

No.

**パプアニューギニア国**  
**小規模稲作振興プログラム実施促進基礎調査**  
**報 告 書**

2003年4月

**国際協力事業団**  
アジア第二部

地二南
JR
03-02

## 序 文

パプアニューギニア国政府から、小規模農業分野における支援の要請があったことを受け、当団は1999年に農業分野での協力可能性確認のため、短期企画調査員を派遣しました。企画調査員の稲作振興に関する調査報告を受け、日本国政府は同国の稲作振興に係る支援を実施することを決定し、2000年12月から長期専門家他を派遣して協力を行ってきました。

パプアニューギニア国政府は、1998年に策定した「国家稲作政策」および2002年に当団の在外開発調査の結果を受けて策定された「稲作振興にかかる国家開発計画」で掲げた稲作普及の実現にむけて、さらなる協力の必要性を認識し、2003年度に、我が国に対し、派遣中の長期専門家を中心とした技術協力プロジェクト「小規模稲作振興プロジェクト」を要請してきました。

これを受けて当団は、小規模稲作振興に関する技術協力プロジェクトの実施に向けて、プロジェクトの妥当性、内容および今後の進め方について協議することを目的とし、2003年3月15日から3月22日まで、農業開発協力部農業技術協力課課長代理 藤井 智を団長とする基礎調査団を現地に派遣しました。

本報告書は、同調査団の現地調査結果を取りまとめたものです。この報告書が、今後のプロジェクトの展開に広く活用されることを願います。

最後に、本調査の実施に際し、ご協力とご支援を賜った関係者の皆様に、深甚なる感謝の意を表します。

2003年4月

国際協力事業団  
理事 泉 堅二郎

調査対象位置図





1. 共同利用の精米所 (マダン州)



2. 米の販売用の袋 (マダン州)



3. モデル農家 (マダン)



4. モデル農家 (マダン)



5. モデル農家 (ウシノ)



6. モデル農家 (ウシノ)



7. モデル農家 (ウシノ)



8. モデル農家 (ウシノ)



9. 研修施設 (農業畜産省エラップ支所)



10. 精米機等機材 (農業畜産省エラップ支所)



11. NAR圃場



12. ROC圃場



13. モデル農家（モロベ州）



14. モデル農家（モロベ州）



15. モデル農家（モロベ州）



16. モデル農家の農機具（モロベ州）

DARK STREET YOUTHS FARMERS						
REPORT OF HEDDIE REPLANT						
INDEX	DATE PLANT	DATE HARVEST	BUKETS	KG	WITH	KG
HEDDIE 1	21/10/02	27/12/02	6	240	124	
HEDDIE 2	23/10/02	26/12/02	6	246	124	
HEDDIE 3	24/10/02	27/12/02	7	249	124	
HEDDIE 4	25/10/02	28/12/02	5	184	147	
HEDDIE 5	27/10/02	29/12/02	9	376	253	
HEDDIE 6	14/10/02	31/12/02	7	280	124	
HEDDIE 7	15/10/02	31/12/02	7	249	124	
HEDDIE 8	16/10/02	31/12/02	9	376	253	
HEDDIE 9	17/10/02	31/12/02	9	349	124	
HEDDIE 10	18/10/02	31/12/02	9	349	124	
TOTAL RICE WITH SKIN			TOTAL WHITE RICE			
2431 KG			1451 KG			

17. モデル農家の稲収穫記録表（モロベ州）



18. モデル農家（モロベ州）



19. ブッシュナイフおよび鎌



20. オイスカ研修センター



21. オイスカ研修センター



22. オイスカ研修センター



23. 研修生宿泊施設（オイスカ研修センター）



24. ぼかし肥（オイスカ研修センター）

## 略語表

NDAL	National Department of Agriculture and Livestock	農業畜産省
NARI	National Agriculture Research Institute	国立農業研究所
ROC	Republic of China (R.O.C.) Agriculture Technical Mission to Papua New Guinea	台湾技術開発団
IRRI	International Rice Research Institute	国際稲研究所



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現地写真

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英語要約版

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資料2 : 農業畜産省 2003 年度予算内訳表

資料3 : 予算申請レター

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資料5 : マダン州稲作状況報告書

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## 1. 調査団の派遣

### 1-1. 派遣の経緯（要請の背景）・目的

パプアニューギニアでは近年米食が普及し、米の国内消費量は 2000 年時点で 15 万トン超にも達し、99%を輸入に依存している。これは、マクロ経済上外貨損失をもたらすのみならず、農村雇用機会の損失となっている。パプアニューギニア国農業畜産省は、食糧安全保障局を中心に「稲と穀物事業」を計画し、小規模農業部門で米生産による自給率の向上を進めている。同国の稲作ポテンシャルは決して低くなく、高地を除く各地で生産が可能であるが、地元の強いニーズにもかかわらず殆どの地域において依然未開発である。このような開発の遅れは、計画の不足、行政支援の弱さや不適正な技術導入などに起因すると考えられ、基礎からの適正技術移転が必要となっている。

このような協力への高いニーズを受けて、2001 年から稲作振興協力プログラムとして、長期専門家派遣、研修実施等による協力を行ってきており、平成 15 年度からは技術協力プロジェクト「小規模稲作振興プロジェクト」として引き続き協力を実施する予定である。

かかる背景の下、今後円滑かつ効果的な協力を行えるよう、技術協力プロジェクトの内容および今後の手順について、現地事務所およびパプアニューギニア国側関係者と協議することを目的として、本調査を実施した。

### 1-2. 調査団の構成

総括 藤井 智 JICA 農業開発協力部農業技術協力課課長代理  
協力計画 井上 琴比 JICA アジア第二部南西アジア・大洋州課職員

### 1-3. 調査日程： 2003 年 3 月 15 日～2003 年 3 月 22 日（8 日間）

日順	月日	曜日	行程
1	3月15日	土	20:05 成田発
2	3月16日	日	13:25 ポートモレスビー着（ケアンズ経由） 15:00 JICA PNG 事務所打ち合わせ、専門家との意見交換
3	3月17日	月	8:30 JICA PNG 事務所打ち合わせ 11:00 日本大使館表敬 13:00 国家計画・地方開発省表敬 14:00 農業畜産省表敬・食糧安全保障局協議 15:40 マダンへ移動 16:20 マダン着

4	3月18日	火	8:00 マダン州農業畜産水産局表敬/打ち合わせ 9:30 マダン・モデル農家視察 11:30 ウシノ・モデル農家視察 15:00 農業畜産省エラップ支所訪問/打ち合わせ 17:00 レイへ移動
5	3月19日	水	8:30 モロベ州第一次産業局表敬/打ち合わせ 9:00 農業畜産省北部地域事務所表敬/打ち合わせ 10:30 国立農業研究所(NARI)訪問/打ち合わせ 11:30 台湾開発センター(ROC)訪問/打ち合わせ 14:00 モデル農家視察
6	3月20日	木	9:05 ラバウルへ移動 13:00 OISCA ラバウル研修センター訪問/打ち合わせ
7	3月21日	金	9:20 ポートモレスビーへ移動 11:00 農業畜産省報告および意見交換 14:00 国家計画・地方開発省報告および意見交換 16:00 JICA PNG 事務所報告
8	3月22日	土	11:00 メディアセンター視察 14:15 ポートモレスビー発 20:30 成田着

#### 1-4. 主要面談者

##### 国家計画・地方開発省

(Department of National Planning and Rural Development)

(3月17日表敬訪問)

Mr. Paul Enny, Assistant Secretary,

Aid Coordination and Management Division

Ms. Linda Taman, Aid Coordinator (Japan Desk),

Aid Coordination and Management Division

(3月21日調査報告)

Mr. Mosilayoza Kwayaila, First Assistant Secretary,

Aid Coordination and Management Division

Ms. Linda Taman, Aid Coordinator (Japan Desk),

Aid Coordination and Management Division

Mr. Jonathan Kenneff, Planner, Development Planning and Program Division

農業畜産省 (National Department of Agriculture and Livestock)

Mr. Matthew 'wela Kanua, Secretary

Mr. Anton Benjamin, Deputy Secretary, Technical Services

Mr. Siva Supiramaniam, Acting Director, Food Security Branch

Mr. Boni Jules, Program Officer for JICA project,  
Food Security Branch (全行程に同行)

小田島 成良 専門家 (小規模農業普及計画)

マダン州農業畜産水産局 (Department of Agriculture, Livestock and Fishery)

Mr. Calun Kassas, Deputy Administrator

Mr. Paschal Feria, Advisor

Mr. Ganet Agodop, Provincial Agriculture officer

Ms. Mary Lilih, Provincial Food Crops Officer

Mr. Atsushi Nakamura, JOCV (Rice Production)

マダン州 州政府

Mr. Bunag Kiup, Deputy Governor

Mr. Otto Aite, Chairman of Primary Industry Section

マダン州モデル農家

(マダン) Mr. Peter Kaimu

(ウシノ) Mr. William Umbaria

農業畜産省エラップ支所 (エラップ農業開発センター) (NDAL Erap Station)

Mr. John Jave, Rice Agronomist

Mr. Steven Heai, Irrigation Agronomist

Mr. James Duks, Senior Livestock officer

農業畜産省北部地域事務所 (Northern Region Office, Division of Provincial and Industry Support Services, Department of Agriculture and Livestock)

Mr. Masayan Mont, Regional Livestock Development Officer

モロベ州第一次産業局

Mr. Geoping Bilong, Advisor  
Mr. Amos Buieba, Rice Project Officer

国立農業研究所 (National Agriculture Research Institute)

Mr. Naihuwo Ahai, Director Research  
Mr. Geoff Wiles, Chief Scientist  
Mr. M.S.Sajjad, Primary Rice Breeder  
Mr. Roy Masamdu, Research Programme Leader

台湾技術開発団

(R.O.C. (On Taiwan) Agriculture Technical Mission to Papua New Guinea)  
Mr. Patrick H.K. Cheng, Mission Leader

モロベ州モデル農家

( 4 マイル地区 ) Mr. Norman  
(Ahi district Poho village) Mr. Nick

モロベ州第一次産業局圃場

Mr. Saphas Arpi, District staff, Morobe DPI

OISCA エコテック研修センター (OICA Eco-Tech Training Centre)

荏原 美知勝 パプアニューギニア開発団団長  
Mr. Francis JICA 委託研修担当(専任)

在パプアニューギニア日本大使館

山下 勝男 特命全権大使  
清水 俊二 一等書記官

JICA パプアニューギニア事務所

斉藤 克郎 所長  
鯉沼 真里 所員  
須佐見 淳 企画調査員 (総合援助調整)

## 2. 要約

本調査を通じて、パプアニューギニアでは、米の生産、消費の両面からのニーズが、政策レベルにおいても農民レベルにおいても高いことが確認された。その意味で、本プロジェクトの実施意義は高いものと思われる。特に本プロジェクトでは、小規模農民の自給稲作を対象としており、裨益者（農民）の一人一人に起こるプロジェクトによる変化は小さいものの、大きな変化を起こさないが故に広い裾野への広がりを期待することができる。

州レベル、国レベルで、様々な機関が本プロジェクトに関係しているが、プロジェクト実施の中心であり直接の裨益者となるのは農民であり、「農民による農民への技術普及」を念頭においている。これは、途上国においては、地域での普及指導にあたる技術者の確保が容易ではない現状を考えると的を射ており、また、コストの面においても、事後の農村での発展を考えても効率的な手法であるといえることができる。

しかしながら、農民から農民へという形態での稲作普及を成功させるためには、農村レベルにおいてある程度の組織化がなされるか、または、少なくとも農民が他の農民へ指導することを当然と考えるような意識が芽生えることが求められる。また、プロジェクトの中心は農民であるが、関係する政府の諸機関についても、それぞれの責任範囲・役割分担の明確化と、各機関の活動の調整が必要となる。従って、本プロジェクトの第一の役割は、中央から末端農家に至るまでの稲作普及の「流れ」を作っていくことにある。

稲作技術の面では、モデル農家を視察した限りでは、ほぼ問題なく稲作を行っており、現状では大きな問題は感じられない。地域の機関も稲作を振興するにあたって、籾擦り機等の機材の村への配置、種子の配布以外には大きな問題を感じていないように見受けられる。しかしながら、適性品種確保の問題、病害虫の問題、土壌管理の問題は稲作が盛んになるにつれ、必ず発生してくるものと推測される。地域および政府レベルでも、そのためのバックアップ体制がほとんどできていないのが現状である。この点に関しては、将来へ続く稲作を目指すのであれば、十分に準備しておくべきあり、その点をどの程度本プロジェクトに組み入れるのか十分な検討が必要である。

### 3. 調査結果

#### 3-1. 小規模稲作の状況

##### 1) 農業政策と稲作振興

パプアニューギニアでは、これまでの在外開発調査や専門家の報告書に記されているとおり、政府は食糧安全保障の観点および米輸入による外貨流失を軽減するために、稲作振興政策を進めている。振興政策の中では、過去の中規模稲作振興の失敗の反省から、特に小規模農家への稲作振興を中心的な課題として捉えている。1998年に農業畜産省が策定したこの振興策（資料1：National Rice Policy Document）の中では、稲作の方向性から始まり、稲作の振興を実際に行うための、各段階における人員の強化（質、数）活動を実施するための予算の割り当て（10年間で35.9百万キナ、最初の1年は4.3百万キナ）が明示されている。しかしながら、これらの計画には、具体的な計画が、地域的、年次別で記載されているわけではなく、国家「スローガン」のようなものになっており、実効性が不明確である。

##### 2) 農家レベルにおける稲作へのニーズ

稲作は、今回訪問した3州（モロベ州・マダン州・東ニューブリテン州）の他にも各地域で程度の差こそあれ、実施されており、また、国内に流通する米の状況を考えても、米が国民の重要な食糧として位置付けられていることは間違いない。市場においては、オーストラリアからの輸入米（Trukai社独占による）が主流を占め、地元産は極限られたものとなっている。

農家は、米を家族の食糧として位置付け、また幾らかの現金を手に入れる手段としても位置付けており、稲作を行うことの有利性を認識しつつある。

##### 3) 小規模農家稲作の状況

稲は、陸稲として、傾斜地、平地で栽培されている他、一部水の便の良いところでは水稲として栽培されている。栽培規模は、共同化しているところ、していないところで様々であるが、1家族単位にすると10アール以内である場合が多い。今回訪問したマダン、モロベ、東ニューブリテン州の3州では、開発福祉支援で実施した研修の受講者（農家）が、地域でモデルファーマーとして稲を栽培しており、各々の農家が稲作について非常に評価している。モロベ州の火山灰地で陸稲の作付けを行うモデル農家は、周辺の40の家族を集め、区画を区切って集団栽培を行っていた。収益もかなり挙げていることがうかがわれ、整地、脱穀、運搬、精米について各々機材を賃借し、作業の簡便化、面積の拡大を図っていた。同じく、同州の水田農家でも集団栽培が見られ、作業から収穫物の分配まですべて

農民により運営されていた。

また、マダン州では州の第一次産業局がかかわり、現段階では不十分であるが、Model Farmer Contact Farmer 一般農家という技術の流れを形成している例も見られた。

いずれの場所においても、現段階である程度の稲作が実施されており、病虫害の問題、施肥等についての栽培上の問題点の指摘は、農家からは聞かなかった。しかし、農家、関係機関とも十分な稲作の知識を有していないため、一度、問題が噴出すると対応が難しいことが想像される。農家は極めて自給自足的であることから、今後稲作を振興するに際しても、低投入（無化学肥料、無農薬）が基本であり、そのためにもそのような条件でも十分に栽培できる品種の普及が重要である。

### 3-2. 実施関係機関

#### 1) 農業畜産省 (NDAL: National Department of Agriculture and Livestock)

本件に関しては、農業畜産省の中でも主に食糧安全保障局 (Food Security Branch) が実施機関となる。また、地方においては、現在、本プロジェクトでは北部3州（東セピック、マダン、モロベ）を対象としており、その3州を含め地域を統括する北部地域事務所が農業省直轄の機関としてプロジェクトに関係する。その他、地域事務所（モロベ）から車で1時間離れた距離のエラップに90年代に設立された農業開発センターがある。

予算に関しては非常に厳しく、稲作振興に対して現在承認されている予算は2003年度で50万キナとなっている（予算内訳については、資料2参照）。これは、人件費は含まない事業費のみであるが、スタッフの旅費はここに含まれており、対象を絞り込まなければ、十分と言える額ではない。また、農業畜産省の食糧安全保障局ではこの他に食糧安全保障のための事業費として150万キナの承認を受けており、このうち100万キナを稲作に仕向けることが現在、農業畜産省から国家計画・地方開発省に対し要請されている（資料3：申請レター）。

なお、その他に稲作振興に活用可能な予算としては、1993年に供与された2KR機材の見返り資金がある。積立額は、キナの下落によりかなり目減りしているものの、積み立て資金については、全て稲作振興プロジェクトに使用することができることになっている（現在の資金の積み立て状況については、資料4を参照）。

#### 2) 農業畜産省北部地域事務所

担当分野としては、稲作の他、畜産、水産がある。職員は4人であり、その構成はエコノミスト1名、プランナー1名、マーケット1名、畜産1名である。今後食糧安全保障のため、1名が中央から配置されることが計画されている。予算の状況は厳しく、特に各々



の州を回るのには交通費が嵩み十分な活動が行われていない。

プロジェクトの関連機関としては、その立地条件からチーフアドバイザーまたは業務調整の駐在先として有効である。

### 3) エラップ農業開発センター

マダン州からモロベ州への主線上にある。周辺では開けた平地を利用した放牧、さとうきびの大規模栽培がみられる。元々は地域の畜産センターとして設立されたが、90年代に穀物プロジェクトが実施された時、その役割に普及、研修が加わった。しかしながら、独自予算で定期的に研修を行っている訳ではなく、現在は予算がついた時だけ細々と研修を実施している状況である。稲作に関しては、一応スタッフとして2名の配置があるが、彼等にとってこの分野は新分野であり、ほとんど技術、経験がない。広い敷地と老朽化しているが研修施設、宿泊施設を持っている。機材も一応揃っている。精米機の配置もあった。

手直しを行えば、北部を協力の中心とした本プロジェクトの中央研修センター的な役割を期待できる。現在配置されているスタッフのトレーニングをどの程度行うことができるか、農民集合研修等の予算をどこからどの程度獲得できるかが、プロジェクトのコンポーネントに入れることができるかどうかの鍵となる。

### 4) マダン州農業畜産水産局

稲作振興の為に現在1名の青年海外協力隊員が配置されている(3月に任期終了。7月より後任派遣予定)。州として稲作チームを組み積極的に活動にあたっている。2002年現在で15名のモデルファーマーを軸に生産振興を行い、籾収量ベースで60トンの実績を持つ(マダン州の稲作実績については、資料5参照)。Model Farmer Contact Farmer 一般農家の流れを形成しており、日本の協力を受けながらも独自に機材を購入し、活動を進める等努力が伺われる。しかしながら、予算は少なく、またスタッフにも人数的、技術的限界がある。

農民、州機関などの役割をうまく整理でき、モデルファーマーの普及場面での積極的な参加を求めることができれば、プロジェクトの地域担当機関としては、有望である。

### 5) モロベ州第一次産業局

稲作振興に関しては、この4年間関係している。ここはかつて Commercial Rice Production を進めてきた地域であり、現在提唱されている自給を目的とした小規模稲作については、充分整理がついていない。そのため、小規模稲作振興に関する計画はなく、予

算の配置も考えられていない。しかしながら、稲作部門は他部門よりは予算的に恵まれており、2001年は8万キナ、2002年には5万キナの配分があった。稲作へは1名の職員が専従で配置されており、その他2名で活動を進めている。活動としては、2001年度に2コース、2002年度に4コースの1～2週間の稲作短期研修を、農民および普及員を対象に実施している。

この地域では一部水田も可能である。また、地域には台湾技術開発団（ROC）および国家農業研究所（NARI）があり、農民が、機材、技術の支援を受けやすい条件を備えている。

州を強化するか直接その傘下の郡を強化するかの判断は必要であるが、稲作振興を展開するのに相応しい地域であると考えられる。

#### 6) 国家農業研究所 (NARI: National Agriculture Research Institute)

本部はモロベ州 Lae の市街地にあり、圃場は少し離れた地域にある。圃場では、原原種の生産が行われると同時に国際稲研究所 (International Rice Research Institute: IRRI) 等から品種を導入し、品種比較試験、選抜が行われている。圃場の管理は十分でなく、原原種圃でありながら不揃いが見られる。また、品種比較試験においても明確なデータの提供はなかった。研究機関というには、施設、スタッフの点からも不安がある。今後、種子生産分野でシニアボランティアの配置が予定されている。機能が充実すれば、稲作において発生する数々の問題の研究機関としてプロジェクトの枠組みの中に加えることができるであろうが、現状のままでは過度な役割を期待することは難しい。プロジェクトでは、種子提供機関としてのみ位置付け、栽培技術に関しては、現場に近いカウンターパート（場合によっては直接モデル農家）に直接技術移転を考えるべきであろう。

#### 7) 台湾技術開発団 (ROC)

プロジェクトが対象と考える3州を含んだ6州に対し、種子生産供給、研修実施、精米機貸与等の稲作協力を行っている。特に種子生産供給に重きをおいており、当方との協力分野での競合は認められない。ROCの事務所はNARI圃場の敷地内にあり、ROC自体も台湾から持ち込んだ純系品種TCS10の原原種増殖を行っている。TCS10は現在広く利用されており、若干の脱粒性過多が指摘されているものの総じて評判は悪くない。ROCとしては、TCS10以外の品種があまり導入されていないことを懸念しているが、ROCは、新たな品種の選定の研究等には直接関与しないため、NARIとNDALがその他の品種の提供を行ってくれることを期待しているとのことであった。

ROCは、種子供給先として重要な存在であり、当プロジェクトの前提の一つとなる。この先、いつまで台湾が協力を続けるのか、台湾の協力が途絶えた後もNARIは種子生産を継続

できるのかが気掛かりな点である。

#### 8) オイスカ・エコテック研修センター

東ニューブリテン州ラバウル郊外に事務所、研修施設を持ち、稲作をベースに様々な総合農業研修を実施している。研修はオイスカが独自に行う1年の総合農業研修(103名/年)、ADBなどに施設を貸して行う研修(180名/年)、平成12年度からのJICA開発福祉支援事業による稲作研修(50名/年)を実施しており、農民にも評判が高い。NGO支援事業による宿泊施設の建設、草の根無償資金協力による精米機の導入等により、センターの設備の整備が行われている。研修の他、農業畜産省からの委託による種子生産も行っており、今年度は26トンを目指している(TCS10とIR10が半々)。

稲作研修に関わるのは3名のスタッフでいずれのスタッフもオイスカのプログラムにより、PNG内および日本国内においての研修修了者である。彼等は日常の稲作管理においては総合的に問題がないと思われるが、専門知識となると不安があることが伺われた。つまり、彼等の技術は経験に基づくものであり、専門性に欠けるように思えた。

例えば、オイスカの圃場では4～5年前まで病害虫に悩まされており、毎年圃場管理に農薬を使用していたが、「ぼかし肥」を導入して有機農業に切り替えたところ問題がなくなったとしている。しかし、水田でどのように生態が変化したから病気や害虫がなくなったのか等は明確にされていない。「ぼかし肥」に関しても、これは日本でも様々な製法はあるものの肥料を製造するまでの期間は切り替えし作業なしの5日間としており、これでは十分な発酵が難しいと考えられ、不安がある。これについても経験であり、実際にできた「ぼかし肥」の肥効は解明されていない。

オイスカは当プロジェクトをすすめるにあたって重要なパートナーであるが、プロジェクトとして本格的にその役割を期待する以上、技術的に十分確かであるかどうか、十分にオイスカ側と協議を持ち技術研修の進め方を決定する必要がある。

## 4．協力の方向性

### 4-1．協力の形態

現在は、プロジェクトの前段階として、個別専門家、青年海外協力隊員の派遣、開発福祉支援事業によるオイスカでのモデル農民研修、関係者の本邦研修の実施等の様々なスキームにより、稲作振興協力が行われている。本プロジェクトも基本的にはこれを受け継ぐものとなる。

協力の形態の詳細に関しては、今後現地に赴任中の個別専門家、カウンターパートを中心としたワークショップを通じ形成されていくものと考えられるが、おおまかな方向は以下のとおりである。

#### 1) プロジェクト目標

対象地域において小規模農家のための持続的な自給稲作生産モデルが確立される。

対象州：東セピック、マダン、モロベ州の3州

但し、希望者については、上記対象州以外からの研修への参加も認める。

#### 2) 上位目標

対象地域とその周辺において自給のための小規模稲作が定着する。

#### 3) 成果

(1) 小規模農家に適した自給稲作生産技術が確立する。

(2) 農民から農民への稲作生産技術の普及がなされる。

このプロジェクト目標に対し、実施体制としては次のとおり考えられる。

#### 1) 種子生産

種子生産、品種の確保に関しては、プロジェクト外の活動とし、この部分は NDAL、NARI、ROC が地方まで配布する。プロジェクトでは、この種子を受け取り、農家に配付するところからが守備範囲となる。

ただし、種子生産に関しては、現在 IR10、TCS10 を含め限られた品種については、種子配布のラインにのっているが、栽培条件の異なる地域への対応や、条件が同じであるとしても品種が少ないことが、国内に広く稲作を進めていく上で支障となることが予測される。少なくとも品種特性、各地域での適合性が明らかにされる必要がある。

#### 2) 農民研修 / 技術者研修

当初は開発福祉支援の延長上でオイスカとの契約により、技術者、モデル農民の研修を実施する。後半においては、より効率的な研修の実施体制を目指し、公的機関施設を利用

した研修の実施を検討する（リソースセンター、研修センターの設置）。研修者の選定については、現状どおり州、郡を通じて行う。

モデル農民以降の研修については、マダン州で行われている方式を取り入れ、モデル農民圃場を利用した農民による農民への研修を実施する。この場合、州、郡のスタッフはこれらの研修の実施調整にあたる。

モデル農民、技術者の研修に係る諸経費に関しては、プロジェクト現地業務費（主にオイスカ契約分）および政府が配分する予算を財源とする。

プロジェクトによる独自研修、既存研修の改善に対し、稲作、機械／器具の日本人専門家の投入が必要であると考えられる。

### 3) 関係機関の調整、連携

中央、農業畜産省地域事務所、州第一次産業局、郡事務所、モデル農民の連携、調整に関して、日本人専門家およびその各々のレベルでのカウンターパートが一体となり行う。中央または北部地域事務所のあるモロベ州へ専門家を配置することが想定される。

### 4) モデル農家のフォローアップ／技術サポート

地域における稲作を振興する上でモデル農家のフォローアップは欠くことができない。現在のオイスカの研修においては、多少のフォローアップは行われているが、限られたスタッフで回ることのできる人数は限られており、内容、頻度ともに改善の余地がある。また、日常のフォローアップと言う点では、地理的に離れており、期待することはできない。そのため、プロジェクトにおいては、現存の地域機関にある程度の役割を付与し、フォローアップのシステムを確立する必要がある。直接のフォローアップにあたる機関については、州の事情により違いがあるものと考えられるので、全ての対象地域において同じ形態を取る必要はない。ただし、全体のフォローアップのレベルを維持するため、地域機関がフォローアップするための技術バックアップ機関が必要である。この場合、今回の訪問先では、NARI あるいはエラップの農業開発センターが有望と思われるが、いずれも技術スタッフの能力に不安がある。

## 4-2. 協力実施のスケジュール

### 1) プロジェクト実施形態の決定

相手国の負担能力、人員を考えると前述した新しい独自の農民研修や技術者研修を行うことは初期の段階では現実的ではなく、当面は現在なされている活動の延長上で考えるべきである。しかし、今後のプロジェクトの進捗を考えると連携調整の業務がかなり増大す

ることが考えられ、プロジェクトをスタート時点から円滑にすすめるためには、活動中の専門家に加え、現場調整業務を主とした専門家を追加的に派遣することが望ましい（プロジェクト立ち上げ専門家）。これによりプロジェクト開始時点において、プロジェクト概念の関係者間での共有を図るとともに、具体的活動、活動に対する役割分担の明確化を図る。

## 2) 事前評価調査団の派遣

本件に関しては、これまでの在外開発調査の結果、2KR 調査の結果、相手側レポート等プロジェクトをデザインするための情報がかなりの程度で整っており、複数の調査団を日本から派遣する必要性は薄い。立ち上げ専門家を派遣し、現場での体制を固めた上で、プロジェクトの枠組みを決定するために事前調査団を送ることが適当であろう。

## 3) プロジェクトの開始時期

現在の状況では、派遣中の個別専門家の任期が 2003 年 12 月まで、開発福祉支援によるオイスカとの契約が 2004 年 3 月までとなっており、継続性を維持するためには 2003 年後半（具体的には 10 月ぐらい）からの開始が望ましいものと考えられる。

## 5 . 検討課題

今後プロジェクトを開始することを目標にする上で、次の点に関し明確にしておくべきである。本件に関しては、相手国農業畜産省及び国家計画地域開発省には申し入れ済み(資料6：調査報告メモ)。

### 1) 種子供給の確保

これに関しては、前述のとおり、プロジェクト外として考えている。種子の供給は、稲作振興の基礎となるので、種子の量、質ともに十分に確保される必要がある。

### 2) 稲作振興に仕向けられる予算の総額、計画

中央レベル、地方レベルともどれくらいの予算が配分され、実際にどの程度支給されるのかはプロジェクトの正否を大きく左右する。少なくとも今後数年間の政府、地方のビジョンを確認する必要がある。

### 3) 稲作振興の戦略

現在のポリシーペーパーでは、単に方向性が示されているだけで、実際どのように振興されるのかが良く分からない。特に小規模農家に対してどのようにPRして、どのような展開を図ろうとしているのか具体的な戦略を確認する必要がある。

### 4) 人員の配置計画 / 各機関の役割、調整計画

プロジェクトを実施する上で、相手側の人員の配置は必至であるが、現在のところ、各機関の責任および役割分担とともに実際にどの程度の人材が配置されるのかが明確でない。これにより、プロジェクトのデザインは大きく変わるので、事前に確認を行う必要がある。

### 5) 他ドナーとの関係

パプアニューギニアでは、オーストラリアがトップドナーであるが、農業分野、特に稲作については、他国での協力実績があるにもかかわらず、協力を実施していない。パプアニューギニアでは、オーストラリア企業である Trukai 社が、米を独占的に輸入しており、その他、畜産分野でも力を持っていると思われる。このような状況において、日本の本協力に対するオーストラリア側の反応を確認する必要がある。

英語要約版



**【English Version】**

**Report of the Fact Finding Team for  
the Smallholder Rice Production Promotion Program**

**April, 2003**

**Japan International Cooperation Agency**

## 1. Fact Finding Team

### 1-1. Background

The amount of rice consumed in Papua New Guinea has been increasing, 99 % of which depends on imports. National Department of Agriculture and Livestock promotes domestic rice production to increase the self-sufficiency rate of rice consumption under the 'Domestic Rice Production and Development Project' administered by its Food Security Branch. However, the rice production has not yet been practiced properly in most places due mainly to the lack of technical knowledge and clear promotion strategy. Thus, technical cooperation in rice production is requested.

In response to the need for technical assistance, JICA has cooperated through the dispatch of experts, volunteers, and the training courses. From FY2003, JICA is planning to commence 'Technical Cooperation Project for Small holder Rice Production Promotion'. The fact finding team is dispatched to facilitate the smooth formation of this project.

### 1-2. Team Member

FUJII, Satoshi (Mr.) Team Leader

Deputy Director, Agricultural Development Cooperation Dept., JICA

INOUE, Kotohi (Ms.) Cooperation Planning

Staff, Southwest Asia and Oceania Division, Regional Dept. , JICA

### 1-3. Itinerary

No	Date		Itinerary
1	3/16	Sun	13:25 Arrival at POM 15:00 Meeting with JICA experts
2	2/17	Mon	08:30 JICA Meeting, Meeting with Mr. Odashima (JICA expert) 11:00 Courtesy call at Embassy of Japan 13:00 Courtesy call at Department of National Planning, Monitoring and Rural Development 14:00 Courtesy call at Department of Agriculture and Livestock, and Discussion 15:40 move to Madang from POM 16:20 arrival in Madang
3	3/18	Tue	8:00 courtesy call at Madang DPI 9:30 Visit a model-farmer site in Madang 11:30 Visit a model-farmer site in USINO 15:00 visit Erap station 17:00 Arrival Lae

4	3/19	Wed	8:30 Courtesy call at Morobe DPI 9:00 Courtesy call at NDAL regional office 10:30 Courtesy call at NARI 11:30 Courtesy call at ROC 14:00 Visit model farmer sites in 3mile to 4mile
5	3/20	Thu	09:05 Move from Lae to Rabaul 13:00 Visit OISCA centre and meeting
6	3/21	Fri	09:20 Move from Rabaul to POM 11:00 JICA meeting 14:00 Report to Department of Agriculture and Livestock
7	3/22	Sat	14:15 Departure from POM to Narita

#### **1-4. List of Organizations and Personnel visited in PNG**

##### Department of National Planning, Monitoring and Rural Development

(Courtesy call on March 17)

Mr. Paul Enny, Assistant Secretary,

Aid Coordination and Management Division

Ms. Linda Taman, Aid Coordinator (Japan Desk),

Aid Coordination and Management Division

(Report on March 21)

Mr. Mosilayoza Kwayaila, First Assistant Secretary,

Aid Coordination and Management Division

Ms. Linda Taman, Aid Coordinator (Japan Desk),

Aid Coordination and Management Division

Mr. Jonathan Kenneff, Planner, Development Planning and Program Division

##### National Department of Agriculture and Livestock (NDAL)

Mr. Matthew'wela Kanua, Secretary

Mr. Anton Benjamin, Deputy Secretary, Technical Services

Mr. Siva Supiramaniam, Acting Director, Food Security Branch

Mr. Boni Jules, Program Officer for JICA project,

Food Security Branch (joined the mission)

##### Department of Agriculture, Livestock and Fishery, Madang

Mr. Calun Kassas, Deputy Administrator

Mr. Paschal Feria, Advisor

Mr. Ganet Agodop, Provincial Agriculture officer  
Ms. Mary Lilih, Provincial Food Crops Officer  
Mr. Atsushi Nakamura, JOCV (Rice Production)

Madang Provincial Government

Mr. Bunag Kiup, Deputy Governor  
Mr. Otto Aite, Chairman of Primary Industry Section

Model Farmer in Madang Province

Mr. Peter Kaimu  
Mr. William Umbaria

Erap Station, Department of Agriculture and Livestock

Mr. John Jave, Rice Agronomist  
Mr. Steven Heai, Irrigation Agronomist  
Mr. James Duks, Senior Livestock officer

Northern Region Office, Division of Provincial and Industry Support Services, Department of Agriculture and Livestock

Mr. Masayan Mont, Regional Livestock Development Officer

Department of Primary Industry, Morobe

Mr. Geoping Bilong, Advisor  
Mr. Amos Buieba, Rice Project Officer  
Mr. Saphas Arpi, District staff

National Agriculture Research Institute

Mr. Naihuwo Ahai, Director Research  
Mr. Geoff Wiles, Chief Scientist  
Mr. M.S.Sajjad, Primary Rice Breeder  
Mr. Roy Masamdu, Research Programme Leader

R.O.C. (On Taiwan) Agriculture Technical Mission to Papua New Guinea

Mr. Patrick H.K. Cheng, Mission Leader,

Model Farmer in Morobe Province

Mr. Norman

Mr. Nick

OICA Eco-Tech Training Centre

Mr. Michikatsu Ehara, Director

Mr. Francis, Rice Officer (for JICA training)

Embassy of Japan

Mr. Katsuo Mamashita, Ambassador

Mr. Shunji Shimizu, First Secretary

JICA Papua New Guinea Office

Mr. Nariyoshi Odashima, Expert in Small Scale Agriculture Promotion

Mr. Atsushi Susami, Project Formulation Advisor

Katsuro Saito, Resident Representative

Masato Koinuma, Assistant Resident Representative

## **2. Summary**

This mission found that the need for rice production is high both in terms of national policy and among farmers in Papua New Guinea. Thus, the proposed technical cooperation project for rice production promotion is considered to be highly relevant. In particular, this project aims to promote subsistence level small scale rice production, which would not require any drastic change in the way of farmers' work. This implies that the rice production could spread in many places.

It is supposed that there are various organizations involved in this project including both national level and provincial level governmental organizations. However, the project mainly focuses on farmers since the project aims to promote rice production through assisting the 'farmer to farmer extension system'. This method is efficient and effective considering the fact that the capable and experienced extension officers are quite limited at local levels. In addition, this farmer to farmer extension is considered to be cost effective and an effective way to continue promoting rice production in villages after the termination of the project.

However, to make this extension system feasible, it is required to have a certain organization or group among farmers, or for leading farmers to consider it their role to teach their knowledge and experience to each other. In addition, although the project focuses on farmers, it is necessary to define roles and responsibilities of related governmental agencies in supporting farmers' activities. Thus, the primary objective of this project is to establish the system of rice production extension from the central government to local farmer levels.

Regarding the technical aspect of rice production, no serious problem was found among the model farmers the team visited. Local organizations also seemed to find no serious problem other than the deployment of machines such as rice processing machine in each village and the provision of seeds. However, it is anticipated that farmers would face the problems of seed provision, diseases and pest, deterioration of soil fertility as rice production spreads in the future. Currently, there is no system to technically assist them overcome these problems either at central or local levels. The establishment of technical backup system should inevitably be taken into consideration in the long run. It should be considered how much of these issues can be dealt with within the framework of this project.

### **3. Facts found**

#### **3-1. Current Situation of Small-scale Rice Production**

##### 1) Agriculture Policy and Rice Production Promotion

The government of Papua New Guinea has promoted rice production to maintain food security and to reduce outflow of foreign currency through the import of rice. The government's rice promotion policy focuses on rice production among smallholders reflecting the past failed experience of commercial rice production promotion. Although the National Rice Policy Document (1998) contains human resource and budget allocation plans, the detailed plan for each year and for each area remains unclear.

##### 2) The Need for Rice Production among Farmers

It was found that people in Papua New Guinea consider rice as their important staple food. Trukai Co., the Australian company which imports rice, almost monopolizes the rice market and domestically grown rice has only small share (about 1 %) in the rice market. Under this situation, farmers recognize the benefits of producing rice by themselves both for their own consumption and for earning some money.

##### 3) Current Situation of Rice Production among Smallholders

Rice is grown as upland rice on both slope and flat land and also in paddy fields in some areas with adequate water supply. The average scale of land for one family is less than 10 are (1000 m<sup>2</sup>). In three provinces the team visited, farmers who finished the training course offered by JICA and OISCA are acting as model farmers and producing rice at their own respective place. In Madang province, the Department of Agriculture, Livestock, and Fishery assists and promotes the rice production by establishing the extension system of 'Model farmers – Contact farmers – Other farmers'.

Both farmers and officials in related organizations did not mention any serious technical problems in rice production. However, it should be noted that it must be very difficult to cope well with problems, such as diseases and pest, since neither farmers nor extension officers have adequate technical knowledge once the problems become apparent. In addition, considering that smallholder farmers cannot afford fertilizers or agrochemicals, it is important to find and supply seeds which are less vulnerable to diseases and pest.

#### **3-2. Related Organizations**

##### 1) National Department of Agriculture and Livestock (NDAL)

The Food Security Branch in NDAL is in charge of rice production promotion. The 2003 budget currently allocated for the rice promotion is 500,000 kina, which is not sufficient to promote rice

production throughout the country. NDAL is proposing to the Department of National Planning and Rural Development that additional budget of 1,000,000 kina, which is appropriated for the Food Security Program, be diverted to rice production promotion.

2) NDAL Northern Regional Office

There are only four staff members in the office at present. One officer for food security will be assigned later on. The budget allocated for this office is far from sufficient for rice production promotion. Considering the central location of the office among target provinces, it may be suitable to have Japanese expert being stationed at this office when the project is implemented.

3) NDAL Erap Station

Currently, Erap station offers training courses only when the fund is available. It has large fields, training centers, dormitory, some agricultural machines including rice processing machine. Although the facility is relatively old, it is possible to utilize this place as a central training center for the project. Staff training and budget allocation are important to make this plan viable.

4) Department of Agriculture, Fishery, and Livestock (Madang Province)

With Japanese cooperation, including the dispatch of JOCV, they actively promote rice production. They have established the extension flow of 'Model farmers – Contact farmers – Other local farmers'. Although budget is very limited and human resource for rice production extension is far from sufficient, this organization could be utilized as a resource center for the province.

5) Department of Primary Industry (Morobe Province)

The plan for smallholder rice production promotion is not clearly established in the province. They have conducted some rice production training for farmers and extension officers. Since there are other related organizations, such as NARI and ROC, in this province, technical assistance and machines are relatively easy to access for local farmers. Thus, it is considered appropriate to promote rice production in this province.

6) National Agriculture Research Institute (NARI)

NARI is producing foundation seeds and conducting experiments to select varieties. However, it seems NARI does not have adequate facilities and technical personnel to become a central research organization for rice cultivation. Considering the current situation, it is not realistic to expect NARI to be responsible for full technical support in the field of rice. However, it is at least expected that NARI produces and supplies necessary seeds.



7) R.O.C. (On Taiwan) Agriculture Technical Mission to Papua New Guinea

ROC focuses on seed production, thus, there is no overlap of cooperation with JICA. The relationship between ROC and JICA is rather complementary. ROC is an important source of seed supply, which is indispensable for the project activities.

8) OISCA Eco-tech Center (Rabaul, East New Britain)

Since FY2000, OISCA offers rice production training course with 50 participants a year under the contract with JICA. OISCA also offers its own training courses in agriculture. In addition to training, OISCA produces seeds (TCS10 and IR10) upon request from NDAL.

There are three OISCA staff members who are in charge of rice production training. Although their overall knowledge of rice production seemed satisfactory, it seemed they are not experts in rice production. Since OISCA remains to be an important partner and is expected to play an important role within the project framework, technical aspects of rice production training course should be discussed further.

## **4. Technical Cooperation**

### **4-1. Overall Framework of Technical Cooperation**

The overall framework is as follows:

#### (1) Project purpose

Sustainable model of subsistence rice production for small scale farmers is established in target areas.

Target areas: East Sepik, Madang, Morobe province

\*Training course will accept participants from other provinces.

#### (2) Overall goal

Small scale farmers in target areas and surrounding areas adopt and practice rice production.

#### (3) Output

1. Subsistence rice production technique suitable for small scale farmers is established.
2. The farmer to farmer extension of rice production technique is conducted.

The project will be implemented with the following framework:

#### 1) Seed Production

Seed production and supply of appropriate variety are considered to be outside of the project. It is expected that NDAL, NARI, and ROC produce and supply seed to each area. The project will take the responsibility of distributing supplied seed to local farmers.

However, to select and supply seed varieties which are suitable for each region is important for the success of the project. Currently, only limited varieties, such as IR10 and TCS10, are available, which would hinder the spread of rice production in areas with different climate conditions. Thus, experiments should be conducted to clarify major characteristics and adaptability of each seed variety.

#### 2) Training of Farmers/Specialists

At the beginning of the project, the training for both model farmers and extension officers will be conducted by OISCA under the current contract. At the latter stage of the project, the establishment of resource centers utilizing existing public facilities should be considered to have more efficient training system at each target area. Participants for training courses will be selected through provinces and districts.

Model farmers, who finished the training course, offer trainings for local farmers at their respective site. The provincial and district government officers will assist model farmers train other farmers. The cost of training courses will be born by model farmers, the project (major part is the contract with OISCA), and government budget.

To start training courses at resource centers in provinces and upgrade existing training

courses, it is necessary to have Japanese experts in the field of rice production and agricultural machinery/tools operation and maintenance

3) Coordination among Related organizations

Japanese expert and counterparts at respective organization have to work together to coordinate related organizations and personnel and project activities. Japanese expert may be dispatched and stationed at either NDAL or Northern regional office of DAL.

4) Follow up and Technical Assistance to Model Farmers

To establish the system to offer technical assistance to model farmers in their daily activities is indispensable to promote rice production in local areas. OISCA does not have enough number of staff to follow up all training participants and is far from target provinces. Thus, the project should aim to establish the technical support system at each provincial level utilizing existing organizations. In addition, the central organization which is responsible for overall technical assistance should be established. It seems possible to utilize either NARI or NDAL Erap station although both of them do not have sufficient technical personnel.

## **4-2. Schedule**

1) Formulation of the Project

To start the project smoothly, it is desirable to dispatch one more Japanese expert in addition to the long-term expert (Mr. Odashima). The experts should clarify the roles and responsibilities of related organizations and concerned people and planned activities of the project.

2) Preparatory Study Team

Since there is sufficient amount of information already obtained from various reports and research, it is sufficient to send only one preparatory study team.

3) Schedule to Start the Project

It is desirable if the project could be launched in the latter half of FY 2003 (possibly, around October) before the term of the expert will end in December 2003.

## **5. Things to be Clarified**

The following points should be clarified before the start of the project.

The mission has already reported these points to NDAL and National Planning Department.

- (1) Seed supply system
- (2) A total amount of budget allocated for rice production promotion.
- (3) Precise strategy of rice production promotion, including PR to small scale farmers.
- (4) The plan of personnel assignment for rice production promotion in national and local levels.
- (5) The plan of coordination and collaboration of concerned organizations, such as donor agencies, and their respective roles and responsibility.

[ 別添資料 ]

資料 1 : National Rice Policy Document

資料 2 : 農業畜産省 2003 年度予算内訳表

資料 3 : 予算申請レター

資料 4 : 2 K R 見返り資金積み立て状況表

資料 5 : マダン州稲作状況報告書

資料 6 : 調査団調査報告メモ

## 資料1 : National Rice Policy Document

**INCREASING DOMESTIC RICE PRODUCTION  
AS A COMPONENT OF NATIONAL FOOD SECURITY**

**(National Rice Policy Document)**

**SEPTEMBER, 1998**

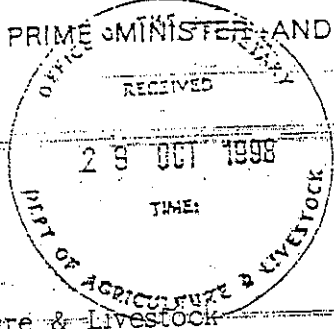
**Department of Agriculture and Livestock  
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OFFICE OF NATIONAL EXECUTIVE COUNCIL  
DEPARTMENT OF THE PRIME MINISTER AND NATIONAL EXECUTIVE COUNCIL

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PAPUA NEW GUINEA



Mr Utula Samana, CMG  
Secretary  
Department of Agriculture & Livestock  
P O Box 417  
KONEDOBU

Date: 28 October 1998  
Our Reference: 11-1-15  
Action Officer:  
Designation:

Your Reference:  
Date:

Please find enclosed herewith the following NEC Decision (s) for your information and action as necessary.

MEETING NO.(S)

DECISION NO.(S):

53/98

239 and 243/98

54/98

244/98

*Winnie A. Kiap*  
WINNIE A. KIAP  
SECRETARY





PAPUA NEW GUINEA GOVERNMENT  
NATIONAL EXECUTIVE COUNCIL

Meeting No: 53/98

Decision No: 243/98

Subject: INCREASING DOMESTIC RICE PRODUCTION AS A COMPONENT OF NATIONAL FOOD SECURITY.

On 2<sup>nd</sup> October, 1998, Council:-

1. endorsed and approved the domestic rice strategy and programme as a component of the farming systems to enhance National Food Security;
2. directed the Department of Lands and Physical Planning to make available suitable but idle government land in the targeted areas to DAL for the purpose of seed production and distribution to farmers in support of domestic rice production;
3. endorsed and approved the proposal to initiate small scale irrigation development to support both rice and agricultural industries in general;
4. endorsed the proposed ten (10) year budgetary requirement for the implementation of domestic rice project starting with K4,324,040 in 1999 (total costs are shown in attached Table 10);
5. endorsed and approved that rice imports remain open and competitive without any restrictions, except that all importers obey the normal rules of fair trade;
6. directed DAL to review existing bilateral arrangements currently in place including the development of new initiatives to enhance technical cooperation in the development of domestic rice programme;

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7. directed DAL to prepare necessary documentation to effect outstanding NEC directive to establish a Rice and Grain Authority;
8. directed DAL to facilitate joint venture investment projects in rice and other related food programmes with interested private investors as well as donors concerned about food security; and
9. directed Department of Treasury & Planning, National Planning Unit and DAL to make available K4.0 million to support and facilitate investment.

I Certify the above to be a correct record of the  
Decisions reached by the National Executive Council



BILL SKATE Chairman



WINNIE A. KIAP Secretary, NEC

Date: 26 October 1998

Distribution: AGRICULTURE & LIVESTOCK/TREASURY & PLANNING/  
NATIONAL PLANNING UNIT/LANDS & PHYSICAL  
PLANNING/TRADE & INDUSTRY/PRIME MINISTER & NEC/

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INDEPENDENT STATE OF PAPUA NEW GUINEA

CONFIDENTIAL

Minister for Agriculture  
and Livestock

File:

Date: 03<sup>rd</sup> September, 1998

POLICY SUBMISSION NO: ...../1998

FOR MEMBERS OF THE NATIONAL EXECUTIVE COUNCIL

INCREASING DOMESTIC RICE PRODUCTION AS A COMPONENT OF  
NATIONAL FOOD SECURITY.

A. PURPOSE/ OBJECTIVE:

The purpose of this submission is to inform National Executive Council (NEC) on the status of current rice imports and to consider policy options with the aim of promoting domestic rice production and for NEC to:

1. endorse and approve the domestic rice development program through mobilization of land and human resources as a component of national food security program.
2. direct the Lands Department and the DAL to make available to the program any suitable unused Government lands in the target areas to be used by the program as seed production and distribution centres.
3. endorse and approve the proposed ten (10) year budgetary requirements for the implementation of the domestic rice development programme and further direct the Department of Treasury and Corporate Affairs and the National Planning and Implementation Office to make available necessary funding to DAL to implement production programmes.
4. endorse the implementation strategies relating to attaining increased rice production in support of national food security [as attached],-
5. direct DAL to review existing bilateral arrangements including other bilateral arrangements tailored towards enhancing domestic rice production through training

of our farmers and DAL/DPI officers, introduction and development of new appropriate technologies, infrastructural development including marketing facilities to support domestic rice production as well as other food crops.

## B. FACTS AND CONSIDERATIONS:

### 1. BACKGROUND

Of all food imports into PNG, rice is without exception, the single most important crop on which more foreign exchange is spent. Between 1991 and 1995 at least 130,000 tons of rice was imported per annum. The current volume of rice imports ranged from 150,000 to 170,000 tons / year, with the estimated retail gate value of over K150 million.

In many places, rice is regarded as a staple food. Although the per capita consumption nationally is 40 kg/capita, it is estimated that consumption in the cities of Port Moresby and Lae are higher. In fact some families consume up to 100kg/capita.

Although rice was first brought to Papua New Guinea over 100 years ago by Christian Missions and traders. It has always been grown mostly as rainfed upland subsistence crop in Finschhafen, Garaina, Maprik, Nuku, East New Britain, Bereina, Madang, Morobe south and North Solomons. Small scale irrigated planting could only be found at Warangoi in East New Britain and Bubia in Morobe. And while the crop is cultivated in many places listed above for domestic consumption, scattered small scale commercial cultivation has not kept pace with demand. The Department of Agriculture and Livestock estimates that PNG currently produces only 600-1,000 tons of rice commercially. It is difficult to give an accurate estimate of subsistence production as all rice is consumed at sites of production.

Currently, DAL is implementing the PNG Rice and Grain Project which has met with variable degree of success and failures. While DAL and her collaborating partners have proven that rice can be grown successfully, and the technology is now widely available to support small scale production, further acceleration is limited by number of factors; the main ones being:

- (a) Staff. Short of staff as well as lack of adequately trained staff at National and Provincial level means only limited number of farmers can be reached.
- (b) Machinery. Lack of good, long lasting cheap machines, especially mills and other pre and post harvest machinery are a disincentive to growers who want to grow more rice.
- (c) Inadequate infrastructure; In most cases, roads for movement of good and service during the dry season but cannot be used during wet season. Rice and food crop farmers need to be reached during the rainy season and to also have access to market for their produce.
- d). Storage sheds and marketing facilities. Storage sheds and marketing facilities are

woefully inadequate at the moment. This limits access to market by producers, and this needs to be addressed.

- (d) **Farmer Training.** Farmer training is most essential if PNG is to grow its own rice. It is not easy to convert from culture rooted in root crops, banana and sago to rice culture. PNG has made a culinary shift towards rice but not adequate cultural shift. Thus sustained farmer training is most essential, as this has proven to work well and found beneficial with selected farmer groups.
- (e) **Funding.** National and Provincial Governments funding to food sector, including rice has not been consistent and adequate. In real terms, this support has declined and has caused problems in procurement of inputs, machinery and hire of staff. If PNG wants to really address the issue of food security and to achieve greater food self sufficiency including rice, then adequate funding needs to be considered seriously.

## 2. CURRENT SITUATION

Rice has now become a staple food for many families and efforts must be made to integrate rice into the farming systems in PNG, as a component of national food security strategy.

(i). In 1994, the state of PNG and Rice Industries (now Trukai) signed a commercial Agreement for Trukai to fund and implement certain Rice, Agriculture and other Industrial projects worth K15 million on the condition that the company will be allowed to import as much rice and rice products as its customers desire. The Agreement is current until January 2000.

In line with this agreement, Trukai funded an IRRI-PNG project for three years, where PNG officers go overseas for training or IRRI experts can come to PNG to conduct training. However, the PNG - IRRI Project has come to an end this June 1998. There is currently, no commitment from Trukai to continue funding it again, however this could be pursued for them to start the next phase of funding the IRRI-PNG. It is proposed that rehabilitation of rice mills in various places in PNG be supported by this project.

(ii) Technical Advisory Committee (TAC) on Rice and Grains was formed in 1994 to advise on direction PNG should take to increase domestic rice production. The committee is made up of representatives from University of Technology (UOT), Department of Agriculture and Livestock (DAL), Trukai Industries (TIPL), International Rice Research Institute (IRRI), Republic of China (Taiwan) Agriculture Technical Mission (ROC), OISCA and Department of Commerce and Industry. The committee meets twice a year, to deliberate on issues of accelerated domestic rice production. They have contributed to, and accepted the document on 'Towards Accelerated Domestic Production and Promotion of Rice'. At the latest meeting on June 18, 1998, they are recommended that Government supports the proposal on increased domestic rice production.

iii). JICA through the Japanese 2KR Project also supports PNG efforts in rice production. In the phase one (1) of this project, Japan has supplied to PNG just over 1,000 tons of various fertilizers. These fertilizers were sold and money is now held in a

Trust Account to be used to support the phase two (2) of the programme. The phase 2 is supposed provide limited farm machinery and equipment for irrigated rice field establishment, however, this is yet to materialise.

OISCA, a Japanese NGO, in collaboration with JICA have established a mixed farming training center at Warangoi near Rabaul that gives two year practical training to grade six graduates in viable farm operations, with rice being the major crop. They have so far trained over 400 students. After graduation, students return to their villages to engage in farming. The programme is popular with kids who drop out from school.

iv). The R.O.C. Taiwan Technical Mission has been supporting rice and vegetable production in NCD and Lae, including Markham Valley. They are prepared to multiply enough seed of selected varieties to kick start the rice industry in PNG.

(v) In order to address food security needs of the population in PNG, the Food and Agriculture Organization (FAO) of the United Nations (UN) and the Department of Agriculture and Livestock have formulated a FAO Special Program in Support of Food Security. The pilot phase is currently being implemented the Markham Valley in the Morobe Province.

The major emphasis of the project is to increase food production on sustainable basis, involving subsistence and emerging commercial farmers in the Markham Valley. The project was integrated into the Grain and Rice Development Project of the DAL. The approach is participatory and holistic, and based on human resource development in order to ensure continuity and sustainability of the process of agriculture development in the future.

A team approach is being used and current collaborating agencies are PNG University of Technology, Republic of China (Taiwan) Agriculture Technical Mission (ROC), Morobe Provincial Administration and Division of Agriculture and Livestock, DPI Huon and Kaiapit Districts, Mamose Fisheries and Fresh Produce Development Company (FPDC).

The Program is currently promoting rice production as a component of its program in the Markham Valley with promising results as witnessed at a field day held May 21, 1998. Farmer interest is high and many more have requested to participate in the program.

(vi) Trading and investment in rice is not a restricted activity and any investor willing to invest in production and marketing should be supported and encouraged.

## The World Situation

Recent projections by FAO and the International Rice Research Institute suggest that by year 2025, about 5 billion people will be eating rice as major part of their diet. This would require that world production rise from the present 550 million tons of milled rice to about 880 million tons. But they said, there is less confidence today; that the production increases achieved in the past green revolution could be repeated in the next twenty five years. For a number of reasons; including water shortage, climatic instability, environmental problems with chemicals, labour shortages and especially conversion of rice land for industry and housing in the traditional rice producing countries.

In addition, if we take into consideration that, only 4% of the world rice produced enter into the international market [96% is consumed within the areas of production], then, we should expect increasing price of rice in the future as a result of demand and supply interplay on prices. Thus the few traditional rice countries as well as newer rice countries that would be in production, might be favoured by the world trend of expected higher prices.

To produce 150,000 - 170,000 tons of milled rice [the equivalent of 240,000 tons of paddy], locally, about 100,000ha of rainfed lowland<sup>1</sup> rice would need to be put into production. Alternatively domestic demand could be met by production from 45,000ha of double cropped irrigated riceland, or by harvesting from 200,000ha of rainfed upland fields. This is a tall order that could not be achieved immediately. PNG should aim at a gradual and systematic strategy to introduce rice into the existing and newer farming systems as a component of the overall food security program.

Our past and current production figures in selected rice areas, seem to indicate that with appropriate direction and support, we could repeat and build on the achievements of the past and present, such as; the 440 tons produced in Maprik in 1991, 300 tons in Finschaffen in 1995, 60 tons in Nuku in 1996, 70 tons in Garaiana/Morobe South and currently 60 tons in Markham Valley of Morobe .

However, we should bear in mind that, land tenure and infrastructure would be major obstacles hindering the push for rapid rice promotion. Thus a program has to be developed towards voluntary mobilization of the farmers with their lands, and empowering/enhancing them through training, machinery, equipment and a strong extension support. This way we could develop the target population to become the front runners in PNG's push towards improved domestic rice production in support on national food security.

#### **Proposed strategies for increased domestic rice production and promotion.**

Papua New Guinea will mobilise three rice growing ecosystems in her drive towards the improvement of domestic self sufficiency and import replacement. These are the rainfed **upland** system; that depends completely on rainfall and uses free draining soils, the rainfed **lowland** system; which also depends on rainfall, but the soil could be saturated with moisture to the crop root-zone and may be flooding or not during parts of the season, and the **irrigated** system; which involve controlled water addition and removal.

To locally produce the current imports of 170,000 tons of milled rice, the equivalent of 240,000 tons of Paddy [un-milled rice], about 100,000 hectares of rainfed lowland rice need to be put under production. Alternatively, imports could be met by production from 45,000 hectares of fully irrigated double cropped rice land or by harvesting from 200,000 hectares of rainfed upland fields. This of course depends highly on commercial viability, productive and management capacities of the farmers to sustain domestic rice production in the long term. While the government appreciates and accepts concerns raised by experts that large scale rice may not be economically viable and sustainable, but the fact is that no one has ever grown rice on large scale and failed. So the advice is also based on assumption. This strategy calls for small scale development for the three systems described above but will

also encourage those who want to try large scale.

As it would be very expensive to meet all these targets all at once, it is advisable to work towards these targets gradually. The realistic target for the first ten years is to work with about 10,000 farm households, and to gradually put into cultivation about 5000 ha rainfed, and a further 1000 with small irrigation. These would give us cumulatively about 74,600 tons of milled rice equivalent, calculated into K74.6 million. Newer areas and farmers could be brought into rice cultivation in subsequent years, for additional increase in production. It is also anticipated that private commercial mills and other support facilities will be set up in targeted areas once the volume of production is increased to warrant such investments.

### C. VIEWS OF THE PRIME MINISTER:

Formal views of the Prime Minister are yet to be sought. However, he has indicated his brimming support during his brief speech whilst meeting the DAL staff in early March.

### D. VIEWS OF OTHER MINISTERS AFFECTED:

To be sought in Cabinet

### E. POLICY IMPLICATIONS

#### Rice as a choice for import substitution

There have been arguments in the past, that rice is not a choice for import substitution, and that the country would be better off producing and exporting tree crops and using the revenue to import cheaper rice. This view was valid when PNG maintained a strong kina policy but since the devaluation and the floating of the kina, the value has dropped to a level where it is no longer possible to buy same amount of rice with the kina. For this reason it is possible now to reconsider domestic rice production, at least for food security reasons. On the other hand, because most of the inputs for production, such as fertilizers, chemicals, fuel, machinery and their parts are imported, and therefore adds to the cost of production per ha of rice. Hence, a thorough assessment of the commercial viability needs to be established if rice is going to be chosen as a candidate for import replacement.

What is important is the economic viability of rice production in PNG. FAO, 1996 has recognized that small scale rice production could be viable in PNG. Sloane Cook et al, 1993, also recommended for small scale rice production as a component of the farming systems. Our own gross margin analysis, and other data suggested that small scale rice cultivation is economical. While larger scale rice cultivation is yet to be proven, PNG must pursue small scale rice production to enhance its national food security position. In fact, by bringing in many small scale rice farmers, it is possible to generate a lot of surplus rice, which can then enter into the market as 'commercial rice' for others to purchase.

Not all parts of PNG are suitable for tree crop or rice production. Areas in the lowland for example are not suitable for coffee, but could be suitable for food crops including rice. People in the areas not suitable for tree crop culture must be encouraged to go into alternate



food crop farming. Thus production of rice is not necessarily diversion of resources from tree crop production, but it is an additional way to supplement the overall national food security. Similarly, since not all lowland areas are suitable for rice production because of edaphic, climatic, social/cultural, financial and technological drawbacks, rice development and promotion will concentrate on selected provinces that have comparative advantage and where farmer interest are higher.

The argument that income generated from a ton of tree crop exports could be used to buy more than one ton of imported rice, so rice imports should be continued. The situation has now changed due to low commodity prices and the falling value of the kina. More kina is now needed to buy the same amount of rice since Gibbson (1993) published his argument in favour of continued rice imports. It is advisable to invest part of the revenue from tree crops into small scale rice production which is economically viable. PNG must encourage small scale rice production similar to what has happened in coffee where most of the coffee produced is from small holder growers.

Large scale rice production of the order of 200-500 ha plots may not be an option for import replacement at the moment, since the economy of production is yet to be proven. Small scale production has been recognized as a viable alternative, PNG thus should look into the small scale cultivation as a component of the farming systems in support of our overall national food security programme.

#### **PNG Government position on rice importation.**

The deregulation in rice imports should continue. Rice imports should be left to private investors. New investors must be welcomed to participate in rice importation to encourage competition in order to avoid monopoly situation.

There is also a consideration or a policy option for the government to engage in importation of rice through bilateral arrangements in order to respond effectively to counteract emergency situations. Consistent with this thinking is to revisit the previous NEC decision to establish the Grain and Rice Authority to import, manage and distribute a national buffer stock. In line with the government desire to increase rice production, the Authority will concentrate on rice and coordinate efforts from all interested parties to increase domestic rice production. This particular policy option needs to be fully assessed prior to its execution due to previous experiences relating to government managed ventures such as Food Marketing Corporations.

Such a policy may raise questions in relation to government intervention in trade matters which normally is a domain of private enterprise and the governments' role is to provide conducive environment to promote trade and investment.

#### **Promotion of domestic rice production as a component of the national food security programme.**

Rice has become a significant food item in PNG. Gradual domestic rice production as a component of the farming systems is very important to enhance national food security. Thus

development and management, general operational expenses, training and promotion of down stream processing.

An amount of K35.9 million is required over a ten year period, of which K4.3 million is expected in year one to set the ball rolling. The funding is expected from the National Government.

Investors both local and from abroad should be invited to also support and participate in the rice industry.

Access to credit is important for the initial funding for equipment, inputs, and infrastructure development. Some sort of a revolving funding systems has to be worked out.

*It is expected that the first ten years would lay a strong foundation for increased rice production in support of national food security. A strong consideration be given to the establishment of an efficient extension support to manage the program cost effectively.*

#### F. STAFFING IMPLICATIONS:

Some staff requirements would be drawn from suitable DAL staff. Additional new staff would need to be recruited to make up the requirements.

Since delivery and appropriateness of services to the rice industry would depend to a large extent on the quality and quantity of applied research, development and extension staff, as well qualified staff needs to be identified and recruited. All staff as well as farmers would need to be well trained in newer production technologies such as irrigation development and management, repairs and maintenance of small equipment and machinery and in production, processing and other post-harvest technologies.

On farm and on station training would be adopted depending on the various circumstances. In addition, post graduate training could be pursued in disciplines that are available locally. Those not available locally would be pursued overseas. Funds have to be sought to promote an accelerated training program to upgrade local scientists to take over PNG's rice industry development with confidence in the very near future. The idea is to have a critical mass of well trained staff and farmers to deliver the goods for a successful rice industry promotion and development.

#### G. EMPLOYMENT IMPLICATIONS:

The industry will create jobs for a cross section of the population, such as farmers, technicians, scientists, post harvest technologies, mechanics, machine/tractor operators, traders and other agro-industry personnel in general. At least, over 10000 growers would be directly involved in the first 10 years.

#### H. LEGISLATIVE IMPLICATIONS:

Nil

I. CONSTITUTIONAL IMPLICATIONS:

Nil

J. DECENTRALIZATION IMPLICATIONS:

Under the NLOPLLG system, this project will be implemented in nearly all the provinces in the country as it would involve both lowland and highland rice varieties. The Provinces and their respective DPIs are expected to play significant roles in the funding and promotion of rice production in their respective provinces and districts.

K. PLANNING IMPLICATIONS:

Over 80 % of the planning process has been completed by the Department of Agriculture and Livestock and only needs comments and endorsement from the Office of National Planning and Implementation.

L. POLITICAL IMPLICATIONS:

Provincial and local level Governments lack expertise in rice farming systems development. Thus rice industry development initially should be the joint responsibility of the National, Provincial and local level Governments.. However, the Provincial Governments and Local Level Governments as well as the private sector and farmer groups or associations should be developed to gradually assume responsibility in their respective areas.

Where and when local level and provincial teams have demonstrated effective capacity to manage their own rice industry, the National Government may encourage them to take full responsibility. On the contrary, where local or provincial governments are aloof in promoting rice based industry for the benefit of their population, the National Government may equally not participate in the area, or reduce participation.

Thus any increased or decreased involvement of the National Government in rice based industry development would depend on the effective participation by the corresponding local Governments both financially and in kind in support of their industry.

Tax exemption on specific agro-machinery , and tax reduction on other inputs to support the industry would be ideal way to reduce the initial production costs.

National, Provincial and Local Level Governments should all seek investors, local or foreign to participate and contribute in the development of the industry based on a whole industry approach basis; that is training, production, processing and marketing of rice.

M. IMPLEMENTATION IMPLICATIONS:

The project has been partially implemented by the DAL under the current Rice and Grain Development Project with insufficient funds being made available by the Government and from donor agencies. It is anticipated that the program will be fully implemented when this submission is fully endorsed and approved by NEC and funded.

N. ENVIRONMENT IMPLICATIONS:

Nil

O. PREVIOUS POLICY REFERENCE:

NEC decision No. NG 69/92 of meeting No. NG 26/92 item (i) - (viii) on food and Livestock strategy for the establishment of a Rice and Grain Authority is still outstanding.

The White Paper on Agriculture-Sectoral Policies: 1996-2000, as endorsed by the NEC Decision No. NG 57/96, emphasize that rice is one of the important food crops and provides policy directives to:

- i. Establish appropriate rice farming systems research, extension and development unit to increase domestic rice production by the year 2015;
- ii. Develop cost effective programmes and the extension system to implement the domestic rice programme.
- iii. Development of infrastructure such as roads, marketing facilities and necessary support services like credit schemes are a critical programme components to the development of agriculture in general and rice in particular.

P. RECOMMENDATIONS:

It is recommended that the NEC:

1. endorses and approves the domestic rice strategy and programme as a component of the farming systems to enhance National Food Security;
2. directs the Department of Lands and Physical Planning to make available suitable but idle government land in the targeted areas to DAL for the purpose of seed production and distribution to farmers in support of domestic rice production;
3. endorses and approves the proposal to initiate small scale irrigation development to support both rice and agricultural industries in general;
4. endorse the proposed ten (10) year budgetary requirement for the implementation of domestic rice project starting with K4,324,040 in 1999 (total costs are shown in table 10)

5. endorses and approves that rice imports remain open and competitive without any restrictions, except that all importers obey the normal rules of fair trade.
6. directs DAL to review existing bilateral arrangements currently in place including the development of new initiatives to enhance technical cooperation in the development of domestic rice programme.
7. directs DAL to prepare necessary documentation to effect outstanding NEC directive to establish a Rice and Grain Authority.
8. direct DAL to facilitate joint venture investment projects in rice and other related food programmes with interested private investors as well as donors concerned about food security.
9. direct Department of Finance and Corporate Affairs, National Planning and Implementation Office and DAL to make available K4.0 million to support and facilitate investment.

**HONOURABLE TUKAPE MASANI, MP**  
**MINISTER FOR AGRICULTURE AND LIVESTOCK.**

## ANNEX I.

# Towards Increased Domestic Rice Based Farming Systems Development in Papua New Guinea in Support of National Food Security.

## 1. The Goal:

2.

Improve on the domestic rice production as a component of the overall national food security through a farming systems approach.

## 2. Background information.

Rice has been introduced into Papua New Guinea for approximately one hundred years, but rice production has remained a subsistence enterprise all these years. Many attempts have been made in the past to increase rice production in traditional rice areas, such as Finschaffen, Maprik, Beriana and North Mekeo, but with only mixed outcome of cycles of increased production followed by decreased production and vice versa. The failures could be attributed to inappropriate varieties and technologies in the past, inadequate extension support, poor infrastructure in terms of roads, mills and storage centers, lack of irrigation and access to market, land tenure issues and un-sustained Government support.

Despite the past failures in promoting the rice industry, rice has become a major item in the diets and import economy of Papua New Guinea. Currently rice import is estimated at 150,000 - 170,000 tons annually, with retail gate value of over K150 million. This contributes significantly to the drawn down of our foreign reserves. It is important that we should start reversing this trend by gradually increasing on our domestic production in the traditional and other favourable rice areas, so as to at least make some contribution to domestic consumption.

Additionally, the International Rice Research Institute, in Manila, Philippines estimated that, by 2025, about 5 billion people in the world would be planning to eat rice as a major part of the diet. This would require that world production rise from the present 550 million tons of milled rice to about 880 million tons. But they said, there is less confidence today, that the production increases achieved in the past green revolution could be repeated in the next twenty five years; for a number of reasons; including water shortage, climatic instability, environmental problems with chemicals, labour shortages and especially conversion of rice land for industry and housing in the traditional rice producing countries.

In addition, if we take into consideration that, only 4% of the world rice produced enter into the international market [96% is consumed within the areas of production], then, we should expect increasing price of rice in the future as a result of demand and supply interplay on prices. Thus the few traditional rice growing countries as well as new countries that would be producing rice, might be favoured by the world trend of expected higher prices.

To produce 150,000 - 170,000 tons of milled rice [the equivalent of 240,000 tons of paddy] locally, about 100,000ha of rainfed lowland<sup>1</sup> rice would need to be put into production. Alternatively domestic demand could be met by production from 45,000ha of double cropped irrigated riceland, or by harvesting from 200,000ha of rainfed upland fields. This is a tall order that could not be achieved immediately. PNG should aim at a gradual and systematic strategy to introduce rice into the existing and newer farming systems as a component of the overall food security program.

Our past and current production figures in selected rice areas, seem to indicate that with appropriate direction and support, we could repeat and build on the achievements of the past and present, such as: the 440 tons produced in Maprik in 1991, 300 tons in Finschaffen in 1995, 60 tons in Nuku in 1996, 70 tons in Garaiana/Morobe South and currently 60 tons in Markham Valley of Morobe.

However, we should bear in mind that, land tenure and infrastructure would be major obstacles in our push for rapid rice promotion. Thus a program has to be developed towards voluntary mobilization of the farmers and their lands, and empowering/enhancing them through training, machinery, equipment and a strong extension support. This way we could develop the target population to become the front runners in PNG's push towards improved domestic rice production in support on national food security.

This proposal is for a mid term of 5 -10 years. It aims to gradually mobilize the population in favourable environments voluntarily with their lands and integrate rice into their farming systems. The target is, by year ten, if land tenure and infrastructure allows, we should try to reach about 10,000 farm households, each cultivating about 0.5 ha of rice, would require about 5000 hectares of land. For this to succeed also, appropriate strategies, must be put in place to gradually address the issues.

### 3. The strategies

#### 3.1. Research and Technology Development.

Appropriate Research and technologies, must be in place for the success of any food improvement program. These need to be fine tuned or developed anew in case of PNG's rice industry.

The Rice and Grain Program of DAL, The University of Technology and the newly established National Agricultural Research Institute, and other rice teams such as Trukai Industries the Taiwanese Technical Mission and OISCA are expected to play significant roles in the research and technology updating and or development for the rice based farming systems. It is expected that professional staff development across the various and essential scientific fields, could cost K2,437,500 in ten years Table 1]. It is proposed that, grants, aids and or bilateral assistance be sought in supplementing Government efforts in the Training programs..

### 3.2. Seed Production and Multiplication.

Good quality seed is essential for quality farming, and appropriate and acceptable varieties must be developed, and seeds multiplied in quality and quantities that would meet farmer demands. Seed multiplication would best be done near to or in the locations of need, so as to cut down on high storage and transport costs. In the absence of seed companies in Papua New Guinea, breeder and foundation seed production must be the responsibility of the various rice groups. However, release of any new variety needs the approval of the Secretary of Agriculture upon recommendation by the Rice and Grain Technical Advisory Committee [following varietal release standards to be developed]. Certified seed production could be done by organized farmer groups, after training in seed production. Seed storage centers should be developed in the growing areas, by Government and Private enterprise. It is estimated that K240,000 would be needed to meet seed costs. A further K200,000 would be needed to meet storage and transportation or freight costs within the first 5 years [table 2].

It is expected that the DAL-Erap Program, the ROC Taiwan Mission and OISCA would play significant parts in the initial seed production. With time, NARI, Trukai and farmers and other interested groups would be encouraged to produce seed to support the program.

### 3.3. The need for a strong extension component.

Very strong extension support is important in the beginning. This is because, lack of effective extension support in quantity, quality and timeliness has been one of the major causes of failures in most agricultural programs in PNG. Since this increased rice production program, must reach many people, for it to succeed, the ratio of extension staff to farmers should be adequate. Ideally a ratio of one extension staff to 100 farmers is ideal, however, since costs would be very exorbitant a relatively second best option of an average ratio of one extension officer to 200 farmers is accepted as relatively reasonable. As farmers gain knowledge, the numbers could be reduced and or the extension staff moved to newer areas where rice would be introduced.

Investment in extension would be costly at the start, but this would pay for itself in the years to follow. Extension staff must be mobile in order to reach the farmers on time and regularly. They must be housed in the area or as close as possible, thus housing would be needed. Table 3, shows the cost to be involved for extension to be effective. Including housing, transport and fuel, salaries and allowances, an amount of K10,475,852 million is needed in 10 years. However, if Provinces provide their own extension staff, and the Program provides only logistic support, such as vehicle, fuel and accommodation, then costs would reduce a great deal. This is the price we must pay for good foundation in rice based farming systems development. The investment in extension is expected to continue to be beneficial to the country many years after initiation



### 3.4. Training of Extension Staff and Farmers

A little knowledge is said to be dangerous. For a good beginning, it is important that all the extension personnel be given proper training themselves. That is the only way, by which they can go and deliver the proper messages to the farmers. We can not afford illiterate or half baked extension staff.

The extension staff would be trained in ways that they could also give extension advice on other crops and technologies that are associated with the farming systems.

Similarly, farmer leaders must also be trained, as well as the farmers themselves. Once farmers are well trained, they'll be able to manage successfully on their own in subsequent seasons, for increased production. Training related costs of K 1,521,470 [Table 4], is considered as a good and necessary investment for the future, because the costs would be justified over time through investment of the knowledge gained into increased productivity.

### 3.5. Land and people to be mobilized in phase 1.

Land tenure is a complex issue in PNG, making access to land especially for long term planning a problem. This program does not aim at forced land acquisition, but rather to reason with farm families to put clan lands into production, for their benefit. We should aim at increased approach to rice food security through voluntary mass mobilization of the population and voluntarily of their customary lands. It is expected to mobilize in the first phase of ten years 5,000 hectares of rainfed land and an additional 1000 hectares for irrigation development, all to involve at least 10,000 farm families.

Since rice technology is relatively alien to the average Papua New Guinean, it is intended to begin with all first time rice farmers cultivating between 0.25 to 0.50 ha. only during the first season's 'Training and Learning Process'. This is based on our experience in the Markham Valley, where 'practicing' on such land size resulted in better care and double the expected yield [producing the equivalent of 4 tons/ha as against the normal 2 tons/ha expected]. Land sizes could then be increased to any size desired by farmers from the second crop onwards. Table one gives an idea of the initial sites, people and land to be mobilized. Provinces not indicated here would be reached in subsequent years.

Where government lands exist in an area, those found idle and suitable could be mobilized for seed production, or mill and storage centers to support the industry.

It is expected that once the program begins in full swing, production is expected to gradually increase, from a few hundred tons and peaked about year 5. Giving about 79,660 tons cumulative in ten years. And at the conservative rice price of K1000 per ton, this would give K47.8 million in ten years Table 5.

Part of the production is expected to be used for home consumption, and the excess sold. If all rice produced, for home consumption or market are costed at current market values

of K1000 / ton, a ten year projection of K47.8 million would be expected from the rainfed fields, while irrigation development would add a further K26.8 Million [tables 5 and 8 ].

### 3. 6. Machinery and Equipment Needs to Support the Program

Agro-machinery would be needed to support the promotion program. Land development, post harvest and processing machinery and mills are a prerequisite for success. Government, the private sector and individuals would be encouraged to invest in agro-machinery for hiring to the population. For the initial promotion phase, there would be the need for Government to set up machinery pools in key production areas, and hire these to the population. Funds generated by hiring could be re-invested to further enhance the program.

Small to medium scale machinery should be promoted, so that they are within farmers reach.

A program that allows for tax reduction on agro-machinery might be important for a short period, so as to make machinery less expensive for the private sector and individuals to purchase. The types of machinery and equipment and their costs and where to locate them are shown in table 6a. Since the initial investment costs are high, K5,045,743, it is proposed to split purchases into 5 year period [table 6b].

The machines need operators, and must be maintained and serviced regularly for their durability. The operational, running and maintenance costs, in addition to mechanics and technicians related costs would be K4,607,160 [table 7].

It is expected that the investment in machinery would finally pay for itself, through the hiring system to be implemented.

### 3.7. Irrigation Development

While the initial stages of rice promotion would depend mostly on rainfall, it is important that we begin irrigation development work for the future. For irrigation would guarantee production of at least two to three rice and alternate crops per year compared to one for rainfed rice production. Irrigated fields would not be affected by drought, which could cause partial or complete failure in rainfed fields in bad years. Yields from irrigated rice fields are also expected to be higher. Vegetable and fruit trees could also benefit from irrigation development. Affordable small scale irrigation should be promoted, for ease of management and maintenance purposes.

It is proposed to develop cumulatively between 1000 ha of small scale irrigated fields in the first ten years. This would cost K4,900,000. [table 8]. Since investment in irrigation development is expected to be beneficial for 50-100 years, thus the costs and benefits should be considered on long time basis

It is expected that cumulative rice revenue from irrigated fields would amount to K 26.8 million by year ten [table 8].

### 3.8. The Rice Growing Environment

The plan is to use three pronged approach in rice development, based on 1. Rainfed upland<sup>1</sup>, 2. Rainfed lowland and 3. Irrigated systems. By use of three ecosystems, more land could be brought into cultivation. Research and extension packages must be developed for profitable utilization of these ecosystems. The Rice and Grain Project, the University of Technology, National Agricultural Research Institute and other rice groups in the country are expected to develop the technologies.

## 4. Essential Enabling Issues or requirements that Must be Addressed.

### 4.1. Program Management

A national program management site should be maintained at Erap, in the Markham Valley. In addition, as a result of the diversity and difficulty and costs in travelling and reaching all sites effectively from only one location [Erap], for efficiency, five sub-management sites should be identified and established. These should coincide with the regional approach. Five site managers must therefore be recruited or posted. On site management is very important since that works better than management by 'remote control'.

The success of areas or sites would depend on the effectiveness of the site managers as well as on the logistic supports given them by management or Government. They need to have regular contact and supervision with their extension staff and farmers through field visits. They also need to be in regular contact with the Program Management by phone/fax and scheduled visits. Overall management costs over ten years will be K3,545,334 [Table 9].

### 4.2. Responsibility of National , Provincial and Local Level Governments.

Provincial and local level Governments lack expertise in rice farming systems development. Thus rice industry development initially should be the National Government responsibility. However, the Provincial Governments and Local Level Governments as well as the private sector and farmer groups or associations should be developed to gradually assume responsibility in their respective areas.

Where and when local level and provincial teams have demonstrated effective capacity to manage their own rice industry, the National Government would encourage them to take full responsibility. On the contrary, where local or provincial governments are aloof in

<sup>1</sup> Rice growing ecosystems are classified as: [a]. Rainfed upland = growing rice on free draining soils that depend solely on rainfall. [b]. Rainfed Lowland = growing rice on soils that have adequate moisture in the root zone of the crop. This also depends on rainfall, but in this case may or may not be flooded for short periods during the crop growth cycle. [c]. Irrigated riceland = refers to plots that are developed for controlled water addition and removal, by taking water from streams, rivers, dams, bore-holes, etc.

promoting rice based industry for the benefit of their population, the National Government may equally not participate in the area, or reduce participation.

Thus any increased or decreased involvement of the National Government in rice based industry development would depend on the effective participation in financial and staff support terms to the industry.

#### 4.3. Professional Staff Development.

PNG lacks staff in quantity and quality, to address her rice based farming systems needs effectively. It is proposed to hire and train local professional staff to gradually take control of the industry.. It is proposed that professional staff strength be increased to cover all professional components<sup>2</sup> important for Rice and Grain Industry development. Recruitment and training should begin as a matter of urgency, so that a full compliment of staff is available by year ten.

#### 4.4. Down Stream Processing and Mill centers

The National and or Provincial /Local level Governments are expected to set up Mill and Storage sheds in areas with significant production. This will be an incentive for increased production. Management of Mill and storage facilities may be transferred to well established and capable farmer associations in each area as a further support to the farmers . Where there are farmers who are in a position to run mills and other machinery, they will be encouraged to buy such equipment and run the mill as a commercial venture. This includes machinery support as well to the farming community.

#### 4.5. Access to Credit and revolving funding system

Access to credit is important for any industry development. A revolving funding system should to be established to support the industry. Technology packages needs to be developed, and costed and to be used as the basis of any ceiling set for access to credit.

#### 4.6 . Formation of Farmer Groups and Cooperatives

Farmer group formation should be encouraged in each growing area. These should be developed gradually, to become responsible for all sectors of the industry in their areas Well developed groups may be given responsibility for operating of Government Mills for down stream processing and marketing of their rice, as an added incentive.

#### 4.7. Rice imports, Investors and bilateral collaboration.

It is realized that rice imports may continue for some time. As such, imports of rice would remain a free market. Investors, local or external may be encouraged to invest into the industry. Existing and proposed private investments such as PNG - Trukai, Morobe

<sup>2</sup> The professional areas are; Extension, Training, Agronomy, plant breeding, irrigation, economics, pest & disease management, soil management and anthropology

Provincial Government - JRP of Thailand and bilateral ones such as PNG - Taiwan, and PNG - Thailand should be encouraged. It is expected that investors would respect the wish of the Government for them to also invest in domestic rice industry development and not only in trading.

## 5. Returns from the investment.

The investment identified above should be considered as a long term one, since most of it would be beneficial over and above the ten year period [ such as irrigation, training of scientist, farmers, technicians, some machinery and mills].

To be viable, the cost of production must be lower than the expected revenue. FAO IN 1986 recognized that small scale rice production could be viable in PNG. Sloan Cook et al 1993, also recommended for a farming systems approach in rice industry development. This proposal is to pursue the farming systems approach, and based on small scale production, with and or without irrigation. Gross margin analysis indicated that this is profitable [ Table 11 ], ranging from 116- 226% based on paddy prices, and from 155- 247% based on mill rice equivalent..

Table 5 indicated that cumulatively rainfed rice production would yield K47.8 Million by year 10, and irrigated rice production would add another K26.8 Million, This would make a total of K74.6 million. By subtracting the production costs and all other investment costs in table 10, the net revenue would be K24.9 million over ten years [Table 12].. This is reasonable proposition as it also absorbs, staff development and irrigation development costs as well

Additional revenue would also come from the hiring of tractors to prepare the land for other alternate crops in the farming systems.

## 6. The Future

PNG hopes to produce rice in sufficient quantities, for domestic consumption, the surplus production would be sold for cash income. The National, Provincial and Local Level Governments are encouraged to promote rice industry development as reasonable within their financial means. We believe that using the farming systems approach to rice promotion as a component of the overall farming systems is the best way to promote national food security.