	プロジェクト合同調整委員会
JICA (Japan International Cooperation Agency)	国際協力機構
K (Potassium)	加里
MAFFS (Ministry of Agriculture, Forestry and Food Security)	農業森林食糧安全保障省
MAFFS-K (MAFFS Kambia District Office)	MAFFS カンビア県事務所
MC (Monitoring Committee)	プロジェクト運営委員会
N (Nitrogen)	窒素
NGO (Non-governmental Organization)	非政府組織
NSADP (National Sustainable Agricultural Development Plan)	国家持続的農業開発計画
P (Phosphorus)	リン
P4P (Purchase for Progress)	前進のための食糧購入
PDM (Project Design Matrix)	プロジェクト・デザイン・マトリックス
PEMSD (Planning, Evaluation, Monitoring and Statistics Division)	計画、評価、モニタリングおよび統計局
PO (Plan of Operation)	事業実施計画
PPR (Project Progress Report)	プロジェクト事業進捗報告書
RARC (Rokupr Agricultural Research Centre)	ロクーブル農業研究センター
RD (Record of Discussion)	実施協議議事録
S (Sulfur)	硫黄
SCP (Smallholder Commercialisation Programme)	小規模農家商業化プログラム
SLARI (Sierra Leone Agricultural Research Institute)	シエラレオネ農業研究所
SMS (Subject Matter Specialist)	専門技術員
SRDP (Sustainable Rice Development Project)	持続的稲作開発プロジェクト
TP-R (Technical Package on Rice production)	稲作技術パッケージ
WAAPP (West Africa Agricultural Productivity Program)	西アフリカ農業生産性プログラム
WFP (World Food Programme)	国際連合世界食糧計画
Zn (Zinc)	亜鉛

1. 緒 論

この報告書は、国際協力機構（以下、JICA）による技術協力プロジェクト「持続的稲作開発プロジェクト」（以下、本プロジェクト）にかかる事業完了報告書（以下、本報告書）である。

本プロジェクトは、2010年7月19日にJICAとシエラレオネ共和国（以下、シエラレオネ国）政府との間で締結された実施協議議事録（以下、RD）に基づき、2010年10月より2014年9月までの4年に亘り実施された。

本報告書は、4年間の本プロジェクト期間に行われた活動内容とその成果、および本プロジェクト目標達成度について記載するとともに、活動を通じて得られた教訓、並びに本プロジェクト終了後にシエラレオネ国政府が実施すべき提言について述べている。

1.1 プロジェクトの背景・経緯

シエラレオネ国の社会経済は、2002年の内戦終結以降回復基調にあり、2008年の実質経済成長率は5.5%を示した。しかし、国連開発計画の人間開発報告書によれば、2009年におけるシエラレオネ国の人間開発指数は182カ国中180位に留まっている。下位低迷の主因は保健指標が著しく低いことにあるが、水道・電気・道路等の社会経済インフラの復興も未だ十分ではなく、人材育成やインフラ整備に外部からの支援が必要な状況が続いている。

シエラレオネ国はアフリカで有数のコメ消費国であり、年間一人あたりのコメ消費量は100kgを超えている。以前は輸出していたほどコメ生産を誇っていたが、内戦により多くの農民が逃避し、農地が荒廃した結果、耕作面積、生産量共に激減し、内戦終結直前の2001年には籾ベースのコメ生産量が過去最低の20万トンとなった。その後は、作付面積が増えたために生産量は増加し、2007年には約64万トンまで回復したが、自給率は70%に満たず、不足分は輸入に依存している状況である。

シエラレオネ国のコメ生産を担うのは、所有農地面積が1ha以下の零細農家である。2004年のセンサスによれば、国内の約64万戸の稲作農家の約85%が零細農家であり、これら農家のコメ生産増加を通じ、農業収入を向上させることは、国家の最大目標である貧困軽減に大きく貢献すると期待されている。中でも国の北西部、ギニア国境に位置するカンビア県は国内有数のコメの生産地であったが、内戦による影響を大きく受けた結果、生産量は激減しており、回復が急務となっている。

以上を背景に、JICAは2006年より3年間、シエラレオネ国農業森林食糧安全保障省（以下、MAFFS）を実施機関として「カンビア県農業強化支援プロジェクト」（以下、既往案件）を実施し、同県の作物生産性向上のための農業技術パッケージおよび農業技術支援マニュアルを作成した。そのうち、稲作技術パッケージ（以下、TP-R）では、プロジェクト開始時に実施したベースライン調査結果を基に推定した、当時の平均収量（籾ベース）0.5Mt/haの2～3倍に当たる、1.0～1.5Mt/haを目標収量と設定した上で、県内7カ所に、農業生態系の異なるパイロット地区を設置し、地元農民の協力の下、2作期にわたり栽培試験を行った。そして、その結果を基に、畑地における直播陸稲と低湿地での移植水稲の二つに大別された栽培環境毎に、圃場整備、播種（苗代）、肥培管理、および収穫後処理等について、TP-Rを体系的にとりまとめた。

ここで採用された技術は、栽培歴の遵守や合理的な播種方法（陸稲）、適切な圃場準備作業や移植方法（水稲）、除草・病虫害防除、種子の取り扱い等、基礎的なものを中心であった。また、

既往案件では、パイロット地区における試験栽培を通じ協力農民への技術移転を行うとともに、研修、ラジオ普及プログラム作成等を通じ、MAFFS カンビア県事務所（以下、MAFFS-K）職員の能力強化を行った。

既往案件の終了を受け、シエラレオネ国政府より、シエラレオネ農業研究所（以下、SLARI）傘下で、同国の稲作技術開発等を担当するロクープル農業研究センター（以下、RARC）における TP-R の追加実証、およびカンビア県の農家に対する TP-R の普及を目的とした技術協力プロジェクトが要請された。同要請を踏まえ、JICA は 2010 年 3 月に詳細計画策定調査団を派遣し、先方政府関係者と協議を行い、本プロジェクトの枠組みを決定し、同年 7 月 19 日、本プロジェクトに関わる RD に両国代表者が署名した。

1.2 プロジェクトの目標、期待される成果

本プロジェクトは、MAFFS および SLARI を実施機関として、既往案件で作成した TP-R を、さらなる収量向上の実現に向けて改訂する一方、カンビア県の農民組織（以下、FBO）を通じ、TP-R 普及手法を確立し、さらには TP-R およびその普及手法をカンビア県外にも伝播しようとするものである。

本プロジェクトは活動開始時より、国家持続的農業開発計画（以下、NSADP）下で進められている小規模農家商業化プログラム（以下、SCP）と連携し、普及員および小農の能力向上、資材調達支援等を通じて、SCP の成功に貢献し、ひいては NSADP や国家の最大目標である貧困軽減に貢献することが期待された。JICA とシエラレオネ国政府との間で締結された本プロジェクトの上位目標及びプロジェクト目標を以下に示す。

- 上位目標：(1) カンビア県における米生産が増加する
(2) TP-R およびその普及方法をシエラレオネ全土に適用する

プロジェクト目標：シエラレオネ国全土に適用可能な稲作技術及び普及手法が確立する

上記のプロジェクト目標を達成するため、以下の成果が求められていた。

本プロジェクトを通じて期待される成果
成果 1： 農民圃場での実証試験を通じて、より高い収量と収益を実現可能な TP-R に改訂される。
成果 2： カンビア県の農民組織（FBO）を通じ、小規模農家に対し改訂 TP-R が普及される。
成果 3： カンビア県外の MAFFS 県事務所職員に改訂 TP-R と普及手法が普及される。

1.3 活動地域、カウンターパート機関、実施体制および協力対象者

活動地域

本プロジェクトは、北部州のカンビア県を主な対象地域として実施した。農業生態系では、低湿地、特に小規模内陸低湿地（以下、IVS）を重視した。

実施機関

MAFFS 及び SLARI であるが、実質的なカウンターパートは、MAFFS-K および RARC を中心とした、両機関の職員であり、両機関から常勤のカウンターパートとして1名ずつが配置された。

実施体制

本プロジェクトを円滑に実施するために、プロジェクト活動の調整・フォローおよびモニタリングを行うことを目的として、MAFFS を調整役とした「プロジェクト合同調整委員会(以下、JCC)」、および「プロジェクト運営委員会（以下、MC）」が設置された。

受益者

TP-R 改訂を主たる目的とする研究活動では、SLARI 傘下の RARC 研究者、および施肥試験実施に協力する FBO 農民が、また、TP-R 普及活動では SCP 下で任命された MAFFS-K 所属普及員および SCP が支援対象とする IVS で稲作を行う FBO 農民、さらにはカンビア県外の MAFFS 県事務所職員が、それぞれ協力の対象範囲となる。

2. プロジェクトの成果

プロジェクト・デザイン・マトリックス（以下、PDM）の指標に基づき、期待された3つのプロジェクト成果の達成度測定結果を以下に示す。

成果 1. 農民圃場での実証試験を通じて、より高い収量と収益を実現可能な稲作技術パッケージ（TP-R）に改訂される。
成果達成測定指標および達成度： 1-1. 改訂 TP-R を適用した実証農家圃場の 80% の場所において、2013 年作期終了までに 3.0 Mt/ha 以上の収量 ¹ が得られる。達成度：60% 1-2. 適切な施肥量と収益性を説明する改訂 TP-R が作成される。達成度：100% 1-3. 普及員が利用する TP-R マニュアルが作成される。達成度：100%
評価： 1-1. 実証農家圃場のうち、3.0 Mt/ha 以上の収量を実現したのは約 50% であった。これは、主に、(i) 達成の条件とされる、適切な水管理が可能な IVS 水田に実証試験圃場を設けることが困難であったこと、(ii) 農民の農作業技術が熟練していなかったこと、および、(iii) 自然肥沃度が低い土壌（無施肥条件下での収量が低い土壌）においては、推奨施肥量では目標収量に達する増収は達成できなかった（施肥量に対する増収量は変わらない）ことによると考えられた。 1-2. 3.0 Mt/ha を達成可能な改訂版 TP-R が作成された。プロジェクト期間中に実施した圃場試験結果から、推奨施肥量は概ね N-P ₂ O ₅ -K ₂ O=40-40-40 kg/ha と結論した。しかし、土壌肥沃度や IVS の環境により収量は変動し、目標収量を達成するためには、適切な水管理およびきめ細かい農作業技術の適用が必要である。 改訂版 TP-R の適用（施肥および稲作技術改善）により稲作農民の収益は改善するが、推奨施肥量に対する増収量は 1.0Mt/ha 程度であり、現在の社会経済条件下において費用対効果はほぼ 1（損益分岐点）であることから、農民が施肥により利益を得ることは容易ではない。水制御が可能な水田が少なく、稲作農家の技術水準が十分ではない現状では、まず農作業技術の改善で収量を改善することを優先し、施肥を行う場合には何らかの政府の支援が必要であると提言した。また、施肥に関しては、施肥効率がさらに高められる可能性があり、研究の継続が重要であることを、具体的な課題を示し提言した。 1-3. TP-R を普及するために、普及員が TP-R の核となる内容を理解し、農民に技術を移転するのを助けるための TP-R 普及マニュアルを作成した。

¹ 適用できる場所は、IVS 内の水田で、施肥効果を確保するための水管理が可能な場所。

成果 2. カンビア県の農民組織（FBO）を通じて小規模農家に対し TP-R が普及される。

成果達成測定指標：

- 2-1. 300 名以上²の FBO メンバー農民が TP-R に関する研修を受講する。達成度：100%
- 2-2. 研修を受けた FBO 農民の 50%以上が TP-R の複数の技術を適用する。達成度：100%
- 2-3. 改訂版 TP-R を普及するための普及材料が作成される。達成度：100%
- 2-4. TP-R に基づく稲作に関する FFS 実施ガイドラインが作成される。達成度：100%

評価：

- 2-1. プロジェクト期間中、FBO 農民および普及促進農家を対象とした TP-R 研修が 15 回実施され、延べ 522 名が受講した。
- 2-2. プロジェクトが実施した調査では対象農民の 50%以上が、18 項目の TP-R 推奨技術のうち、14 項目を適用しており、うち 11 項目については 80%以上が適用している。
- 2-3. 改訂版 TP-R を普及するための教材を作成した。
- 2-4. 改訂版 TP-R の個別技術に関する普及ガイドライン（TP-R マニュアルおよび普及ガイド）を作成した。

成果 3. カンビア県以外の MAFFS 県事務所職員に改訂 TP-R と普及手法が普及される。

成果達成測定指標：

- 3-1. 30 名の職員が TP-R と普及手法に関する知識・スキルを身につける。達成度：100%

評価：

- 3-1. 全国の MAFFS 県事務所職員 102 名を対象とした TP-R 普及にかかる研修をカンビア県で実施した。研修終了時に実施した研修達成度試験を行った結果、参加者の 30%が 30 点満点中 15 点以上を獲得した。

以上のことから、プロジェクトの成果は、ほぼ達成されたと結論できる。

² 2012 年雨期と 2013 年雨期にスーパーバイザーと日本人専門家による集中的な助言とモニタリングが実施される FBO 農民。

3. プロジェクト目標の達成度

PDMに基づき、プロジェクト目標の達成度を測定した結果を以下に示す。

プロジェクト目標 シエラレオネ国全土に適用可能な稲作技術及び普及手法が確立する。
目標達成度測定指標： 1. MAFFS が TP-R と普及手法を公式に推奨する。達成度：100% 2. 研修を受講した各県の MAFFS 職員の 80%以上が TP-R 及びその普及手法の有効性を確認する。達成度：100%
評価： 1. 現地視察・JCC 等の機会を通じ、MAFFS の実務・意思決定双方のレベルで、TP-R の有効性に対する理解が浸透した。そして、2014 年 7 月に実施されたフォーラムにおいて、TP-R にある農作業技術を MAFFS の標準的な稲作普及技術とすることが、参加者（MAFFS 関係者（本省普及局長、SCP コーディネータおよび各県事務所代表）およびドナー（国際農業開発基金（以下、IFAD）、国際連合世界食糧計画（以下、WFP）等）、非政府組織（以下、NGO）（バングラデシュ農村発展委員会（以下、BRAC）、CARITAS 等）間で合意された。 この後、MAFFS 普及局は、TP-R 研修を受講した全県農業事務所職員に対し、研修で学んだ TP-R を SCP 担当普及員に移転するように指示を出した。 2. 2014 年 3 月～4 月にかけて、全国の MAFFS 県事務所職員 102 名を対象に、カンビア県で TP-R 適用水田視察を含め、TP-R 研修を実施した。研修終了後に行ったアンケート調査の結果、受講者の 99%が TP-R の有効性を認めた。

以上の成果指標の達成度から、プロジェクト目標は達成したと言える。

4. 活動実施スケジュール（実績）とその結果

プロジェクトは、プロジェクト目標達成に向けた成果発現のために、RD の事業実施計画（以下、PO）に基づき、プロジェクト実施期間中、以下の活動を実施した。

4.1 成果1のための活動

- 1-1 カンビア県外への現地踏査を含む稲作関連情報収集
- 1-2 既往案件で開発した TP-R 改訂の方向性の検討・決定
- 1-3 TP-R 圃場試験の年次計画作成
- 1-4 TP-R 圃場試験地の選定
- 1-5 ポット試験および圃場試験の実施
- 1-6 試験のモニターおよび試験結果の分析
- 1-7 TP-R の改訂

4.2 成果2のための活動

- 2-1 FFS に沿った普及年次計画の作成
- 2-2 TP-R および FFS 普及教材を基にした稲作にかかる FFS 実施ガイドラインの作成
- 2-3 FFS 試験区の選定
- 2-4 普及員および普及促進農家用普及教材の作成
- 2-5 普及員および普及促進農家に対する研修・訓練の実施
- 2-6 FFS 試験区に基礎を置いた普及活動の実施
- 2-7 普及活動の進捗モニタリング
- 2-8 TP-R の改善された普及手法のとりまとめ

4.3 成果3のための活動

- 3-1 カンビア県外の MAFFS 県事務所職員の研修計画の策定
- 3-2 TP-R および普及方法にかかる研修の実施
- 3-3 MAFFS 各県事務所における TP-R および普及手法の利用状況のモニタリング

これらにかかる活動の実績は表1に示すとおりであり、活動の詳細は表2にとりまとめた。活動全般に関し、日常業務の協働を通じ、カウンターパートへの技術移転を行った。

また、本プロジェクト初動時にプロジェクト紹介用パンフレットを作成し、関係者に配布するとともに、定期的にプロジェクト活動および成果を事業進捗報告書としてとりまとめ、JCC に報告した。第3年次以降には、毎月プロジェクトニュースレターを発行し、MAFFS およびドナー、NGO 等、農業・農村開発分野の関係者に配布し、プロジェクトの広報に努めた。また、現場に視察に来たドナー（世銀による西アフリカ農業生産性プロジェクト（以下、WAAPP）、ブラジル外交団、ドイツ国際協力公社（以下、GIZ）、BRAC、WFP 等）の受け入れを行い、連携の可能性について検討を行った。

さらに、POには記載がないが、成果2のための活動として、二期作導入の可能性を検討するために、雨季作で支援したFBOの中で、乾季にも水がある湿地を有し、乾季作導入に積極的な農民グループに対しては、乾季作のための肥料の供与および技術指導を実施した。

この他、SCP支援のために本プロジェクトで調達し、対象FBOに供与した肥料の利用にかかるモニタリング、およびMAFFSの要請に基づき、稲作の収支分析、および歩行型耕耘機導入における収支分析を実施した。

表 1 プロジェクト成果にかかる活動実績

活 動	2010			2011												2012												2013												2014								
	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9												
成果1にかかる活動																																																
1-1. カンビア県外への現地踏査を含む稲作関連情報収集	■																																															
1-2. 既往案件で開発したTP-R改訂の方向性の検討・決定	■	■																																														
1-3. TP-R圃場試験の年次計画作成							■																																									
1-4. TP-R圃場試験地の選定							■																																									
1-5. ボット試験および圃場試験の実施							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
1-6. 試験のモニターおよび試験結果の分析							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
1-7. TP-Rの改訂																																			■	■												
成果2にかかる活動																																																
2-1. FFSに沿った普及年次計画の作成							■																																									
2-2. TP-RおよびFFS普及教材を基にした稲作にかかるFFS実施ガイドラインの作成																																																
2-3. FFS試験区の選定																																																
2-4. 普及員および普及促進農家用普及教材の作成							■																																									
2-5. 普及員および普及促進農家に対する研修・訓練の実施							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
2-6. FFS試験区に基礎を置いた普及活動の実施																																																
2-7. 普及活動の進捗モニタリング																																																
2-8. TP-Rの改善された普及手法のとりまとめ																																																
成果3にかかる活動																																																
3-1. カンビア県外のMAFFS県事務所職員の研修計画の策定																																																
3-2. TP-Rおよび普及手法にかかる研修の実施																																																
3-3. MAFFS各県事務所におけるTP-Rおよび普及手法の利用状況のモニタリング																																																

表 2 プロジェクト活動の詳細

<p>成果 1 にかかる活動</p>
<p>1-1: カンビア県外への現地踏査を含む稲作関連情報収集 詳細: コメ生産統計収集・分析、カンビア県 SCP 支援 FBO 活動状況、同 FFS 実施状況、カンビア県外の IVS および稲作実態調査（トンコリリ、ボンバリ、ケネマ、ボ、ポートロコ県）を実施した。これにより、シエラレオネ国一般にコメ生産性が低いこと、SCP 支援を受けている FBO の活動が低調で、FFS がほとんど実施されていないこと、IVS での稲作はカンビア県内外で顕著な差が認められないこと、などが明らかになった。</p>
<p>1-2. 既往案件で開発した TP-R 改訂の方向性の検討・決定 詳細: RARC と TP-R 改訂にかかる試験研究のテーマについて 9 回にわたり議論し、その方向を、生産性向上のための施肥法の最適化と決定した。</p>
<p>1-3. TP-R 改訂のための圃場試験の年次計画作成 詳細: ポット試験結果、および前作期の圃場試験結果を基に、毎年、試験計画を作成した。初期においては、試験テーマを収量に及ぼす施肥量および水管理の影響とした。その後、収量向上のための最適施肥量の検討に変更した。</p>
<p>1-4. TP-R 改訂のための圃場試験地の選定 詳細: 毎年各作期前に、現地調査、農家への聞き取りを基に試験地を決定した。</p>
<p>1-5. ポット試験および圃場試験の実施 詳細: ポット試験では、低湿地土壌の肥沃度を評価するために、全国の各種生態系の水田 37 カ所から採取した土壌を使用し、特定養分の欠如処理を施して水稻を生育させ、土壌肥沃度を評価した。また一斉生育比較試験により肥沃度の土壌間差を検討し、特定養分反応試験等を実施し、養分の欠乏程度を評価した。 一方、圃場試験では、ポット試験結果を受けて、リン（以下、P）および窒素（以下、N）用量および硫黄（以下、S）施与処理を組み合わせた試験を実施した。</p>
<p>1-6. 試験のモニタリングおよび試験結果の分析 詳細: ポット試験および圃場試験のモニタリングを行い、結果を分析した。RARC の化学分析能力向上のために、化学分析指導を行った。全国各地から採取した土壌を用いた各種ポット試験の結果から、シエラレオネ国の土壌は、一般に P が広範に著しく欠乏しており、これが稲の生育を最も制限していると考えられた。次いで S が欠乏しており、次いで加里（以下、K）、N が続く。亜鉛（以下、Zn）の欠乏は地域特異的であった。一斉生育試験結果から、土壌の自然肥沃度の土壌間差は大きく、施肥反応性も差が認められた。また、P 施用量試験から、一般に P 施与量を標準量の 2 倍に増加させると、稲の生育量はそれに伴い増加した。これらの結果、および日本で実施した土壌の化学分析試験から、IVS 土壌における、稲収量増加のために効率的な施与養分比率として、N:P₂O₅:K₂O:S=30:70:30:60 が適切であると推量した。 一方、3.0 Mt/ha の収量を実現するための施肥量を検討する圃場試験の結果から、P の施与量増加によっても、S 施与によっても、収量は増加しなかった。N については、現行の推奨施肥量を減じても収量に変化はなかった。このように、ポット試験結果を圃場試験で再現することはできなかった。この原因として、ポットと圃場の稲の生育環境や養分供給環境が異なること、養分以外に生育制限要因が存在する可能性があること等、が考えられた。これらの結果から、改訂版 TP-R において推奨する肥料三要素の施与量を N-P₂O₅-K₂O=40-40-40 kg/ha とした。</p>
<p>1-7. TP-R の改訂 詳細: ポット試験、土壌の化学分析並びに圃場試験結果、および FBO 圃場での稲作モニタリング結果を基に、TP-R を改訂した。改訂箇所は、主に施肥技術、収益性分析、種子生産である。また、収量構成要素の中で、収量に大きな影響を与える穂数を決定する、稲の初期生育段階における管理の重要性とともに、作付け計画の策定とその遵守を強調している。</p>

成果 2 にかかる活動
<p>2-1. FFS に沿った普及年次計画の作成 詳細: FFS に沿って、稲の生育段階に応じた普及研修計画を作成した。</p>
<p>2-2. TP-R および FFS 普及教材を基にした稲作にかかる FFS 実施ガイドラインの作成 詳細: TP-R および FFS 普及教材を基礎に、稲作技術普及のためのガイドラインを作成した。ガイドラインは、TP-R を普及用に要約した TP-R 普及マニュアル、および FFS 用に TP-R の内容を稲の生育段階に沿って分割し、わかりやすく説明する普及ガイドとからなる。</p>
<p>2-3. FFS 試験区の選定 詳細: SCP の実施に沿い、MAFFS が選定する FBO の共同圃場の一部に、普及員と共に FFS 試験区を選定した。選定に当たっては、試験テーマ以外の要因が稲の生育に影響を与えないように、地形や土壌、水環境などに考慮するように指導した。</p>
<p>2-4. 普及員および中核農家用普及教材の作成 詳細: FBO 圃場での稲作モニタリングを通じ、認識された農作業上の問題点とその改善方策を基に、普及員および中核農家が稲作普及に使用するための普及教材を作成した。教材は、農民の識字率が低いことを考慮し、写真やイラストを中心にし、わかりやすく視覚に訴える内容とすることを心がけ、素案を普及員研修に使用し、参加者の反応や理解度を踏まえ、素案に改良を加え、最終版を作成した。</p>
<p>2-5. 普及員および中核農家に対する研修・訓練の実施 詳細: 普及員および中核農家の能力向上の一環として、座学と実践からなる稲作技術研修を実施した。座学研修では、現地モニタリング期間に撮影した写真を用い、農民の不適切な農作業を取り上げ、その理由と改善策について説明した。実践研修は、SCP が支援する FBO 共同圃場および FFS 試験区において、普及活動のモニタリングを兼ねて実施した。収量調査は、座学で理論を学んだ上で現地実習を行い、理解を深めた。必要に応じ、FBO 農民に対する直接支援も実施した。 また、MAFFS からの要請により、二期作の検討を行った。SCP 支援対象 FBO と協力して、乾季作に必要な水量が確保できると考えられる IVS 圃場で、試験栽培を実施した。その結果、乾季作は水管理が比較的容易であること、および日射量が大きいことから、施肥効果が発現しやすく、圃場管理が十分に行われれば、3 ヶ月品種では 2.5 Mt/ha、4 ヶ月品種では 3.0 Mt/ha の収量を確保できることが、FBO 圃場での栽培試験から明らかとなった。</p>
<p>2-6. FFS 試験区に基礎を置いた普及活動の実施 詳細: プロジェクト期間を通じ、SCP が支援した 44FBO に設営した FFS 試験区において、普及員と共に FBO 農民に対する稲作技術普及活動を実施した。SCP では、ある FBO に対する投入財供与、技術指導等の支援は一年（一作）限りであるが、この期間では、農民の稲作技術の理解度が十分でないことが明らかとなったため、プロジェクト期間中、技術習得に意欲のある熱心な FBO 農民に対して直接研修、技術指導を繰り返し行った。</p>
<p>2-7. 普及活動の成果モニタリング 詳細: 普及活動の結果、FBO 農家がどの程度、推奨農作業技術を採用しているか、収量に変化があったか等を探るため、プロジェクト期間後半に、過去に SCP からの支援を受け、かつ本プロジェクトから技術研修を受けた FBO 農民に対し、聞き取り調査を実施した。</p>
<p>2-8. 改善された TP-R 普及手法のとりまとめ 詳細: 改訂 TP-R の内容、および普及活動の結果をとりまとめ、TP-R 普及方法（普及ガイドラインおよび普及教材）を作成した。</p>

成果 3 にかかる活動

3-1. カンビア県外の MAFFS 県事務所職員の研修計画の策定

詳細: 全国の MAFFS 県事務所職員に対する TP-R 研修計画を MAFFS 普及局と共に策定した。TP-R 改訂作業の遅れ、それに伴う普及教材作成の遅れから、当初予定より 1 年遅れの計画となった。

3-2. TP-R および普及手法にかかる研修の実施

詳細: 2014 年 3 月中旬から 3 週間、カンビア県で全国の MAFFS 県職員 102 名を対象に実施した。1 回の研修における受け入れ人数を上限 40 名として、3 回に分けて 1 回 4 日ずつ、延べ 12 日間、研修を実施した。半日は TP-R 適用 FBO 圃場における稲の生育視察を行い、TP-R の有効性を確認し、その後、TP-R の内容について 10 個の研修モジュールにより説明した。研修中には、各県における稲作の実態を知るために、品種や作期情報を収集した。また、施肥や播種量の計算演習を実施した。研修の最初と最後にテストを実施し、研修効果を測定した。なお、TP-R の普及範囲拡大を期待して、当研修に BRAC から 3 名、WFP から 2 名の技術者を研受け入れた。また、稲を対象として、プロジェクト目標も類似する世銀の WAAPP との連携の具体的活動として、ギニア国農業省職員 5 名、WAAPP 担当の MAFFS 県事務所職員 26 名を対象とする TP-R 研修を 3 日間、2014 年 5 月に実施した。

3-3. MAFFS 各県事務所における TP-R および普及手法の利用状況のモニタリング

詳細: MAFFS 本省は、全国普及員研修後、各県事務所普及局および作物局に対し、研修結果を現場普及員と共有するように指示した。

5. 投入の実績

5.1 専門家派遣実績（氏名、指導分野、派遣期間、業務概要等）

4年間の活動期間中に、10分野の専門家11名を計125.43人・月、現地に派遣した。各年次における各専門家の派遣状況ならびに各分野の専門家により実施された特記すべき業務は、表3に示すとおりである。

5.2 研修実施実績（研修分野、研修期間、参加者数、研修概要等）

本プロジェクトにおいて実施した研修は、大きく（1）カウンターパート研修、（2）農民研修、（3）本邦および第三国研修の3つに分類できる。

（1）カウンターパート研修

初年度には、MAFFS-Kのカウンターパート職員（普及員）が稲作理論全般を正しく理解すること、普及員の稲作に関する知識および普及能力を把握することの二点を主たる目的として研修を実施した。本研修を通じ、普及員の稲作技術や計算能力が顕著に欠如しており、また農民に適切に稲作技術を移転する能力が十分でないことも明らかとなった。

第2年次には、初年度に実施した稲作技術研修で得られた結果を踏まえTP-Rの内容と各時期の稲栽培状況に沿って、座学と実地演習がバランス良く取り入れられるように企画設計し、研修を実施した。収量調査を例に取れば、普及員はまず座学でその理論を学び、その後、FBO圃場で実際に収量調査を実践した結果、その理解が一層深まった。また、本プロジェクトでは、研修の実施と並行し、TP-Rの重要なメッセージを農民に分かりやすく説明するため、イラストを活用したTP-R普及教材を作成し、普及員に配布した。教材の詳細については、研修において解説を行い、普及員が本教材を用いて農民に正しく技術移転出来るようFFSの模擬実習も行った。

第3年次以降、普及教材を用いた研修に加え、普及員は優良FBO圃場視察や農民研修に講師として参加し、更なるファシリテーション技術の向上や新たな知見の習得を図るとともに、普及教材の改良に向け農民の声を収集した。第4年次には、全国の農業事務所職員102名を対象とした稲作技術研修を実施し、プロジェクト成果の面的拡大を図った。

4年間のプロジェクト活動を通じて、研修を受講したカウンターパートは延べ888人・日に上る。年次毎の研修内容、日数、参加者等は表4に示すとおりである。

表 3 専門家の派遣実績および各分野の主たる業務内容

氏名	担当	第1年次									第2年次																		
		2010年			2011年			2012年			2011年			2012年			2013年												
		平成22年度			平成23年度			平成24年度			平成24年度			平成25年度			平成26年度												
		9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9			
君島 崇	総括																												
西谷 光生	副総括/普及(栽培)																												
山口 淳一	栽培技術1																												
山岸 恭敬	栽培技術2																												
石原 博英	小規模灌漑開発																												
中村 麻依子	普及(収穫後処理)																												
西森 勇記	農民組織化																												
竹村 光春	業務調整/栽培技術(普及)補助、栽培試験研究																												
林 真理子	業務調整/栽培技術(普及)補助																												

氏名	担当	第3年次									第4年次																		
		2012年			2013年			2014年			2014年			2015年			2016年												
		平成24年度			平成25年度			平成25年度			平成26年度			平成26年度			平成27年度												
		10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10			
君島 崇	総括/稲作技術改善/普及員研修																												
西谷 光生	副総括/普及プログラム開発																												
山口 淳一	栽培技術1																												
佐々井 兼人	化学分析指導																												
中村 麻依子	普及教材開発																												
山岸 恭敬	普及教材開発																												
奥山 洋大	栽培試験研究																												
竹村 光春	業務調整/栽培技術(普及)補助																												

- 総括/稲作技術改善/普及員研修**
- ・業務全体の指揮・監督・調整
 - ・日本側、シエラレオネ側双方の関係機関との協議主導
 - ・詳細活動計画の策定、成果評価指標の決定
 - ・ベースライン調査実施
 - ・雨季・乾季稲作指導およびモニタリング
 - ・カンビア県普及員・農民研修、全国普及員研修の実施
 - ・供与種子・肥料調達支援
 - ・広報活動の実施（ニュースレター作成、ラジオ放送）
 - ・JCC開催
 - ・中央省庁・ドナーとの連携強化
 - ・第三国研修実施支援
 - ・中間レビュー調査団、終了時評価調査団への対応
 - ・プロジェクトフォーラムの実施
 - ・各報告書（改良TP-R、普及ガイド、プログレスレポート等）の取りまとめ

- 副総括/普及プログラム開発**
- ・実証試験結果のTP-R普及活動への反映
 - ・雨季・乾季稲作指導およびモニタリング
 - ・カンビア県普及員・農民研修、全国普及員研修の実施
 - ・ニュースレター作成
 - ・中央省庁・ドナーとの連携強化
 - ・中間レビュー調査団、終了時評価調査団への対応
 - ・TP-R普及手法（普及ガイド、普及教材）の取りまとめ

- 栽培技術1および2**
- ・ベースライン調査実施
 - ・詳細活動計画（改良TP-R実証試験枠組み）の策定
 - ・改良TP-R実証試験実施監理および結果取りまとめ（ポット試験、化学分析、圃場試験）
 - ・RARCに対する試験研究体制整備支援
 - ・中間レビュー調査団、終了時評価調査団への対応
 - ・各報告書（改良TP-R、化学分析マニュアル）の取りまとめ

- 小規模灌漑開発**
- ・小規模灌漑開発モデル候補地の予備的検討
 - ・小規模灌漑開発にかかる技術指導（測量、小規模灌漑施設構築、進捗管理）
 - ・普及ガイドの取りまとめ（小規模灌漑開発技術）

- 化学分析指導**
- ・改良TP-R実証試験実施監理および結果取りまとめ（化学分析指導）
 - ・化学分析マニュアルの取りまとめ

- 普及(収穫後処理)**
- ・ベースライン調査実施
 - ・雨季・乾季稲作指導およびモニタリング
 - ・カンビア県普及員・農民研修の実施（収穫、収穫後処理技術）

- 普及教材開発**
- ・雨季・乾季稲作指導およびモニタリング
 - ・実証試験結果のTP-R普及活動への反映
 - ・雨季・乾季稲作指導およびモニタリング
 - ・カンビア県普及員・農民研修の実施（普及教材活用）
 - ・普及教材の取りまとめ

- 農民組織化**
- ・SCP支援FBO（農民組織）調査
 - ・供与種子・肥料活用状況モニタリング

- 栽培試験研究**
- ・改良TP-R実証試験実施監理（ポット試験、圃場試験）
 - ・雨季・乾季稲作指導およびモニタリング
 - ・カンビア県普及員・農民研修、全国普及員研修の実施
 - ・RARCに対する試験研究体制整備支援

- 業務調整/栽培技術(普及)補助**
- ・ベースライン調査実施
 - ・雨季・乾季稲作指導およびモニタリング
 - ・改良TP-R実証試験実施監理（ポット試験、圃場試験）
 - ・カンビア県普及員・農民研修、全国普及員研修の実施
 - ・第三国研修同行
 - ・中間レビュー調査団、終了時評価調査団への対応
 - ・プロジェクトフォーラムの実施

表 4 カウンターパート研修概要

研修課題	研修期間 (日)	対象普及員	参加者数 (人・日)	座学	実地 演習	FFS 模擬演習
第1年次 (2010年10月 - 2011年3月)						
稲作栽培技術	4	MAFFS-K	72	✓	-	-
第2年次 (2011年4月 - 2012年8月)						
稲作栽培技術/FFS	20	MAFFS-K	317	✓	✓	✓
第3年次 (2012年10月 - 2013年9月)						
稲作栽培技術/FFS	10	MAFFS-K	87	✓	✓	✓
第4年次 (2013年10月 - 2014年9月)						
稲作栽培技術/FFS	2	MAFFS-K	4	✓	-	✓
稲作栽培技術	12	全県 MAFFS	408	✓	✓	-
合計	48		888			

(2) 農民研修

第2年次に、SCP 支援対象農民グループ圃場の稲作モニタリングを実施した結果、多くの圃場で不適切な農作業が実践されていることを確認した。そして、これら農作業技術が低収の主因であり、現状の農作業技術では施肥を行っても顕著な増収は望めないと推察された。もし、農民が各農作業の意味合いを正しく理解し、その実践を通じ増収効果を体感したならば、農民は積極的に推奨栽培技術を取り入れていくと考えられた。本プロジェクトでは、モニタリング結果を FBO 農民と共有するとともに、米の生産性向上に不可欠な推奨栽培技術の普及を進めるため、研修を計画、実施した。

研修は、(i) 作期前に稲の一生と性質にかかる基礎的な知識および生育と農作業との関係についての座学研修、(ii) 稲作期間中の圃場モニタリングを通じた現地指導、および、(iii) 作期終了後に農民が自身の農作業を振り返る反省座学研修、からなる。一連の研修により、自らの農作業技術の欠点が理解され、次作期に向けた備えが可能となる。座学研修では、イラストや実際の農作業風景の写真を多用し、理解が深まるように努めた。

研修は当初、MAFFS に FBO 代表数名ずつを招待する形で実施したが、会場の収容能力に限界があること、および参加者への連絡の不徹底などの問題が起きたことから、プロジェクトチームが集会場施設のある村に出向き、そこに近隣の村の農民を招待して研修を実施するようにした。これにより、より多くの農民が研修に参加できるようになった。

また、研修の初期においては、日本人専門家が研修講義を主導し、普及員は主に通訳として参加していたが、プロジェクト中盤以降は、研修や日本人専門家との一連の協働を通じ、稲作技術やファシリテーション技術に関する知識と経験を身に付けた普及員が講義を担当し、日本人専門家の活動は後方支援に止め、持続性が担保される様、心掛けた。

表 5 に示すように、4 年間のプロジェクト活動を通じて研修を受講した農民は、延べ 651 人・日に上る。

表 5 農民研修概要

研修課題	研修期間 (日)	対象者	参加者数 (人・日)
第2年次 (2011年4月 - 2012年8月)			
小規模灌漑開発	13	FBO 農民	129
稲作栽培技術/モニタリング評価	6	FBO 農民	108
稲作栽培技術	1	中核農家	10
第3年次 (2012年10月 - 2013年9月)			
優良 FBO 視察	3	FBO 農民	36
稲作栽培技術/モニタリング評価	8	FBO 農民	278
第4年次 (2013年10月 - 2014年9月)			
稲作栽培技術/モニタリング評価	2	FBO 農民	90
合計	33		651

(3) 本邦および第三国研修

シエラレオネ国の農業セクターにおける課題は、プロジェクトが直接支援した現場レベルにおける生産性向上に止まらず、国家政策としての農業政策企画や農業普及企画管理、統計企画設計等、多岐に亘っている。

そこで、第2年次以降、当該分野における課題解決の糸口を掴むため、7名のカウンターパート（MAFFS 上級職員と RARC 研究者）が本邦研修に参加した。

一方、現場レベルでは、主に技術的な課題解決のため、MAFFS 上級職員1名と MAFFS-K 職員3名が、マラウイ国における小規模灌漑開発に、MAFFS-K 普及員2名がエジプト国における稲作栽培技術にかかる第三国研修に参加した。各研修のタイトル、実施期間、参加者等は表6に示すとおりである。

表 6 本邦および第三国研修概要

第2年次 (2011年4月 - 2012年8月)

研修コース	Third Country Training in Malawi on Small Scale Irrigation		
期間	10th - 17th July, 2011		
研修員氏名	所属機関	職位 (当時)	職位 (現在)
Abdul Rahman Kamara	MAFFS	Head of Sub-Component 2, SCP	Deputy Director (Agric. Engineer)
John A. Lakoh	MAFFS-K	Subject Matter Specialist (SMS) (Land and Water Development)	SMS (Agric. Engineering Services)
Amara Kargbo	MAFFS-K	SMS (Extension)	Frontline Extension Worker (FEW)
Andrew Mambu	MAFFS-K	District Coordinator	District Training Focal Person

第3年次 (2012年10月 - 2013年9月)

研修コース	Rice Cultivation Techniques for Africa (Egypt)		
期間	23rd April - 20th September, 2013		
研修員氏名	所属機関	職位 (当時)	職位 (現在)
Daniel M. Kamara	MAFFS-K	Block Extension Supervisor (BES)	Same as before

研修コース	Agricultural Extension Planning and Management		
期間	10th July - 20th September, 2013		
研修員氏名	所属機関	職位 (当時)	職位 (現在)
Bakarr J. Bangura	MAFFS	Deputy director of extension	Director of extension

研修コース	Planning and Designing of Agricultural Statistics for Food Security Policy Making		
期間	20th August - 22nd October, 2013		
研修員氏名	所属機関	職位 (当時)	職位 (現在)
Umaru M. Sankoh	MAFFS-K	District Agricultural Officer (DAO)	Same as before

研修コース	Planning of Agricultural Policy		
期間	18th August - 24th September, 2013		
研修員氏名	所属機関	職位 (当時)	職位 (現在)
Joseph Saidu Bangura	MAFFS	Assistant director of PEMSD	DAO Bo District

研修コース	Promotion of African Rice Development through strengthening coordination between Coalition for African Rice Development (CARD) and Comprehensive Africa Agriculture Development Programme (CAADP) for Sub-Saharan African Countries		
期間	20th August - 10th September, 2013		
研修員氏名	所属機関	職位 (当時)	職位 (現在)
Denis J. Taylor	RARC	Senior Researcher	Same as before

第4年次 (2013年10月 - 2014年9月)

研修コース	Rice Cultivation Techniques for Africa (Egypt)		
期間	24th April - 26th September, 2014		
研修員氏名	所属機関	職位 (当時)	職位 (現在)
Abu Bakarr Sesay	MAFFS-K	Block Extension Supervisor (BES)	Same as before

研修コース	Agricultural Extension Planning and Management		
期間	15th July - 14th September, 2014		
研修員氏名	所属機関	職位 (当時)	職位 (現在)
Amadu Joseph Sesay	MAFFS-Bombali	Crop Officer	Same as before

研修コース	Promotion of African Rice Development through strengthening coordination between CARD and CAADP for Sub-Saharan African Countries		
期間	17th July - 2nd August, 2014		
研修員氏名	所属機関	職位 (当時)	職位 (現在)
Prince Kamara	MAFFS	SCP Coordinator	Same as before

なお、第4年次は、研修生6名が本邦研修に派遣される予定であったが、エボラ出血熱感染拡大への懸念から、8月以降の派遣が取りやめになったことは残念である。

5.3 供与機材実績（リスト、設置場所、利用・管理状況）

プロジェクト期間中に 400,000 米ドル相当の資機材（車輛、バイク、事務機器、分析機器、種子、肥料等）が供与された（表 7）。いずれの物品についても、プロジェクト期間中は適切に使用された。プロジェクト満了後に譲渡された物品については、カウンターパート機関によって維持管理され、引き続き農業農村振興に係る活動に活用されることが期待される。

表 7 供与機材実績一覧

年度	内容 (仕様、モデル等)	数量	現況	使用頻度 *
2011	MAFFS/MAFFS-K			
	車輛 (Toyota Land Cruiser)	2	稼働中	A
	コピー機 (Canon Image runner 2318)	1	良好	A
	ラップトップパソコン (Dell OPTILEX 380)	2	良好	B
	プロジェクター (Dell 1201 MP)	1	良好	C
	プリンター (HP Deskjet F2180)	1	良好	B
	デジタルカメラ (Olympus FE-4000)	2	良好	B
	バイク (Honda XL125)	2	良好	A
	稲作技術パッケージ (既往案件作成版)	1,000	-	B
	稲種子	14,000 kg	-	C
	肥料	56,300 kg	-	C
2011	RARC			
	バイク (Honda XL125)	1	良好	C
2012	MAFFS/MAFFS-K			
	車輛 (Toyota Hilux)	1	良好	A
	稲種子	1,950 kg	-	C
	肥料	12,025 kg	-	C
	RARC			
	ノートパソコン (Compaq Presario V6700)	1	良好	B
	コピー機 (Canon IR 2016)	1	良好	B
	プリンター (HP Laser jet 1505P)	1	良好	B
	配電網整備	1	良好	A
	井戸掘削	1	良好	A
2012	化学分析用機材	1セット	良好	C
	化学分析用試薬	1セット	良好	C
	化学分析用ガラス器具	1セット	良好	C
	MAFFS/MAFFS-K			
2013	肥料	11,400 kg	-	C

* 使用頻度分類：

A：大（週5日程度）、B：中（週1-3日程度）、C：使用時期は限定的

なお、プロジェクト車輛、バイク、事務機器、分析機器等の先方政府への引き渡し式は、2014年9月5日に、カンビアで行われた。

5.4 一般業務費実績（年度毎の金額実績、再委託業務の成果等）

各年次の一般業務費の執行状況は表8に示すとおりである。

表8 一般業務費実績

内容	支出（円）			
	第1年次	第2年次	第3年次	第4年次
備人費	476,215	2,438,574	2,204,343	2,389,998
旅費・交通費（車両燃料、車両維持管理費等）	1,933,185	1,307,642	2,696,665	2,314,726
資機材購入費（文具、バイク、電化製品等）	3,549,011	6,598,885	1,624,671	169,889
通信費（インターネット、ラジオ放送等）	111,225	1,771,921	1,961,188	2,356,444
資料作成費	246,197	311,168	236,001	177,463
施設保守管理費（発電機、事務所）	83,296	2,041,141	1,502,468	969,017
日当	50,124	294,528	417,332	2,614,781
土壌化学分析	0	0	4,437,000	0
会議費	0	0	52,932	352,931
合計	6,449,253	14,763,859	15,132,600	11,345,249
総計	47,690,961			

第1年次（2010年10月～2011年3月）

第2年次（2011年4月～2012年9月）

第3年次（2012年10月～2013年9月）

第4年次（2013年10月～2014年9月）

6. プロジェクト実施運営上の工夫

6.1 シエラレオネ国政府プログラムとの連携

第 1.2 節で述べたように、シエラレオネ国政府は NSADP の下、小規模農家の商業化による農業セクターの活性化を目的とした SCP を、2010 年より実施している。SCP は、(1) 米を中心とした食用作物の生産集約化・多様化・付加価値化・流通促進、(2) 小規模灌漑開発、(3) 地方道路の改善による市場アクセスの向上、(4) 農業金融へのアクセス改善、(5) 社会的保障・食糧安全保障・セーフティネットの構築、(6) 計画・調整・モニタリング・評価体制の強化、の 6 つのサブプログラムからなり、これらの分野横断的な取り組みにより、小農の商業化を図ろうとするものである。本プロジェクトでは、生産性向上の観点から、上記サブプログラムのうち、(1) に対する支援を主として活動を行った。

SCP の枠組みにおいては、MAFFS がドナー関係者に活動進捗を報告し、助言を求める農業顧問グループ（以下、AAG）会議や SCP 全体会議、SCP サブコンポーネント会議、SCP 政策方針会議等を通じて、各ドナーが、個別に実施するプロジェクトの活動内容を共有する機会が設けられており、本プロジェクトでも要請に応じ、JCC とは別に活動の進捗や成果を報告してきた。中でも、RARC で実施したポット試験の発表を通じ、シエラレオネ国低湿地土壌での稲生産を制限している欠乏元素を明らかにしたことは、農業大臣から目に見張る成果であるとの評価を受け、また参加者からも多くの問い合わせを受ける等、多くの耳目を集め、稲作を振興する複数のドナーと連携することにつながった。

政府のプログラムと緊密に連携することにより、本プロジェクトの活動の認知度は高まったと言え、プロジェクト成果の達成にも貢献したと考えられる。

一方、オーナーシップを尊重する観点から、可能な限り政府プログラムの進捗に沿って業務を進めたことにより、プロジェクト側の自由度が減少し、活動に制約が生じるという側面もあった。これについては、次章第 7.1 節で述べる。

6.2 オンザジョブトレーニングを基礎とした技術移転

SCP の下では、選定された FBO に対し、それぞれ 1 名のコミュニティ・ファシリテーター（以下、CF）と FFS 監督官（以下、FS）が配置されていた。CF は、各 FBO に試験圃場を設置し、そこで行われる FFS を通じ農民自身による農業生産に対する学びを促進する役目を、FS はそれを監督する役目を、それぞれ担っていた。

本プロジェクトでは、SCP との連携の観点から、これら普及員を農民レベルでの生産性向上に寄与する接点と捉え、第 5.2 節で見たように、様々な機会を捉え、多くの研修を実施した。研修では、稲作技術に係る座学や実地演習のみならず、FFS 実施計画に関する議論や FFS の進捗モニタリングを行い、最新の情報が共有されるよう配慮した。さらに必要に応じて、日本人専門家が直接 FBO 圃場へ赴き、圃場を前にして普及員や農民に適切な技術指導を行い、研修での学習事項がより効果的なものとなるよう心掛けた。このような一連の協働を通じ、MAFFS-K の 2 名の普及員については、FBO 農民に対して、独自に研修を行えるまでに能力が向上した。

6.3 現地をベースにした活動と中央政府との連携

本プロジェクトは開始当初から、カンビア県をベースとして活動を行った。これは期待される成果を達成するための活動が、主としてカンビア県の普及員および FBO 農民を対象にしたものであったためである。このため、第 6.1 節で述べたように、定期的に作成する報告書の提出時に開催される JCC 会議や AAG 会議、SCP 関連会議等において、中央政府やドナー関係者に対し、プロジェクトの活動、成果を報告するように努めてきた。しかし、プロジェクト期間中に実施された中間レビューでは、プロジェクト目標の達成にはカンビア県の成果を全国に普及することが求められていることから、今後は MAFFS 本省との一層緊密な連携が必要であるとの指摘を受けた。

これを受けて、本プロジェクトは MAFFS に働きかけ、本省内に一部屋を確保し、プロジェクト事務所を開設し、秘書を常駐させるとともに、プロジェクト要員が毎週数日、MAFFS の事務所で執務することとした。これにより、本省の上級職員とのコンタクト回数が増え、ドナー関係者の訪問も増え、プロジェクトの認知度が格段に向上した。

6.4 研究と普及

本プロジェクトは稲の生産性向上の実現に向け、実施機関である MAFFS/MAFSF-K および RARC を、それぞれ普及と試験研究の両輪と位置付け、技術および財政の両面から支援を行った。試験研究分野における大きな成果の一つは、RARC で実施したポット試験を通じ、シエラレオネ国の低湿地土壌における稲生産性の制限要因として、P 欠乏および S 欠乏を特定できたことであろう。

しかしながら、ポット試験は好適に構成された環境の中で栽培された稲の生育を評価するものであり、ここで得られた成果が、即、現場（農民圃場）へと移転出来るものではない。そこで、本研究結果に基づき、(1) 異なるリン施用量がイネの生育と収量に及ぼす影響を検討すること、(2) 費用便益を考慮しつつ、3.0 Mt/ha の収量を可能にする改訂 TP-R 作成の一助とすること、の 2 点を主たる目的とし、RARC のカウンターパートとともに、農民圃場に共同でリン施用量試験圃場を設置し、研究成果のフィードバックを試みた。最終的に、必要な条件が整いさえすれば、農民レベルにおいても、利益を確保しつつも、3.0 Mt/ha 以上の収量が達成出来ることが、改訂 TP-R において取りまとめられた。

また従来、研究（RARC）と普及（MAFFS および FBO 農民）の間には一定の乖離が見られていたが、RARC におけるポット試験や当該圃場への視察を行うことにより、MAFFS と RARC、農民と RARC の接点を増やす機会を創出した、という意味においても価値ある取組であった。

6.5 他ドナーとの連携

シエラレオネ国においても、AfDB、BRAC、FAO、IFAD、WFP、World Bank 等、多くの農業関連ドナーが活動しており、各ドナーもまた、SCP の各サブコンポーネントに何らかの形で貢献していた。その多くとは、SCP 関連の会議での発表や農業・農村開発関連ドナー非公式会議への出席、農業ニュースレターの発行を通じた広報活動を通じ、知己となり、定期的に情報共有、意見交換を行うようになった。この中で、双方の活動内容を知るにつれ、本プロジェクトによる活動が、相手方ドナーに不足している技術的側面を補完出来るであろう、という見解の一致が見られたことから、相乗効果を狙って、各ドナーとの連携を模索した。

活動期間中に行った具体的な連携例としては、以下を挙げることができる。

(1) AfDB

AfDB は、農業生産の向上と農民所得の向上を目的とし、農業セクター修復プロジェクト (ASREP) を、カンビア県を含む全国 5 県で実施していた。カンビア県においては、MAFFS-K および RARC の施設修復や建設業者へ委託する形で IVS の修復³ (排水路、周辺水路、畦畔の建設) を行い、施設の修復においては評価すべき成果を挙げた。しかし、IVS の修復においては、MAFFS の設計、施工監理⁴が不十分であることに加え、建設業者の施工技術が未熟であり、不適切な排水路や周辺水路の配置、過大/過小な通水容量の排水路、過大畦畔建設、圃場内畦畔の不在、圃場の均平作業の未実施等、工事品質が低かったため、工事終了後の IVS においても、収量向上を望むことはできなかった。本プロジェクトでは、このような圃場に対して、圃場内畦畔の建設、圃場間小排水路の建設、圃場内均平作業等、農民の力で可能な範囲での改善を加えた。そして、その上で、普及員を通じ TP-R に記載されている適切な稲栽培技術を移転した結果、これらの圃場における生産性向上に寄与した。

(2) BRAC

BRAC は、女性グループへの小規模貸付を基本としつつも、農業開発分野については、稲作、種子認証・増殖、野菜生産、生産技術普及、湿地開発、養鶏等、様々な支援を 5 県で展開していた。本プロジェクトと同様に、稲作に関する活動を行っていたことから、プロジェクトの早い段階から双方の圃場を視察し、意見交換を行う等の交流を始めてきた。交流の一環として、BRAC 農業部代表を含めた 3 名を、全県 MAFFS 県事務所職員を対象とした研修 (TP-R 研修) に招待した。BRAC では本研修を高く評価し、同様の技術研修を、BRAC 活動地域の普及員に対して行い、TP-R の普及により稲生産性向上を目指している。この連携例については、本プロジェクト最終年次に実施したプロジェクトフォーラムにおいて、同代表より紹介が行われた。

(3) WFP

WFP は、小農の米生産増加に寄与するため、日本政府の資金拠出により、湿地開発に対する Food for Work、資材供与、稲作技術研修を提供するプロジェクトを、ポートロコ県を対象に 2013 年より開始した。本プロジェクトでは、WFP の技術者 2 名を TP-R 研修に招待するとともに、開発地区の視察を実施し、必要な助言を与えた。この他、TP-R 研修を受けたカンビア県の農民が、WFP 支援地区の農民に対して技術移転を行う計画や、WFP の前進のための食糧購入 (P4P) を活用した本プロジェクト対象地区からの米の買い付けについても検討されている。本連携もまた、プロジェクトフォーラムにおいて、WFP の技術顧問より発表された。

³ 修復という名目で工事を行ったが、カンビア県には開発された IVS がほとんど皆無であったため、新規開発と同様、測量から作業を開始しなければならなかった。

⁴ 設計、施工監理業務は MAFFS が担うことになっていたが、MAFFS は測量機材を有しておらず、準備期間も限られ、技術者の能力も十分ではなかったことから、精度の高い設計作業が出来ず、経験のない施工業者に対する適切な管理業務を実施することも不可能であった。

(4) 世界銀行

世界銀行の融資で実施されている WAAPP において、シエラレオネに対しては、日本政府からの信託基金（PHRD）が拠出されている。シエラレオネにおける WAAPP の目標も、プロジェクトと同様に稲作の生産性向上であることから、プロジェクト開始当初から連携が期待され、情報交換は適宜行ったが、なかなか実現には至らなかった。しかし、2014 年 4 月上旬、WAAPP の中間評価のために、シエラレオネを訪問した世界銀行のミッションが、プロジェクトがカンビア県で実施していた全国普及員に対する TP-R 研修の現場を見学した際、その質の高さを評価し、WAAPP に携わる近隣諸国の農業普及関係者へ、同様の研修を実施するよう、プロジェクトに要請した。これを受けて、プロジェクトでは同年 5 月に、ギニア農業省の WAAPP 関係者 5 名およびシエラレオネ関係者 26 名、合計 31 名に対し、TP-R 研修を実施した⁵。

これらの活動を通じ、TP-R が広く認知され、その活用の場に広がりが見られたことは言うまでもない。この他、実現はしていないが、GIZ、CARITAS、IFAD、ブラジル普及公社等との連携の可能性について、話し合いや現地視察団の受け入れを行ったことを付記しておく。

⁵ 当初、リベリアの関係者 5 名も研修に参加する予定であったが、研修直前になり参加取り止めとなった。

7. プロジェクトの活動から導き出された教訓

7.1 他ドナーの財政支援に依存した先方政府実施プログラムとの連携

第 6.1 節では、既存の政府プログラム SCP との連携による利点を述べた。他方、プロジェクトの自由度が減少し、活動に制約が生じかねない事態に陥ったことも事実である。

SCP はの実施にあたっては、ドナーからの支援が必要であり、実施開始年の 2010 年には、欧州連合 (EU) のフードファシリティからの財政支援を受けた。この支援は 1 年で終了し、翌 2011 年からは世界農業食糧安全保障プログラム (GAFSP) が支援することとなり、その資金の運用管理を IFAD が担うことになった。

しかし、シエラレオネ政府と IFAD との意思疎通が円滑に進まず、これが SCP の活動を滞らせる結果となった。特に、SCP の根幹をなすサブプログラム 1 に係る、MAFFS 普及員の FFS 活動関連の資金が全く拠出されない事態となった。この予算執行の遅れは、本プロジェクト期間の後半まで続き、プロジェクト活動は少なからず影響を受けた。本プロジェクトでは、普及員の活動費は予算化していなかったが、この事態となり、本プロジェクト予算から普及員の活動に必要な燃料費を捻出、支出を通じて、SCP 活動を支援した。しかし、GAFSP の予算では普及員の活動手当が含まれており、本プロジェクトの燃料費支出のみでは、普及員の活動のモチベーションは高まらず、その結果、現場の普及活動については、本プロジェクト専門家およびローカルスタッフへの負担が大きくなった。

このように、他ドナーからの財政支援を前提として実施される政府プログラムに全面的に則った本プロジェクトは、その活動が停止する危険性を孕んでいた。相手国政府のオーナーシップを尊重することが重要なのは言うまでもないが、本プロジェクトが独自に設定した目標達成に向けて、活動を遅滞なく行うためには、連携の旗印の下、単に先方プログラムに準じるだけでなく、有事を想定し、その際の対応を準備しておく必要がある。

7.2 稲作技術普及に必要な人材の戦略的育成

TP-R を農民が理解し、収量向上と収入増加を実現するためには、TP-R 適用の前提となる、稲の生育、栄養生理に関わる基礎的な知識が必要である。この理解を助けるために、普及ガイドラインでは冒頭で、稲の生育および生理生態について理論的な説明をしているが、普及員は、圃場で実際に稲を見ながら、これを農民に説明できる必要がある。しかし、いつ、どの農作業を行うべきかについては説明できても、実際に生育している稲を見ながら、問題点を指摘し、解決策を提示できる普及員は、現在シエラレオネ国にはほとんどいない。

本プロジェクトでは、エジプト国での稲作技術にかかる第三国研修にカウンターパートの普及員を 2 年連続で派遣し、これら 2 名の稲作技術にかかる知識・能力は飛躍的に向上した。今後は、彼らが核となり、実践的な技術普及が可能な普及員が増えることが期待される。

JICA では稲作技術能力向上にかかる本邦研修コースがあり、毎年シエラレオネからも MAFFS や RARC から研修員が派遣されている。また、2012 年には CARD 支援の一環でフィリピン国 IRRI での稲作技術研修が実施され、シエラレオネ国から 6 名の要員が派遣されたが、要員選定は本プロジェクトとは関係なく行われた。エジプト国での研修を含め、稲作技術能力向上に関係する複数の研修コースへの要員派遣を、本プロジェクト活動と連携させることで、より大きな効果発現

の可能性があったことを考慮すると、今後の稲作技術研修の要員派遣は、より戦略的に人選を行うことが重要であろう。

8. PDM の変遷

本プロジェクト期間中、PDMは2回改訂した。改訂の内容は以下に説明するが、当初PDM(ver.1.0)および改訂版PDM(ver.2.0およびver.3.0)は添付資料1-1から1-3に示した。

8.1 PDM ver1.0 (プロジェクト開始時)

RDにも添付されたPDM ver1.0は、インセプション会議において承認され、プロジェクトの進捗状況に応じて、必要な変更を施していくことが確認された。

8.2 PDM ver2.0 (中間レビュー時に変更)

プロジェクトがより具体的な目標をもって活動できるよう、また改良TP-Rの面的拡大によりプロジェクト終了後の持続性が担保されるよう、PDMの改訂が中間レビュー時に行われた。改訂PDMの主たる要点は以下のとおりである。

- プロジェクトの達成度を図るため、上位目標、プロジェクト目標、成果のそれぞれに対する現実的かつ具体的な指標の決定
- 新しい成果（成果3：TP-Rおよび普及手法のカンビア県外の農業事務所職員への移転）の追加
- 成果3に関する活動の追加および、指標の改訂に伴う成果1および2関連活動の改訂

8.3 PDM ver3.0 (終了時評価時に変更)

プロジェクトの対象生態系はIVSであることから、プロジェクト上位目標にあるカンビア県内のコメ生産増加もIVSにおけるコメ生産に限定される旨、脚注に付した。

9. 合同調整委員会の開催記録と協議内容

プロジェクト期間中に、8回のJCC会議が開催された（表9）。JCC会議では、プロジェクト事業進捗報告書（以下、PPR）の内容説明が主な目的であったが、先方政府からの要請に応じる形で各種収支分析や現地視察も織り交ぜ発表を行った。JCCの会議議事録は、添付資料2-1から2-8に取りまとめた。

表9 JCCの開催記録

No.	開催日	会場	参加者数	内容
1	2011年3月1日	MAFFS 会議室	10	PPR1の内容説明および承認
2	2011年12月9日	同上	15	PPR2の内容説明および承認
3	2012年3月19日	同上	23	PPR3の内容説明および承認
4	2013年1月10日	同上	20	PPR4の内容説明および承認
5	2013年4月19日	RARC 会議室	56	現地稲作視察およびPPR5の内容説明および承認
6	2013年12月10日	MAFFS 会議室	18	PPR6の内容説明および承認、コメの収支分析、作付け体系、本邦研修生帰国報告
7	2014年1月24日	同上	28	終了時評価調査結果報告
8	2014年5月12日	同上	20	PPR7の内容説明および承認、稲作における労働投入量の日本の事例、手押し耕耘機の導入にかかる収支分析

10. プロジェクト終了後シエラレオネ国側が取り組むべき事項に対する提案

10.1 TP-Rの普及

本プロジェクト終了後は、MAFFS 県事務所職員対象 TP-R 研修において TP-R の要点を学習した 102 名の普及員が、その内容を各県事務所職員および農民に移転していくことが期待される。そのために必要な支援として、本プロジェクトでは FFS を中心とした普及手法（普及ガイドライン、普及マニュアル、普及教材）を開発、配布した。第 11.1 節において農業大臣が言及しているように、TP-R の普及はまだ端緒についたばかりであり、MAFFS は各県事務所が活動を継続できるような支援を行っていくことが重要であろう。

TP-R の中で提言しているが、TP-R を適用して最大の効果を発現するためには、改善された農作業技術の導入と施肥が必要であるが、施肥効果の発現には、水の制御、管理が可能な水田環境が必須である。現状においては、水の制御が可能な水田は非常に限られており、このような状態で施肥をしても、投資費用に見合う利益を挙げることは困難であると考えられる。農民の経済状態に鑑み、TP-R の適用は、改善農作業技術導入を最優先させることを強く提案する。また、施肥の導入を図る際には、補助金等、政府による財政支援が不可欠である。

また、TP-R は二期作にも適用可能である。むしろ、水管理が容易であり、日射量が大きい乾季作の方が、適切な農作業を行うことで、高い施肥効果に基づく、高収量が期待できる。水資源が豊富な IVS は可能な限り、乾季作を行うことでコメ生産量が増加し、自給率の上昇が期待できることから、TP-R を適用した乾季作の普及を推進すべきである。

10.2 TP-R 実証試験の継続

本プロジェクト期間中に複数回実施した TP-R 実証試験を通じて、農民圃場においても 3.0 Mt/ha 以上の収量が得られることは実証された。しかし、土壌肥沃度の差に基づく収量や施肥反応性の変動も認められており、今回示した推奨施肥量の普遍性については、さらに検証を重ねる必要がある。今後、必要と考えられる試験課題は以下のものが挙げられる。

- (1) 収量に及ぼす日射量の影響を評価するための年間を通じた定期作付試験
- (2) 土壌の高いリン酸吸収係数に基づく高水準の P 施用量試験
- (3) 土壌の広範かつ激しい S 欠乏に基づいた S 施与試験
- (4) 稲の養分要求量および土壌肥沃度に基づく養分比率を変化させた施肥試験

10.3 IVS 以外の生態系に対する TP-R 作成

本プロジェクトでは、その生産ポテンシャルに鑑み、主に IVS を対象とした改訂 TP-R を作成した。しかしながら、シエラレオネ国には IVS の他に、upland、boliland、riverain、mangrove swamp の 4 つの生態系があり、これら生態系に対する TP-R の適用範囲について、しばしば質問を受けた。プロジェクト期間中に行った TP-R 適応度調査によれば、生態系を異にしても多くの技術の適用可能性があるが、一部の技術（マングローブ湿地における 3 週間苗の移植、畦畔・排水路の構築等）については、適用が困難である可能性が示唆されている。そこで他の生態系については、

関係機関（RARC/SLARI、MAFFS）によって、今回の IVS 用の TP-R を基に、各生態系に応じた TP-R が作成されることが期待される。

10.4 質の高い IVS 開発および圃場整備の推進

カンビア県においては、IVS がほとんど開発されていない。その結果、稲作期間中の水管理が難しく、洪水や深水により稲の生育が停滞し、施肥効果が見られず、収量が向上しない場面が多く見られた。現状を打破するため、ASREP 等ドナー資金により IVS の修復工事がカンビア県を含め、全国で行われているが、その工事の質は満足する水準からは程遠い。水田は、稲の栽培に適するように、水が適正に管理され、稲が均一に生育する環境を提供するものである。この環境が整って、初めて TP-R の効果が保障される。適切な通水容量を持つ排水路とともに、堅固な畦畔と均平な圃場整備を伴う、質の高い IVS 開発が臨まれる。

また、農民の手で可能な水田整備方法として、等高線に沿った畦畔建設による水田造成を推奨する。これにより、土工量を少なくすることが可能である。

10.5 SCP の FBO 支援方法の再検討

本プロジェクト活動を通じて、SCP が支援する FBO への稲作技術支援を行ったが、SCP では、ある FBO への支援は一作限りとなっており、この期間では、農民が能力向上に至る十分な支援を行うことは困難である。今後 SCP 下で FFS がどのように進められるのか不明であるが、稲作技術普及にかかる活動は、最低でも二作期継続できるような仕組み作りが求められる。

水資源が豊富な IVS であれば、二期作を通じた技術支援が考えられよう。

本プロジェクトで実施したように、FBO 農民への座学による稲作技術研修を、FBO 村落にて作期前および作期後に行い、そこに、近隣の集落の稲作農家を招待することは有効である。さらには、FBO 農民同士の交換研修旅行を企画することも効果的である。

11. 次期フェーズへの展望

11.1 農業大臣の考え

本プロジェクトの現地活動終了に際し、農業大臣は、次期の JICA による支援について、以下のような内容となるよう期待感を表明した。

パイロットフェーズは終了したと認識しており、今後は TP-R（二期作を含める）の普及を全面的に推進して欲しい。TP-R は、まずカンビア県全体に波及させ、収量向上を図る。他県への普及はまずポートロコ県に対して行う。各県において、特産物として推奨する作物は異なり、コメについてはカンビア県およびポートロコ県を対象としている。

カンビア県では、さらにコメのバリューチェーンの確立を目指し、収穫後処理および流通分野を取り込む。

11.2 プロジェクトによるコメント

カンビア県における TP-R の普及推進は、当県がシエラレオネ国における主たる稲作地帯であることから、合理的である。普及員も本プロジェクトの実施を通じて稲作に関する知識、普及能力が向上しており、複数の FBO の農民も TP-R を適正に適用し、収量増加を実現している。したがって、TP-R 普及の拡大にはそれほど困難は伴わないと考えられる。ポートロコ県についても、稲作が盛んであり、カンビア県に隣接する地理的關係から TP-R 普及には異存ない。WFP や BRAC も活動しており、これら機関との連携を通じた相乗効果も期待出来る。

しかし、IVS の開発が進んでいない現状においては、TP-R 普及の効果は限定的にならざるを得ない。他のドナーによる IVS 開発をカンビア県およびポートロコ県に誘導し、工事にかかる設計や施工の技術指導を JICA プロジェクトが担当するという連携により、質の高い IVS 開発を実現することが可能である。そこに TP-R を普及させることで最大限の効果を引き出すことが考えられる。

これら 2 県以外の県における TP-R 普及は、県外普及員および農民をカンビア県またはポートロコ県にて研修することを通じて実施する。稲作普及や IVS 開発を行う他ドナープロジェクトの技術スタッフの研修も同様に行うことで、TP-R 普及範囲が広がることが期待される。

カンビア県におけるコメのバリューチェーンの確立に関しては、流通分野については FAO が農業ビジネスセンター（以下、ABC）幹部に対してビジネス能力向上研修を実施している。収穫後処理に関しては、精米品質の向上が鍵であるが、これには、精米機の性能および運転技能、さらには粳品質が大きく関わっている。生産段階での収穫後処理、および精米機オペレータの技能にかかる研修を繰り返し行う必要があるが、プロジェクトとしての関与は小さいものと考えられる。

添付資料

添付資料 1-1	PDM ver.1.0
添付資料 1-2	PDM ver.2.0
添付資料 1-3	PDM ver.3.0
添付資料 2-1	第 1 回 JCC 会議議事録
添付資料 2-2	第 2 回 JCC 会議議事録
添付資料 2-3	第 3 回 JCC 会議議事録
添付資料 2-4	第 4 回 JCC 会議議事録
添付資料 2-5	第 5 回 JCC 会議議事録
添付資料 2-6	第 6 回 JCC 会議議事録
添付資料 2-7	第 7 回 JCC 会議議事録
添付資料 2-8	第 8 回 JCC 会議議事録

(1) Project Design Matrix (Version 1)

Project Title: Sustainable Rice Development Project in Sierra Leone

Project Period: 2010 August – 2014 July

Implementing Agency: Ministry of Agriculture, Forestry and Food Security (MAFFS)

Target Area: Kambia district

Beneficiaries: 10 -15 rice producing FBOs, RARC and MAFFS Kambia office (MAFFS-K)

Date: July 19, 2010

Narrative Summary	Indicators	Source	External conditions
Overall Goal To increase production and incomes of small-scale rice farmers in Sierra Leone	- Self sufficiency of Sierra Leone in rice increase to 70-100%	National agricultural statistics	- No significant change in national policy on rice development is made.
Project Purpose To establish rice production techniques and its extension method which are applicable throughout Sierra Leone	- XX % of MAFFS officials in each district confirms effectiveness of the TP-R and its extension method.	Project reports Workshop at the end of the Project	- Necessary budget for extension of the TP-R is secured.
Outputs 1. To elaborate the Technical Package for Rice (TP-R) through on-station and on-farm verification	- XX % of trial farms which applied TP-R accomplish production target. - XX % of the rice produced in trial farms which applied TP-R satisfy the quality target. - The elaborated TP-R is drawn up.	Project reports	- No major barrier appears in extending TP-R to other districts.
2. To extend TP-R to small-scale farmers through Farmers Based Organizations (FBOs) in Kambia district	- XX rice farmers take the trainings on rice production. - XX % of rice farmers which took trainings apply the technical package.	Project reports	
Activities 1-1. To collect information on rice production in other districts than Kambia and conduct field survey, as necessary 1-2. To decide direction for elaboration of the current TP-R 1-3. To make annual plans of TP-R trials with a good combination between on-station and on-farm verification 1-4. To select FBOs where on-farm TP-R trials are implemented 1-5. To implement on-station trials at the research fields of the Rokupr Agricultural Research Center (RARC) and on-farm trials at selected FBOs' farm fields 1-6. To monitor and analyze findings of the trials in view of various aspects 1-7. To reflect to TP-R the results of the trials and reaction of farmers involved in extension activities 2-1. To make annual plans of extension in line with the Farmers Field School (FFS) method 2-2. To revise the manuals and materials made in the Agricultural Development Project in Kambia 2-3. To select demonstration farms in collaboration with the selected FBOs 2-4. To train Front Extension Workers (FEWs) and farmer facilitators of the selected FBOs 2-5. To set demonstration farms in collaboration with the selected FBOs 2-6. To implement extension activities based on the demonstration farms 2-7. To monitor progress of the extension activities 2-8. To wrap up the results of the extension activities and compile them to an improved extension method of TP-R	Inputs < Japanese Side > - Experts 1. Chief adviser 2. Rice cultivation technique 3. Post-harvest technique 4. Extension 5. Farmers organization 6. Coordination - Equipment 1. Vehicles 2. Necessary equipment for extension activities 3. Other necessary equipment - Counterpart training in Japan - Operational expenses < Sierra Leonean side > - Counterparts - Project office - Facilities for technical verification at RARC - Operational expenses	- FEWs who took the trainings remain in the same position.	Pre-condition - Security condition in the target areas does not deteriorate.

1-1

Project Title: Sustainable Rice Development Project in Sierra Leone

Project Period: 4 years (from October 2010 to September 2014)

Implementing Agency: Ministry of Agriculture, Forestry and Food Security (MAFFS)

Target Area: Mainly Kambia district

Beneficiaries: FBO farmers supported under SCP, RARC and MAFFS Kambia office (MAFFS-K)

Date of revision: July 10, 2012

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p>Overall Goal To increase rice production in Kambia district To apply the Technical Package on Rice Production (TP-R) and extension method¹ all over Sierra Leone</p>	<p>1. Rice production is increased 30 % in Kambia district compared with the rice production in 2014. 2. Extension workers of the district agricultural offices in the country other than Kambia district disseminate revised TP-R using extension method developed under the Project to farmers more than 10,000 persons by the end of 2018</p>	<p>1. Statistical data on rice production 2. Data of the district agricultural offices in the country,</p>	<p>- No significant change in national policy on rice development is made.</p>
<p>Project Purpose To establish rice production techniques and its extension method which are applicable throughout Sierra Leone</p>	<p>1. TP-R and extension method are officially endorsed by MAFFS 2. 80 % of MAFFS officials who received training in each district confirm effectiveness of the TP-R and its extension method.</p>	<p>1. Document of endorsement 2. Results of questionnaire survey to officials of MAFFS district agricultural offices</p>	<p>- Necessary budget for extension of the TP-R is secured.</p>
<p>Outputs</p> <p>1. To revise the TP-R, which can realize higher yield and profit, through on-farm verification</p> <p>2. To extend TP-R to small-scale farmers through Farmers Based Organizations (FBOs) in Kambia district</p> <p>3. To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.</p>	<p>1-1. More than 3.0 Mt/ha of yield² is obtained more than 80% of locations of on-farm verification, where revised TP-R is applied, in the cropping seasons by 2013. 1-2. Revised TP-R, that includes method on appropriate dosage of fertilizer and profitability, is developed. 1-3. A manual on TP-R for use of extension workers is produced.</p> <p>2-1. More than 300³ FBO farmers receive training on TP-R 2-2. More than 50% of the FBO farmers who received training applies several techniques of the TP-R. 2-3. Extension materials for disseminating revised TP-R are prepared 2-4. A guideline on implementation of Farmer Field School (FFS) on rice cultivation based on the TP-R is developed.</p> <p>3-1. 30 officials acquire knowledge and skills of TP-R and extension method.</p>	<p>1-1. Project reports 1-2. Document on TP-R 1-3. Manual on TP-R</p> <p>2-1. Project reports 2-2. Sample Survey to farmers 2-3. Extension materials 2-4. Guideline on implementation of FFS</p> <p>3-1. Project reports</p>	<p>- Water control environment is ensured. - Fertilizer is secured by FBO farmers</p>

Project Design Matrix (Version 3)

Project Title: Sustainable Rice Development Project in Sierra Leone

Project Period: 4 years (from October 2010 to September 2014)

Implementing Agency: Ministry of Agriculture, Forestry and Food Security (MAFFS)

Target Area: Mainly Kambia district

Beneficiaries: FBO farmers supported under SCP, RARC and MAFFS Kambia office (MAFFS-K)

Date of revision: September 10, 2014

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p>Overall Goal To increase rice production in Kambia districtⁱ To apply the Technical Package on Rice Production (TP-R) and extension methodⁱⁱ all over Sierra Leone</p>	<p>1. Rice production is increased by 30 % in Kambia district compared with the rice production in 2014. 2. Extension workers of the district agricultural offices in the country other than Kambia district disseminate revised TP-R using extension method developed under the Project to farmers more than 10,000 persons by the end of 2018</p>	<p>1. Statistical data on rice production 2. Data of the district agricultural offices in the country,</p>	<p>- No significant change in national policy on rice development is made.</p>
<p>Project Purpose To establish rice production techniques and their extension method, which are applicable throughout Sierra Leone</p>	<p>1. TP-R and extension method are officially endorsed by MAFFS 2. 80 % of MAFFS officials who received training in each district confirm effectiveness of the TP-R and its extension method.</p>	<p>1. Document of endorsement 2. Results of questionnaire survey to officials of MAFFS district agricultural offices</p>	<p>- Necessary budget for extension of the TP-R is secured.</p>
<p>Outputs 1. To revise the TP-R, which can realize higher yield and profit, through on-farm verification</p>	<p>1-1. More than 3.0 Mt/ha of yield is obtained more than 80% of locations of on-farm verification, where revised TP-R is applied, in the cropping seasons by 2013ⁱⁱⁱ. 1-2. Revised TP-R, that includes method on appropriate dosage of fertilizer and profitability, is developed. 1-3. A manual on TP-R for use of extension workers is produced.</p>	<p>1-1. Project reports 1-2. Document on TP-R 1-3. Manual on TP-R</p>	<p>- Water control environment is ensured. - Fertilizer is secured by FBO farmers</p>
<p>2. To extend TP-R to small-scale farmers through Farmers Based Organizations (FBOs) in Kambia district</p>	<p>2-1. More than 300 FBO farmers^{iv} receive training on TP-R 2-2. More than 50% of the FBO farmers who received training applies several techniques of the TP-R. 2-3. Extension materials for disseminating revised TP-R are prepared 2-4. A guideline on implementation of Farmer Field School (FFS) on rice cultivation based on the TP-R is developed.</p>	<p>2-1. Project reports 2-2. Sample Survey to farmers 2-3. Extension materials 2-4. Guideline on implementation of FFS</p>	
<p>3. To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.</p>	<p>3-1. 30 officials acquire knowledge and skills of TP-R and extension method.</p>	<p>3-1. Project reports</p>	

ⁱ Production increase is expected to happen in the rice fields in IVS (Inland Valley Swamp).

ⁱⁱ Extension method means the practical guideline on implementation of FFS and extension materials on rice cultivation

ⁱⁱⁱ Applicable places are rice fields in IVS where field water control is possible for effective fertilization.

^{iv} FBO farmers which are advised and monitored intensively by Supervisors and Japanese experts in wet season of 2012 and 2013

Activities	Inputs	
<p>1-1. To collect information on rice production in other districts than Kambia and conduct field survey, as necessary</p> <p>1-2. To decide direction for revision of the TP-R developed at the previous JICA cooperated project</p> <p>1-3. To make annual plans of TP-R trials (on-farm verification)</p> <p>1-4. To select locations where on-farm verification on TP-R are implemented</p> <p>1-5. To implement pot-experiments of fertilizer application at the Rokupr Agricultural Research Center (RARC) and on-farm verifications at selected farm fields</p> <p>1-6. To monitor and analyze findings of the pot-experiment and on-farm verifications in view of various aspects</p> <p>1-7. To reflect the results of the on-farm verifications and reaction of farmers involved into TP-R</p> <p>2-1. To make annual plans of extension in line with the Farmers Field School (FFS) method</p> <p>2-2. To produce draft guideline on implementation of FFS on rice cultivation based on TP-R and extension materials for FFS</p> <p>2-3. To select FFS test plots in collaboration with the selected FBOs</p> <p>2-4. To prepare training materials for extension workers and farmer facilitators</p> <p>2-5. To train Front Extension Workers (extension workers) and farmer facilitators of the selected FBOs</p> <p>2-6. To implement extension activities based on the FFS test plots</p> <p>2-7. To monitor progress of the extension activities</p> <p>2-8. To wrap up the results of the extension activities and compile them to an improved extension method of TP-R</p> <p>3-1. To make training plan for officials of the district agricultural offices of MAFFS other than Kambia district.</p> <p>3-2. To conduct trainings on TP-R and extension method</p> <p>3-3. Monitor situation of utilization of TP-R and extension method at each district office</p>	<p>< Japanese Side ></p> <p>- Experts</p> <ol style="list-style-type: none"> 1. Chief adviser 2. Rice cultivation technique 3. Post-harvest technique 4. Extension 5. Farmers organization 6. Coordination <p>- Equipment</p> <ol style="list-style-type: none"> 1. Vehicles 2. Necessary equipment for extension activities 3. Other necessary equipment <p>- Counterpart training in Japan and/or third country</p> <p>- Operational expenses</p> <p>< Sierra Leonean side ></p> <p>- Counterparts</p> <p>- Project office</p> <p>- Facilities for technical verification at RARC</p> <p>- Operational expenses</p>	<p>- Extension workers who took the trainings remain in the same position.</p> <p>Pre-condition</p> <p>- Security condition in the target areas does not deteriorate.</p>

Minutes of the Joint Coordinating Committee Meeting on the Baseline Survey Report and Progress Report 1 for the Sustainable Rice Development Project in Sierra Leone

The first Joint Coordinating Committee Meeting (the Meeting) on the Sustainable Rice Development Project (SRDP) in Sierra Leone (the Project) was convened at the conference room of the Forestry Division of the Ministry of Agriculture, Forestry and Food Security (MAFFS), Youyi Building, at 10:00 a.m. on 3rd March, 2011. The attendants are shown in Annex 1.

The Meeting, chaired by Mr. Francis A. R. Sankoh, Director General, MAFFS, proceeded according to an agenda as shown in Annex 2.

In his opening remarks, the chairman apologized for poor attendants, due to other important meetings taken place on the same day. Nevertheless, the chairman insisted on the importance of the Project and the necessity of the technical cooperation extended by the Project, and the Meeting proceeded.

1. Minutes of the Inception Meeting

The minutes of the inception meeting (Annex 3) was distributed and discussed. Main points of the discussion on the minutes of the inception meeting were shown in the following.

Comment No.11 (of the Minutes of the Inception Meeting): Although the both sides agreed on the RD, some issues related budget (counterpart funds and transport of JICA's experts, etc) would be carefully discussed within the Ministry again because of necessity of arrangement with the Ministry of Finance and Economic Development (MOFED).

Chairman: Counterpart fund should be given by the Project

Chief Advisor, JICA: This is regarding the clarification on the undertakings of the Sierra Leonean Government, undertakings of which are stated in the Project's Record of Discussion which have been agreed upon and signed by the both Governments before the commencement of the Project. We expect the Sierra Leonean Government would make efforts to shoulder its counterpart fund as it could lead to the assurance of the Project sustainability.

RARC provided the Project with one permanent counterpart at the cost of RARC.

No.12: Some incentive for technical staff should be taken in consideration like other development partners (AfDB, World Bank etc)

Chairman: What do you think about this issue? Technical staffs usually have some incentives including allowance, fuel, etc. to implement their activities.

Chief Advisor, JICA: We have provided three (3) motorbikes to one Community Facilitator (CF), one District Coordinator (DC), and one RARC counterpart, respectively, to facilitate implementation of the

Project activities.

Chairman: Not only motorbikes but also fuel should be provided to support the assigned staff's activity.

Chief Advisor, JICA: CFs under SCP are receiving allowance at this moment. Besides, results and/or outputs of the Project are expected to be replicated to other districts as the Project aims to improve TP-R and establish an extension system which can be applicable throughout the country. If we provide any allowance to them to motivate their SCP related activities, you also have to follow the same manner in other districts. We have to be careful not to press the budget of Sierra Leonean Government further. When we ask them to do extra work, of course, we are willing to provide the allowance as compensation.

Chairman: CFs have to extend the number of FFS to fulfill our responsibility to increase the productivity, and for this we need fuel and provision of two (2) motorbikes is not enough.

Chief Advisor, JICA: We provided 24 motorbikes in the previous project and many of them are still operational. During the first phase for the Project, we just provided the motorbikes for those who do not have mobility and spare parts for DCs. We are not planning to increase the number of FFS in the Project, because we are supposed to support the FBOs under SCP in developing their members' capacity through the establishment of FFS. But we are willing to change and/or modify our proposed plan depending on SCP framework.

No. 1: PEMSD should be involved in the monitoring of the Project.

Sierra Leonean Participant: According to this issue, PEMSD is expected to be involved monitoring the project. PEMSD always should be involved. Is there any possibility PEMSD will be provided their mobility?

Chief Advisor, JICA: We understand the importance and necessity of monitoring and evaluation under SCP, and therefore we always welcome to collaborate with PEMSD. However, as the PEMSD is not a member of the Monitoring committee, we have not considered the issue on the mobility of PEMSD. We take note of this issue. What is the more important constraint for PEMSD, mobility or human resources?

Chairman: PEMSD plays a very important role to estimate rice production and yield through yield survey at sample plots in the rice fields of various ecologies. Through the yield survey, we will estimate more accurate production. However, due to lack of resources, we cannot have that data. We need mobility to do this work.

No. 10: Monitoring Committees should be chaired by a third person. The District Agriculture Committee at the Kambia District Council should be involved to the project implementation body.

Sierra Leonean Participant: What does this issue mean? What are the relationship between the project and District Council at present?

Chief Advisor, JICA: The Monitoring Committee (MC) is supposed to be held at quarterly basis with District Agricultural Officer (DAO) of Kambia as a chairperson. However, DAO is also an implementer as a project manager for this project. In the inception meeting, therefore, one recommended us that the MC should be chaired by a third person, as it is difficult to conduct a fair and independent review under such set up.

We do not have enough linkage with District Council so far. We explain our activity to the Council from time to time.

No. 2: JICA establishes demo-farm for a trial, while SCP pursues commercialization. Does JICA still continue experiment?

Sierra Leonean Participant: Are you still planning to conduct the some experiments?

Chief Advisor, JICA: Answer is yes. We are mandated to attain the Project objective mainly through two outputs in the Project: (i) to elaborate technical package on rice (TP-R), and (ii) to extend the TP-R to small scale farmers through FBO (FFS). To obtain these outputs, on-farm and on-station trials will be conducted in collaboration with RARC.

Chairman: As a conclusion, please think about the support of M&E and other relevant staff members. Fuel should be provided one gallon per week for each CF to facilitate their activities.

Chief Advisor, JICA: As I said, we are willing to work with PEMSD, but for the support we really need to know the current M&E system you are adopting. We take note of the fuel issue.

After the above discussions, the Minutes of the Inception Meeting was adopted.

2. Presentation of Baseline Survey Report and Progress Report 1

After the discussion on the minutes of the Inception Meeting, Chairman asked Mr. Takashi KIMIJIMA, Chief Advisor of the Project (SRDP), to present the Baseline Survey Report and Progress Report 1.

The JICA Chief Advisor of the Project made presentations on the two reports using a Power Point (Annex 4), along with the main portion of the Progress Report 1, which was distributed to the participants (Annex 5).

After the presentation, the following discussions were made.

Sierra Leonean Participant: We now understand the performance of the staff and level of inputs you mentioned in your presentation. There are still several issues about rice cultivation such as land preparation, harvesting, etc., and women usually are engaged in uprooting, transplanting and post-harvest activities.

Chairman: To reduce the heavy burden from farmers, labor saving activities (machinery) must be introduced. Research work with RARC is also important because they have been conducting a lot of experiment since the station was established in 1934.

RARC representative: We are now planning and implementing some research works under WAAPP and CARD. Of course, machinery is one of the targets, while extension activities to fill the gap between research and farmers' reality are also required. RARC always welcomes the technical advice from JICA.

Chairman: Capacity of staff is sometimes insufficient. Training for extension workers should be conducted continuously and you also should train farmers as well.

We understand you have some absent period from March to April. Who will manage the project during that period? Although the project should be looked after by DAO, I do not think DAO is good enough to handle the project. Therefore, we recommend you to hire the national counterpart for the proper project operation, and it must help you, even though you are absent.

Chief Advisor, JICA: TP-R is expected to be a comprehensive one including various farming practices like land preparation, weeding, etc.

We understand RARC has long experiences with some decades, but unfortunately, there has not been a detailed technical package for extension workers to utilize. During the Project period, JICA experts will work closely with RARC researchers to improve the present TP-R through a series of experiments.

We understand mechanization is required in the future, but in the light of circumstance at present we do not think it will work well immediately. We need cost-benefit analysis, well managed services with good mechanics, etc., so that farmers could really be benefited from mechanized agriculture. Operation and maintenance of the sophisticated machinery require human capacity of various field, and it will take long time to develop such capacity.

Chairman: We know the feasibility of mechanization depends on farming scale. However, mechanization is a must for further development. Without mechanization there will be no progress. We need high quality machine with durability.

Sierra Leonean participant: In page 3-3 of the handouts, third item of 2) above, it is mentioned that farmers are willing to participate in the development of IVS without payment if proper guidance is given. Is it true? As far as I know, farmers do not work without any incentives.

Chief Advisor, JICA: In the course of the first phase activity, we made dialog with the farmers in two villages, which were candidate of on-farm trial for TP-R improvement. There, we have come to know they were willing to participate in the swamp development without incentives under the conditions that technical guidance is offered and farming tools are provided as necessary.

Chairman: As a conclusion, please continue and intensify the training, involving the CFs and FBO farmers. I recommend you to hire a national counterpart at your own cost to make the project operation smooth and efficient with MAFFS while the experts are absent, so that the project will not be interrupted. We still need more mobilization and would like to move forward with the mechanization.

The Meeting was adjourned at 12:30 p.m.

end

Annex 1 List of participants on the First Joint Coordinating Committee

Sierra Leonean Side:

Name	Position	Organization
Mr. Francis A.R. Sankoh	Director General	MAFFS
Dr. Idriss Baggie	Research Coordinator (Officer in charge)	SLARI (RARC)
Mr. Abdul Rahman Kamara	Irrigation Engineer, SCP Component 2	MAFFS
Mr. Mac. A. Bockari	Assistant Director (Forestry)	MAFFS
Mr. Cyril Konnel	Assistant Director (Forestry)	MAFFS
Mr. Mohamed H. Deen	Livestock Officer	MAFFS

Japanese Side:

Name	Position	Organization
Mr. Takashi Kimijima	Chief Advisor of SRDP	JICA-SRDP
Mr. Mitsuharu Takemura	Coordination/Ass. Cultivation Technique (Extension)	JICA-SRDP
Mr. Masahiro Yoshikawa	Representative	JICA Sierra Leone Field Office
Mr. Joseph K. Lewis	Programme Officer	JICA Sierra Leone Field Office

AGENDA OF THE JOINT COORDINATING COMMITTEE (JCC)
ON THE SUSTAINABLE RICE DEVELOPMENT PROJECT IN SIERRA LEONE

Venue: Conference room, MAFFS, Youyi Building

Date: 3rd March, 2011

Time: 10:00am

TIME	ACTIVITY
10:00-10:10	Opening 1. Chairman's Opening Remarks – Hon. Minister
10:10-11:10	Summary 1. Review of minutes of the inception meeting 2. Presentation of Progress Report and Baseline Report
11:10-11:40	Discussion
11:40-11:55	Conclusions and next steps
11:55-12:00	Closing Remarks

Minutes of the Inception Meeting on the Sustainable Rice Development Project in Sierra Leone.

The captioned meeting was held at 10:00 on 7th October, 2010 at Conference hall of the Ministry of Agriculture, Forestry and Food Security, Youyi Building.

The meeting was chaired by Permanent Secretary, Mr. Edward M. Kargbo.

Mr. Takashi KIMIJIMA, Chief advisor submitted twenty copies of Inception Report on the Project, and made presentation on the contents of the Inception Report using Power Point. He clarified the objectives and expected results of the Project, explained the planned activities to attain the objectives, institutional setup expected, and undertakings of JICA and Sierra Leonean Government.

After the presentation, comments, clarification, suggestions were made from the participants. Main ones are the following.

1. PEMSD should be involved in the monitoring of the Project.
2. JICA establishes demo-farm for a trial, while SCP pursues commercialization. Does JICA still continue experiment?
3. For commercialization, post-harvest aspects are important. But, there is no mentioning about this aspect in the presentation.
4. Processing is important for value addition of rice. Post-harvest aspects should be looked into in the Project.
5. Federation of National Farmers was established to streamline the four national farmers' organizations. Farmers groups should be a part of the Project team.
6. In the presentation, the Project seems train only extension workers. FBO farmers and research people should also be trained.
7. There were many research works conducted in 1970s and 80s at RRS-R. Specialities and knowledge of RARC's researchers and technical staff of MAFFS Crop Service Division should be fully utilized.
8. One of the key issues in establishing technical package which are applicable to farmers is varieties and qualities of fertilizers. In addition, process and value addition should be taken into consideration.
9. In order to solve mobility constraint in the Ministry, motorbikes should be provided to division of M&E.
10. Monitoring Committees should be chaired by a third person. The District Agriculture Committee at the Kambia District Council should be involved to the project implementation body.
11. Although the both sides agreed on the RD, some issues related budget (counterpart funds and transport of JICA's experts, etc) would be carefully discussed within the Ministry again because of necessity of arrangement with the Ministry of Finance and Economic Development (MOFED).

Annex 3

12. Some incentive for technical staff should be taken in consideration like other development partners (AfDB, World Bank etc).
13. Portion of budget should be seriously considered. Cost of despatching international experts in a district is more than portion of material's provision to farmers.
14. Land preparation is key issues for improvement of rice yield.
15. The Agricultural Development Guideline should be copied and circulated among stakeholders.
16. There are no clear strategies of spread out into nationwide of Technical Package for Rice while implementing only in the Kambia district for four years.
17. During a baseline survey, it is necessary to study production cost which farmers actually spend.
18. Donor coordination should be necessary under the CSP.



The Sustainable Rice Development Project in Sierra Leone

Presentation of Progress Report 1 and Baseline Survey Report

3rd March, 2011
MAFFS Conference Room,
Youyi Building

Project Purpose and Outputs

- Project Purpose:
To establish rice production techniques and its extension method which are applicable throughout Sierra Leone
- Outputs:
 - To elaborate the Technical Package on Rice (TP-R) through on-station and on-farm verification
 - To extend the TP-R to small-scale farmers through Farmers Based Organizations (FBOs) in Kambia

Approach to the Project 1

- (1) Elaboration of TP-R
 - To obtain higher yield (target yield to be set)
 - To pursue profitability
 - IVS is the target ecology to be focused
- (2) Dissemination of TP-R to FBO farmers
 - To develop capacity of extension workers (community facilitators) assigned to the FBOs
 - To adopt Farmer Field School (FFS) as extension method

1. Project Activities during the First Phase (Oct. 2010 – Feb. 2011)

- a. Inception meeting
- b. Baseline survey
- c. Training of CFs and DCs on lowland rice cultivation technique
- d. Designing of experiment for improving technical package on rice production
- e. Provision of equipment for the Project implementation

1. Project Activity a. Inception Meeting

Meeting with:

MAFFS (Oct. 6, 2010),
MAFFS-K (Oct. 12, 2010),
RARC (Oct. 17, 2010)

- Project objective and expected results
- Project activities planned
- Implementation set up
- Clarification of undertakings of JICA and MAFFS

1. Project Activity b. Baseline survey

- 1 Rice production trend and rice related projects (statistical data analysis)
- 2 Characteristics of IVS and rice cultivation (field reconnaissance)
- 3 Situation IVS under FBO/SCP (field reconnaissance)
- 4 Situation of FFS (interview to CFs and DCs, visit to FFS experiment plots)
- 5 FBOs supported under SCP (inventory of FBOs supported by SCP, interview to FBO members)
- 6 Adoption of improved rice cultivation techniques in the pilot project sites in the previous project (interview to the farmers groups of the pilot projects)

1. Project Activities

c. Training of SCP extension workers

1. Target: 10 community facilitators, 3 district coordinators, 3 BES, and 1 SMS (extension) at MAFFS Kambia; Total of 17.
2. Duration: 4 days (Feb. 7 – 10, 2011)
3. Contents: Lecture on rice production techniques (life cycle, growth duration, seeds, land preparation, crop management, fertilizer application, harvest and post-harvest, cost-benefit analysis, yield survey), mini-test, homework
4. Materials: Technical package and manual on rice production (JICA, 2009), and handouts, power point presentation

1. Project Activities

d. Designing of experiment

A series of discussions have been held with RARC. Main discussion points included:

1. Experiment themes and methods for technical package improvement, and
2. Project related equipment to be provided by JICA (equivalent to US\$100,000).

1. Project Activities

e. JICA's Inputs during the first phase

- 1 Sending Japanese experts (7 experts with 15 person-months from Oct. 2010 – Mar.2011)
- 2 Reprint of technical package and manual on rice production (1,000 copies)
- 3 Preparation of project pamphlet (100 copies)
- 4 Provision of GPS (7 units) and topo-maps (for Kambia district) for IVS inventorization
- 5 Provision of motor-bike (3 units), one each for CF, DC and RARC, and spare parts of motor-bike for DCs
- 6 Office equipment (Desktop computer (2), a printer, a photocopy machine, a projector, digital camera (2), etc.) and furniture (desks (5) and chairs (8), etc.) to MAFFS Kambia

2. Findings and Issues

IVS development and utilization (1)

- Characteristics of IVS and rice cultivation (comparative study between Kambia and other districts)
 - IVSs in Kambia are generally smaller in scale as compared to other districts due to the topographic conditions
 - IVS development is left behind in Kambia
 - Improved rice cultivation technique has not been disseminated well in Kambia
 - Soil conditions and diseases do not vary much among districts.

2. Findings and Issues

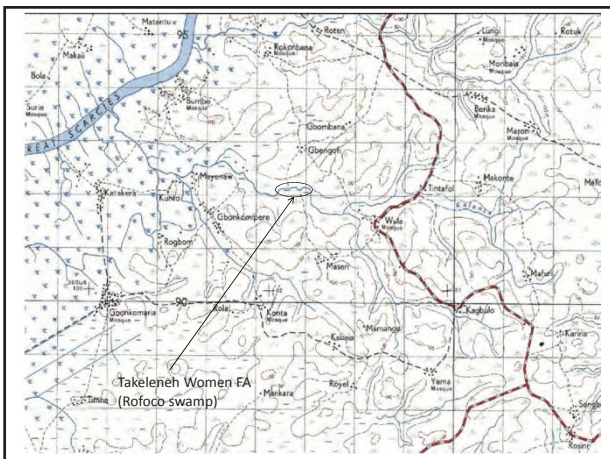
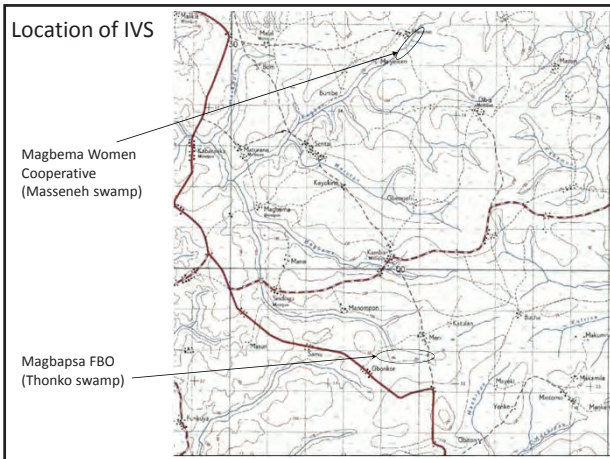
IVS development and utilization (2)

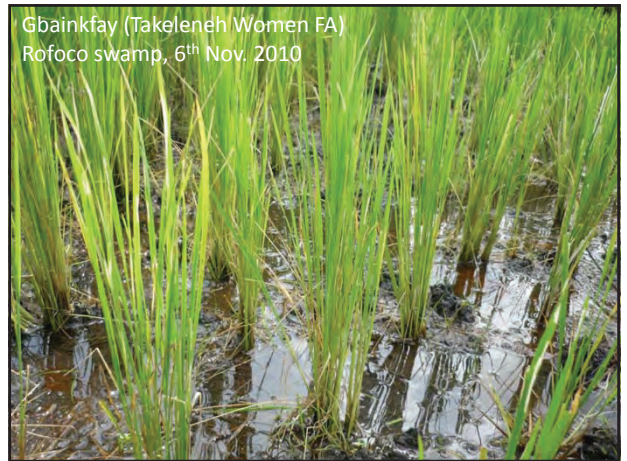
- IVS development situation in Kambia
 - Contribution of ASREP intervention for IVS development is modest due to its status of partial development
 - ASREP intervention failed to involve beneficiary farmers in the development works because of not fulfillment of their commitment
 - Farmers are willing to participate in the development of IVS without asking money if proper guidance is given.

2. Findings and Issues

IVS development and utilization (3)

- IVS development by FBOs supported by SCP
 - None of IVS has been utilized fully. Development scale was 15 ha at maximum. The least area was less than 3ha.
 - Some IVSs have limited development potential due to its location, while other IVSs have peaty soil where machinery cultivation is difficult.
 - Difficult access to IVS is another constraint to machinery utilization.
 - Use of fertilizer is minimal under the above situation.
 - Estimated yield is very low (less than 0.5 ton/ha in many cases)







3. Findings and Issues Situation of FFS (1)

- Attitude of Community facilitators (CF) and District coordinators (DC)
 - 10 CFs and 3 DCs of Kambia district have received FFS training at Makali two times (2008-2009, 2010)
 - 28 FFS were conducted at the field of FBOs. One CF was responsible for 2 to 3 FFS
 - They were supposed to sensitize the FBOs, establish experiment plots, and made regular visits for technical guidance.
 - However, 14 FFS only have established experiment plots.
 - Established experimental plots were poorly managed in many cases

3. Findings and Issues Situation of FFS (2)

- Capacity of CF and DC
 - Results of training: Grade A (7); B (8); and C (2)
 - In general, they do not have enough capacity in calculation (seed rate, fertilizer application, etc.)
 - Their capacity on rice cultivation technique has not fully developed yet, and need continuous training.

Examples of calculation test 1

- Calculate rice seed requirement (xx kg/ha, and yy kg/acre) under the following assumptions.
 - 1) Plant density is 20 hills/m²;
 - 2) Number of seedlings is 3/hill;
 - 3) Germination rate is 80%;
 - 4) 1,000-grain weight is 25 g

(A.=18.75kg/ha)

Examples of calculation test 2

- In case that the fertilizer application rate is 60 kg/ha of N, 40 kg/ha of P₂O₅, and 40 kg/ha of K₂O, how many kg of compound fertilizer (15-15-15) and Urea are necessary for 1 ha of rice field?
(A.=15-15-15: 267kg, urea: 43.5kg)

3. Findings and Issues Situation of FBOs

- Of the eight (8) lowland (IVS) FBOs supported under SCP, cultivating rice in IVS in Kambia district, only two (2) FBOs have gone through FFS.
- The success of farmer to farmer extension depends much on the farmer facilitator's motivation.
- FBOs are often divided into sub-groups which sometimes are very small (less than 10), for convenience of extension by CF.

3. Findings and Issues Lessons learned from the previous project (1)

- Adopted technologies:
 - Simple, manageable, cost saving, yet bring about visible effect.
 - Transplanting few seedlings per hills (disseminated to surrounding areas as "JICA method", shallow transplanting, proper spacing, transplanting at low tide, fertilizer application at low tide, etc.
- Utilization of machinery
 - Profit making machine tended to be managed well.
 - Rice huller (but need technical skill for O&M and site selection)

3. Findings and Issues Lessons learned from the previous project (2)

- Group activity
 - Basis for sustainable development and farmer to farmer extension
 - Weak or dictatorial leadership and/or unaccountable financial management develop distrust among members
- Necessity of follow up and monitoring
 - Necessity of close monitoring and follow up for the farmers to sustain the activity properly

4. Plan for the next phase (May 2011 -) Strengthening of Extension Activity (1)

- Capacity Development of CFs and DCs
 - Continuous training (both theoretical and practical) on rice production technique (refresher course, calculation, field measurement, yield survey, etc.)
 - Support to the FFS implementation
 - training of farmers,
 - experiment design at FFS,
 - regular visit
 - Monitoring of CFs and DCs performance
 - Farmers viewpoint
 - Experts viewpoint

4. Plan for the next phase (May 2011 -) Strengthening of Extension Activity (2)

- Capacity development of FBOs
 - Training of FBO farmers on rice cultivation at sensitization period (by CF and DC)
 - Conduct study tour to the advanced rice cultivation areas (exchange views among farmers)
 - Development of extension materials for farmers (photos, illustration, video, radio programme, etc.)

4. Plan for the next phase (May 2011 -) Research Activity (1)

Improvement of the technical package

Proposed design of experiment 1

- Objective: to know the effect of fertilizer and water control on the yield of rice in IVS ecology
- Target yield: 3 to 3.5 ton/ha
- Target ecology: IVS
- Experiment sites: 3 (2 farmers fields and a RARC field)
- Farming practices: following the technical package
- Treatment: fertilizer application (3 levels) and water control (with and without bund) = 6
- Variety: NERICA L19 (medium duration variety)
- Measurements: labour inputs, growth (plant height and tiller number), yield, and yield component, B/C, etc.

4. Plan for the next phase (May 2011 -) Research Activity (2)

Experiment 2

- Objective: to assess the growth limiting nutrients on IVS soils
- Experiment method: Pot experiment
- Treatments: soils (IVS) and fertilizer application
- Variety: NERICA L19
- Observation: symptom of nutrient deficiency, plant growth, etc.
- Measurement: dry matter production, major nutrients absorbed by plants, soil chemical analysis

4. Plan for the next phase (May 2011 -) Inputs

- Sending of Japanese experts (total of some 27.4 person-months)
- Research equipment necessary for the Project implementation (RARC)
- Seed and fertilizer for the support of FBOs under SCP in Kambia district
- Other office equipment and farm tools as necessary

5. Recommendations

1. Harmonization of development activities between Component 1 and 2
2. Strengthening of monitoring function of FFS (both extension workers and FBOs)
3. Revision of seed quantity to be supported by SCP
4. Careful selection of fertilizer for support (not assorted but specific)

Thank you for your attention.

Ministry of Agriculture, Forestry and Food Security
The Republic of Sierra Leone

The Sustainable Rice Development Project in Sierra Leone

Progress Report 1

March 2011

Japan International Cooperation Agency

RECS International Inc.

NTC International Co., Ltd.

The Sustainable Rice Development Project in Sierra Leone

Progress Report 1

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Abbreviations

ABC	Agricultural Business Center
ASREP	Agricultural Sector Rehabilitation Project
CF	Community Facilitator
DC	District Coordinator
FBO	Farmers Based Organization
FFS	Farmers Field School
IVS	Inland Valley Swamp
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
MAFFS	Ministry of Agriculture, Forestry and Food Security
MAFFS-K	MAFFS - Kambia
MC	Monitoring Committee
NERICA	New Rice for Africa
NRDS	National Rice Development Strategy
NSADP	National Sustainable Agricultural Development Plan
PEMSD	Planning, Evaluation and Monitoring Statistics Division
RARC	Rokupr Agricultural Research Center
RD	Record of Discussion
SCP	Smallholder Commercialization Programme
SLARI	Sierra Leone Agricultural Research Institute
SMS	Subject Matter Specialist
SRDP	Sustainable Rice development Project
TP-R	Technical Package on Rice cultivation

1. Introduction

The Sustainable Rice Development Project in Sierra Leone (“the Project” hereinafter) is implemented in accordance with the Record of Discussion on the Project (“the RD” hereinafter) which have been agreed upon and signed between JICA and the government of Sierra Leone on July 19, 2010.

This Progress Report 1 for the Project is prepared compiling the activities made jointly by Ministry of Agriculture, Forestry and Food Security (“MAFFS” hereinafter) and the Japanese expert team sent by Japan International Cooperation Agency (“JICA” hereinafter) during the first phase, their findings obtained and issues identified, and activity plan in the second phase.

1.1 Project Purpose and Expected Results

According to the RD, the project purpose is “to establish rice production techniques and its extension method which are applicable throughout Sierra Leone”. And the overall goal of the project is “to increase production and incomes of the small-scale rice farmers in Sierra Leone”.

The project purpose is expected to be achieved through the results as shown below.

Expected Results through the Project	
Result 1:	To elaborate the Technical Package for Rice (TP-R) through on-station and on-farm verification.
Result 2:	To extend the TP-R to small scale farmers through Farmers Based Organizations (FBOs) in Kambia district.

It can be said that the Project aims at preparing the nationwide technical extension for rice cultivation through the improvement of TP-R and through the establishment of extension method of TP-R through FBOs. The Project is implemented as a part of the Smallholder Commercialization Programme (“SCP” hereinafter) under National Sustainable Agricultural Development Plan (“NSADP” hereinafter). Through the capacity development of small-scale rice farmers and through the support of inputs provision, the Project is expected to contribute to the success of SCP, and hence NSADP.

1.2 Project Area, Counterparts, and Implementation Organization

Project Area

The project area covers the whole Kambia district. Lowland, especially inland valley swamp (“IVS” hereinafter) is regarded as important agro-ecosystem.

Trials to improve TP-R are conducted both in the experimental farms of RARC and in farmers fields in the Kambia district. Dissemination of TP-R is carried out using the Farmers Field School (“FFS” hereinafter) method for 10 to 15 FBOs to be selected in the course of the Project based on the baseline survey results.

Implementing agency

The Project is implemented by MAFFS and SLARI as implementing agencies (counterpart agencies).

Essential counterparts are the staff members of MAFFS-K and RARC, and one full-time counterpart is assigned from each of the two agencies.

Implementation organization

To implement the Project harmoniously, a Joint Coordination Committee (“the JCC” hereinafter) and a Monitoring Committee (“the MC” hereinafter) are established to coordinate, follow up, and monitor the Project activities.

2. Project Activities

2.1 Inception meeting

The Project started in October, 2010, when three JICA Project experts left Japan.

After arriving in Sierra Leone, the JICA experts held a series of Inception Meetings with concerned offices as follows.

- MAFFS : Oct. 6, 2010,
- MAFFS-K: Oct. 12, 2010,
- RARC: Oct. 17, 2010

In the meeting JICA experts distributed the Inception Report of the Project and explained the contents clarifying: (i) Project objective and expected results, (ii) Project activities planned, (iii) Implementation organization, and (iv) Undertakings of JICA and MAFFS.

2.2 Baseline survey

A series of baseline survey conducted for the purpose of grasping the existing situation and issues on rice production and knowing the activities and organizations for the rice production promotion. The results are supposed to be utilized in determining the direction for the improvement of TP-R and dissemination, and in determining various indicators for the evaluation at the time of the Project completion.

The baseline survey is conducted mainly by the JICA experts in collaboration with the Sierra Leonean counterparts. Survey items and methodologies are in the following.

Table 2.1 Subjects of baseline survey and their survey methods

Survey subject	Method (source of information)
Rice production trend	Statistics (PEMSD, MAFFS, NRDS, Africa Rice Center)
Rice related projects	Report (NRDS)
Agricultural extension and FFS	Interview
Farmer based organization (FBO)	Data analysis and Interview
Features of IVS and its utilization	Site reconnaissance (In and outside Kambia district)
Adoption of technical package in the pilot villages in the previous project	Interview (farmers' groups of the pilot project areas)

Results of the baseline survey were compiled separately as the Baseline Survey Report.

2.3 Capacity development of extension workers on lowland rice production technique

In order for extension workers to have common understanding of rice production techniques in theory, and to evaluate their knowledge on rice production technique as well as extension capacity, the JICA Project Team organized a four-day-training on rice production from 7th through 10th February, 2011. The training program was prepared and lecturers were selected by subject as shown in Table 2.2.

Table 2.2 Program of SRDP Training (1) on Rice Production

	Subject	Lecturer
[1] Feb 07	Lifecycle of Rice	
10:00 - 11:00	Opening, Orientation	P. Fofana, Kimijima, Nishiya
11:00 - 12:00	Pre-Test	Nishiya
13:00 - 14:00	Physiology of Rice, Variety of Rice	Kimijima
14:00 - 15:00	Proper time of cultivation, Yield Component	Kimijima
15:00 - 16:00	Mini Test	Kimijima
[2] Feb 08	Rice Cultivation Method 1	
09:30 - 10:00	Review of Mini Test	Kimijima
10:00 - 11:00	Seed	Takemura, Nishiya
11:00 - 12:00	Seed Rate (Practice, Homework)	Nishiya
13:00 - 14:00	Seedling, Land Preparation, Transplanting	Nishiya
14:00 - 15:00	Video on Rice Production	Nakamura
15:00 - 16:00	Mini Test	Nishiya
[3] Feb 09	Rice Cultivation Method 2	
09:30 - 10:00	Review of Mini Test and Homework	Nishiya
10:00 - 11:00	Fertilizer	Nishiya
11:00 - 12:00	Fertilizer Application Rate (Practice, Homework)	Nishiya
13:00 - 14:00	Field management (Water management)	Kimijima
14:00 - 15:00	Field management (Weed control, Pest control)	Kimijima
15:00 - 16:00	Mini Test	Kimijima
[4] Feb 10	Rice Cultivation Method 3	
09:30 - 10:00	Review of Mini Test and Homework	Nishiya
10:00 - 11:00	Harvesting, Post-harvest handling	Nakamura
11:00 - 12:00	Yield Survey	Kimijima
13:00 - 14:00	Cost-Benefit Analysis	Nishiya
14:00 - 15:00	Mini Test, Evaluation, Closing	Nishiya, S. Tarawali, Kimijima

The participants in the training consisted of three (3) SCP District Coordinators, 10 SCP Community Facilitators, and selected four (4) extension staffs of MAFFS-K who would be involved in the SCP activities. All participants are male. Average age is 51 years old and duration of MAFFS staffs is 29 years. Out of 17 participants, 10 have attended the FFS training in 2008 and/or 2010. In addition, there were three (3) observers, consisting of a SMS in charge of extension and two (2) local staffs of the Project.

At the beginning, a questionnaire was distributed and a pre-test was conducted to know personal data and present level of knowledge on rice production, respectively. Questions in the pre-test were prepared in consideration of what they were expected to learn in the training. Then, a series of lectures and practices of different subjects regarding rice production were provided using handouts, power point presentation, and/or demonstration by the Japanese experts. Mini-tests were conducted at the end of each day to confirm the achievement of the participants. As for the calculation of seed rate and fertilizer application rate, homework was given to review the practices in the class. All the handouts, pre-test, mini tests, and

presentation materials are presented in the Annex.

The Technical package and technical manual on rice production, the products of the previous project, was used as a main text in the training. In the lectures, original slides were prepared for detailed explanation and additional information. A video entitled "the improvement from reed marsh - Kamedago land development district" was shown on the third day to share the experience of Japanese swamp development. Seed germination test was explained by showing the actual result and practice by the participants. In the practices, the answers to the pre-test were explained, and then further questions were given for group discussion.

2.4 Preparation of experiments for the improvement of technical package on rice production

(1) Meetings

In order to improve the current technical package on rice production further to meet the demand to enhance rice yield, research activities were expected in the Project. The JICA Project Team contacted with RARC from the beginning of the Project, and a series of discussions have been made to come up with the concrete design of the experiment. So far, eight meetings have been held.

In the meeting, project related equipment to be provided to RARC by JICA was also discussed.

Minutes of each meeting with distributed discussion materials are compiled as Annex 2.

(2) Visit to the candidate experiment sites

On 16th February, the JICA Project team, together with two RARC counterparts, visited two villages (Samu and Gbainkfay in Magbema chiefdom) where the villagers utilize IVS nearby for rice cultivation. They explained the village elders the purpose of the visit, and then examined the topographic conditions, soils, rice growth of IVS through field reconnaissance, and flood pattern, duration and magnitude through interview with farmers in each village. After the field visit, they made dialogue with farmers asking if they are interested in cooperating with the experiment.

Summary of the field visit to the candidate experiment sites were presented in Annex 3.

2.5 Inputs from JICA

During the first phase of the Project from October 2010 to March 2011, the following inputs were provided by JICA

- 1) Sending Japanese experts (17 person-months with 7 experts from Oct. 2010 – Mar.2011)
- 2) Reprint of technical package and manual on rice production (1,000 copies)
- 3) Preparation of project pamphlet (100 copies)
- 4) Provision of 7 units of GPS, 10 sheets of topo-map covering the Kambia district, and 112 gallons of fuel and lubricants for IVS inventorization work for Kambia district
- 5) Provision of 3 units of motor-bike (3 units); one for CF, one for DC of MAFFS-K and one for

RARC, and spare parts of motor-bike for DCs of MAFFS-K

- 6) Office equipment (Desktop computer (2), a printer, a photocopy machine, a projector, digital camera (2), etc.) and furniture (desks (5) and chairs (8), etc.) to MAFFS Kambia

2.6 Inputs from Sierra Leonean side

Inputs provided by the Sierra Leonean side were the following:

- 1) Office space with furniture at MAFFS-K
- 2) Counterpart personnel from MAFFS, MAFFS-K and RARC

3. Findings and Issues

Main findings obtained and issues identified during the first phase activities are summarized and presented in the following sections.

3.1 Capacity of Extension Workers under SCP

- 1) Attitude of the community facilitators (CF) and district coordinators (DC) has been inadequate
 - 9 CFs and 3 DCs of Kambia district have received FFS training as a refresher course at Makali in 2010.
 - One CF was responsible for 2 to 3 FFS and totally 28 FFS were supposed to be conducted in 2010. FFS was expected to be managed under collaboration with the FBOs members and establish experimental plots with regular visit for technical guidance.
 - However, 14 FFS only have been established with experiment plots as of Dec, 2010. Besides, established experimental plots were inadequately managed in many cases
- 2) Capacity of CF and DC needs to be improved

Having taken part in the training actively, all 17 MAFFS-K staffs could receive certificate successfully. The achievement rate of the participants was evaluated in the mini tests and homework. In total score of them was 74.6 in 100 in average. The number of the participants who got Grade A (≥ 80), Grade B (≥ 60) and Grade C (< 60) was 7, 8 and 2, respectively. In general, they learned the TP-R/TM-R at certain level. The theory in rice cultivation was understood relatively well, but calculation skill for fertilizer application, seed rate, yield estimate and so on was still insufficient.

Table 3.1 Results of the mini test and homework

	Point Allocation	Average	Highest	Lowest	Remarks
Mini test 1	20	11.5	20	8	
Mini test 2	20	16.1	20	8	
Mini test 3	20	14.2	20	8	
Mini test 4	20	14.2	20	8	
Homework 1	10	8.8	10	5	Calculation of seed rate
Homework 2	10	9.7	10	5	Calculation of fertilizer rate
Total	100	74.6	88	53	

At the end of the training, the 17 participants evaluated the training by using questionnaire. The questions and their answers are presented in Table 3.2. At the first question, 13 answered that the training was good because they gained more knowledge. The most impressive subject was fertilizer application, followed by yield component, seed rate, cost-benefit analysis and so on. There were some negative comments on shortage of time, poor English ability of the lecturers, inadequate per diem to the participants and absence of field practice. In other questions, they also requested longer period and frequent training during the remaining Project period. The subjects they wanted to learn in succeeding trainings included: 1) fertilizer application rate, 2) yield estimate, 3) cost-benefit analysis, 4) post-harvest, 5) swamp development, 6) seed rate and 7) IPM.

Table 3.2 Evaluation for training by participants

	Question	Answer
Q 1	What is your opinion about the training?	Good (13), Fair (4), Poor (0)
	Reasons:	[Positive] Gain more knowledge (8) [Negative] Short in time (3), Imperfect English (2), Low per diem (2), Necessity of field practice (1)
Q 2	Did you get any new idea in the classroom lectures?	Yes (16), Somewhat (1), Not at all (0)
	What idea?	Fertilizer and fertilizer application rate (9), Life cycle and yield component (6), Seed rate (4), Cost-benefit analysis (3), Video on Japanese rice development (3), Post-harvest (1)
Q 3	What is your suggestion to improve the training?	More time and frequent (10), More per diem (5), More practical work (3), More hand-out (1), Explanation method (1)
Q 4	Did you face any problems during the training?	None (7), Difficulty in calculation (3), Short in per diem/food (3), Short in time (2), Language (1)
Q5	What are the subjects to be picked up in the future training?	Fertilizer application rate (7), Yield estimate (6), Cost-benefit analysis (5), Post-harvest (3), Swamp development (2), Seed rate (1), IPM (1)

The Project Team will conduct a series of training both in theory and in practice during the Project period, taking those opinions into account.

3.2 Situation of FBOs

Of the eight (8) lowland FBOs cultivating rice in IVS and supported under SCP in Kambia district, only two (2) FBOs have gone through FFS.

The success of farmer to farmer extension depends much on the farmer facilitator's motivation.

FBOs are often divided into sub-groups which sometimes are very small (less than 10), for convenience of extension by CF.

3.3 IVS Development and Utilization

1) Characteristics of IVS and rice cultivation situation in Kambia district and other districts are as follows:

- IVSs in Kambia are generally smaller in scale as compared to other district due to the topographic conditions
- IVS development is left behind in Kambia
- Improved rice cultivation technique has not been disseminated well in Kambia
- Soil conditions and diseases do not vary much among districts.

- 2) IVS development in Kambia has faced with problems:
 - Contribution of ASREP intervention for IVS development is modest due to its status of partial development
 - ASREP intervention failed to involve beneficiary farmers in the development works because of not fulfillment of their commitment
 - Farmers are willing to participate in the development of IVS without payment if proper guidance is given.
- 3) Rice production in IVS by FBOs supported by SCP has not been remarkable.
 - None of IVS has been developed fully. Development scale or area under cultivation was 15 ha at maximum. The least area was less than 3ha.
 - Some IVSs have limited development potential due to its topographic condition, while other IVSs were of peaty soil where machinery cultivation is very difficult.
 - Access to IVS is another constraint to introduce machinery for land preparation.
 - Use of fertilizer is minimal under the uncontrolled water condition.
 - Estimated yield is very low (less than 0.5 ton/ha in many cases)

3.4 Lessons Learned from the Previous Project

- 1) Adopted technologies by the pilot project farmers were those which are simple, manageable, cost saving, yet bring about visible effect. Examples of adopted technologies include: (i) transplanting few seedlings per hills (disseminated to surrounding areas as “JICA method”), (ii) shallow transplanting, (iii) proper spacing, (iv) transplanting at low tide (mangrove swamp), fertilizer application at low tide (mangrove swamp), etc.

However, sustenance of the productivity have not been assured without monitoring and follow up. Yield level of rice tended to be declined.

- 2) Among the machinery or equipment introduced more utilized one was rice huller. This machine was utilized the most and relatively well managed and maintained, although it needs technical skill for operation and maintenance. When introduce a rice huller, the site selection should be done carefully so that rough rice to be milled could be collected easily.
- 3) Group activity is the basis for sustainable rice development and farmer to farmer extension. Weak or dictatorial leadership and/or unaccountable financial management develop distrust among members. Therefore, when selecting FBOs, their organizational structure and executive members should be examined carefully.

3.5 Recent Research Results on Rice Production

- 1) RARC has been conducting various research works on rice. So far as the results obtained, recommended planting density is 20 hills/m², nursery duration is 20 to 40 days, weeding, if only once, is to be done at 4 to 6 weeks after transplanting. Fertilizer (NPK compound) is applied at 2 weeks after transplanting with the recommended dosage of N-P₂O₅-K₂O = 60-40-40 kg/ha for lowland rice and 80-40-40 kg/ha for upland rice.
- 2) An experiment using 5 to 10 ton/ha of compost (N = 2-3% on average) made from oil kernel cake showed the same effect as the application of recommended amount of fertilizer. Oil kernel cake is available at palm oil refinery factory at Freetown. Although the results showed the positive effect, it is skeptical if the use of oil palm kernel cake is practical from the viewpoint of economy and access to the raw materials.
- 3) Rice straw and rice bran, byproducts of rice can be effective materials for productivity enhancement.
- 4) In IVS, NERICA L19 and L20 perform well. NERICA L19 shows tolerance to iron toxicity.
- 5) ROK22 with growth duration of 140-150 days, and ROK23 with 180 days grow better in Mangrove swamp.
- 6) In 1980s, split application of nitrogen with total dosage of 60 kg/ha, after the first application of P₂O₅ and K₂O (40 kg/ha each) has been experimented to enhance nitrogen utilization rate.

4. Activity Plan in the Second Phase

Based on the findings and issues described in the previous Chapter, activity plan in the second phase is formulated. The second phase is going to start at the end of April or early May 2011. Capacity development of CFs and DCs is continued and strengthened. Improved cultivation techniques of rice are disseminated to members of FBOs by CFs through FFS. Performance of CFs in FFS is closely monitored, and necessary advice will be given as necessary.

In order to improve the present technical package for increasing yield, experiment shall be carried out at the farmer's field. Aside from the fertilizer application treatment, some water control measures with minor engineering works will be done as a part of trial.

Detailed activity plan is presented below.

4.1 Strengthening of Extension

1) Capacity development of CFs and DCs

Training (both theoretical and practical) on rice production technique (refresher course, calculation, field measurement, yield survey, etc.) will be continued.

Short time but intensive theoretical training is conducted regularly on the specific topic. Calculation capacity is enhanced through repeated test.

Implementation of FFS will be supported by JICA experts. At the time of sensitization, new cultivation methods which have been proved effective are introduced. Theme of experiment at the experiment plots is selected through dialogue with the farmers. At weekly regular visit, technical guidance is conducted in relation to rice growing stages. Field measurement and yield survey are also conducted using FFS sites.

Performance of the CFs and DCs is monitored mainly from the farmers' viewpoint.

2) Capacity development of FBOs

Training of FBO farmers on rice cultivation is conducted at the sensitization period by CF and DC supported by SMS extension and JICA experts.

Study tour to advanced rice production area and/or other IVS FBOs is organized. The visiting farmers are expected to exchange views to better cultivation method with recipient farmers.

Various extension materials for farmers are developed in consideration of their low literacy rate. Extension materials to be developed include: photos, illustrations, videos, radio programmes, etc. all of which are audiovisual aid.

4.2 Experiment for the Improvement of the Technical Package

For the improvement of the technical package, the following two sets of experiment are planned.

1) Field experiment

- Objective: to know the effect of fertilizer and water control on the yield of rice in IVS
- Target yield: 3 to 3.5 ton/ha
- Target ecology: IVS
- Experiment sites: 3 (2 farmers' fields (Samu and Gbainkfay in Magbema chiefdom) and a RARC field)
- Farming practices: following the technical package
- Treatment: fertilizer application (3 levels: N-P₂O₅-K₂O= 0-0-0; 40-20-20; 80-40-40) and water control (with and without bund) = 6 (drainage canal and peripheral canals may be constructed)
- Variety: NERICA L19 (medium duration variety)
- Measurements/observation: labour inputs, growth (plant height and tiller number), yield, and yield component, major nutrient absorbed by rice plants, etc.

Emphasis is put on the establishment of accurate measurement methods in this phase.

2) Pot experiment

- Objective: to assess the growth limiting nutrients on IVS soils
- Treatments: soils (IVS) at different location and fertilizer application
- Variety: NERICA L19
- Observation: symptom of nutrient deficiency, plant growth, etc.
- Measurement: dry matter production, major nutrients absorbed by plants, soil chemical analysis

4.3 Proposed Inputs from JICA

In the next phase, JICA is expected to provide the following inputs.

- Sending of Japanese experts (total of some 25 person-months)
- Research equipment necessary for the Project implementation (RARC)
- Seed and fertilizer for the support of FBOs under SCP in Kambia district (FBOs)
- Office equipment and farm tools as necessary (MAFFS-K, RARC, and/or FBOs)

5. Recommendations

Based on the findings obtained and issues identified through the first phase activity, the JICA Project Team makes the following recommendation to MAFFS.

(1) Harmonization of development activities between Components 1 and 2 of SCP

To enhance the productivity of rice in IVS, fertilizer application is indispensable. At the same time, water control is a must to make fertilizer application effective, especially for rainy season cropping.

Currently, Component 1 of SCP has gone ahead by providing FBOs with inputs materials and by constructing ABCs. Whereas, the swamp development of Component 2 has left behind. Under such situation, lowland FBO farmers, especially those in IVS cannot enjoy the real benefit of seed and fertilizer fully, which will make IVS farmers discouraged to cultivate more and apply fertilizer.

Swamp development method adopted by ASREP, which involved local farmers in civil work by paying has created serious problem as it did not fulfilled its commitment.

As the farmers cultivating rice in IVS know that they are the beneficiary of development, they are willing to participate in the development works without asking for money. They just need tools like shovel.

Implementation of Component 2 should be promoted to develop swamp to catch up the progress of Component 1. When on-going inventorization of IVS is finished, prioritization of IVS should be done. Those FBOs utilizing the priority IVS should be considered as candidate FBOs to be supported by SCP after confirming that there is no land tenure problem.

(2) Careful selection of FBOs to be supported under SCP strictly applying the selection criteria.

FBO selection in Kambia district seemed have not been done properly, as many FBOs in IVS have not met their selection criteria. This caused various problems, like low level of understanding of FFS, inadequate cultivation area in IVS, etc., all of which hindered expected production increase.

MAFFS should be involved in the process of selecting FBOs by examining them if candidate FBOs really met the selection criteria, so that the expected benefit could be assured.

(3) Strengthening of monitoring function for FFS implementation (both extension workers and FBOs)

Inadequate FFS progress was partly attributed to the current weak monitoring system. Monitoring and evaluation has not been done in the process of FFS. There must be various indicators set to evaluate FFS. In each of FFS process from sensitization through harvest, some measurable indicators should be set, and monitoring should be done accordingly. Target of monitoring and evaluation includes both extension workers and FBO farmers.

(4) Revision of seed quantity to be supported by SCP

The technical package developed in the JICA's previous project that has been distributed nationwide recommend less seed rate than that under SCP. Under transplanting method, less than 30 kg/ha of seed is needed, which is less than half of the rate SCP distributes to FBO farmers. This less amount has been

commonly adopted in the rice producing countries, and the pilot projects implemented in the previous project has proved its effectiveness. They could enjoy less seeds with more production. In fact, transplanting a few seedlings per hill with proper spacing has been adopted by not only those in pilot project villages but also in surrounding villages as “JICA method”.

For most farmers, seed rice is valuable and expensive input which is sometimes obtained as loan from traders and money lenders with very high interest rates. Therefore, they are keen to adopt less seed rate when they know that this will not affect yield or rather increase it.

Purchasing seed rice for distributing to FBO farmers in SCP presses the Government budget. If it can reduce the budget for seed rice even a little, this precious amount could be utilized for other development activity like swamp development.

Distribution of less seed rice deserves the Government’s serious attention.

(5) Careful selection of fertilizer for support (not assorted but specific)

At present SCP is supporting FBOs in distributing chemical fertilizers whatever the sort is. Plants require specific nutrients according to their growth stages. Nitrogen is the source of protein forming the structure of body, and it is required more in the panicle initiation stage as well as initial growth stage. Phosphorus fertilizer is particularly important in the initial growth stage, whereas potassium is required in the whole growing stage.

Determination of the required amount of those major nutrients is not easy as it depends on the soil fertility. However, as RARC has set recommended dosage of fertilizer in lowland as $N-P_2O_5-K_2O = 60-40-40$ kg/ha, this proportion should be used for the time being.

It is strongly recommended that the Government should purchase the specific fertilizers which will assure the similar dosage as above by combination.

If compound fertilizer (15-15-15) and urea is available, 21 bags of urea and 129 bags of compound fertilizer will make similar proportion of major nutrients ($N-P_2O_5-K_2O=48.4-32.3-32.3$ kg/ha) for 30 ha.

Minutes of the Joint Coordinating Committee Meeting on the Progress Report 2 for the Sustainable Rice Development Project in Sierra Leone (MAFFS-JICA)

The second Joint Coordinating Committee Meeting (the Meeting) on the Sustainable Rice Development Project in Sierra Leone (the Project) was convened at the conference room of the Ministry of Agriculture, Forestry and Food Security (MAFFS), Youyi Building, at 12:00 p.m. on 9th December, 2011. The attendants are shown in Attachment 1.

The Meeting was chaired by Dr. Joseph Sam Sesay, Minister of MAFFS. In his opening remarks, the chairman made a brief explanation about the background of the Project and objectives of the Meeting. Besides, the chairman insisted on the importance of the Project that is aligned with the national flagship project, Smallholder Commercialization Programme (SCP), in terms of enhancement of rice production.

After the explanation, the chairman asked Mr. Takashi KIMIJIMA, JICA chief advisor of the Project (the chief advisor), to present the contents of the Progress Report 2 of the Project.

The chief advisor made the presentations using a PowerPoint, along the four (4) main pillars of the Progress Report 2 including (i) collaborative experimental work with RARC to elaborate technical package on rice production (TP-R), (ii) dissemination of TP-R, (iii) support to 22 FBOs under SCP in 2011, and (iv) third country training in Malawi on small irrigation development. Presentation materials were distributed to all the participants (Attachment 2).

After the presentation, the chairman admired the Project's effort and requested the chief advisor to provide some of presentation slide because those discoveries can be answered to the question in relation to rice production or yield from the presidential task force meeting. Most of the participants showed their interests on the progress of the Project and the following discussions were made.

(i) Collaborative experimental work with RARC to elaborate technical package on rice production (TP-R)

Chairman: According to your presentation about pot experiment results in RARC, application of organic materials including palm kernel cake and rice husk and bran showed negative effect on rice growth. Is the same problem possible to occur in all agro-ecologies like IVS, boliland, mangrove swamp?

Chief Advisor, JICA: This adverse effect could be occurred under submerged condition. Because soil becomes reduced condition in the course of decomposition of those organic materials and it accelerates iron toxicity problem. Therefore, those materials should not be applied unless they are well decomposed.

Chairman: Palm kernel cake and rice by-products are very important for us as fertilizer resources, but any results don't come out from research. Therefore, I would like you to make some experiment by using decomposed materials. Those results must be very useful for us.

Chief Advisor, JICA: I will convey your request regarding decomposed organic materials to our experts who are taking care of experiments at RARC, even though our first priority is to find out what the most critical nutrient in the soil is. Fortunately, some of the researchers in RARC also conduct trials by using palm kernel cake and I hope it will help you.

Sierra Leonean Participant (MAFFS): I would like to know the detailed information about methodology of on-station and on-farm trials.

Chief Advisor, JICA: As for on-station trials, experiment itself was conducted in the greenhouse using plastic pots with 2.5 liters capacity. Nine (9) treatments were set up as described in the report including seven (7) nutrient treatments and two (2) treatments with a single addition either of palm kernel cake or rice husk and bran. Chemical reagents were employed as nutritional sources instead of fertilizer itself since single element fertilizers like potassium chloride and superphosphate are not available in Sierra Leone.

On the contrary, we used NPK compound fertilizer to set three (3) levels of fertilizer application rate for on-farm trial. Surrounding bund was constructed to set water control treatments (with and without).

(ii) Dissemination of TP-R

Sierra Leonean Participant (MAFFS): We admire farmers' effort to obtain more than 3.0 t/ha of yield, which is quite higher than national average (1.7 t/ha). I would like to know the further information about cultivation condition such as variety, ecology, methodology, etc.

Chief Advisor, JICA: Variety employed was NERICA L19 and agro-ecology is pure IVS. We instructed them to construct bund to control water, so that effective utilization of fertilizer can be ensured. Other practices recommended were puddling before transplanting, use of young (3 weeks) seedling, transplant 2 – 3 seedlings per hill shallowly with 20 – 25 cm apart and periodical weeding. Although each practice is quite simple and may conduce slight favorable effect, integrated practices can bring higher yield and I think those can be applicable to all over the country.

Sierra Leonean Participant (MAFFS): I found some swamp pictures with sandy soil in your report. Can we make efficient fertilizer use under such condition?

Chief Advisor, JICA: Nutrition holding capacity in sandy swamp is generally low. As a result, effectiveness of fertilizer application becomes also low. Applying small quantity of fertilizer several times can be recommended to prevent leaching fertilizer from those soils. In addition, if we apply fertilizer before well establishment of roots, fertilizer cannot be fully used by rice plant. Therefore, we also have to consider about the timing of fertilizer application and to avoid too early application.

Sierra Leonean Participant (MAFFS): I wonder the effectiveness of training provided by the Project. Even last phase project emphasized training, but similar problem about low capacity of extension agents still come out up to date. Have they been trained well to develop their capacity?

Chief Advisor, JICA: We are trying to do our best and keep the training quality high. Despite our effort, community facilitators are still low capacity up to date. This is simply because they are lack of basic knowledge, for instance calculation skill. Most of them hardly answer when they are asked about seed rate and fertilizer application rate depending on farmers' cultivation area. Since we try to improve their capacity as much as possible, we also give them some lectures for basic calculation skills by using first 30 minutes of the training session. However, training itself is not review for basic school activities and they should have been well-trained, especially basic scholarship, before they start their own mandate. This is the reality we are facing in the field of

extension.

Sierra Leonean Participant (MAFFS-K): Some of the community facilitators who were trained at Makali a couple of years ago didn't have knowledge about crop cultivation, because they belonged to other sections like forestry, livestock, etc. Those community facilitators had to be replaced with others due to their poor performance under SCP. Selection of proper extension agents is another important issue.

Sierra Leonean Participant (MAFFS): We normally use 62.5 kg/ha of seed rice based on recommendation rate by RARC. However, I heard in other countries 50 kg/ha of seed rice is recommended. What is your recommendation seed rate for typical IVS?

Chief Advisor, JICA: We recommended 30 kg/ha in our previous project, instead of your recommendation. In fact, in Japan 20 kg/ha of seed rice is nursed if we employ manual transplanting. 25 - 30 kg/ha of seed rice is sufficient. Farmers tend to nurse all the seed they received from my experience in this country, as a result seedlings in nursery are overcrowded, too old seedlings are transplanted due to lack of labor force and some leftover seedlings are still found. We'd better reduce the seed rate to practice economy.

Chairman: I think establishment of farming/cropping calendar is another important issue to increase yield because it will not make any cost to practice. Therefore, I would like to know the correct timing of farming practices.

Sierra Leonean Participant (MAFFS): Based on your report, out of 22, 5 FBOs/IVSs has permanent water flow throughout the year. Do you think it is possible to plant rice three (3) times a year in those IVSs? It will be good from the perspective of agribusiness.

Chief Advisor, JICA: I fully agree with you about importance of drawing up farming calendar. In case we employ short duration variety, i.e. 90 days variety, it's possible to plant rice three (3) times a year, so that we can avoid the peak rainy season (July, August and September). Growing rice during peak rainy season cannot be recommended from the viewpoint of solar radiation and difficulties of drying after harvest. But we also take account of farmers' preference, and some farmers desire to grow vegetable during dry season instead of rice since vegetable tend to be more profitable.

(iii) Support to 22 FBOs under SCP in 2011

Sierra Leonean Participant (MAFFS): What were the selection criteria of FBOs? Did you select new FBOs?

Chief Advisor, JICA: FBOs were selected by MAFFS-K. I know they struggled to find out the suitable site for SCP criteria. Kambia district is surrounded by two big rivers and such topographic nature makes streams short and steep, and also makes IVSs smaller.

(v) Issues to be addressed

Sierra Leonean Participant (MAFFS): I want to look at low quality of seed rice provided from RARC. Did you collect Pa Kiamp which showed low germination rate via official channel or somebody in RARC? Because this is an institutional matter and I want to take it up to research.

Chief Advisor, JICA: Seed rice was purchased through RARC, but they didn't produce those seed rice and just

collected from farmers. The poor quality of seed rice might occur at the farmers' field level, but RARC assured over 98% of germination rate and over 99% of purity with certified labels. Although the responsibility in providing low quality seed in under JICA, RARC should also be responsible for selling seed rice with false information.

As for Pa Kiamp, it is not officially registered or released variety and few varietal characteristics are available. As far as I know, this variety was introduced from Ghana about ten years ago. Therefore, I have contacted the one (1) personnel of Ministry of Agriculture in Ghana to collect the detailed information about this variety, though I have not yet any received response from them. Once I received the information about this variety, I will share any with you.

Chairman: Producing and selling rice for farmers is not their mandate. Only they have to do is to produce and secure foundation seed and seed multiplication is suppose to be done by private sector. They may prioritize business rather than research works, once they have started the money producing works. We should let them stay on their real mandate.

The meeting was adjourned at 14:00 p.m.

End

Attachment 1 List of Attendants

No.	Name	Organization	Designation	Tel.	e-mail
1	Joseph Sam Sesay	MAFFS	Minister		_____
2	Amara I. Sheriff	MAFFS	Ag. Deputy Director General		_____
3	Adikali Samura	MAFFS	Deputy Secretary		_____
4	Ben A. Massaquoi	MAFFS	Director, Extension		_____
5	James K. Pessima	MAFFS	Director, Crops		_____
6	B. J. Bangura	MAFFS	Deputy Director, Extension		_____
7	IMO Shamie	MAFFS	Deputy Director, Crops		_____
8	Jack A. Jalloh	MAFFS	Assistant Director, Extension		_____
9	M. A. Sheriff	MAFFS	Assistant Director, M&E		_____
10	Sid M. Kamara	MAFFS	Head, NACU		_____
11	Peter Kamara	MAFFS	Focal Point, NRDS		_____
12	Umaro M. Sankoh	MAFFS	M&E Officer, Kambia		_____
13	Takashi Kimijima	JICA	Chief Advisor, SRDP		_____
14	Kazuaki Sato	JICA-SLFO	Resident Representative		_____
15	Akiko Tatsuta	JICA-SLFO	Project Formulation Advisor		_____



The Sustainable Rice Development Project in Sierra Leone

Presentation of Progress Report 2

9th December, 2011
MAFFS Conference Room,
Youyi Building

1

Project Purpose and Outputs

- **Project Purpose:**
To establish rice production techniques and its extension method which are applicable throughout Sierra Leone
- **Outputs:**
 - To elaborate the Technical Package on Rice (TP-R) through on-station and on-farm verification
 - To extend the TP-R to small-scale farmers through Farmers Based Organizations (FBOs) in Kambia

2

Approach to the Project 1

- (1) Elaboration of TP-R
 - To obtain higher yield
 - To pursue profitability
 - IVS as the main ecology to be focused
- (2) Dissemination of TP-R to FBO farmers
 - To develop capacity of extension workers (community facilitators and district coordinators) assigned to the FBOs under SCP
 - To adopt Farmer Field School (FFS) as extension method
 - Develop effective extension tools

3

1. Project Activities during the First Phase (Oct. 2010 – Mar. 2011)

- a. Inception meeting
- b. Baseline survey
- c. Training of CFs and DCs on lowland rice cultivation technique
- d. Designing of experiment for improving TP-R
- e. Provision of equipment for the Project implementation
- f. Preparation of Progress Report 1
- g. Joint Coordination Committee Meeting 1

4

2. Project activities during first half of the second phase (Apr. - Aug. 2011)

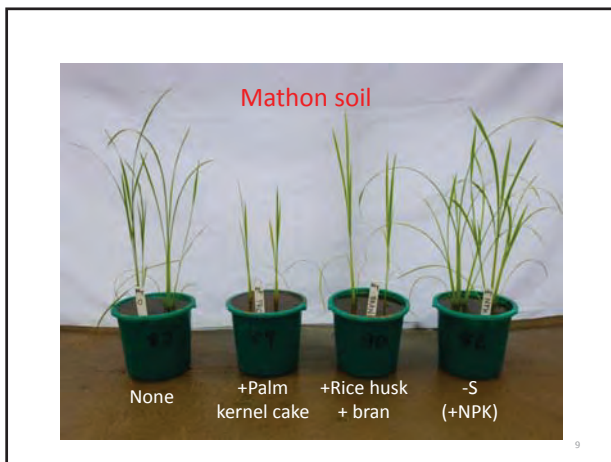
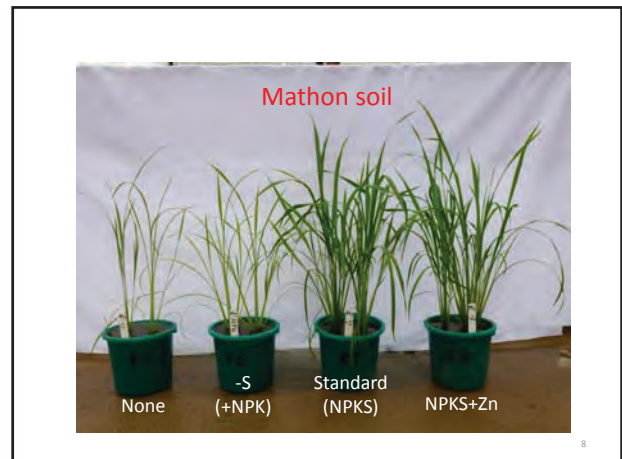
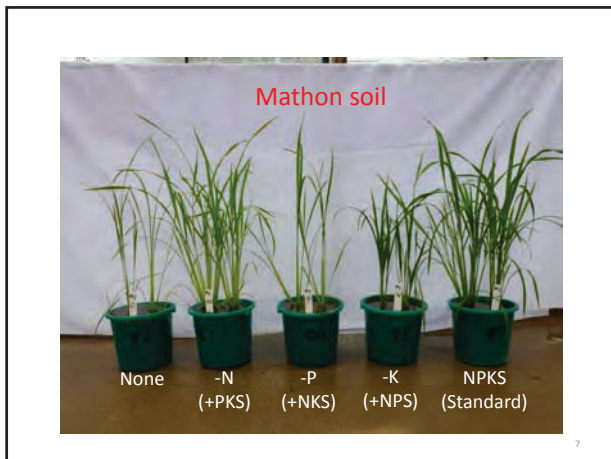
- a. Trial for improving the TP-R (page 2 - 8)
- b. Dissemination of TP-R (page 8 – 13)
- c. Support to the FBOs under SCP (page 14-17)
- d. Third country training in Malawi on small scale irrigation (page 18-20)
- e. Other activities (page 20-21)

5

a. Trial for improving the TP-R (1) (page 2-5)

1. Soil fertility assessment trial (pot experiment)
 - Objective: to assess the variation of soil fertility of the lowland rice field in Kambia district
 - Soils used: 11 soils
 - Treatments: nine (0, -N, -P, -K, -S, NPKS (standard), +Zn, palm kernel, rice husk)

6



Shortage level of mineral elements

Agro-ecology	Location	Element (nutrient)				
		N	P	K	S	Zn
IVS	Kamaranka	+	+++	++	+++	+
	Sinbeck	-	+++	++	+	+++
	Karawani	+++	+++	++	++	-
	Robannah	+	+++	++	++	-
	Tholokuray (upper)	++	+++	++	++	+
	Tholokuray (lower)	++	+++	+++	+++	-
	Mathon	++	+++	++	+++	-
Boliland	Kalintin	+	+++	+	++	-
Riverain	Robana	+	+++	+	-	+
Msa	Kibanka	+	++	++	+	-
	Mawirr	++	++	+	-	-

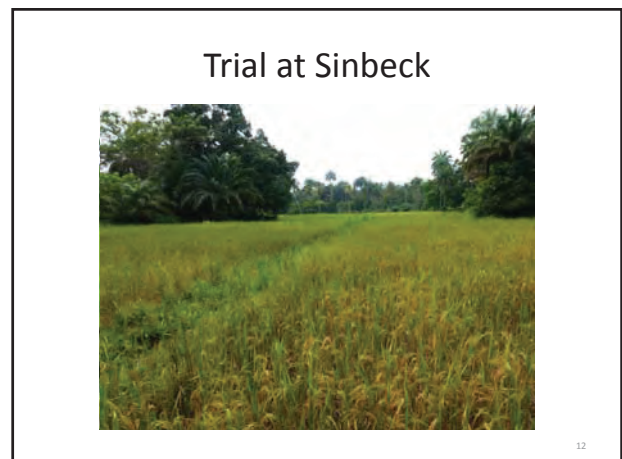
Shortage level (balance of relative DW between treatments in parenthesis):

- +++ Highly deficient (100-70)
- ++ Considerably deficient (69-40)
- + Fairly deficient (39-10)
- Not deficient (9 or less)

a. Trial for improving the TP-R (2) (page 5-8)

2. Effect of fertilizer application and water control on rice yield (On-farm experiment)

- Farmers fields: Sinbeck and Robot
- Treatments: with bund and without bund
- 3 levels of fertilizer dosage (0-0-0, 40-40-40, 80-80-80)



2. Project activities during first half of the second phase (Apr. - Aug. 2011)

- a. Trial for improving the TP-R
- b. Dissemination of TP-R (page 8 – 13)
- c. Support to the FBOs under SCP
- d. Third country training in Malawi on small scale irrigation
- e. Other activities

13

b. Dissemination of TP-R (1)

1. Organizing training sessions for community facilitators (CFs) and district coordinators (DCs)
 - One refresher course (May 30 through June 1)
Life cycle of rice plant, Cultivation technique, fertilizer calculation, yield component, nutrition, post-harvest, etc.
 - Four short sessions

July 7	Basic calculation practice, and observation of pot experiment;
July 26	Establishing experimental plot;
Aug. 10	Designing FFS experiment, and sharing experience of third country training in Malawi;
Aug. 23	Clarification of the present situation of FBO activities, and principles of yield survey

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b. Dissemination of TP-R (2)

2. Radio extension programme
 - To disseminate TP-R to wider range of farmers.
 - Selection of theme → Examination of important messages → Preparation of draft manuscript → Modification of manuscript as necessary → Translation of manuscript in local languages → Recording
 - June 2011: Nursery and main field preparation
 - July 2011: Uprooting and transplanting
 - Aug. 2011: Management of transplanted rice

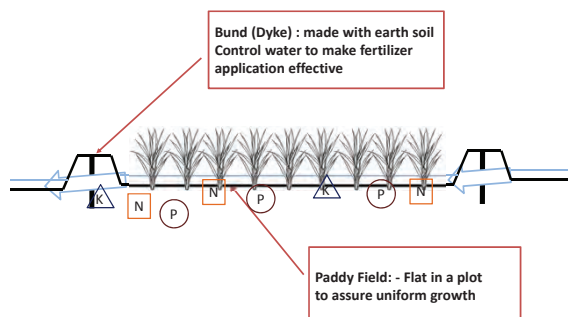
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b. Dissemination of TP-R (3)

3. Development of extension materials
 - Necessity to develop more visual extension tools for farmers.
 - Examples are:

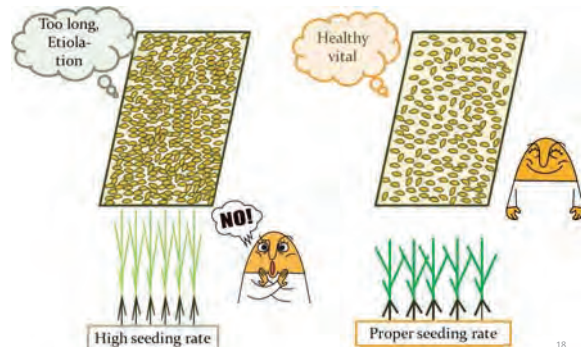
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Illustration (Bund)

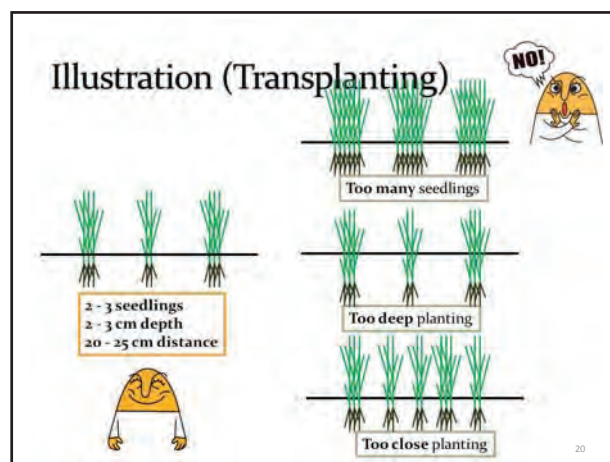
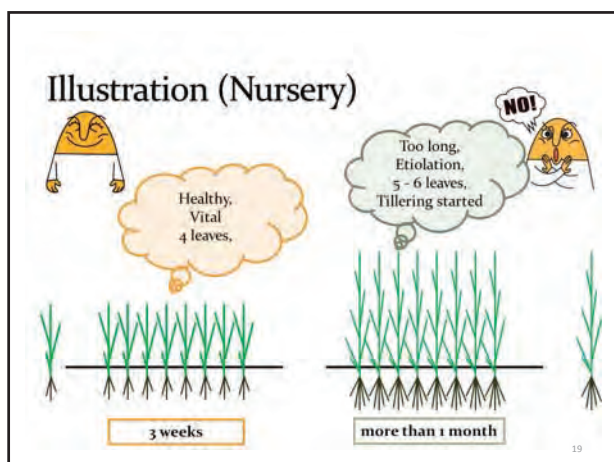


17

Illustration (Nursery)



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2. Project activities during first half of the second phase (Apr. - Aug. 2011)

- a. Trial for improving the TP-R
- b. Dissemination of TP-R
- c. Support to the FBOs under SCP (page 14-17)
- d. Third country training in Malawi on small scale irrigation
- e. Other activities

c. Support to the FBOs under SCP (1)

1. Several features of the selected FBOs

- Total of 22 FBOs have been selected for support
- Swamp area identified totaled 164 ha with average FBO area of 7.5 ha (range: 2.6 – 18 ha).
- More than 10 FBOs have swamps where water is running for more than 9 months.
- 11 out of 22 FBOs were formed in 2011.

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c. Support to the FBOs under SCP (2)

2. Procurement of seeds and fertilizers to FBOs

- JICA's commitment stated in Record of Discussion of the project
- Provision of seeds based on the assumed dosage of 62.5 kg per hectare (1 bushel per acre)
- Four varieties were procured (NERICA L19, ROK 5, ROK 10, and Pa Kiamp) with total amount of some 11 tons
- Provision of fertilizer based on the assumed cultivation area of 15 ha per FBO
- Proposed proportion of compound fertilizer (15-15-15) : urea (46-0-0) = 6:1 as recommended nutrition proportion by RARC. Total of 41 ton were procured.

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c. Support to the FBOs under SCP (3)

3. Assist in preparing memorandum of understanding (MOU) and land agreement (LA)

- Seeds distributed without MOU or LA due to delayed delivery of seed rice (mid-June, 2011).
- Delayed preparation and distribution of MOU and LA to FBOs (mid-August, 2011).
- Delayed distribution of fertilizer.

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c. Support to the FBOs under SCP (4)

4. Technical support to FBOs by JICA experts

- Selection of three FBOs for intensive support by JICA team
- Weekly visit and technical guidance by JICA team (from July 2011)
- Other 19 FBOs also visited regularly (every two weeks) for monitoring (from September, 2011)
- FFS experiment conducted through CFs trained by JICA team

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2. Project activities during first half of the second phase (Apr. - Aug. 2011)

- a. Trial for improving the TP-R
- b. Dissemination of TP-R
- c. Support to the FBOs under SCP
- d. Third country training in Malawi on small scale irrigation (page 18-20)
- e. Other activities

30

d. Third country training in Malawi on small scale irrigation

- To share the experience of small irrigation development project by JICA in Malawi, where low cost, simple, and quick methods of small irrigation development were introduced.
- Four trainees (one from MAFFS HQ, and three from MAFFS-K) were sent to Malawi for one week (from July 10 to 17, 2011)
- Field visit to irrigation development sites, exchange the development view with Malawian officials, learn the previous JICA project, etc.

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2. Project activities during first half of the second phase (Apr. - Aug. 2011)

- a. Trial for improving the TP-R
- b. Dissemination of TP-R
- c. Support to the FBOs under SCP
- d. Third country training in Malawi on small scale irrigation
- e. Other activities (page 20-21)

33

e. Other activities

- Provision of laboratory equipment to RARC
- Preparation of wiring the electric cables and constructing a deep well at RARC

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3. Inputs (page 21-22)

- Japanese experts (11.8 person-months as of August, 2011)
- Office equipment at RARC (photocopier, PC, printer)
- Spare parts for motorbike (for CFs and DCs at MAFFS-K)
- 10.8 ton of assorted seed rice, and 41.1 ton of fertilizer (compound fertilizer (15-15-15) and urea)
- 1 video editing software and digital camera
- Green house construction and its necessary materials for pot experiment at RARC
- Fuel to MAFFS-K (for generator and motorbike)

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4. Issues to be addressed (page 21-22)

- Low quality of rice seeds procured from RARC
Farmers were complaining
 - Low germination rate of Pa Kiamp
 - Not pure seeds
- Inefficient monitoring and extension
 - No monitoring system has been established such as profile of FBOs, swamps, input delivery, procedure, schedule, etc.
 - Low capacity of extension workers with low motivation

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5. Proposed Activity in the Subsequent Phase
(Sep. 2011 – Mar. 2012)

Continuation of the current activities

- Capacity development of extension workers through periodic training sessions and field visits ;
- Capacity development of FBO members supported under SCP through FFS, and through technical guidance in the field as well as training sessions;
- Development of radio extension programmes on rice cultivation technique;
- Development of extension materials; and
- On-station and on-farm trials for improving TP-R

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5. Proposed Activity in the Subsequent Phase
(Sep. 2011 – Mar. 2012)

New activities

- Trial development of IVS;
- Monitoring and evaluation of FFS;
- Monitoring and technical guidance on dry season rice cultivation in IVS;
- Improvement of working environment of RARC : Electric cable network and borehole drilling;
- Procurement of laboratory equipment and accessories for RARC;
- Preparation of Progress Report 3; and
- Joint Coordination Committee Meeting 3.

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Thank you for your attention.

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Minutes of the Joint Coordinating Committee Meeting on the Progress Report 3 for the Sustainable Rice Development Project in Sierra Leone

The third Joint Coordinating Committee Meeting (the Meeting) on the Sustainable Rice Development Project in Sierra Leone (the Project) was convened at the conference room of the Ministry of Agriculture, Forestry and Food Security (MAFFS), Youyi Building, at 11:15 a.m. on 19th March, 2012. The attendants are shown in Attachment 1.

The Meeting was chaired by Dr. Joseph Sam Sesay, Minister of MAFFS.

Firstly, chairman asked attendants to review the minutes of the second Joint Coordinating Committee Meeting (the previous Meeting) which was circulated to participants in advance. There was no dispute on the contents of document, except for mistake on one participant's designation. However, chairman pointed out an excessive volume of minutes for review and suggested Mr. Takashi KIMIJIMA, Chief Advisor of the Project (the chief advisor), to prepare matrix-like table including issues, decision, recommendation and responsible people when next review session of minutes is held.

After approval of the minutes of the previous Meeting, the chief advisor made presentations on project progress implemented in the last six (6) months period using a PowerPoint, along with five (5) main components of the Progress Report 3 including (i) collaborative experimental work with RARC to elaborate technical package on rice production (TP-R), (ii) capacity development of extension workers and lowland FBO farmers, (iii) growth monitoring and yield components analysis at FBOs, (iv) monitoring of distributed inputs utilization, and (v) support to FBOs for dry season rice cropping. Presentation materials were distributed to all the participants (Attachment 2).

After the presentation, chairman admired the Project's eye opener results for both research and extension, also emphasized an importance of serious research work since national yield level is still low. Most of participants showed their interests on the progress of the Project and the following discussions were made.

(i) Collaborative experimental work with RARC to elaborate technical package on rice production (TP-R)

Sierra Leonean Participant (MAFFS): In connection with soil fertility trial, we do have comprehensive countrywide land resource study reports by UNDP/FAO.

Chief Advisor, JICA: That's new to us about such kind of reference book. We would like to share it to come up with new output. The more inputs come in, the more output could be come out.

Sierra Leonean Participant (MAFFS): The previous recommendation rate of fertilizer application for rice from RARC is that $N-P_2O_5-K_2O = 60-40-40$ or $80-40-40$ kg/ha, I think we had better revise this recommendation based on the results made.

Sierra Leonean Participant (MAFFS): I understood the research results that phosphorus deficiency is most crucial issue in the soil of Kambia district. Do you have any solution for productivity improvement?

Chief Advisor, JICA: Now, we are conducting another set of pot trial to propose recommendation fertilizer rate.

And we are also planning to carry out soil fertility trial by using newly collected soils from other districts. If we can see similar results/tendency from those soils, we may be also able to cover wider range of soils in Sierra Leone with same recommendation.

Sierra Leonean Participant (SLARI): I think the results obtained from the pot experiments your project is conducting are important. This is relevant to revision of recommendable fertilizer application rate since a lot of changes have been taking place after the previous recommendation (N-P₂O₅-K₂O = 60-40-40 or 80-40-40 kg/ha) was made. However, we have to consider soil complexity when we step forward to farmers with these results. The outcome from pot experiment doesn't always bring the same results in the field. Therefore, I (SLARI) agree with the collaboration with JICA. But, I am questioning about involvement and/or participation of staffs in RARC. I understand the Project is supposed to provide to some extent inputs, but who will take care of this kind of experiment when the Project has been phased out. In this sense, how do you arrange to develop capacity of the staffs in RARC?

Chief Advisor, JICA: As for involvement of staffs in RARC, I don't think we neglect them when we started this particular project. Because we had a series of meeting, nearly 10 times, to discuss experimental design towards attainment of our project objectives. Actually, we have been trying to involve them, but we sometimes found it difficult to find them at office. They are sometimes busy with meeting, engagement in Freetown, etc. Therefore, this pot experiment has been mainly conducted by our rice researcher, Dr. Yamaguchi. Of course greenhouse where trial is implementing is located in RARC compound and we'll always welcome those who want to see progress. In addition, Dr. Yamaguchi is going to make presentation at in house meeting which will be held on 26th – 28th March at Njala University on behalf of our project to expose trial and collect comments, so that we will be able to produce better output with you. I'll convey your comments to him.

Sierra Leonean Participant (SCP/MAFFS): Do you think it is possible to carry out soil test as you did for all SCP supported FBOs before we start procurement of inputs?

Chief Advisor, JICA: Unfortunately, it is difficult due to limitation of resources.

Sierra Leonean Participant (MAFFS): What is the observation in mangrove swamp, concerning salinity and sulfur toxicity?

Chief Advisor, JICA: Salinity problem in mangrove swamp is probably caused by poor drainage. Saline normally can be washed away when fresh water from rainfall flow into field. But if drainage is not properly done, saline can retain in soil and it causes some salt injury for rice plants. As for sulfur toxicity, there is alternating process of oxidation and reduction, which produces hydrogen sulfide. As this also damages rice plants, we have to carefully select the site where we cultivate. That's our findings so far.

(ii) Capacity development of extension workers and lowland FBO farmers

Sierra Leonean Participant (MAFFS): In research activities, we have to collaborate under the government initiative and we'd better expose this report result, so that it will be conducive to better production not only for Kambia but also throughout country. I think crop protection from nursery to harvest is also important to secure sufficient yield. Don't you emphasize counter measures for pests and diseases in your project?

Chief Advisor, JICA: We didn't see any serious damages caused by pests and diseases at FBOs we supported, except for one (1) FBO's field at Soribolomia where was destroyed by caterpillars. At that time, we enquired the crop protection officer in Kambia to control them and they just sprayed chemical to eradicate them. Actually, most of diseases found in FBO's fields were associated with nutrient deficiency one. Therefore, we will not go in more detail about crop protection, but we are willing to look into them when serious damage caused by pests and/or diseases.

Sierra Leonean Participant (SCP/MAFFS): According to your report, the Project seems to put many inputs for capacity development in extension area. I think we need to find out the linkage between FAO and JICA since FAO has been mandated capacity building for GAFSP.

Chief Advisor, JICA: We want to have a linkage with FAO since we are part of SCP. However, it's not been realized yet so far due to several constraints like time, distance, etc. We always want to be involved in any capacity development aspect.

(iii) Growth monitoring and yield components analysis at FBOs

Sierra Leonean Participant (MAFFS): As for table7 which compares the yield between two treatments, 2 seedlings and 10 seedlings, I don't know whether it is correct or not.

Chief Advisor, JICA: Each experiment was designed to compare effect of treatments on grain yield with certain assumptions. For example, it was assumed that less number of seedlings would produce more tillers since there is less competition within a hill, which would bring about higher yield. However, results were contrary to our expectations. This make it difficult for us to analyze the data obtained. Now, we suppose this was caused by unfavorable location where test plot established and less number of tillers due to poor growth in initial stage. We also feel the necessity for retest this kind experiment under better or equal field condition.

Sierra Leonean Participant (MAFFS/PEMSD): My interest area is yield assessment. Methodology is almost same approach and findings you have presented here (1.4 – 1.5 ton/ha) is really comparable to what we have done (1.7 ton/ha).

Chief Advisor, JICA: I'm happy to hear about that our results are comparable to your figures. We would like to make more communication to come up with better way for analysis and/or survey.

(iv) Monitoring of distributed inputs utilization

Sierra Leonean Participant (SCP/MAFFS): My concern is low usage of fertilizer we have distributed.

We have to find out the way to ensure proper utilization of inputs given out to FBOs. Should we continue usual way of SCP which fixed amount to be provided to each FBO irrespective of its cultivation area or should we give fertilizer as per area cultivated by FBO?

Chief Advisor, JICA: I would like to rather support your idea that FBO-specific amount of fertilizer provision based on area cultivated than fixed amount provision. Because even if we supply over dosage of fertilizer, each FBO use only small portion for their communal farm and sometimes they sell fertilizer. They should know real value of fertilizer.

(v) Support to FBOs for dry season rice cropping

Sierra Leonean Participant (MAFFS): If you are confronting water shortage for dry season cropping, why don't you introduce borehole or something to secure this season's cropping?

Chief Advisor, JICA: I don't think it is realistic when we grow rice because it's costly. The selling price of rice cannot offset borehole construction and management cost.

Lastly, the chairman emphasized importance of serious collaboration between JICA, SLARI/RARC, FAO, GAFSP, Crop, Agric. Engineering, etc. and also expected more practical works in research and extension.

The meeting was adjourned at 1:20 p.m.

End

A matrix table highlighting main discussion points is presented in Attachment 3.

Attachments 1

List of Attendants

No.	Name	Organization	Designation
1	Joseph Sam Sesay	MAFFS	Minister
2	Francis A. R. Sankoh	MAFFS	Chief Agricultural Officer/Director General
3	B. J. Bangura	MAFFS	Deputy Director, Extension
4	Sid M. Kamara	MAFFS	Head, NACU
5	Robert M. Koroma	MAFFS	Representative Project Coordinator, IFAD
6	Amadu T. Jallow	MAFFS	Assistant Director, Animal health
7	Ben A. Massaquoi	MAFFS	Director, Extension
8	Matthew Gboku	SLARI	Ag. Deputy Director General
9	Mohamed A. Sheriff	MAFFS	Assistant Director, Statistics and Programme
10	Lovell Thomas	MAFFS	Deputy Minister II
11	Prince Kamara	MAFFS	Coordinator, SCP
12	Joseph S. Bangura	MAFFS	Assistant Director, Monitoring and Evaluation
13	Umaru M. Sankoh	MAFFS	M&E officer, Kambia
14	James K. Pessima	MAFFS	Director, Crop
15	S. T. Kamara	MAFFS	Deputy Director, AESD
16	Nelford E. W. Rose	MAFFS	Engineer
17	Sheku A. Mansaray	MAFFS	Ag. Director, Forestry
18	Goelfrey L. Jones	MAFFS	Assistant Director
19	Edward B. Kamara	MAFFS	Chief Accountant
20	Takashi Kimijima	JICA	Chief Advisor, SRDP
21	Mitsuharu Takemura	JICA	Agronomist, SRDP
22	Kazuaki Sato	JICA-SLFO	Resident Representative
23	Akiko Tatsuta	JICA-SLFO	Project Formulation advisor



**The Sustainable Rice Development
 Project (SRDP) in Sierra Leone
 Joint Coordination Committee Meeting 3
 on Progress Report 3**

March 19, 2012
 MAFFS Conference Room,
 Yuui Building, Freetown
 Sierra Leone

SRDP Purpose and Outputs

- Project period: 2010-2014
- Target area: Kambia district
- Project Purpose:
 To establish rice production techniques and its extension method which are applicable throughout Sierra Leone
- Outputs:
 - To elaborate the TP-R
 - To extend the TP-R to small-scale farmers through FBOs in Kambia

Contents of the Progress Report 3

1. Introduction :
 Project background and organization of the report
2. Project Progress
 - Trials for improving TP-R (2.1)
 - Capacity development of extension agents and farmers (2.2)
 - Finding out the barriers to rice yield increase (2.3)
 - Monitoring of the utilization of distributed inputs (2.4)
 - Support to the FBOs for the dry season rice cultivation (2.5)
 - Project inputs (2.6)
 - Issues to be addressed (2.7)
3. Proposed activities in the subsequent period

Appendixes (1-9)

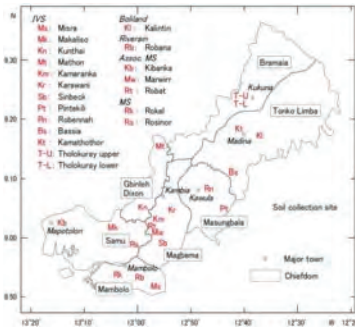
Appendixes

- 1 Associated data of pot experiment (2.1)
- 2 Reports on the SRDP short training (2.2.1)
- 3 Radio extension program (2.2.3)
- 4 Monitoring results of 22 FBOs (2.3)
- 5 Farming record and yield of rice at FBO communal farms in 2011 wet season (2.3.1)
- 6 Record of farming and yield of the experiment in the test plots at FBO farms in 2011 wet season (2.3.2)
- 7 Results of yield component analysis in the test plot of 9 FBOs (2.3.3)
- 8 Utilization of FBO communal farm areas by FBOs (2.4)
- 9 Destination of distributed inputs (2.4)

2.1 Trials for improving TP-R

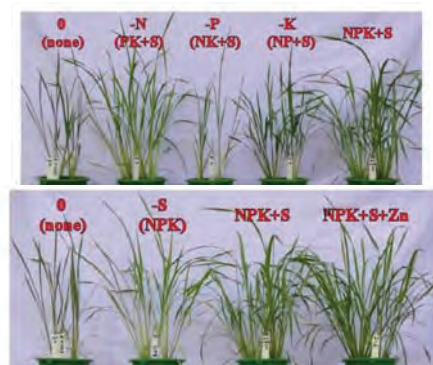
- Soil fertility assessment trials (pot experiment)
- Field trial

2.1.1 Soil fertility assessment trials



Location of the soils used for the fertility assessment trials

2.1.1 Results of the soil fertility assessment trial - Case of Misira soil -



2.1.1 Shortage level of mineral nutrients in various soils in Kambia District

Soil ^(a)	Agro-ecology	Element (nutrient)				
		N	P	K	S	Zn
M _s *		+	+++	++	++	+
M _k *		-	+++	-	-	+++
K _n *		++	+++	+	-	+
M _t		++	+++	++	+++	-
K _m		+	+++	++	+++	+
K _r		+++	+++	++	++	-
S _b	IVS	-	+++	++	+	+++
S _b *		-	+++	++	++	-
P _t *		+++	+++	+++	+++	-
R _n		+	+++	++	++	-
B _s *		-	+++	-	+++	-
K _t *		++	+++	++	++	-
T-U		++	+++	++	++	+
T-L		++	+++	+++	+++	-
K _l	Boliland	+	+++	+	++	-
R _b	Riverain	+	+++	+	-	+
K _b		+	++	++	+	-
M _w	MSa	++	++	+	-	-
R _t *		+	+++	+	-	+++
R _k *	MS	+	++	-	-	-
R _s *		+	++	+	+	-

2.1.1 Major findings from soil fertility assessment trials

- P, K and S are generally deficient in the soils of Kambia district for growing rice.
- Deficient level of K and S may be severer in soils of IVS and boliland than those in MSa and MS.
- To determine the optimum level of the deficient elements for rice performance, another set of the experiment is on-going.

2.1.2 Trials for improving TP-R Field trials

Location	Bund	Fertilizer application rate (N-P ₂ O ₅ -K ₂ O kg/ha)		
		0-0-0	40-40-40	80-80-80
Sinbeck	-	0.7	1.9	2.9
	+	2.0	2.2	2.2
Robat	-	2.0	2.2	2.9
	+	2.2	2.7	3.2

Grain yield adjusted to 14% moisture content.
+ and - of bund treatment: with and without bund
Variety: ROK24

2.1.2 Findings from the field trial

- Bund construction and fertilizer application brought about yield increase (except a Sinbeck farm treatment of high rate of fertilizer with bund)
- Robat farm treatment of high rate of fertilizer with bund attained 3.2 ton/ha.
- However, incremental benefit (or yield increase) is yet enough to recover the fertilizer cost.

2.2.1 Capacity development of extension workers

Nine one-day training sessions were held for extension workers on the following themes

- Designing of FFS test plot
- Present situation of rice farming at 22 FBOs
- Monitoring the FBO farms and activities
- Panicle initiation and top dressing
- Study tour to a FBO farm where bund has been constructed
- Yield survey (theory and practice)
- Use of grain moisture meter
- Judging the time of harvest
- Analysis of yield component

2.2.1 Results from capacity development Extension workers

- Capacity of the extension workers has been built up in general. Two district coordinators have acquired enough knowledge on yield survey by experiencing yield survey practice at various locations.
- It was also realized that the planning capacity of the extension workers was inadequate. FFS test plots were often established at inadequate locations.
- Most extension workers have low numerical calculation ability.

2.2.2 Capacity development of FBO farmers

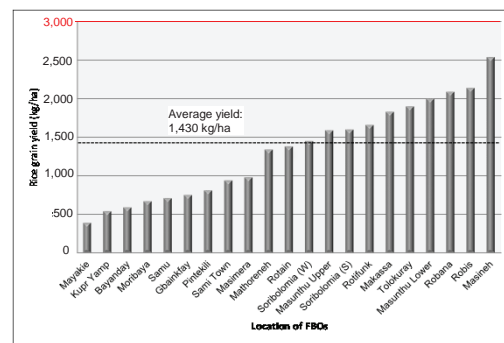
FBO farms were regularly visited by JICA-SRDP experts to provide necessary farm guidance, among others:

- Fertilizer application (timing, dosage)
- Water management

2.2.2 Results from capacity development FBO farmers

- They tended to believe that fertilizer application always increase yield.
- They do not have an idea of cost and benefit.
- The farms were not equipped with bund for water control.
- In most case, fertilizer applied were ineffective in yield increase.

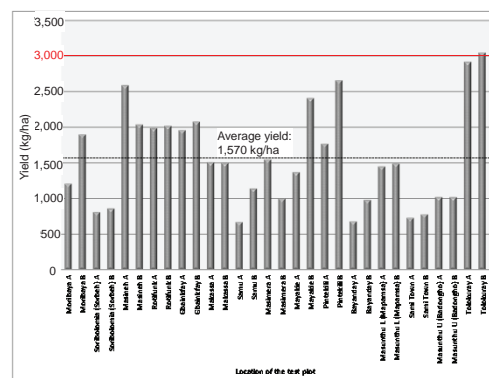
2.3.1 Results of the rice growth monitoring at FBOs



2.3.1 Findings from the rice growth monitoring

- Average yield of 21 FBOs was 1,430 kg/ha, ranging from 390 kg/ha at Mayakie to 2,540 kg/ha at Masineh.
- Nine (9) FBOs yielded less than 1,000 kg/ha even they applied fertilizer.
- Samu, with the highest fertilizer dosage of N-P₂O₅-K₂O= 144-81-81 kg/ha, yielded merely 710 kg/ha, while Masineh with the modest dosage of N-P₂O₅-K₂O= 20-20-20 kg/ha yielded as high as 2,540 kg/ha.
- Several unfavorable farming practices or conditions for better rice growth: deep transplanting, insufficient puddling, transplanting old seedlings, no water control measures, etc. were observed.

2.3.2 Results of FFS experiment



2.3.2 Findings from FFS experiments

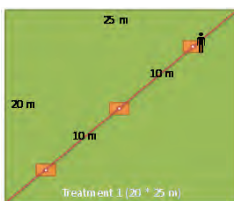
- Average grain yield of all treatments is 1,570 kg/ha, ranging from 670 kg/ha in Samu, treatment A (2 seedlings per hill), to 3,050 kg/ha in Tolokuray, treatment B (5 weeks old seedlings).
- Higher yield in Mayakie treatment B and Pintekili treatment B was likely attributed to the high dosage of fertilizer and their locational advantage of being established in the lower position.
- Higher yield in Tolokuray was realized as a result of respecting recommended farming practices in TP-R and water management.

2.3.3 Yield component analysis

- Grain yield of rice is the product of the following components:
 - Number of hills per unit area;
 - Number of panicles per hill;
 - Number of filled grains per panicle; and
 - 1,000 grain weight.

High grain yield is obtained when the value of any components is improved.

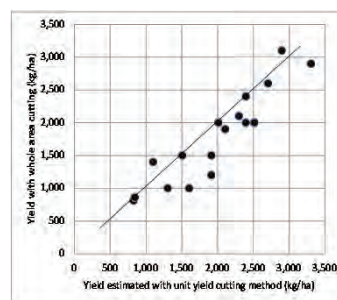
2.3.3 Yield component analysis Procedure of unit area cutting method



Yield component analysis was made at 9 experiment plots adopting unit area cutting method. Procedure of this method is:

- In each treatment plot, 3 sub-plots with 2 m² each were selected along one diagonal of the plot, and all the hills in a sub-plot were harvested separately.
- The number of hills as well as the number of panicles per hill was counted.
- After the average number of panicles per hill was calculated, five hills having the average number of panicles were randomly selected as representative hills.
- Panicles of five representative hills were threshed, winnowed, and the filled grains were weighed and measured moisture content.
- 20 grams of grains were counted to estimate 1,000 grain weight.

2.3.3 Yield component analysis Comparison of yield between two yield survey methods



Estimated yield obtained from the unit area cutting methods should be identical to actual yield from whole area cutting to make yield component analysis meaningful.

2.3.3 Findings from yield component analysis

- Close positive correlation is observed between grain yield and filled grain number per m².
- Positive correlation is observed between grain yield and panicle number per m².
- Increase in the number of well filled grain contributes much to the grain yield increase.



Assuring healthy initial growth and grain filling during maturity may be the keys to increase yield.

2.3.3 Important farming practices conducive to the yield increase

- Assuring healthy initial growth to secure enough number of tillers:
 - Proper seedling age at transplanting (2 to 3 weeks)
 - Sufficient puddling and leveling
 - Basal fertilizer application at puddling or transplanting
 - Careful transplanting (uprooting, proper spacing, shallow transplanting, a few seedlings per hill, etc.)
 - Careful water management
- Assuring good grain filling
 - Top dressing at booting stage
 - Sufficient water supply until the dough stage.

2.4 Monitoring of the utilization of distributed inputs to the FBOs (rainy season, 2011)

- Very low utilization rate (19%) of FBO group farm (average cultivated area per FBO = 1.4 ha ranging from).
- Participation of FBO members in group activities is very low in general.
- Distributed seeds and fertilizers were re-distributed among members' private farms.
- Fertilizer did not bring about yield increase.

2.5 Support to the FBOs for the dry season cropping of rice

- 12 FBOs are currently supported to obtain higher rice yield in the second cropping through the provision of fertilizer, food for work, and regular technical guidance by the project.
- FBOs are expected to procure seeds by themselves, respect the current technical package and cropping calendar, water management, and other practices advised by the project.
- Test plots are established to conduct fertilizer experiment at 5 FBO fields.

Examples of good practice - dry season cropping 2012 -



Masineh (Gbinleh Dixon), Yeffin, bund constructed, water management, top dressing at booting stage, respect cropping calendar

Examples of good practice - dry season cropping 2012 -



Mathoraneh (Magbema), NERICA L-19 and Butter cup, puddling, leveling and bund construction made.

Examples of good practice - dry season cropping 2012 -



Robis (Gbinleh Dixon), 13 March, 2012
Test plot; puddled, levelled, careful transplanting, water management, respect cropping calendar, etc.

Examples of good practice - dry season cropping 2012 -



Rotifunk (Gbinleh Dixon), 12 March, 2012
Test plot, NERICA L19, bund constructed, puddling, water management, respect cropping calendar, etc.

Examples of good practice - dry season cropping 2012 -



Masunthu (Tonko Limba), 8 March, 2012
Group work of puddling, removal of organic materials,
transplanting the test plots, bund constructed, etc.

2.6 Inputs by JICA

JICA sent eight Japanese experts with 18.0 person-months to execute the project activities. JICA also provided the following inputs to the project.

To MAFFS-K

- Fuel cost for motorbikes for SCP extension and a generator for office of MAFFS-K;
- Spare parts of motorbikes for SCP extension of MAFFS-K;
- Farm tools to 12 FBOs for constructing bund and canals for second cropping;
- Cost for broadcasting radio extension programs (5 times);
- Cost for satellite internet connection (6 months);
- Cost for allowances for the training session to SCP extension workers (9 times).

2.6 Inputs by JICA

To RARC

- Construction of overhead electrical cable network at RARC
- Construction of a borehole at RARC
- Procurement of laboratory equipment
- Construction of a greenhouse (materials and labor)

2.7 Issues to be addressed

- Necessity of strengthening the capacity of FBO farmers as a group in order to realize productivity enhancement
- Efforts to be made towards the profitable rice cultivation
- Double cropping of rice

3. Proposed project activities in the subsequent period (Mar. – Aug. 2012)

- Capacity development of farmers and extension workers;
- Monitoring of dry season rice farming in 12 FBOs;
- Trial low cost development of IVS;
- On-station and on-farm trials for improving TP-R;
- Preparation for the support to the FBOs in rainy season rice cultivation;
- Technical seminar on SRDP;
- Mid-term project evaluation;
- Development of extension materials to disseminate TP-R;
- Training in Japan; and
- Preparation of Progress Report 4.

Thanks so much for your attention.

Attachment 3 Matrix of the discussion

Observation	Issues	Decision or recommendation	Responsible person
1. Minutes on the last JCC too long	<ul style="list-style-type: none"> • Not easy to understand or consume much time 	<ul style="list-style-type: none"> • Use matrix including issues, decision or recommendation and responsible person 	<ul style="list-style-type: none"> • Person in charge of preparing minutes
2. Soil suitability study exists on 8 crops by FAO/UNDP	<ul style="list-style-type: none"> • The study was conducted in 1979-81. 	<ul style="list-style-type: none"> • Ask FAO Rome to cross check the original soil test data for 8 traditional crops and 4 new crops conducted during 1978-1981 • FAO to work TCP on country wide soil test 	<ul style="list-style-type: none"> • FAO for TCP • LWDD
3. SLARI has not been involved in SRDP	<ul style="list-style-type: none"> • SRDP activities have been made based in Kambia, and closely work with RARC which is under SLARI. • It is not so easy to contact directly with SLARI due to the distance between Kambia and Freetown. 	<ul style="list-style-type: none"> • SLARI should be more proactive. • More close communication should be made between SLARI and RARC 	<ul style="list-style-type: none"> • SLARI • RARC
4. The results of SRDP are eye opener.	<ul style="list-style-type: none"> • Not much collaboration has been made between JICA and MAFFS, FAO, etc. 	<ul style="list-style-type: none"> • All the divisions in MAFFS should collaborate with JICA. 	<ul style="list-style-type: none"> • Extension, Crops, PEMSD, Engineering Divisions in MAFFS, and FAO

Minutes of the Joint Coordinating Committee Meeting on the Progress Report 4 for the Sustainable Rice Development Project (SRDP) in Sierra Leone

The fourth Joint Coordinating Committee Meeting (the Meeting) on the Sustainable Rice Development Project in Sierra Leone (the Project) was convened at the conference room of the Ministry of Agriculture, Forestry and Food Security (MAFFS), Youyi Building, at 10:00 a.m. on 10th January, 2013. The objectives of the Meeting were: (i) to present the contents of the Progress Report 4 of the Project, (ii) to propose the annual work plan for 2013, and (iii) to get approval of the contents of the joint mid-term review report of the project. The attendants are shown in Attachment 1.

The Meeting was held according to the agenda distributed to the participants (Attachment 2). It was firstly chaired by Dr. Joseph Sam. SESAY, Minister of MAFFS, and then by Mr. Lovell Thomas, Deputy Minister of MAFFS, as the Minister left in the middle of the Meeting for unavoidable reason.

Upon the request by Chairman, Mr. Takashi KIMIJIMA, the chief advisor of the project (JICA chief advisor), first made presentations on project activities made and results obtained in the last six (6) months period from March through August 2012, according to the contents of the Progress Report 4, using a PowerPoint. His explanation even included part of recent project activities until December 2012. Presentation materials were distributed to all the participants (Attachment 3).

After the presentation by the JICA chief advisor, chairman asked participants for comments and questions, and the following discussions were made. Main points of discussions were summarized in a matrix as shown in Attachment 4.

Then, the work plan of the Project for 2013 was presented by the JICA chief advisor, and it was approved without any comments.

Lastly, main points of the mid-term review report of the project, including the recommendations made by the joint mid-term review mission and proposed revision of the Project Design Matrix (PDM) were explained by the JICA chief advisor. The contents of the mid-term review report were unanimously approved by the participants.

Mr. Sano, a project formulation advisor of the JICA Sierra Leone Field Office, made a comment that the MAFFS should secure necessary budget for the field extension activities for assuring effective and efficient technology transfer of technical package on rice production down to the farmers, which guarantees the project sustainability.

Attachment 1 Attendants List

No	Name	Organization	Designation	Telephone	e-mail
1	Joseph Sam Sesay	MAFFS	Minister		
2	Lovell Thomas	MAFFS	Deputy Minister		
3	Francis A. R. Sankoh	MAFFS	Chief Agriculture Officer		
4	B.J. Bangura	MAFFS	Deputy Director, Extension		
5	Alie B. Yillah	MAFFS	Acting Deputy Director		
6	J. K. Pessima	MAFFS	Director, Crops		
7	S. T. Kamara	MAFFS	Director of Agric. Engineering		
8	Sorie Bangura	MAFFS-K	DAO Kambia		
9	Denis M. Kamara	MAFFS	Training Officer MAFFS		
10	J. A. Jalloh	MAFFS	Assistant Director, Extension		
11	Umaru M. Sankoh	MAFFS-K	M&E officer, Kambia		
12	Alusine Jah	MAFFS	M&E Specialist, PEMSD		
13	J. E. D. Terry	MAFFS	Deputy Director, Forestry		
14	Sahr J. Kellie	MAFFS	Assistant Conservator, Forestry		
15	Neilford Rose	MAFFS	Acting Assistant Director, Agric. Engineering		
16	John S. Kamara	MAFFS	Assistant Director, Crops		
19	Alhaji Mohamed Sanoh	SLARI	Head of communication		
17	Takashi KIMJIMA	JICA-SRDP	Chief advisor		
18	Yodai OKUAYAM	JICA-SRDP	JICA expert		
20	Akihira Sano	JICA	Project Formulation Adviser		



Sierra Leone Government

Ministry of Agriculture Forestry and Food Security (MAFFS)

JICA Joint Coordination Committee Meeting

Agenda Programme (1hour 30 mins)

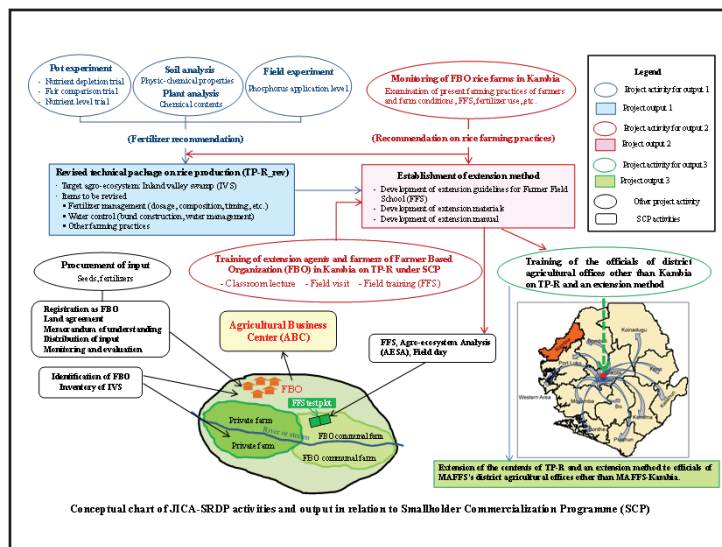
1. Silent Prayer
2. Self Introduction- 5 mins
3. Opening remarks - Chief Agricultural Officer- 5 mins
4. Progress Report no.4 presentation followed with discussions- 30mins
5. Project Annual Work plan for 2013 followed with discussions- 15 mins
6. Brief presentation of first joint project evaluation report followed with discussion and approval by committee members- 20 mins
7. Any other Business (AOB)- 10 mins
8. Closing remarks by the Hon. Minister
9. Lunch




MAFFS – JICA
SUSTAINABLE RICE DEVELOPMENT PROJECT IN
SIERRA LEONE
(2010-2014)
Fourth Joint Coordination Committee Meeting
10 January, 2012
at MAFFS conference hall, Youyi Building, Freetown

Project Purpose and Output

- Project period: 2010-2014
- Target area: Mainly Kambia district
- Project Purpose:
To establish rice production techniques and its extension method which are applicable throughout Sierra Leone
- Output:
 - To revise the present technical package on rice production (TP-R)
 - To extend the TP-R to small-scale farmers through FBOs in Kambia
 - To extend the contents of TP-R and an extension method to officials of MAFFS’s district agricultural offices other than MAFFS-Kambia.



Progress Report 4
Contents

1. Introduction
2. Project Progress during the Last Six Months (Mar.-Aug. 2012)
 - 2.1 Trials for improving Technical Package on Rice Production
 - 2.2 Performance of rice cultivated by FBO farmers in the dry season
 - 2.3 Capacity development of the FBO farmers and extension workers
 - 2.4 FBOs to be supported under SCP in 2012
 - 2.5 Mid-term review of the Project
 - 2.6 Input by JICA
 - 2.7 Issues to be addressed
3. Proposed Activities in the Subsequent Project Period

2-4-4

Activities for output 1: Soil fertility assessment in Kambia

Description	Remarks
Soil fertility assessment trials and analysis works (Pot experiment)	<ol style="list-style-type: none"> 1. Phosphorus was found to be the most deficient in soils of Kambia for growing rice, followed by potassium and sulfur. 2. Natural soil fertility varies much among the soils 3. Rice growth was enhanced with double dosage of phosphorus.

An example of the plant response to various nutrient treatments in pot culture (Plants grown with Misra soil, 24 days after transplanting)

Difference of plant growth among soils due to the difference in natural soil fertility.

Above: N response (Misra soil); Middle: P response (Robennah soil); Below: K response (Kalintin soil). Dosage (from left) : 0, 0.25, 1 and 2 unity of the standard (1= 0.5 g/pot)

Activities for Output 2 (2012 Dry season cropping)

Description	Unit	Q'ty	Remarks
Planning, technical guidance and growth monitoring of the dry season cropping of rice in the supported FBOs (Jan. – Jun. 2012)	No. FBOs Rice area (ha)	12 7	12 FBOs were supported for the dry season cropping
Distribution of fertilizer and rice (food for work) to the FBOs for the dry season cropping	Fertilizer (kg) Rice (kg)	5,200 2,100	Fertilizers were given for both rice and vegetables
Yield survey of rice grown during the dry season	No. of FBOs	12	Maximum yield with 3.0 ton/ha was recorded (NERICA L19) at Mathoreneh, followed by 2.5 ton/ha (Butter cup) at Masunthu, 2.4 ton/ha at Mathoreneh (Butter cup), etc.
Lessoned learned			See page 17 and 18 of the PR4

Communal farm at Mathoreneh, Magbema, planted with NERICA L19; Left: 03/03/2012; Middle: 14/03/2012; Right: 18/05/2012

Yield of rice cultivated at FBO fields in the dry season, 2012 in Kambia district

Village	Yield (kg/ha)	Water Control Structure
Ghaninkay	~800	No
Masimera	~800	No
Samu	~800	No
Rotifunk	~800	No
Bayanday	~800	No
Rotifunk	~1,200	Yes
Masimera	~1,400	No
Ghaninkay	~1,800	No
Mabineh	~2,000	Yes
Gbaninkay	~2,000	No
Mathoreneh	~2,400	Yes
Masunthu	~2,500	No
Mathoreneh	~3,100	Yes

* shows the plots where water control structures were established.

Variety: ■ Butter cup ■ NERICA L19 ■ Yeffin

Activities for Output 2 (Rainy season 2012)

Description	Unit	Q'ty	Remarks
Procurement of seeds and fertilizer	kg (seeds) Kg (fertilizer)	1,950 12,050	As planned
Sensitization of new FBOs	No. of FBOs	17	Done jointly with MAFFS Kambia
FBO IVS survey	No. of FBOs	17	Done after the determination of FBOs
Training of extension workers (District coordinators and community facilitators)	No. of sessions	4	Various subjects (rice production techniques, FFS planning, extension materials, etc.)
Training of FBO farmers and farmer facilitators	No. of attendants	171	161 FBO farmers trained. 10 farmer facilitators were trained as a part of ASREP training.
Farmers field visit	No Number	3 36	FBO farmers learned how other FBO farmers made efforts to enhance yield.

Training of FBO farmers at MAFS-K (31/05/12)

Farmer-to-farmer extension (bund construction) at Masiaka, Gbinleh Dixon (23/07/2012)

Farmers field visit at Laya, Masungbala (09/11/2012)

Activities for Output 2 (Evolution of the yields by FBOs) :





Description	Unit	Remarks
Analysis of rice growth and productivity of rainy season cropping 2011 in the FBOs	No. (21 FBOs)	Maximum yield of 2.5 ton/ha was obtained at a communal farm of the FBO at Masineh under fertilizer application and controlled water conditions. Inadequate farming practices and no water management limit the yield.
Analysis of growth and yield of rice in the rainy season cropping 2012 at FBOs field	No. (9 FBOs out of 17 supported)	Maximum yield of more than 3 ton/ha was obtained at a communal farm of the FBO at Masiaka under fertilizer application and controlled water conditions. FBO group ties were often very weak.

Grain yield of rice in the communal farm of FBOs in the rainy season, 2011

Grain yield of rice in the communal farm of FBOs in the rainy season, 2012 (data as of 20 December, 2012)

Other activities

Description	Unit	Q'ty	Remarks
Research and development			
Trial development of small irrigation for second cropping with farmers' participation (Apr., 2012)	Canal length(m) person-days	300 100	Trial development was done at two FBO farms.
Reports			
Progress Report 3 (Mar., 2012)	No. of copy	65	between Sep. 2011 and Feb. 2012, Mar. and Aug. 2012
Progress Report 4 (Aug., 2012)	No. of copy	65	
Presentations			
Agricultural Advisory Group (Mar., Aug., 2012)	No.	1	Activities of JICA-SRDP
Joint Coordination Committee (Mar., 2012)	No.	1	On progress report 3
Mid-term review			
Joint mid-term review study (Jul. 2012)	No.	1	Mid-term review report

Trial small irrigation development with farmers' participation (Mar-Apr. 2012)
 1: survey and excavation of canal at Masunthu, Tonko Limba.
 2: canal water running at Masunthu, Tonko Limba.
 3: construction of a water pit protected with bamboo fence at Robis, G. Dixon
 Joint mid-term review team's field survey at Mathoreneh, Magbema (Jul. 2012)

Input for 2012 (Jan. – Dec. 2012)

Description	Unit	Q'ty	Remarks
Japanese experts	Person-months	33.3	As planned
Equipment for RARC Chemical laboratory	set	1	Laboratory environment is not satisfactory for ensuring reliable analysis results; e.g. electricity supply.
Seed rice	kg	1,950	For FBO support under SCP in Kambia
Fertilizer	Kg	12,050	
Fuel for motorbike for securing community facilitators' mobility for Jan. -Feb. 2012, and Jul. - Aug. 2012	Gallons	276	Emergency expense to mobilize community facilitators to conduct periodical monitoring of rice cultivation at FBO farms.
Fuel for the generator at MAFFS-K (Jan. - Feb., May - Jun., and Sep.- Oct. 2012)	gallons	504	Cost sharing with MAFFS-K and RPSDP
Satellite internet connection at MAFFS-K	months	12	

Achievements and challenges

Significant achievements	Challenges
1. Soil fertility analysis to modify the present fertilizer recommendation as a part of the revision of the technical package on rice cultivation	<ul style="list-style-type: none"> ➢ Difficulty in determining the limiting factors on crop growth. ➢ Not only available phosphorus but also soil acidity and phosphorus absorption co-efficient of soils may limit the rice growth.
2. Monitoring of the utilization of seeds and fertilizer distributed to FBOs for the rainy season cropping in 2011	<ul style="list-style-type: none"> ➢ Merely 19% of the targeted land area was actually cultivated. ➢ Very few FBOs recovered the seed rice and fertilizers. ➢ MOU has not been respected.
3. Promising production potential of rice in the dry season when water control is easier and when weather is favourable (3 ton/ha with NERICA L19, and 2.5 ton/ha with Butter cup were attained)	<ul style="list-style-type: none"> ➢ Climate and hydrological data need to be accumulated. ➢ Cultivable area is limited due to water scarcity. ➢ Water management techniques are not well-disseminated. ➢ Damage by birds and rats becomes severer towards the end of the dry season (May and June).
4. Increase in rice yield at farmers field where technical packages were adopted. (More than 3 ton/ha in a FBO farm, and nearly 4 ton/ha in FFS plot were attained in the rainy season 2012)	<ul style="list-style-type: none"> ➢ SCP budget is not released timely, which hampered regular monitoring by extension workers. ➢ Quality seeds are hardly available. ➢ FBOs supported under SCP are not necessarily well-organized.

Mid-term Review of the Project

June – July, 2012

Objectives

- (1) To review the progress and achievements of the project activities
- (2) To review the Project from the viewpoints of five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact and Sustainability)
- (3) To formulate the Joint Mid-term Review Report and make necessary recommendations on the project activities in the remaining period

Evaluation Members



Sierra Leone Side

No.	Field	Name	Present Occupation
1	Leader	Mr. Bakarr J. Bangura	Deputy Director of Extension, Extension Division, Ministry of Agriculture, Forestry and Food Security (MAFFS)
2	Member	Mr. Sayo Tarawalli	District Extension Officer, MAFFS Kambia District Office (MAFFS-K)
3	Member	Mr. Umaru M. Sankoh	District M&E Officer, MAFFS-K



Japanese Side

No.	Field	Name	Present Occupation
1	Leader	Mr. Fuyuki Sagara	Senior Representative, JICA Ghana Office (JICA: Japan International Cooperation Agency)
2	Rice Cultivation	Dr. Yoshimi Sokei	Special Advisor, Arid and Semi-Arid Farming Area Division, Rural Development Department, JICA
3	Project Management	Mr. Takahiro Nakamura	Deputy Director, Arid and Semi-Arid Farming Area Division, Rural Development Department, JICA
4	Evaluation and Analysis	Mr. Isao Dojun	Consultant, Chuo Kaihatsu Corporation

Review results by evaluation criteria - 1

Relevance: High

Smallholder Commercialization Programme (SCP) started in 2010 as national flagship project which has a component “Smallholder Commercialization: production intensification, diversification, value addition and marketing (component 1)”.

Government developed National Rice Development Strategy (NRDS) in 2009 whose one of the objectives is “to ensure an increase in the productivity and production of rice in a sustainable way”

Effectiveness:

It is still difficult to prospect whether the indicator of the Project Purpose is achieved by the end of the project period.

Review results by evaluation criteria - 2

Efficiency:

Efficiency of the Project is at a satisfactory level in general

Impacts:

According to interviews with FBO's member farmers, they are realized effectiveness of the techniques transferred under the Project and they expressed to apply learned techniques, such as use of young seedling (age of 3 weeks), transplanting 2-3 seedlings per hill, appropriate puddling and leveling of rice fields, and weeding etc. for rice cultivation in this cropping season (wet season 2012).

Sustainability:

See the recommendation part

Recommended Actions to be taken by the Project - 1

(1) Development of TP-R

While the Project is revising TP-R targeting the yield of 3.0 ton/ha, it is observed certain technical conditions such as as component of fertilizer and water control are required to attain the target. Therefore, it is recommended for the Project to clarify those technical conditions and describe them in the TP-R and its manual.

(2) Enhancement of the training of the extension workers

It is the extension workers who deliver the improved rice farming technology to the farmers through FFS.

- a) Further enhance the number and quality of the trainings for extension workers
- b) Conduct training for district officials including training officer and FFS coordinator and extension officer in the districts other than Kambia before the wet season of 2013

Recommended Actions to be taken by the Project - 2

(3) Arrangement of meeting in Freetown

In order for MAFFS to take actions based on the recommendations, the progress and issues in the Project activities should be shared and discussed at timely manner. Therefore, it is recommended the Project arranges periodical meetings among stakeholders concerned more frequently in Freetown.

(4) Arrangement of field visits

It is recommended that the Project arranges the field visits in Kambia for MAFFS staff in Freetown in order for them to understand the project activities more.

Recommended Actions to be taken by MAFFS - 1

(1) Sustainable utilization of the TP-R

a) RARC researchers take the role as the trainer of extension workers during the remaining Project period since RARC is expected to provide the technical backstop of the TP-R after the termination of the Project.

b) At least one RARC researcher is assigned for laboratory work such as soil analysis and pot experiment since this activity definitely contributes to the capacity building of researcher in this country.

(2) Alignment of extension method (extension guideline and material) to FFS

a) MAFFS officials who have skill on the FFS participate in the project activities in order for the Project stakeholders to further deepen the knowledge on FFS.

b) MAFFS extension division, which has the function to backstop FFS and capacity building of extension workers in Sierra Leone, participate in the process and provide advice on working out extension guideline and materials.

Recommended Actions to be taken by MAFFS - 2

(3) Expansion of outcome of the Project activities

Outcomes of the Project including revised TP-R, extension guideline and materials are expected to be shared and utilized all over the Sierra Leone. Following points are recommended to MAFFS to promote the Project outcomes.

- a) Coordinate and give guidance to districts other than Kambia to apply the project's outcomes.
- b) Cost sharing of the training for district officials country wide.
- c) Officially endorse the revised TP-R, extension guideline and materials.
- d) Distribute the revised TP-R, extension guideline and materials to all districts through official channel.
- e) Follow up the extension workers in all the districts trained by the Project for sustainability.

Recommended Actions to be taken by MAFFS - 3

(4) Assignment of focal person in Kambia district

The further communication and coordination between the Project in Kambia and MAFFS are strongly required. Therefore, it is recommended MAFFS to assign one focal person in Kambia district who can take responsibility for these arrangements.

(5) Acceleration of IVS development

It is observed that yield of 3.0 ton/ha can be attained through application of revised TP-R where water can be properly controlled. Therefore it is expected MAFFS to accelerate IVS development under the component 2 of SCP.

Modification of Project Design Matrix - 1

Item	Version 1	Proposed revision (Version 2)	Reason for change
Overall goal	To increase production and incomes of small-scale rice farmers in Sierra Leone	To increase rice production in Kambia district To apply the Technical Package on Rice production (TP-R) and extension method all over Sierra Leone	More direct impact by the Project should be set as Overall goal.
Indicator for the Overall Goal	Self sufficiency of Sierra Leone in rice increase to 70-100%	1. Rice production is increased 30 % in Kambia district compared with the rice production in 2014. 2. Extension workers of the district agricultural offices in the country other than Kambia district disseminate revised TP-R using extension method developed under the Project to farmers more than 10,000 persons by the end of 2018	In the case of Kambia, it is expected increase of rice production as effects of the project activities and continuation of extension activities using TP-R and extension method. As for other district, it is expected that extension workers acquire knowledge and skills on TP-R and extension method, and then, carry out technical transfer to farmers.

Modification of Project Design Matrix - 2

Item	Version 1	Proposed revision (Version 2)	Reason for change
First indicator for the Project Purpose		TP-R and extension method are officially endorsed by MAFFS	From the view of sustainability, the outcomes of the Project are expected to be utilized by MAFFS.
Second indicator for the Project Purpose	XX % of MAFFS officials in each district confirms effectiveness of the TP-R and its extension method.	80 % of MAFFS officials who received training in each district confirm effectiveness of the TP-R and its extension method.	Numerical target was set up, therefore, the review team proposes a numerical target. Target persons are specified (officials who received training).
Output 1	To elaborate the Technical Package for Rice (TP-R) through on-station and on-farm verification	To revise the TP-R, which can realize higher yield and profit, through on-farm verification	Word "elaborated" is changed to "revised", because a TP-R was developed in the previous JICA cooperated project and that TP-R is going to be revised. Main purposes of revision of the TP-R are increase of yield and profitability, therefore, these words are added.
First indicator for the Output 1	XX % of trial farms which applied TP-R accomplish production target.	1-1. More than 3.0 Mt/ha of yield is obtained more than 80% of locations of on-farm verification, where revised TP-R is applied, in the cropping seasons by 2013.	More suitable indicator is proposed by indicating a target yield at the locations of on-farm verification.

Modification of Project Design Matrix - 3

Item	Version 1	Proposed revision (Version 2)	Reason for change
Second indicator for the Output 1	XX % of the rice produced in trial farms which applied TP-R satisfy the quality target.	---	Quality improvement of rice is not main aim of the Project. Therefore, This indicator is deleted.
Third indicator for the Output 1	The elaborated TP-R is drawn up.	1-2. Revised TP-R, that includes method on appropriate dosage of fertilizer and profitability, is developed.	Main features of TP-R are explained in order to understand what kind of revision will be done on TP-R.
New indicator for the Output 1	---	1-3. A manual on TP-R for use of extension workers is produced.	The above TP-R is more theoretical material for extension workers. In addition to TP-R, a manual on TP-R for extension workers easily understandable is prepared.
First indicator for the Output 2	XX rice farmers take the trainings on rice production.	2-1. More than 300 FBO farmers receive training on TP-R	Numerical target is set up.
Second indicator for the Output 2	XX % of rice farmers which took trainings applies the technical package.	2-2. More than 50% of the FBO farmers who received training applies several techniques of the TP-R.	Numerical target is set up.

Modification of Project Design Matrix - 4

Item	Version 1	Proposed revision (Version 2)	Reasons for change
New indicator for the Output 2	---	2-3. Extension materials for disseminating revised TP-R are prepared	In order to disseminate TP-R to farmers in the framework of SCP and along with FFS approach, extension materials used at FFS activities are necessary.
New indicator for the Output 2	---	2-4. A guideline on implementation of Farmer Field School (FFS) on rice cultivation based on the TP-R is developed.	In order to implement FFS on specific issues like rice cultivation based on TP-R, a practical guideline is necessary for extension workers for effective implementation of FFS.
Output 3	---	3. To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.	In order to confirm applicability of TP-R and extension method throughout Sierra Leone, dissemination of TP-R and extension method to the district agricultural offices is necessary.
Indicator for the Output 3	---	3-1. 30 officials acquire knowledge and skills of TP-R and extension method.	New indicator for evaluating degree of achievement of the Output 3. It is expected that at least 2 officials at each district agricultural office participate trainings on TP-R and extension method.
Activities: Activities for the Output 3 were added and several modifications on the activities for Output 1 and 2 were done in accordance with modification of indicators.			
Several means of verifications are revised based on modification of indicators.			

Proposed activities for 2013

1. Strengthening ties with MAFFS HQ and SCP related donor agencies
2. Information sharing and making dialogue with other donors supporting agriculture and rural development fields
3. Trials and chemical analysis for revising TP-R
4. Continuation of monitoring and guidance of rice farming in the FBO fields
5. Development of extension methods on rice cultivation
6. Provision of training to extension workers and farmers
7. Provision of agricultural input to support SCP and their monitoring in Kambia
8. Preparation and submission of PR 5 and PR 6
9. JCC meeting and MC meeting

Attachment 4 Matrix of the discussions

Observation	Issues	Decision or recommendation	Responsible person
1. Revision of Technical package	How to disseminate the technical package	Demonstration plot should be established	MAFFS, JICA-SRDP
	Iron toxicity is a problem	Promotion of drainage is the prime recommendation	AESD
2. FBO group activities under SCP	Weak ties among FBO members	Social survey should be made in selecting FBOs	SCP, MAFFS District office
3. Involvement of SLARI in SRDP	Insufficient information sharing of the project with SLARI	SLARI should be more proactive. More close communication should be made between SLARI and RARC	SLARI, RARC
4. Dissemination of technical package nationwide	Kambia should be put priority as it is a rice bowl	JICA-SRDP's activities are Kambia based. Nationwide dissemination is one of the project results to be attained.	MAFFS, JICA-SRDP
5. Productivity improvement under SRDP	Yield increase is still low	Further efforts be made.	MAFFS, JICA-SRDP
6. Technology transfer to extension workers	Dissemination of technical package to the FBO farmers has been limited because of no disbursement of the cost for the field work	Careful planning and timely disbursement of the budget	SCP, MAFFS, JICA-SRDP

Minutes of the 5th Joint Coordinating Committee Meeting on the Progress Report 5 for the Sustainable Rice Development Project (SRDP) in Sierra Leone

The fifth Joint Coordinating Committee Meeting (the Meeting) on the Sustainable Rice Development Project in Sierra Leone (the Project) was convened at the conference hall of the Rokupr Agricultural Research Centre (RARC), Rokupr, Kambia, at 11:30 a.m. on 19th April, 2013, after visiting rice fields of two Farmer Based Organizations (FBO) supported by JICA-SRDP under the Smallholder Commercialisation Programme (SCP). The objective of the Meeting was to present the contents of the Progress Report 5 and discuss about them. The attendants are shown in Attachment 1.

The meeting was chaired by Mr. Ben Massaquoi, Director of the Extension Division of MAFFS. Following the welcome speech by Dr. Taylor, a senior researcher of RARC, Mr. Prince Kamara, SCP coordinator made a speech. He, while appreciating the JICA's support, mentioned that the JICA's activity was well aligned with SCP, and that he wished the further extension of the JICA's support. Then, the Minister of MAFFS made another statement. He was impressed with the FBO farmers acquiring appropriate farming practices the JICA disseminated to enhance yield and profit. He expected JICA to scale up the activities in the next phase. He also expected JICA's intervention for FBO farmers to be private enterprises.

The contents of the progress report 5 of SRDP were explained by Mr. Umaro Sankoh, District Agricultural Officer of MAFFS Kambia, using PowerPoint. The presentation materials were distributed to the participants (Attachment 2). After his explanation on the report, question and answer sessions followed. Main concern expressed among the participants was the fertilizer and soil fertility issues. The JICA-SRDP chief advisor answered to several questions that JICA-SRDP has not concluded about the recommended dosage of fertilizers, that pot experiment has been conducted to find out the most critically deficient nutrients in the soils, that the results of pot experiment did not necessarily show the necessary amount of nutrients for crop growth, and that field experiment will continue to come up with the fertilizer recommendation.

Other comments from the participants included the necessity of more coordination between MAFFS HQ and district offices, inclusion of improved farming practices into technical package aside from fertilizer recommendation, the necessity of more training sessions to extension workers and farmers, etc.

Towards the end, the Minister requested SRDP and RARC to cooperate each other, so that RARC could continue research work after JICA's support has finished. He further requested SRDP to propose recommended cropping calendar for disseminating double cropping of rice as well as maximizing the profit, and conduct cost – benefit analysis for rice production. Chairman wrapped up the session by requesting the followings to SRDP: (i) detailed

explanation of the on-farm fertilizer experiment results, (ii) cost-benefit analysis of the rice production, (iii) translation of pot experiment results into technical package (fertilizer recommendation), (iv) necessity of MAFFS-SLARI-JICA joint meeting, (v) coordination with extension office with regards to TP-R training guide preparation, (vi) continuance of soil survey in the next phase, (vii) necessity of analytical equipment for soil chemical analysis, and (viii)necessity of district coordination meeting.

Main points of discussions were summarized in a matrix as shown in Attachment 3.

The JCC meeting was closed at 1:00 p.m.

**Attachment 1 MAFFS/JICA-SRDP Joint Coordination Committee Meeting 5
Attendants List (1/3)**

Date: 19/04/2013

Place: Conference Hall, Rokupr Agricultural Research Centre, Rokupr, Kambia

#	Name	Designation	Institution	Mobile phone no.	e-mail address
1	Joseph S. Sesay	Minister	MAFFS		_____
2	Francis A-R Sankoh	Chief agricultural officer	MAFFS		_____
3	Prince Kamara	SCP coordinator	SCP/MAFF		_____
4	Ibrahim Shamie	Director, crops	MAFFS		_____
5	Ben Massaquoi	Director, extension	MAFFS		_____
6	Henry Kargbo	Deputy director, crops	MAFFS		_____
7	B.J.Bangura	Deputy director, Extension	MAFFS		_____
8	Willem Bangura	Deputy director, forestry	MAFFS		
9	Joseph S. Bangura	Assistant director, PEMSD	MAFFS		_____
10	Mohamed Conteh	Head, Agricultural Information Communication Unit	MAFFS		
11	Samuel D. Johnson	System Administrator	MAFFS		_____
12	Bernard Kamara	Personal assistant to the Minister	MAFFS		
13	Yumetta Beysolow	Personal assistance to Deputy Minister 1	MAFFS		_____
14	Neilford Rose	Assistant director, agricultural engineering	MAFFS		_____
15	Josse Olu John	President	NaFFSL		_____
16	Mohamed S. Kabiru	Secretary general	NaFFSL		_____
17	Festus Kamara	Financial secretary	NaFFSL		_____
18	Foday B. Kamara	Assistant secretary	NaFFSL		
19	Sheik	District coordinator, Kambia	NaFFSL		

**Attachment 1 MAFFS/JICA-SRDP Joint Coordination Committee Meeting 5
Attendants List (2/3)**

Date: 19/04/2013

Place: Conference Hall, Rokupr Agricultural Research Centre, Rokupr, Kambia

#	Name	Designation	Institution	Mobile phone no.	e-mail address
20	Umaru Sankoh	District agricultural officer, Kambia	MAFFS Kambia		_____
21	John A. Lakkoh	AESD officer	MAFFS-Kambia		
22	Andrew Mambu	FFS supervisor	MAFFS Kambia		
23	John B. Kamara	FFS supervisor	MAFFS-Kambia		
24	Daniel M. Kamara	Block extension supervisor	MAFFS Kambia		
25	Asmana Kabbia	Crop protection officer	MAFFS Kambia		
26	James R. Kanu	Project coordinator	ASREP		
27	Abu Bakarr Sesay	Field controller	ASREP		_____
28	Samuel Conteh	Monitoring and evaluation	ASREP		_____
29	Daniel S. Fornah	PDMO	SLARI		_____
30	Alimamy Fornah	Research officer	SLARI		_____
31	Samuel S. Harding	Research officer	SLARI		_____
32	D. R. Taylor	Senior research officer	RARC		_____
33	B.A.K. Kamara	Research officer	RARC		_____
34	Foday Suma	Research officer	RARC		
35	David Abass Kamara	Research officer	RARC		_____
36	Abdulai Bangura	Research officer	RARC		_____
37	Kattingu J. Charles	Research officer	RARC		_____
38	Juliana M. Vangahun	Research officer	RARC		_____

**Attachment 1 MAFFS/JICA-SRDP Joint Coordination Committee Meeting 5
Attendants List (3/3)**

Date: 19/04/2013

Place: Conference Hall, Rokupr Agricultural Research Centre, Rokupr, Kambia

#	Name	Designation	Institution	Mobile phone no.	e-mail address
39	Nabieu Kamara	Research assistant	RARC		_____
40	Moses J. Tucker	Research assistant	RARC		_____
41	Moses Daramy	Research assistant	RARC		_____
42	Sayo Sesay	Research assistant	RARC		_____
43	Musa Swaray	Research assistant	RARC		_____
44	Fatmata A. Kamara	Technical secretary	RARC		_____
45	Alpha B. Jalloh	Rice breeder	RARC		_____
46	Nazir Mohamed	Agro-economist	RARC		_____
47	Fonda B. Jenkins	Social scientist	RARC		_____
48	Teo Kaifineh	Senior mechanical superintendent	RARC		
49	Momoh L. Kamara	Acting admin. officer	RARC		
50	Kazuaki Sato	Representative, Sierra Leone Field Office	JICA		_____
51	Takashi Kimijima	Chief advisor	JICA-SRDP		_____
52	Maiko Nakamura	Expert	JICA-SRDP		_____
53	Junichi Yamaguchi	Expert	JICA-SRDP		_____
54	E.E.Bangura	Senior staff	JICA-SRDP		
55	Abdul Sam Sesay	Senior reporter	SLBC		
56	Lansana Kabba	Senior mobile projectnist	SLBC		

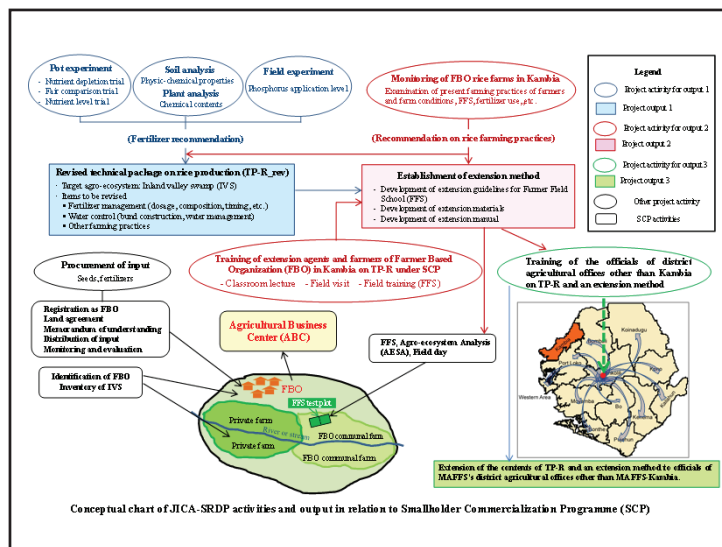



MAFFS – JICA
SUSTAINABLE RICE DEVELOPMENT PROJECT IN
SIERRA LEONE
(2010-2014)
Fifth Joint Coordination Committee Meeting

19 April, 2013
at RARC conference hall, Rokupr, Kambia

Project Purpose and Output

- Project period: 2010-2014
- Target area: Mainly Kambia district
- Project Purpose:
To establish rice production techniques and its extension method which are applicable throughout Sierra Leone
- Output:
 - 1) To revise the present technical package on rice production (TP-R)
 - 2) To extend the TP-R to small-scale farmers through FBOs in Kambia
 - 3) To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.



Progress Report 5
Contents

1. Introduction
2. Project Progress during the Last Six Months (Oct. 2012-Mar. 2013)
 - 2.1 Trials for improving Technical Package on Rice Production
 - 2.2 Rice cultivation by FBOs in the rainy season 2012
 - 2.3 Rice cultivation by FBOs in the dry season 2012/13
 - 2.4 Capacity development of FBO farmers and extension workers
 - 2.5 Input by JICA
 - 2.6 Issues to be addressed
3. Proposed Activities in the Subsequent Project Period

Activities for output 1: Soil fertility assessment in Kambia and outside Kambia

Description	Remarks
Comparison of the fertility in soils of Kambia with those outside Kambia (Pot experiment)	<ol style="list-style-type: none"> Phosphorus was found to be the most deficient in soils of both Kambia and outside Kambia, followed by sulfur and potassium. No much difference in soil fertility was observed between inside and outside Kambia.

Location map of soils collected from other districts than Kambia for pot experiment

Location of soil taken	Soil abbreviation	Agro-ecology	Nutrient				
			N	P	K	S	Zn
Rokon	RO	IVS	-	++	-	-	-
Tambi	TB	Bolliland	-	+	+/-	++	+/-
Robis	RM	Riverain	-	++	+/-	-	+/-
Kamaranka II	K2	IVS	-	+	-	+++	-
Musaia	MU	IVS	-	+	+/-	+/-	-
Tikonko	TK	IVS	-	-	-	++	-
Rolako	RL	Bolliland	+/-	++	+/-	-	-
Mayatha	MY	Bolliland	-	++	+/-	-	-
Torma Bum	TR	Riverain	-	+/-	+/-	+	-

No. 1-3: Soils in Kambia district

Deficient level	Symbol
Extremely high deficient	+++
Highly deficient	++
Considerably deficient	+
Fairly deficient	+/-
Not deficient	-

None -N (+PK) -P (+NK) -K (+NP) NPK

Kamaranka II (Bombali, IVS)

None -N (+PK) -P (+NK) -K (+NP) NPK

Musaia (Koinadugu, IVS)

Plant response to nutrient treatments in selected soils (27 days after transplanting)

None -N (+PK) -P (+NK) -K (+NP) NPK

Rolako (Bombali, Bolliland)

None -N (+PK) -P (+NK) -K (+NP) NPK

Torma Bum (Bonthe, Riverain)

Plant response to nutrient treatments in selected soils (27 days after transplanting)

Activities for output 1: Soil chemical analysis guidance

Transfer of Technologies on Soil Chemical Analysis

- Based on the recommendation made by the joint mid-term review mission, a JICA expert was assigned to transfer the technologies for analysing soils.
- A Sierra Leonean counterpart was appointed by RARC to work with the JICA expert.
- Joint analytical works started in February, 2013 for transferring the technologies including: (i) handling of utensils and reagents, (ii) handling and maintenance of laboratory equipment, and (iii) soil analysis procedure, precautions in analysis, (iv) presentation methods, (v) interpretation of the results, etc.
- Soil pH (H₂O, H₂O₂, KCl), Exchangeable acidity, Electro-conductivity (EC), and available P (Bray 1 and Truog methods) have been analysed using 38 samples as of mid-March 2013.

2-5-7

Activities for output 1: On-farm verification

Grain yield by treatments in the phosphorus application trial at three locations

Treatment (N-P ₂ O ₅ -K ₂ O kg/ha)	Yield (ton/ha)			
	Masineh	Robot		Tolokuray
		with bund	without bund	
None (0-0-0)	2.3	-	-	2.6
P0 (40-0-40)	2.0	1.5	1.9	2.6
P30 (40-30-40)	3.0	2.4	4.0	2.5
P100 (40-100-40)	3.0	3.7	3.4	2.3
P200 (40-200-40)	2.7	2.2	3.3	2.0

The highest yield of 2.5 to 4.0 ton/ha was obtained from the treatment with the modest phosphorus dosage of 40-30-40 kg/ha. Unlike what was observed in the pot experiment, yield was not increased with the increased phosphorus dosage in the farmer's field conditions. Complex causes could be considered for explaining the results.

Activities for output 1: On-farm verification

Yield components by treatments in the P application trial at Masineh

Yield components	P rate ^a (P ₂ O ₅ kg/ha)				
	None	P0	P30	P100	P200
- Number of hills per m ²	-	27.5	25.0	21.3	23.3
- Number of panicles per hill	-	5.5	< 6.7	= 6.5	6.5
- Number of filled grains per panicle	-	48.0	< 65.2	= 84.8	75.6
- Thousand grain weight ^b (g)	-	29.2	29.0	28.3	29.1
Estimated yield (ton/ha)	-	2.1	< 3.2	= 3.3	3.3
Yield with whole area cutting ^b (ton/ha)	2.3	2.0	< 3.0	= 3.0	2.7

^a 40kg/ha of N and K₂O are commonly applied to all the treatment plots. All the fertilizers are applied at puddling as basal.

^b Expressed at 14% moisture content

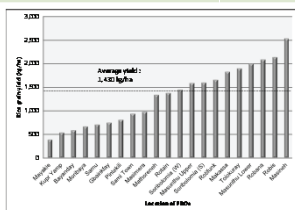
Actual yield at P30 significantly increased by about 50% compared to P0. The number of panicles per unit area and the number of filled grains per panicle are the main components to increase yield.

However, increase in the number of tillers as we have seen in pot experiment was not observed in higher dosage of phosphorus application treatments (P100 and P200) at on-farm verification.

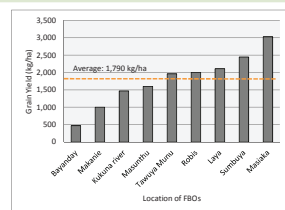
Complex causes could be considered for explaining the results.

Activities for Output 2: Support of FBOs in rice cultivation (evolution of the grain yields)

Description	Unit	Remarks
Analysis of rice growth and productivity of rainy season cropping 2011 in the FBOs	No. (21 FBOs)	Maximum yield of 2.5 ton/ha was obtained at a communal farm of the FBO at Masineh under fertilizer application and controlled water conditions. Inadequate farming practices and no water management limited the yield even with fertilizer application.
Analysis of growth and yield of rice in the rainy season cropping 2012 at FBOs field	No. (9 FBOs out of 17 supported)	Maximum yield of more than 3 ton/ha was obtained at a communal farm of the FBO at Masiaka under fertilizer application and controlled water conditions. FBO group ties were often very weak.



Grain yield of rice in the communal farm of FBOs in the rainy season, 2011



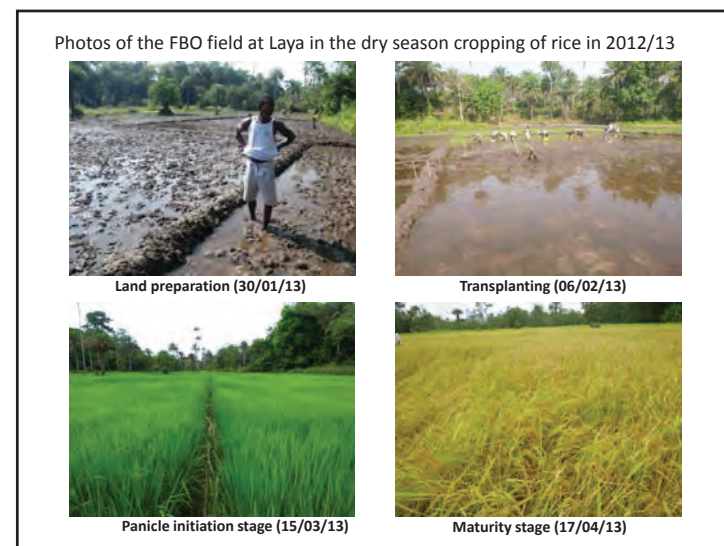
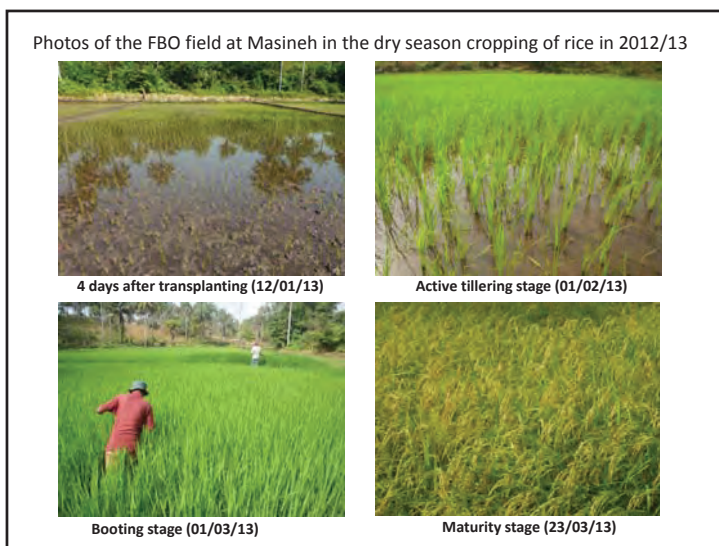
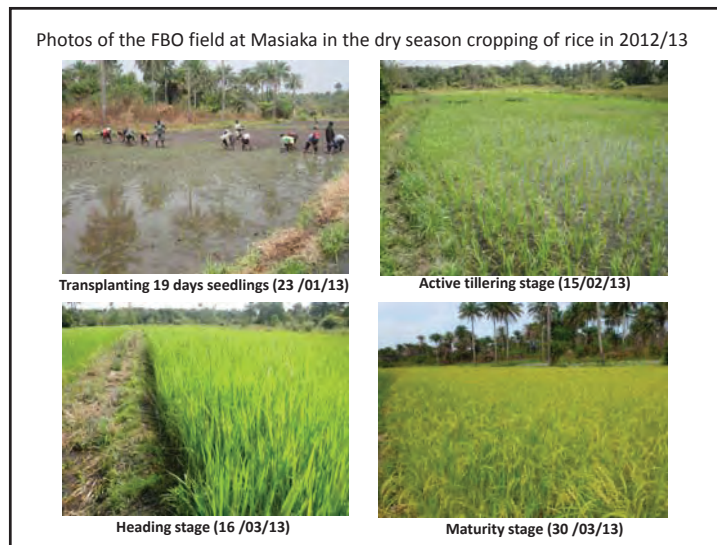
Grain yield of rice in the communal farm of FBOs in the rainy season, 2012 (data as of 20 December, 2012)

Activities for Output 2 : Capacity development of FBO farmers and extension workers of MAFFS-K

Description	Unit	Q'ty	Remarks
Training session for FBO farmers before the dry season cropping			
Refresh the memories on rice cultivation techniques before dry season cropping	No. farmers (No. FBOs)	154 (11)	Done at Masiaka, Tawuya Munu and Masunthu
Learn the features of early maturing varieties			
Training sessions for the extension workers of MAFFS-K			
1. Visit to good practice FBO fields		7	3 FBOs visited
2. Yield survey (incl. yield component analysis)	No. of participants	6	At Masineh's exp. Plots
3. Study tour of pot experiment		8	Soil fertility assessment
Development of extension method on TP-R			
Preparation of extension guide and materials to fit FFS	set	1	Under preparation
Level of adoption of TP-R techniques by FBO farmers			
Interview survey to FBO farmers	No. farmers	50	Yield increase with high adoption rate of the recommended farming practices confirmed.

Input to the project by JICA for the last 6 months Oct. 2012 – Mar. 2013

Description	Unit	Q'ty	Remarks
Japanese experts	Person-months	16.1	As planned
Seed rice (butter cup) Fertilizer (15-15-15) for the dry season cropping 2012/2013	bushel kg	11.1 2,325	Distributed to 8 FBOs on locan Distributed to 9 FBOs according to the cultivation area (400kg per ha)
Farm input (shovel, hoes) Fertilizer for P application experiment	No. kg	5 each 170kg	For FBO support under SCP in Kambia N: 96kg, P2O5: 46kg, K2O: 26kg
Cost for allowances for the training session to SCP extension workers and FBO farmers (incl. farmers' field visit)	Le.		
Fuel for motorbike for SCP extension	gallons	276	Emergency expense to mobilize community facilitators to conduct periodical monitoring of rice cultivation at FBO farms in the both rainy and dry seasons.
Fuel for the generator at MAFFS-K (Oct. 2012, Jan.-Feb. 2013)	gallons	378	Cost sharing with MAFFS-K and RPSDP
Satellite internet connection at MAFFS-K	months	6	



Issues to be addressed

Significant achievements	Issues
1. Transfer of technology of soil chemical analysis from the Japanese expert to the RARC counterparts	<ul style="list-style-type: none"> ➤ Environment of RARC laboratory does not allow to conduct full scale soil analysis. Unstable water supply, unstable electricity supply, unrepared analytical equipment, etc.
2. Support of 17 FBOs in providing farm input and guidance with FFS experiment, which resulted in the yield increase	<ul style="list-style-type: none"> ➤ How to avoid the duplication of FFS plots happened at 17 FBOs supported by JICA-SRDP after the intervention of ASREP under SCP ➤ Average group farming area of 17 FBOs supported by the project under SCP was merely 1.5 ha. How to secure the substantial volume of rice for marketing should be seriously thought. ➤ The component 1 of SCP including support to the FBO farmers should be implemented timely to disseminate the rice cultivation techniques and assure the farmers to respect cropping calendar, which are necessary conditions to increase rice yield.

Proposed activities for the next 6 months

- (1) Strengthening of ties with MAFFS Headquarters and SCP related donor agencies
- (2) Information sharing and making dialogue with other donors supporting agriculture and rural development fields
- (3) Trials and chemical analysis for revising TP-R;
- (4) Field monitoring and guidance of rice farming in the FBO fields in Kambia district;
- (5) Provision of training sessions to disseminate TP-R to extension workers and FBO farmers in Kambia;
- (6) Development of extension methods on rice cultivation for SCP;
- (7) Provision of training course on TP-R to extension workers outside Kambia district;
- (8) Preparation of Progress Report 6; and
- (9) Holding JCC meeting and MC meetings

Attachment 3 Matrix of the discussions

Observation	Issues	Decision or recommendation	Responsible person
1. Contradictory results are shown between pot experiment and on-farm experiment	Recommended dosage of fertilizer is not seen	Detailed explanation of the on-farm fertilizer experiment results should be presented.	SRDP, RARC
2. Dry season rice cropping is going well.	How to realize double cropping of rice or multiple cropping for maximizing profit.	Recommendation on cropping calendar on double cropping of rice and multiple cropping should be made.	SRDP
3. Dosage of fertilizer used in FBO support seems higher	Can th cost of fertilizer be recovered by the incremental benefit?	Cost-benefit analysis of the rice production should be presented	SRDP, RARC
4. The results of pot experiment are complicated.	Recommended dosage of fertilizer is not seen.	The results of the pot experiment should be translated into technical package (fertilizer recommendation)	MAFFS, SRDP, RARC
5. Direction of the research on soil fertility is not consistent among the stakeholders.	Dosage of fertlizer to be recommended under SCP is not determined.	A joint meeting between MAFFS, SLARI and JICA should be held.	MAFFS, SRDP
6. JICA-SRDP is going to develop extension method.	No detailed information on this is not shared.	MAFFS extension division should be involved in the preparation of TP-R extension guide.	SRDP, MAFFS
7. Importance of soil fertility assessment is recognized.	Survey extent is not deep enough.	The soil survey should be continued in the next phase of the JICA project.	MAFFS
8. Soil chemical analysis is conducted in Japan.	Why not the analysis work done in Sierra Leone?	Analytical equipment necessary for soil chemical analysis should be procured.	MAFFS, SLARI, RARC
9. Overlapped activities are observed in the field by JICA-SRDP and ASREP.	No coordination or communication has been made	District coordination meeting should be organized.	MAFFS, MAFFS-K

MUNITES OF THE SIXTH JOINT COORDINATING COMMITTEE MEETING
ON
THE MAFFS-JICA SUSTAINABLE RICE DEVELOPMENT PROJECT IN SIERRA LEONE

The sixth joint coordinating committee meeting on the Sustainable Rice Development Project (SRDP) in Sierra Leone was convened at 10:00 a.m. on 10th December, 2013 at the conference hall of the Ministry of Agriculture, Forestry and Food Security (MAFFS), Youyi Building, Freetown.

The meeting was chaired by Dr. Joseph Sam Sesay, Minister of MAFFS (the Chairman). The attendants of the meeting are shown on Attachment 1. The Agenda of the meeting and presentation materials distributed to the attendants are presented on Attachments 2 and 3, respectively.

After giving brief background on the activities of the SRDP and expressing expectation for the next phase, the Chairman called for JICA-SRDP to explain the progress of the work discussed in the previous JCC (the fifth JCC) meeting.

Action points from Progress Report No. 5

The action points from the Progress Report 5 were explained by Takashi Kimijima, Chief Advisor of SRDP. Main points of the explanation are in the following.

- 1) SRDP continue fertilizer trial in the field to come up with the new fertilizer recommendation.
- 2) SRDP continues testing double cropping in Kambia district. Recommended cropping pattern for double cropping of rice will be presented.
- 3) Cost-benefit analysis of the rice production is a very important issue to the project which will be presented later.
- 4) Technical package will be revised by the end of the project incorporating fertilizer recommendation.
- 5) We presented soil fertility analysis results and idea on new fertilizer recommendation in the policy orientation meeting in May 2013. However, we have not yet come to consensus on the recommended fertilizer dosage with RARC.
- 6) JICA-SRDP is preparing extension guide for TP-R dissemination. A draft of the extension guide was distributed to the extension division of MAFFS for comments and contributions.
- 7) Although it is ideal if we could conduct soil chemical analysis in the country, still basic infrastructure especially unstable electricity supply does not allow us to conduct detailed analysis.
- 8) We are closely collaborating with MAFFS-K so that no overlapping activities with other donors are occurred.

After confirming the action points, the Chairman raised the concern that there was little collaboration and/or communication among organizations involved in rice development.

The Chairman then urged SRDP to present Progress Report 6 and cost-benefit analysis on rice production.

Presentation of Progress Report No.6 and cost-benefit analysis

Contents of Progress Report No. 6 were presented by Mitsuo Nishiya, Deputy Chief Advisor of JICA-SRDP, using a PowerPoint followed by the presentation of cost-benefit analysis on rice production and cropping pattern for double cropping of rice by Takashi Kimijima.

The following discussions on the presentation were made.

- 1) The Chairman was concerned about the result of cost benefit analysis which JICA-SRDP presented, showing that the rice production is not a profitable business at the moment. According to the Chairman, since 1970, none of the reports which analyzed cost-benefit of rice concluded that rice production was not profitable. The Chairman asked JICA-SRDP to review the assumptions used in the analysis and make comparison with the Japanese rice production. He also asked JICA-SRDP to make analysis on the effect of introducing small agro-machinery (power tiller) and herbicide on cost-benefit.
- 2) The Chairman insisted the necessity for having a session to discuss about the issues on rice production. Francis A-R Sankoh, Chief Agricultural Officer, suggested that the session be held at the occasion of National Agricultural Retreat.
- 3) While expressing that rice farming is very difficult business, Sheku T. Kamara, Assistant Chief Agricultural Officer, emphasized the use of short duration varieties with at least ninety (90) days, to have standing crops in the rainy season so that triple cropping a year is possible. The next phase of JICA project should also target / address the farmer's capacity in constructing bunds and other agricultural activities. He added that it is important to determine the combination of fertilizers, so that specific chemicals would be supplemented.
- 4) Joseph S. Bangura, Assistant Director of PEMSD supported the SRDP's position that rice production is not profitable, due to the recent competitive labor market because of the boom in the mining sector. As many youths are absorbed in the mining sector, the available labor is scarce in the agriculture. When employed in agriculture, they do not work as hard as expected while demanding high wage. He also said that subsidy in input is not a solution to boost agricultural production. Instead, it is better to use best practices in farming. He added that rice performs better in the dry season than the rainy season as the climate condition is more favorable and as the fertilizer is more effective in the dry season. He also mentioned that far more investment has been laid in Japanese farming than that of Sierra Leone.
- 5) Another contribution was made by Henry Kargbo, Deputy Director of Crops that rice production being unprofitable was not true, because Rokupr Agricultural Research Centre gave their experience in rice research which was very contrary to the assumptions presented by the JICA-SRDP team. He added that to be break-even the rice yield should be around four (4) ton/ha. He observed that the major part of the production cost is covered by labor, which means that the farmers are paying

themselves. If one factors the labor cost then rice production will be profitable. He believed that the crops division has to be engaged and involved in production issues. Also, he added the use of herbicides brings about profit because the cost of herbicides offset the labor requirement in weeding. He ended his comments by inviting JICA- SRDP to an engagement, since they are presently working on seed production.

- 6) B. J. Bangura, Deputy Director of Extension commented on the issue of cost-benefit analysis. According to him, the issue of rice production not bearing profit in Sierra Leone should be a challenge to the Ministry. One should not make it personal, instead, the Ministry should find possible means to overcome the issues surrounding production and farmers activities to enhance better rice yield and move to commercialization which at the same time will make rice farming profitable.
- 7) Alfred Kamara, Crop Officer of Kabala district also contributed on the area of varieties. He said that the local farmers know the varieties they use, and that those varieties are well adapted to the local environment. He advised then it is better to compare the new varieties with those old varieties in their performance before introducing the new varieties.

Responses of Chief Advisor of JICA-SRDP to the comments and contributions from the participants

Takashi Kimijima responded to the comments from the participants. He promised to re-examine the assumptions set for the cost-benefit analysis, and the efficiency of introducing small scale agro-machinery. Meanwhile, he did not agree to introduce herbicide in the rainy season, as it is too risky for the farmers to make it effective. He also reminded the participants of the high cost of labors as one of the factors increasing the total cost of production. He also opposed the idea of introducing triple cropping of rice using short duration varieties, in which one cropping is to be harvested in July when rainy season starts. While he admitted that the JICA-SRDP team has been working with crops and extension divisions at district level, the team would try to improve in their cordiality in future.

Comments from Head of JICA Sierra Leone Field Office

Toshihisa Hasegawa, Head of JICA Sierra Leone Field Office (SLFO), made few comments after his introduction about JICA-SLFO activities in Sierra Leone. He expressed his gratitude to the participants in collaborating with the JICA-SRDP team, and assured them that the team will continue to work hard in order to contribute meaningfully to the rice productivity increase in the Country. While explaining that JICA's assistance policy to Sierra Leone set the agricultural sector as one of the three core pillars, he mentioned that the implementation of the project in the next phase has yet been determined and that the decision will be made by the Japanese Government based on the outcome of the terminal evaluation study for the current JICA-SRDP, the study of which will be carried out in January, 2014. He also commented that as JICA's resources are limited to deal with wider scope, it is wise to collaborate with other donors in bearing synergy.

Experience sharing of training in Japan

To the end, a brief presentation using PowerPoint was made by B.J. Bangura, on behalf of the five MAFFS staff that went to Japan for training under JICA with special reference on the Job Improvement Plan (JIPs) for implementation. According to B.J. Bangura, the training was very educative and comprehensive which is very timely for the training of trainers. He wants to encourage JICA to continue to provide such opportunity to MAFFS staff especially for the engineering department. He also requested financial support from the Ministry to the trainees to enable them facilitate their assignment as required by the training process. He also advised colleagues that it will be very much useful if they can put the Job Improvement Plan together and apply what they were thought during the training in their work place. After his presentation, one of the trainees Alfred Kamara submitted his training report published by JICA to the Minister as gift from the training center.

The Chairman of the meeting thanked JICA and the trainees and hoped that the training contents they have acquired will make a positive difference in their work place and promised to make possible provision for finance to facilitate their activities.

Closing

The Chairman wrapped up the session by summarizing main points of discussion, which are tabulated in attachment 4.

The meeting was closed at 13:00.

MAFFS/JICA-SRDP Joint Coordinating Committee Meeting 6

List of Attendants (1/2)

Date: 10/12/2013

Place: Conference Hall, MAFFS, Youyi Bldg., Freetown

#	Name	Designation	Organization	Mobile phone no.	e-mail address
1	Joseph Sam Sesay	Minister	MAFFS		_____
2	Fatmata Jarai Jalloh	Extension Officer	MAFFS		_____
3	B.J.Bangura	Deputy Director, Extension	MAFFS		_____
4	Alfred Kamara	Crops Officer	MAFFS		_____
5	Joseph S. Bangura	Assistant Director M&E	PEMSD / MAFFS		_____
6	Toshihisa Hasegawa	Head, Sierra Leone Field Office	JICA		_____
7	Akihira Sano	Project Formulation Advisor	JICA		_____
8	Alie B. Yillah	Deputy Director, Agric. Engineering	MAFFS		_____
9	Neilford Rose	Assistant Director Ag. Engineering	MAFFS		_____
10	Francis A.R. Sankoh	Chief Agricultural Officer	MAFFS		_____
11	Henry Kargbo	Deputy Director Crops	MAFFS		_____
12	Kate N.B. Garnett	Ag. Director Forestry	MAFFS		_____
13	Umaru M. Sankoh	DAO MAFFS Kambia	MAFFS		_____
14	Sheku T. Kamara	ACAO MAFFS	MAFFS		_____
15	Joseph D. Ganda	Asst. Director, Ag. Engineering	MAFFS		_____

MAFFS/JICA-SRDP Joint Coordinating Committee Meeting 6

List of Attendants (2/2)

Date: 10/12/2013

Place: Conference Hall, MAFFS, Youyi Bldg., Freetown

#	Name	Designation	Organization	Mobile phone no.	e-mail address
16	Takashi Kimijima	Chief Advisor	JICA		_____
17	Mitsuo Nishiya	Deputy Chief Advisor	JICA		_____
18	Umaru Fofanah	Project Officer	JICA		_____
19					
20					
21					
22					
23					
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25					
26					
27					
28					
29					
30					

Agenda of the Sixth Joint Coordination Committee Meeting (JCC) for the Sustainable Rice Development Project (SRDP) in Sierra Leone

Venue: Conference Hall, MAFFS, Youyi Bldg.

Date: 10 December, 2013

Time: 10:00 – 12:00

Agenda

1. Silent prayers
2. Self-introduction
3. Chairman's opening remarks
4. Action points from Progress Report 5
5. Presentation and discussion of Progress Report 6
6. Cost-benefit analysis on rice production following discussion
7. Recommended cropping pattern for double cropping of rice
8. Experience sharing of 2013 MAFFS staff trainees (5) from Japan under JICA with special reference to the Job Improvement Plan (JIPs) for implementation

Attachment 3 Presentation Materials (1/8)




**MAFFS – JICA
SUSTAINABLE RICE DEVELOPMENT PROJECT
IN SIERRA LEONE
(2010-2014)**

Sixth Joint Coordinating Committee Meeting

10 December, 2013
MAFFS conference hall, Youyi Bldg., Freetown

Agenda

1. Silent prayers
2. Self introduction
3. Chairman’s opening remarks
4. Action points from Progress Report No.5
5. Presentation and discussion of Progress Report No.6
6. Cost-benefit analysis on rice production following discussion
7. Recommended cropping pattern for double cropping of rice
8. Experience sharing of 2013 MAFFS staff trainees(5) from Japan under JICA with special reference on the Job Improvement Plans (JIPs) for implementation

Matrix of discussion results in the 5th JCC

Observation	Issues	Decision or recommendation	Responsible person
1. Contradictory results are shown between pot experiment and experiment.	Recommended dosage of fertilizer is not seen.	Detailed explanation of the on-farm fertilizer experiment results should be presented.	SRDP, RARC
2. Dry season rice cropping is going well.	How to realize double cropping rice or multiple cropping maximizing profit.	Recommendation on cropping calendar on double cropping of rice and multiple cropping should be made.	SRDP
3. Dosage of fertilizer used in FBO support seems higher	Can the cost of fertilizer be recovered by the incremental benefit?	Cost-benefit analysis of the rice production should be presented	SRDP, RARC
4. The results of pot experiment are complicated.	Recommended dosage of fertilizer is not seen.	The results of the pot experiment should be translated into technical package (fertilizer recommendation)	MAFFS, SRDP, RARC
5. Direction of the research on soil fertility is not consistent among the stakeholders.	Dosage of fertilizer to be recommended under SCP is not determined.	A joint meeting between MAFFS, SLARI and JICA should be held.	MAFFS, SRDP
6. JICA-SRDP is going to develop extension method.	No detailed information on this is not shared.	MAFFS extension division should be involved in the preparation of TP-R extension guide.	SRDP, MAFFS
7. Importance of soil fertility assessment is recognized.	Survey extent is not deep enough.	The soil survey should be continued in the next phase of the JICA project.	MAFFS
8. Soil chemical analysis is conducted in Japan.	Why not the analysis work done in Sierra Leone?	Analytical equipment necessary for soil chemical analysis should be procured.	MAFFS, SLARI, RARC
9. Overlapped activities are observed in the field by JICA-SRDP and ASREP.	No coordination or communication has been made	District coordination meeting should be organized.	MAFFS, MAFFS-K

3

Project Purpose and Output

- Project period: 2010-2014
- Target area: Mainly Kambia district

Project Purpose:
To establish rice production techniques and its extension method which are applicable throughout Sierra Leone

Output 1
To revise the present technical package on rice production (TP-R)

Output 2
To extend the TP-R to small-scale farmers through FBOs in Kambia

Output 3
To extend the contents of TP-R and an extension method to officials of MAFFS’s district agricultural offices other than MAFFS-Kambia.

4

Attachment 3 Presentation Materials (2/8)

Progress Report 6 - Contents

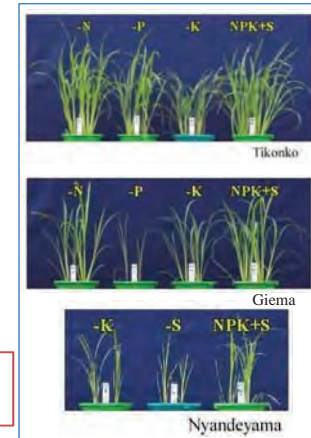
1. Introduction
2. Project Progress during the Last Six Months (Mar.- Aug. 2013)
 1. Trials for improving Technical Package on Rice Production
 2. Rice cultivation by FBOs in the dry season 2012/13
 3. Rice cultivation by FBOs in the rainy season 2013
 4. Capacity development of FBO farmers and extension workers
 5. Project operation
3. Proposed Activities in the Subsequent Project Period

5

Trials for improving TP-R (Soil fertility evaluation) (1)

Soil	Abbr.	Element				
		N	P	K	S	Zn
Robenhah-U	RU	Severe	High	Fair	Less	Fair
Masineh	MH	Fair	High	Fair	Less	Fair
Kpuabu	KP	Fair	High	Fair	Less	Fair
Buline	BL	Fair	High	Fair	Less	Fair
Nyandeyama	NY	Fair	High	Fair	Less	Fair
Giema	GM	Fair	High	Fair	Less	Fair
Kanikay	KK	Fair	High	Fair	Less	Fair
Mandu	MD	Fair	High	Fair	Less	Fair

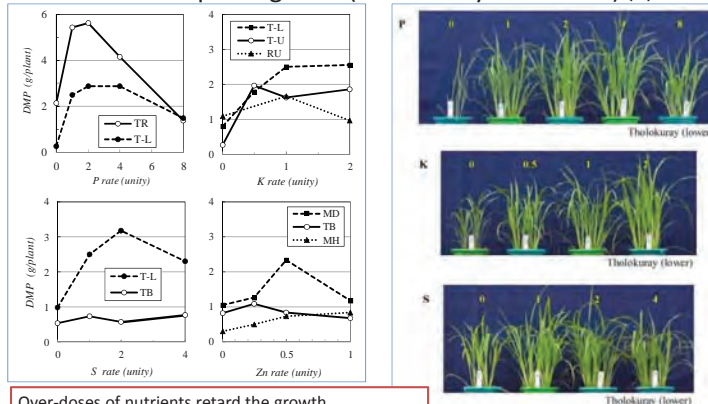
Very severe
Severe
High
Fair
Less



Deficiency of P and S was widely distributed. Deficiency of N and K also appeared in several soils, but deficiency of Zn was site specific

6

Trials for improving TP-R (Soil fertility evaluation) (2)



Over-doses of nutrients retard the growth. Plants would respond to 100-200 kg P₂O₅/ha. 20% of N amount would be optimum for S application.

7

Trials for improving TP-R (On-farm verification) (1)

- To examine the effect of **level of P** on growth and yield of rice plants at lowland, on-farm trials were carried out at a FBO farmers' rice field during the dry season 2013.




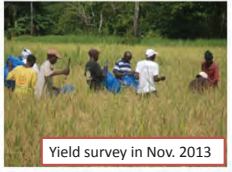
Treatment (N-P ₂ O ₅ -K ₂ O kg/ha)	Yield (ton/ha)
P0 (60-0-40)	2.4
P30 (60-30-40)	4.2
P100 (60-100-40)	3.6
P0-residual (60-0-40)	3.0

8

Attachment 3 Presentation Materials (3/8)

Trials for improving TP-R (On-farm verification) (2)



- On-farm fertilizer trial has been set at 5 locations in the rainy season 2013. This time, the effect of graded **level of N, P, and S** on the rice growth and yield is tested.

Treatment	Fertilizer application rate: N-P ₂ O ₅ -K ₂ O-S (kg/ha)
1: Control	0-0-0-0
2: Standard	60-40-40-0
3: Low N, -S	20-40-40-0
4: Low N, + S	20-40-40-10
5: Low N, High P, +S	20-100-40-10

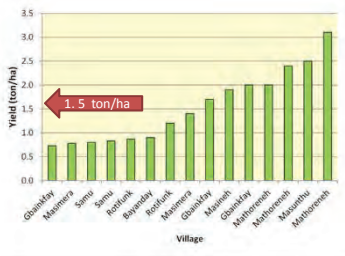
Rice cultivation by FBOs in the dry season 2012/13 (1)

- SRDP supported **10 FBOs** in the dry season cropping 2012/13.
 - Average yield: **2.2 ton/ha** (1.5 ton/ha in 2011/12)
 - Maximum yield: **3.3 ton/ha**
 - Those FBOs having produced rice with 2 ton/ha or more constructed bunds with a drainage canal.
 - Proper farming practices such as weeding, water management and timely fertilizer application are necessary.

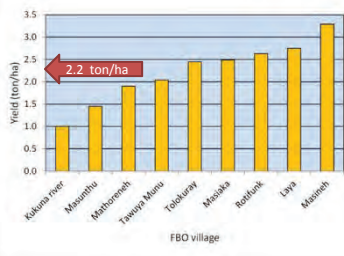



Rice cultivation by FBOs in the dry season 2012/13 (2)

2011/12





2012/13



Comparison of the grain yield of rice in the FBO fields between the last two dry seasons

Rice cultivation by FBOs in the rainy season 2013

- 19 FBOs**, including 14 FBOs which had been given support before, were selected for support in 2013.
 - 300 kg/ha of NPK 15-15-15** were distributed.
 - 8 FBOs were supported construction of drainage canal, peripheral canals and internal bunds by ASREP/GAFSP, while the other FBOs constructed them by themselves.
 - Small-scale **seed production** is going on at 4 FBO fields.

Attachment 3 Presentation Materials (4/8)

Capacity development (Training for FBO farmers)

- In the end of the dry season, a **wrap up training** session for the member farmers (59 in total) of 10 FBOs who received support by the project were held in May 2013.
- Prior to the start of the rainy season cropping, farmers of 19 FBOs (65 in total) were provided **training on rice cultivation technique** in June 2013.

Drama: cost-benefit on fertilizer

Exercise: cropping calendar

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Capacity development (extension method, Training)

- The **extension guideline and materials** (the Guide) has been under preparation in consultation with the Extension Division of MAFFS-HQ, MAFFS-K and FAO, with the objective of disseminating TP-R down to the farmers through FFS under SCP.
- Training:** To share the contents of the **Guide** with the extension workers of MAFFS-K, and obtain the feedback from them, a series of training session was provided to them in July, 2013.

Extension Material on Technical Package on Rice Production

Sustainable Rice Development Project in Sierra Leone (SRD, MAFFS)

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Manual on soil chemical analysis

- Manual on soil chemical analysis** is under preparation.
 - 17 analysis methods
 - Description:
 - 1) principle
 - 2) apparatus
 - 3) reagents
 - 4) procedure
 - 5) calculation.

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Proposed activities (Sept. 2013 - March 2014)

- On-farm trials for revising TP-R and utilization of the results in the extension activities
- Strengthening of coordination with MAFFS/SCP, and procurement of agricultural input for FBOs and monitoring of its utilization
- Coordination of the dissemination of TP-R
- Survey on the adoption level of farming techniques in TP-R by FBO farmers
- Cooperation with the **terminal evaluation** mission
- Provision of guidance on TP-R and its extension method to extension workers outside Kambia
- Preparation and submission of Progress Report 7
- Holding JCC meeting and MC meetings
- Communication with other donors/NGOs active in agriculture and rural development sector

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Attachment 3 Presentation Materials (5/8)

TOPICS

1. Cost-benefit analysis of rice production
2. Recommended cropping pattern for double cropping of rice

Cost-benefit analysis
- Assumption for the analysis 1 -

Cost items:

- Production cost of paddy (rough rice) is defined as the cost necessary for farmers to cultivate rice, and is composed of labor, input, and tools. Cost for land development (bund construction, drainage construction, and terracing work) is not counted.

Benefit:

- Benefit comes from the quantity of paddy produced. Without fertilizer application condition, 1,200 kg of rough rice is assumed to be produced.

Cost-benefit analysis
- Assumption for the analysis 2 -

Unit price:

- Labor cost is Le 7,000 per man-day.
- Fertilizer cost consists of wholesale price + sales margin + transportation cost (Le 108,500 per 25kg)
- Seed cost is Le 2,000 per kg.
- Cost for tools and materials is calculated as the depreciation based on the assumption of economic life of 3 to 8 years.
- Farm gate price of paddy is Le 1,200 per kg (Le 30,000 per 25kg).

Cost-benefit analysis
- Assumption for the analysis 3 -

- Labor requirement (man-days/ha): 438

	Without fertilizer
1 Brushing	63
2 Digging	75
3 Puddling/leveling	63
3 Uprooting	32
4 Transplanting	44
5 Weeding	75
6 Harvest	47
7 Threshing	28
8 Winnowing	13

Source: JICA-SRDP based on the interview with FBO farmers (2013)

Attachment 3 Presentation Materials (6/8)

Cost-benefit analysis

- Assumption for the analysis 4 -

- Seed amount: 40 kg/ha
- Tools :
 - Hoe (8 years) 10 units (Le 40,000/unit)
 - Sickle (5 years) 10 units (Le 20,000/unit)
 - Tarpaulin (3 years) 2 sheets (Le 90,000/sheet)
 - Winnowing (5 years) 5 units (Le 7,000/unit)

Cost-benefit analysis

- Cost per hectare (Le)

	Unit	Quantity	Unit cost	Total
1. Labor	man-day	438	7,000	3,066,000
2. Seed	kg	40	2,000	80,000
3. Fertilizer	25 kg bag	0	108,500	0
4. Tools and materials				
- Hoe	unit	10	5,000	50,000
- Sickle	unit	10	4,000	40,000
- Winnowing	unit	5	1,400	7,000
5. Material				
- Tarpauline	unit	2	30,000	60,000
- Rice bag		24	1,000	24,000
TOTAL				3,327,000

Cost-benefit analysis

- Gross benefit per hectare (Le)
 - Le 1,200/kg x 1,200 kg/ha = Le 1,440,000
- Net benefit per hectare (without fertilizer)
 - Le 1,440,000 – Le 3,327,000 = - Le 1,887,000

Rice farming is not a profitable business at present. If half of the labor requirement is covered by family labor, financial benefit will be close to break even.

Cost-benefit analysis

- How to improve the farmers' economy -

What are the alternative ways to improve profitability?

- Fertilizer application to increase yield ?
- Spraying herbicides to reduce weeding cost ?
- Mechanization to reduce cost for land preparation ?

Attachment 3 Presentation Materials (7/8)

Cost-benefit analysis

Fertilizer use

- Benefit per ha: $3,200 \times 1,200 = \text{Le } 3,840,000$
 - Incremental benefit $(3,200 - 1,200) \times 1,200 = \text{Le } 2,400,000$
- Cost of fertilizer per ha: $\text{Le } 108,500 \times 12 = \text{Le } 1,302,000$
- Increase in cost (labor in harvest, threshing, and winnowing, and rice bags)
 - $32 \text{ man-days} \times \text{Le } 7,000 + \text{Le } 40,000 = \text{Le } 264,000$
- Net Benefit per ha (with fertilizer)
 - $\text{Le } 3,840,000 - (\text{Le } 3,327,000 + \text{Le } 1,566,000) = - \text{Le } 1,053,000$

Fertilizer improve profitability but not enough.

Cost-benefit analysis

- Herbicide use -

- Herbicide cost per ha
 - Propanil (for broadleaf) : $\text{Le } 360,000 (4L \times \text{Le } 90,000/L)$
 - 2,4-D (for Graminae) : $\text{Le } 90,000 (1L \times \text{Le } 90,000)$
 - Total : $\text{Le } 450,000$ (Labor cost for weeding: $\text{Le } 525,000$)

Herbicide may reduce the weeding cost a little, but strict water control is necessary to bear the effect.

Hand weeding is unavoidable even after the herbicide spray. Considering possible negative environmental impact, it is not recommended to use herbicides at present.

Cost-benefit analysis

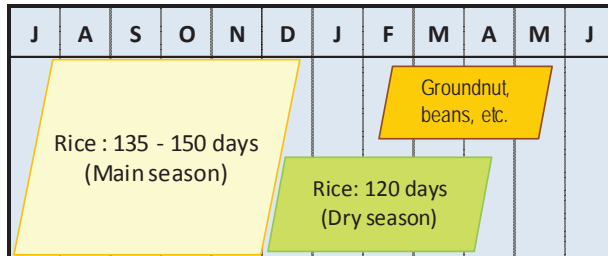
- Mechanization (tentative values) -

- Cost of tractor service
 - Price of a tractor (50 PS) with attachment : $\text{USD } 40,000$ (equivalent to $\text{Le } 174,000,000$)
 - Economic life: 8 years (= $\text{Le } 21,750,000/\text{year}$)
 - Cultivation area: 125 ha per year (= $\text{Le } 174,000/\text{ha}$)
 - Maintenance cost (repair and spare parts): 5% of the price (= $\text{Le } 174,000,000 \times 0.05 / 125 = \text{Le } 69,600/\text{ha}$)
 - Fuel (20L/ha): $\text{Le } 4,500 \times 20 = \text{Le } 90,000$
 - Operator ($\text{Le } 50,000/\text{ha}$)
- Total : $\text{Le } (174,000 + 69,600 + 90,000 + 50,000) = \text{Le } 383,600$
Digging by labor : $\text{Le } 525,000$

Cropping pattern for double cropping 1

- Double cropping of rice is possible at inland valley swamp from the experience of JICA-SRDP.
- Necessary condition is to secure water throughout the growth period.
- Higher yield is expected in the dry season under more manageable water condition and more solar radiation than in the rainy season.

Examples of cropping pattern (rice-rice-vegetable)



Cautions in preparing cropping pattern 1

Rainy season cropping of rice

- Varieties to be used may better be medium to long duration (135 to 150 days) and harvested by the middle of December at latest.
- Transplanting should be done before peak rainy season (middle of August).
- Fertilizer should be applied at the time of transplanting to avoid intensive rainfall.
- Do not irrigate the field but drain water from the field.

Cautions in preparing cropping pattern 2

Dry season cropping of rice

- Nursery preparation should be started in December, and transplanting be done until mid-January.
- Medium duration varieties (eg. NERICA L19) are better be planted considering scarce water resources and rodents/birds.
- In case nursery preparation is delayed in January, short duration varieties should be used.
- Fertilizer should be applied with good water management.

Matrix of the discussion (Action points) at the 6th JCC meeting

Observation	Issues	Decision or recommendation	Responsible person
The need to re-examine the assumptions used for cost-benefit analysis of rice production.	The results of the analysis showed the negative profit.	To re-examine these assumptions by comparing with other countries including Japan; To examine the profitability of introducing small agro-machinery (power tiller) and herbicide	MAFFS, SRDP
Activities made by the stakeholders in the rice sector have not been coordinated or collaborated.	Information has not been shared or development efforts were not harmonized.	Have a session to discuss about the issues of the rice sector (at the occasion of National Retreat)	MAFFS
Fertilizer application is risky in bringing about profit when used in the rainy season.	How to make fertilizer application effective in the rainy season.	To examine the cropping pattern and varieties so that rainfall will not bring about negative impact on fertilizer application.	MAFFS, SRDP
Joint terminal evaluation study will commence soon on JICA-SRDP activities.	MAFFS need to appoint evaluation team members to undergo the process.	MAFFS to appoint joint evaluation team members to work with the Japanese team.	MAFFS
MAFFS trainees sent to Japan under the JICA programme prepared the Job Improvement Plan (JIPs)	They lack financial support to implement the JIPs	While the MAFFS makes efforts to secure funds, the trainees make their best efforts to implement the JIPs under the constraints.	MAFFS