FARM Africa

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The Maendeleo Agricultural Technology Fund

# Final Evaluation of MATF Round V Projects

## Final Report

Submitted by
Repcon Associates

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## ACRONYMS

| | | |
|---|---|---|
| A2N | - | Africa 2000 Network |
| AP | - | advisory panel |
| APEP | - | Agricultural Productivity Enhancement Programme |
| BEP | - | Break Even Point |
| CBOs | - | community based organisations |
| CBT | - | community based trainers |
| CIP | - | Cashew nut Improvement Programme |
| CVA | - | Commercial Villages Approach |
| DAO | - | District Agriculture Officer |
| ERTA | - | Enhanced Regional Trade Alliances |
| FAO | - | Food and Agriculture Organization |
| FARM-Africa | - | Food and Agricultural Research Management - Africa |
| FAS | - | Financial Service Associations |
| FBU | - | Farmer Business Units |
| FCI | - | Farm Concern International |
| FFS | - | Farmer Field School |
| FGD | - | Focused Group Discussion |
| FLO | - | Fair Trade Labelling Organization |
| GDP | - | Gross Domestic Produce |
| GOT | - | Government of Tanzania |
| HCA | - | Horticultural Council of Africa |
| JKUAT | - | Jomo Kenyatta University of Agriculture and Technology |
| KARI | - | Kenya Agriculture Research Institute |
| KII | - | Key Informant Interview |
| KIRDI | - | Kenya Industrial Research and Development Institute |
| MAAI&F | - | Ministry of Agriculture, Animal Industry and Fisheries |
| MATF | - | Maendeleo Agricultural Technology Fund |
| MFI | - | Micro-Finance Institute |
| MHQFP | - | Masasi High Quality Farm Products |
| Mkukuta | - | Mkakati wa Kukuza Uchumi na Kupunguza Umaskini Tanzania |
| MOA | - | Ministry of Agriculture |
| NAADS | - | National Agricultural Advisory Services |
| NARI | - | Naliendele Agricultural Research Institute |
| NARO | - | National Agriculture Research Organisation |
| NDLD | - | Namutumba District Local Government |
| NERICA | - | New Rice for Africa |
| NGOs | - | non-governmental organisations |
| P/M&E | - | Participatory Monitoring & Evaluation |
| PAFA | - | Pallisa Farmers Association |
| PMD | - | Powdery Mildew Disease |
| PPM &E | - | Participatory Planning, Monitoring and Evaluation |
| QI | - | Questionnaire Interviews |
| RIAM | - | Rogers Innovation Adoption Model |
| SACCO | - | Savings and Credit Cooperative Society |
| SHG | - | Self-Help Group |
| TOR | - | Terms of Reference |
| TOT | - | Training of Trainers |
| UEPB | - | Uganda Export Promotion Board |
| USA | - | United States of America |
| USAID | - | United States Agency for International Development |
| VODP | - | Vegetable Oil Development Project |
| WG | - | Women's Group |

# CHAPTER ONE: EXECUTIVE SUMMARY

## 1.1: Background

This report outlines the findings of the final Evaluation of Round V Grants administered by FARM-Africa through its Maendeleo Agricultural Technology Fund-MATF which is focused at improving livelihoods of small holder farmers and herders within Kenya, Uganda and Tanzania through promoting transfer and adoption of promising agricultural technologies. The Evaluation study was undertaken under contract by Repcon Associates- a Nairobi-based consultancy and targeted the five projects namely:-

i) Increasing Farmer Incomes Through Improved Farm Management, Organic Certification and Fair-Trade Labelling of The Cashew Nut Production in Masasi District , Mtwara Tanzania
ii) Enhancing Regional Trade Alliances for Bulb Onions, Targeting the Nairobi Onion Market Share - Small Holder Commercialization and Market Access- Mang'ola (Karatu District) in Tanzania and Kieni district in Kenya
iii) Fresh Fruit Processing and Enterprise Development in West Kenya Through the use of Solar Drying Technology in Homa Bay, Vihiga and Busia Districts of West Kenya
iv) Promoting NERICA III Upland Rice Production, Processing and Marketing in Namutumba District, Uganda
v) Production and processing of Citronella and Lemon grass in Pallisa district

## 1.2: Evaluation Criteria

The evaluation was largely analytical utilising both quantitative and qualitative data collected through literature review, entry and debriefing meetings, focus group discussions, key informant interviews, field observations and structured questionnaire interviews. During the fieldwork, lead agencies and their partners provided linkage between the study team and stakeholders to the project including the beneficiary groups. Indeed, in the case of Dutch Connexxion Ltd in Masasi, the Evaluation Team participated in a programmed training session organised under auspices of the project and was sat through a meeting with the local District Commissioner.

## 1.3: Study Findings

Round V projects are characteristically broad in focus and thematic coverage probably motivated by the need for the MATF to remain relevant in light of ongoing shift in the agricultural and rural development policies and strategies of East African states which made adoption of a standardised approach to the evaluation of target projects quite a daunting task. However, towards the evaluation of Round V projects and maintaining sight of the Terms of Reference, this study adopted 12 broad criteria against which, success or otherwise of the entire Round V was attempted. Our observations are as follows;-

(a) Round V was largely a success

Evaluated against the said 12 criteria namely;- Technical Feasibility, Innovativeness, Value addition and market penetration, Return on investment, Impact on livelihood security, Potential for replication, economic impacts, Partnerships, structures for sustainability, environmental, social and gender impacts, it becomes evident that Round V was a success. Four of the five projects attained a score above 60% implying that, these were essentially good projects (Table 1.1 below).However, massive effort is require to cause a turn around in Project No 5 on introduction of Citronella in Pallisa District. Profitability for farmers will require tenfold increase in both yield and market prices while recouping of MATF funds is

only possible where such changes are backed up by a three fold increase in the hectarage under oil crops.

Round V had a specific bias towards fostering value addition and market penetration and when evaluated against this goal, only the Duccon project on Cashew Nuts was successful with all the others performing poorly on this score. Most projects posted very positive margins and thus impressive returns to MATF investments in less than three years. The same was observed for the cashew nuts project which, unlike the other 4 targeted a tree crop whose response time is longer than that of vegetables. Essentially therefore, the economic analysis has confirmed the high economic potential of the interventions supported and the fact that considerable home-work preceded their selection.

**Table 1.1: Performance of the Five Projects Evaluated**

| Project | % Score on 11 Criteria | Return on MATF Investment | Success in value addition/ market penetration (score out of six) | Performance Ranking |
|---|---|---|---|---|
| 1. Organic Certification and Fair-Trade Labelling of Cashew Nut Production in Masasi District , Mtwara Tanzania | 89.1 | 2.77 | 5 | 1 |
| 2. Enhancing Regional Trade Alliances for Bulb Onions, targeting the Nairobi Onion Market | 83.6 | Mang'ola = 10.67<br>Kieni = 8.68<br>Combined = 9.67 | 3 | 2 |
| 3. Fresh Fruit Processing and Enterprise Development in West Kenya through the use of Solar Drying Technology | 50.9 | Homabay = 0.37<br><br>Busia = 1.4 | 2 | 4 |
| 4.Promoting NERICA III Upland Rice Production, Processing and in Namutumba District Uganda | 81.8 | 6.84 | 3 | 3 |
| 5. Production and processing of Citronella and Lemon grass in Pallisa district-midterm evaluation | 45.5 | (0.57) | 1 | 5 |

Such impressive returns on investment including the potential to fully recover farmers investment in own labour costs imply that MATF-supported technology transfer has potential to create rural wealth and jobs - the two most strategic ingredients to achieving economic transformation of rural areas. Indeed, in the case of cashew nut processing in Masasi, investment by MATF has succeeded beyond expectation in that farmers have attracted their own factory through which they can process own produce and sell at better prices and simultaneously retain jobs that would otherwise have been exported with raw nuts. As well, with some measure of aggressiveness, adoption of solar drying technology as demonstrated holds the key to unlocking the economic potential of pineapples and other fruits in Western Kenya. Through such highly successful demonstrations, this study observes that the MATF is increasingly successful in its mission and goals and remains highly relevant to the agricultural and rural development policies and strategies of East African States.

In sections below, a quick review of performance against other MATF objectives is provided.

(b) The MATF remains relevant to rural development in East Africa

Agricultural and rural development policies in Kenya, Uganda and Tanzania are highly dynamic as the reality of their potential contribution towards policy alleviation and general national development gets appreciated. Indeed, currently the main focus is commercialisation of small holder agriculture as a vessel for increasing the incomes of rural households which underpinning the base for the manufacturing sectors and value addition to

agricultural produce is a highly valued strategy. By selecting and funding interventions targeting high value crops, value addition and market penetration through the Round Five Grants, the MATF has remained sensitive and aligned to local development objectives and

(c) Round V marked a turning point in the operations of the MATF:
In the history of the MATF, Round V is the only incident when a grant was advanced to a private sector operative in the person of the Dutch Connexxion Ltd. The latter not only managed to inject the high degree of professionalism typical of the Private Sector but also succeeded in dispelling myths that the sector is all about the financial margin. It thus follows that, expectation will be high for the MATF to consider opening future grants to competitive private sector players.

(d) Some aspects of project implementation were wanting
The relevance of certain technologies tried was not always clear. Specifically, solar driers rolled out in Western Kenya have largely remained un-utilised possibly suggesting that the felt need of target communities lay elsewhere. However, the tissue culture bananas that were introduced in Busia as part of this project are increasingly gaining esteem in providing alternative means to livelihood for the formerly –growing farmers.

(e) Need to resolve issues outstanding to Round V:

As Round V comes to a close, several issues remain outstanding and the same are flagged out as recommendations:-

i) Ordinarily, the final evaluation takes place at the conclusion of a Round of funding and when the MATF is already clear on which grants to extend. However, in the impression of this study, two cases require additional support to extend capacity building as follows:-
    - The Dutch Connexxion requires support to build further capacity for the board of MHQFP Ltd.
    - The ERTA Onions project merits funding to build capacity for the Commercial Villages which are still threatened by market intermediaries.

ii) The MATF should make a decision as to the merits of extending the revolving fund to grantees where technical intervention has stalled.

### 1.4: Lessons learned / core recommendations

*(i) There is need to interrogate proposals much more closely:*

This lesson accrued from the case of ERTA Onions and Solar drying of fruits whereby:-

- The proposal to enhance a regional alliance in onion marketing was never at all addressed in project implementation implying that it was just that- a good title. This study has however established that both Mang'ola and Moshi account for the lion's share of bulb onions traded in Nairobi and the idea of forming an alliance between both production areas sounded quite interesting.
- The case of fruit processing in Western Kenya where data on fruit production Grant were applied firstly in the production of the same fruits targeted for processing and preservation.
- Data on crop-oil based income was used to defend the proposal from cultivating lemon grass for oil production. It turned out that prices proposed cannot recover the investments by farmers based on which project implementation has suffered.
- The recommendation here is that the MATF should consider the merits of exposing the final shortlist of proposals to external review so as to afford them a much closer scrutiny to facilitate ascertaining of facts, orientation of partnerships etc.

*(ii) Need for an after-projects evaluation:*

Based on analysis of the status of project adoption, it became clear that the final evaluation of MATF-funded projects actually occurs when projects are possibly at the Innovators and Early adopter's stage which represents less than 20% in project development. A scenario in which the project is concluded at the early adopter stage has critical implication to attainment of objectives since, attempts to document such projects after a three year implementation period will basically capture lessons accrued from involvement of innovators and early adopters and largely leaves out that of later entrants. The impression of this study is that, the MATF stands to gain a lot from taking stock of status of Grants expired upwards of 2 years ago. Based on such a study, MATF may probably find it prudent to consider funding the scaling up of technologies that are already tried on the ground other than playing extension of the research field.

*(iii) Revolving funds should be optional to projects where technology adoption is evident:*

The role of revolving funds within projects was not always clear. Indeed, this project came across one Round V group which is yet to adopt the primary technology but is now mobilising towards receipt of revolving funds. Indeed, the relationship between the revolving fund and the technical intervention was not always clear and our recommendation is for revolving funds to be released as part of an approved and negotiated business strategy. Further, revolving funds should only be released as an incentive to groups where technology adoption is evident.

*(iv) Extreme geographical scatter is counter-productive:*

On the MATF V projects was implemented across national boundaries, a second one was replicated in three districts while a third one was isolated deep in southern Tanzania and of necessity, the cost effectiveness of such design comes to focus. Indeed, this study failed to document any merit pertaining specifically to replication of projects across administrative boundaries given that the same were later on managed as separate entities and often lacked the attention accorded to a single centralised project. In the view of this study, the project recruitment process should aim to minimise geographical scatter while maximising on Grant Value.

*(v) Capacity building and institutional development within grants requires to be strengthened:*

Conventional training during grant implementation has mainly extended to group formation and leadership complemented by TOT on the technological aspects. In most cases, the contacts were not sustained long enough as to offer support to the leadership of emergent groups which subsequently collapsed sometimes even before expiry of the grants. A case in point within Round V is the Fruit Processing Project in Western Kenya whereby the full complement of collaborating groups in Vihiga are yet to come on board and neither has the mandatory Apex Association been formed. The state of the solar drier in Vihiga is a good example of what befalls investments that are not supported by institutional structures. Clearly, there is need for capacity building to be sustained throughout the entire project life and beyond.

*(vi) Merits for investing MATF resources in construction of facilities are not clear:*
Under the Round V grants, MATF supported two projects that involved construction of physical infrastructure in form of solar driers and an Oil Distillery both of which have but stalled. In the case of solar driers, farmers are apparently in favour of selling fresh produce whereas at Pallisa, production of lemon grass for processing has stalled causing the plant to remain idle. Further lessons can be borrowed from Round IV Grants whereby Rice mills constructed in Luweero with MATF support proved non-viable while cost recovery from masonry tanks constructed in Western Kenya (SANA project) proved impossible. In the

opinion of this study, MATFs funds should largely target capacity building for target groups who can then explore means of accessing desired technologies within the market in which, case, the example of Masasi where empowered farmers have been able to attract shelling factories outside of MATF funding provides an ideal case study.

*(vii) Price instability remains a critical barrier in the commercialisation of agriculture:*
Round V of the MATF Grants was heavily oriented towards promotion of value addition and other strategies aimed at attaining market penetration to secure higher return on agricultural investments. As it turned out, with the exception of EARTA Onions where market project activities achieved higher prices for produce all other projects were dogged by poor market prices and inability to effectively penetrate markets. Technologies that were anticipated to facilitate value addition were either not accessible while attempts at market linkage were not entirely successful. The implication here is that, there are no clear lessons to carry forward and, given the critical importance of commercialisation as a strategy to rural development in East Africa, there is probably need for the MATF to consider committing additional resources towards promotion the search and transfer of workable technologies in this area.

# CHAPTER TWO: INTRODUCTION

## 2.1: Objectives and Scope of the Evaluation

The MATF is a regional initiative of FARM-Africa established in 2002 with the aim of improving the livelihoods of smallholder farmers and herders mainly through support from the Rockefeller Foundation, Gatsby Trust and Kilimo Trust. The Fund is active in Kenya, Uganda and Tanzania where its **core strategy is to enhance uptake of new agricultural technologies and promoting innovative dissemination methods through provision of** competitive grants to different organisations including research institutes, government parastatals, non-governmental organisations (NGOs), community based organisations (CBOs) and private companies. This purpose can be broken down into specific objectives namely:

- to promote dissemination of innovative, proven technologies;
- to facilitate development of innovative partnerships between different stakeholders in technology transfer;
- to identify and promote innovative dissemination methods;
- to document and disseminate best technologies and dissemination practices.

MATF is managed from FARM-Africa's Kenya office, with its own dedicated staff of seven. The fund manager is assisted in decision-making by an advisory panel (AP) comprising seven members chosen from the three East African countries, plus representatives of the fund's current donor the Kilimo Trust and the FARM-Africa Kenya regional director. As well as making decisions on which projects to fund, the AP is actively involved in monitoring projects and setting the strategic direction for the Fund.

## 2.2: Focus and Scope of the Round V Evaluation Study

The Terms of Reference (Appendix 1.1) have stipulated that each of the 5 Round V projects be evaluated based on analysis of value chain, supporting social structures and socio-economic and environmental impacts so as to determine achievement of design goals including contribution to MATF objectives.

## 2.3: Overview of Projects

The nature and scope of the Round V Projects evaluated in this report is presented in Table 2.1 below. Each Round IV project lasted three years with a ceiling grant value of £80,000. Further, with the exception of Grant No. 5 (Processing of citronella and lemon grass), which spanned 2009 through 2011 and is therefore in its second year, all other grants were implemented between August 2007 and September 2010 and are therefore in the no-cost extension period having completed the three year implementation period. Further, and without exception, all the Round V were strongly biased towards value addition and market penetration as a strategy towards commercialisation of small-holder agriculture.

Table 2.1: Nature and Scope of the Round V Projects

| Project Title | Country | Grant Amount (£) | Name of grantee | Nature of grantee |
|---|---|---|---|---|
| 1. Organic Certification and Fair-Trade Labelling of Cashew Nut Production in Masasi District , Mtwara Tanzania | Tanzania | 79,993.45 | The Dutch Connexxion Ltd | Private company |
| 2. Enhancing Regional Trade Alliances for Bulb Onions, targeting the Nairobi Onion Market Share | Tanzania and Kenya | 79,809.44 | Farm Concern International (FCI) | NGO |

| | | | | |
|---|---|---|---|---|
| 3. Fresh Fruit Processing and Enterprise Development in West Kenya through the use of Solar Drying Technology | Kenya | 80,007 | Africa Now | NGO |
| 4.Promoting NERICA III Upland Rice in Namutumba District Uganda | Uganda | 80, 070 | Africa 2000 Network (A2N) | NGO |
| 5. Production and processing of Citronella and Lemon grass in Pallisa district | Uganda | 75,212 | NARO-NaCRRI | National Research Institute |

## 2.4: Approaches in the Evaluation Study

### 2.4.1: Study Methodology

By design, the proposed evaluation study was inherently heavy on assessments and this called for proportionately higher allocation of effort in generation of primary data through observations, stakeholder consultations and interviews. Outlined below, is the study procedure adopted and executed in pursuit of study goals and objectives.

Pre-field briefings

As a follow-up to the Inception Report issued by the Consultant, meetings were held so as to jointly review the TOR and harmonize client and consultant expectations in respect of the study. A mutually acceptable approach to the study including an itinerary for the field work, data capture methodologies and tools, logistics, etc were discussed. During the initial liaison meeting, the need for the evaluation study to unearth and document economic impacts of target projects were expressed which required that production data for representative farm enterprises be generated through questionnaire interviews. It was thus principally agreed that, in spite of time constraints, the study to incorporate questionnaire interviews alongside other study methodologies subsequent to which, the Consultant reviewed past itineraries and data capture tools as per agreements with the Fund manager. Appendix 2.1 and 2.2 provide the Itinerary for field work and the data capture tool applied in the study. Alongside the preparatory discussions, the counterpart team worked hard to disseminate the field itinerary, mobilize field contacts and logistics and also assembled project documents which were subsequently made available to the Study Team.

Document and Literature Review

The study timeframe as negotiated with the client was quite tight and allowed just adequate time for pre-field preparatory work. The consultant did obtain project documents from the client (see Appendix 2.3) which were reviewed and referenced throughout the entire study period. Review of project documentation was extended to searches at *www.farmafrica.org.uk* and *www.maendeleo-atf.org* where the extensive documentation of the entire MATF programme is generously availed.

Field Consultations

Field consultation entailed activities as follows:-

*(i) Entry point discussions:* Entry into each project always started with a meeting with the Lead Agency during which an overview of the project including design objectives, specific methodology and achievements was presented following which, an itinerary was then agreed on. Essentially, from a list of beneficiary groups previously mobilized by the lead agency, the Study Team would select the most representative groups who would then be visited in line with the itinerary developed by the Lead Agency. Appendix 2.4 presents the comprehensive list of institutions visited and people talked to as part of the evaluation study.

*(ii) Sessions with participating groups:* Engagement with beneficiaries adopted either of three methods namely group discussions, focus group discussion and questionnaire interviews. The number of FGDs conducted largely depended on the size, diversity and dynamics of participating groups while the questionnaire interviews sought to capture a statistically descriptive sample in which case, the target was maintained at 10% of the group membership.

The core informants to the study were the MATF counterpart staff and partners with whom interviews were conducted on a continuous basis. Interviews were also extended to cover other stakeholders including group members who appeared to command cutting-edge information. Table 2.2 provides a breakdown of the consultations conducted as part of this study.

*(iii) On the Ground observations:* It was often not possible to visit all groups participating in target projects. Subsequently, representative groups that were visited and studied served as case studies for the technology in questions. The study team always supplemented the meetings with visits to the production centers where success or otherwise of the technology under implementation was assessed based on specific checklists and also against claims made by group members during plenary sessions. The team also took advantage of the ground truthing exercises to investigate potential environmental impacts and also revalidate claims of effects and economic impacts of the project to individual team members, always making special effort to capture aspects of the-not-very successful cases. As demonstrated in the evaluation, however, calculation of Gross Margins proved to be the only reliable measure of the economic potential of technologies under evaluation.


**Plate 2.1: Focus group discussion with leaders of the Umoja Kilimo Hai Group-Masasi**

*(iv) Wrap-up meetings:* At the completion of visits to each project, a wrap-up meeting was held for purposes of highlighting tentative findings of the mission to the Lead Agency and partners and during which, the study team sought clarification on any issues emergent in respect to the project under evaluation. Of necessity, the question of possible extension of project funding- but which was largely outside the scope of this study, always popped up.

**Plate 2.2: On-Site interviews with onion farmers in Kieni**

Outcome of the Field Work

Fieldwork for the evaluation study extended to cover all the five projects scattered in diverse areas of Kenya, Uganda and Tanzania. Conduct of field work was further complicated by the prevalence of projects replicated in more than one area such as the ERTA Onions project implemented in both Kenya and Tanzania and the Fruit processing initiative implemented in 3 widely spaced districts of western Kenya. In total, the evaluation study entailed 14-site visits, held 11 Focus Group Discussions, 30 Key Informant Interviews and administered 161 questionnaires (Table 2.2) all of which yielded the data that went to inform this report. As was the case with evaluation of R IV projects, this Team's opinion after the fieldwork is that, managing the entire complement of projects supported by the MATF poses monumental challenges given the sheer distances involved.

Data Cleaning and Entry

Respective data sets for each project were entered, cleaned and reduced using summary statistics (means, standard deviation and coefficients of variability) and then screened to yield information on specific themes as follows:-

Derivation of economic indicators

This was mainly achieved through computation of Gross Margins to determine return on investment. Towards computation of gross margins for each enterprise, production data was gathered through questionnaire interviews with individual farmers who had grown the particular crop prior to and after project intervention. At least 20 farmers were interviewed for each enterprise whereby, accruing data and information on production patterns was also validated through focus group discussions, key informant interviews and available secondary data. After data entry and cleaning, computations followed standard procedures.

Evaluation of Individual Project Performance

This was achieved by assessing/ranking of schemes using the evaluation criteria as indicators. Scoring of each scheme against evaluation criteria provided an indication of its merits while gross scores facilitated ranking of schemes.

**Table 2.2: Summary of Outputs from the Field Work**

| Project Title | Target Beneficiaries | | | Quantitative indicators in data capture | | | |
|---|---|---|---|---|---|---|---|
| | Target | Actual | Groups | FGDs | QIs | KIIs | Site visits |
| 1. Organic Certification and Fair-Trade Labelling of Cashew Nut Production in Masasi District , Mtwara Tanzania | 1000 | 1127 | 6 (8) | 5 | 20 | 3 | 2 |
| 2. Enhancing Regional Trade Alliances for Bulb Onions, targeting the Nairobi Onion Market Share | (Kieni) 2000 | 2000 | 4 | 4 | 20 | 13 | 3 |
| | (Mang'ola) 1000 | 600 | 4 | 3 | 37 | 14 | 3 |
| 3. Fresh Fruit Processing and Enterprise Development in West Kenya through the use of Solar Drying Technology | 600 | 600 | 30 | 3 | 46 | 4 | 4 |
| 4.Promoting NERICA III Upland Rice in Namutumba District Uganda | 3000 | 3195 | 125 | 3 | 36 | 6 | 3 |
| 5. Production and processing of Citronella and Lemon grass in Pallisa district-Uganda | 2000 | 2392 | 28 | 2 | 74 | 6 | 4 |
| Totals | 5000 | 6187 | 183 | 8 | 166 | 16 | 11 |

Key: FGDs- Focus Group Discussions, QIs-Questionnaire interviews KIIs-Key Informant Interviews

### 2.4.2 The Team[1]

For the proposed MATF Round V evaluation study, Repcon Associates deployed a team of three professionals namely;- a Social Impact Assessment Specialist, a Rural Sociologist backed-up by a Value Chain Management Expert and in-house staff. The Consultant Staff were also complemented by a counterpart from the MATF in the person of Monicah Nyang who proved to be an invaluable Key Informant on the entire MATF Project.

### 2.4.3: Reporting Procedures

This report has largely been prepared in conformity to specifications of the study TORs. A draft version of this report was submitted and reviewed by the MATF whose comments were applied in the production of this Final Report. Appendix 2.5 provides a pictorial coverage of the 5 projects as evaluated in this study.

[1] **Notes on Terminologies used:**

| | |
|---|---|
| Consultant | The company contacted to undertake the Evaluation Study |
| The Consultant Team | Staff of the Consultant deployed to undertake the Study |
| The Team | The combined effort of the consultant staff and MATF that undertook the Study |
| Counterpart staff | Staff of the MATF that took part in the Study |
| The Study | Activities undertaken in respect of the Final Evaluation of MATF Round V Projects under this contract |

# CHAPTER THREE: EVALUATION RESULTS FOR THE ROUND V PROJECTS

## 3.1 Organic Certification and Fair-Trade Labelling of Cashew Nut Production in Masasi District - Mtwara Tanzania

### 3.1.1 Background

Cashewnut - *Anacardium occidentale* is the fourth most valuable export crop in Tanzania after coffee, cotton and tea. Mtwara region alone accounts for over 60% of the national cashew production whereby Newala, Masasi and Mtwara Districts account for 50, 29 and 19% of the regional production respectively. Nut production in Mtwara region is currently in a recovery path following the dramatic decline in yield from 145,000 tonnes in 1973 to 16,500 tonnes in 1986. [2] Recently, higher cashew prices and liberalised marketing have created favourable conditions that have encouraged farmers to tackle several of the biological constraints on production and as a result, cashew production has risen steadily from 16,500 tonnes in 1986 to over 80,000 tonnes in 1994 (See Fig 3.1 below).

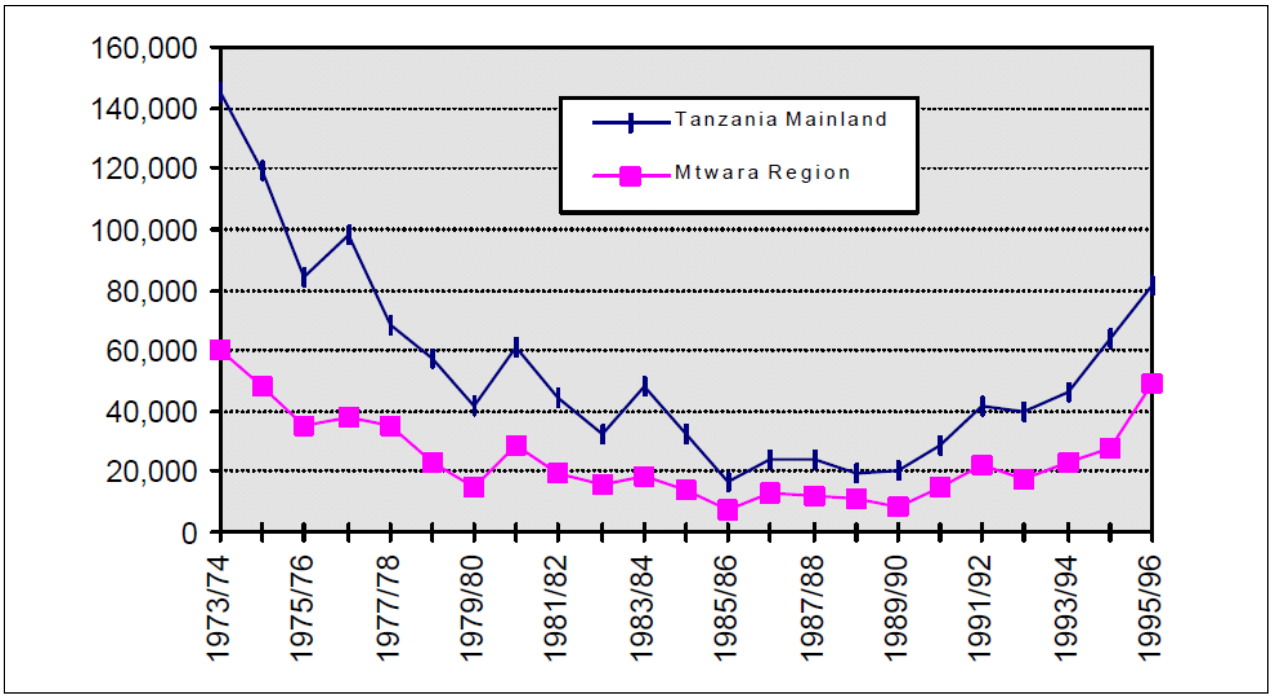


**Figure 3.1: Trends in cashew nut production in Mtwara (1973 to 1996)**

For the local farmers in Mtwara Region, cashew nut is the main source of cash income as between 1990 and 1996, the crop accounted for 51.2% of the cash crop tonnage marketed from the area (followed by groundnuts and sesame) and over three-quarters of total cash income. However, poor post harvest storage combine with inadequate market penetration to undermine incomes from cashew nut and today, Mtwara as among the poorest regions in Tanzania.

It is against such background that the MATF was approached to fund the Project on Increasing Farmer Incomes through Improved Farm Management, Organic Certification and Fair-Trade Labelling of Cashew Nut Production in Masasi District with the goal of improving

[2] Decline in production was caused by a complex of socio-economic (low producer prices, inefficient marketing, villagisation) and biological factors (cashew powdery mildew disease, low tree yields, overcrowding of trees).

farmers' income through increasing cashew yields and obtaining Organic and Fair Trade Certification: Core outputs were targeted as follows:-

i) Cashew farmers have improved access to profitable markets through obtaining fair trade label and organic smallholder group certificate
ii) Farmers have gained knowledge and skills on organic cashew production through Farmer Field Schools
iii) Cashew farmers have improved access to credit and inputs
iv) Yields of cashew nut production have increased through better farm management practices
v) Project achievements and processes are documented through a well-functioning monitoring and evaluation system

**Plate 3.2: Cashew nut on the field**

### 3.1.2 Project Design and Implementation

(a) Documented trends and opportunities

The Project was designed to build on past work and experiences in the cashew nut industry namely:

i) Research by the Naliendele Agricultural Research Institute (NARI) which had documented a possible 500% increase in yield of cashew whose up-scaling in the 8,940 square kilometre area of Masasi district had great potential to transform the local economy. As such, with proper sanitation, pest and disease control, the project hoped to increase average yield of cashew to 400kg/ha on the short term.
ii) An export market for Organic and Fair Trade labelled Tanzanian cashew was already documented. The Dutch Connexxion Ltd was ready to build a long-term relationship with farming communities to northern the anticipated market linkages.
iii) The Cashew Nut Improvement Program (CIP) had successfully introduced practices and techniques which had lead to a five-fold increase in cashew export in the period 1990-1996.

The proposed project had identified these opportunities as firm pillars on which organic agronomy and Fair Trade Labelling could be harnessed through a Farmers Organisation to build an enterprise with capacity to penetrate top-niche export markets for small scale-grown cashew nuts and in the process drastically improve the incomes of rural farmers. Project targets had been set as follows;-

(b) Project Targets

The project set to improve the standards of living of 1000 smallholder cashew farmers in Masasi District. This would be achieved through specific outputs:-

i) Cashew farmers attain improved access to profitable markets through obtaining fair trade label and organic smallholder group certificate
ii) Farmers gained knowledge and skills on organic cashew production through Farmer Field Schools
iii) Cashew farmers attain improved access to credit and inputs
iv) Yields of cashew nut production increase through better farm management practices
v) Project achievements and processes are documented through a well-functioning monitoring and evaluation system

(c) Technology

The Project targeted to introduce three broad interventions each of which entailed introduction of a specific technological package as follows;-

**(i) Farm sanitation:** This was to be achieved through pursuit of improved and organic-based cashew management technologies including those previously tried under the CIP namely:-

- Orchard sanitation by removing unproductive trees, pruning overlapping canopy and removing suckers, which will increase farm profitability and reduce risk of Powdery Mildew Disease (PMD).
- Top-working of unproductive trees, grafting improved varieties on old trunks of unproductive trees.
- New planting of improved varieties in existing cashew orchards using improved planting schemes, gradually changing orchards with poor planting schemes and low yielding varieties to high yielding orchards.
- PMD control measures including the said orchard sanitation in the total project area (avoiding PMD to be hosted by neighbouring fields), scouting and proper application of biological fungicides or elemental sulphur.
- Biological control of pest populations (mainly Heliopeltis and Mealybug) by stimulating predators (eg African red ant), avoiding the use of alternative host of the pests (Pigeon pea) and use of biological insecticides.
- Increase of soil fertility in young cashew plantations by intercropping with peanut and other leguminous crops
- Propagating improved varieties in village based tree nurseries, with improved material from scion gardens of Naliendele Agricultural Research Institute.

**(ii) Promotion of Farmer Field Schools**: Two FFS of around 25 farmers each will be established in each of the four production areas in November 2007. The 200 participating farmers will graduate in December 2007, after the FFS has covered all activities of a cropping year from soil preparation to post-harvest activities. Three more FFS groups will be started in each production area in November 2008. In total 500 farmers are expected to graduate within the project period. Members of an FFS come together on a regular basis in the FFS cashew field to jointly observe the experiment, exchange experiences, evaluate and to take decisions. By doing so, not only their knowledge about cashew farming increases but also they learn to discuss, take decisions, give presentations, etc.

**(iii) Farmer organisation into Farmer Business Units:** The Farmer Business Units (FBU) are owned by the cashew producers and will be the primary trade partner in the cashew value chain. FBU is an approach to empower the producers and take away the role of middlemen. The FBU venture into several activities like bulk purchase and sales of the cashew, bulk purchase and distribution of inputs, propagation of planting material etc,

which will earn the FBU income for the member farmers. In order to obtain and retain the Fair Trade certificate, the FBUs will need to meet the Fair Trade Labelling Organization (FLO) standards for Smallholder Organizations. The formation of an apex of FBUs will press the costs of certification, at the same time strengthening the farmers' position in the market chain.

**(iv) Marketing interventions:** Improved profitability of cashew-based farm enterprises was to be achieved through reducing the producer prices while increasing revenues from sales, thus expanding the profit margin. Interventions targeted:-

- Contracting of farmers: Direct purchase from farmers will eliminate middlemen from the value chain hence reserving higher returns for the primary producer in line with core tenets of Fair Trade and Organic Trade Chains.
- Empowerment of producer groups: Once farmers are organized into Farmer Business Units, they will have more power as a group to negotiate with other stakeholders in the value chain (buyers, input suppliers, local government) on the prices for products and services.
- Penetration of top niche organic markets through fair trade licensing: Nuts that reach organic and fair-trade standards can fetch higher prices in the world market, and farmers should also be rewarded for better quality in out-turn, moisture and size of the nut as this eventually also gives higher value kernels.

(d) Partnerships

This project was proposed by an array of partners under the leadership of *The Dutch Connexion Ltd* as the lead agency. The project is unique in the MATF history as the first Grant to ever be issued to a private sector operative as Lead Agency. Other partners were identified as follows:-

**Table 3.1: Partnerships in the cashew nut improvement project**

| Partner | Affiliation | Specific role | Status |
|---|---|---|---|
| AgroEco | Private consultancy | Specific consultancy in Organic Certification | Provided services |
| Naliendele Agricultural Research Institute, Mtwara | GOT Research Institute | Provision of quality germplasm and research in cashew production | Replaced by others |
| NMB (National Micro-finance Bank) | Government affiliated commercial bank | Credit Finance services to farmers | Pulled out |
| DESEMP-PP | NGO | Initial support to Dutch Connexxion and associates | Provided services |
| Fair Trade Original | International Certification agency | Assists in setting up the Fair Trade market channel | Still on board |
| Morgenland | An organic buyer from Germany | Committed itself to buy all organic grown cashew from Masasi | Still on board but quality standards too high |
| SKAL | The Netherlands Certification Body | Will carry out certification of organic farms | Still on board |
| Tancert | Tanzanian Certification body. | SKAL will hire Tancert services. | Still on board |
| Masasi District Council | GOT Local Authority | Extension services | Steeped in controversy of policy interpretation |
| Premier Cashew Industries | Certified organic processor in Dar Es Salaam | Initial process of organically grown nuts | Replaced by Olam |
| Rural Urban Development Initiatives (RUDI) | NGO | Formation and capacity building for FBUs. | Still ion board |

| | | | |
|---|---|---|---|
| Asha Omar Fakih | An expert in Integrated Pest Management and Farmer Field | Train project and government field staff in FFS and to develop a suitable FFS curriculum for cashew. | Provided services |

### 3.1.3 Study Findings

In retrospect, the cashew nuts project is a pace-setter in different ways since, in addition to being the first private sector-led grant to be issued by the MATF, it is also the most distant of all MATF grants. It is situated in Masasi District over 200km away from Mtwara Town along the boundary of Tanzania and Mozambique. The massive success of this project is also clearly evident from the following documented project outputs:-

**Membership:** The project overshot its targeted membership of 1000 by 127.

**Plate 3.3: FDG Session for farmers at Masasi**

**Most farmers have been trained:** Through the Farmer Field Schools approach, all farmers participating in the project will have been trained by the time the project closes early next year. The FFS adopts a demonstration plot model where an existing cashew field is used to train a class of 25-30 farmers on organic farming (non-use of chemical with exception of elemental sulfur, surveillance and identification of insects-both beneficial and harmful, thinning and pruning, soil conservation, abolition use of fire use in land preparation, intercropping of cashew with legumes, gap filling with improved varieties, etc. From testimonies of participating farmers, they have acquired skills that are also handy in food crop production. They include abolition of burning of farm residue in favour of mulching, contour faming, etc.

**The target to establish Farmer Business Units was fully met***:* The project met the target of establishing 6 farmer groups- Farmer Business Units each of which is registered as a functional business entity. The FBUs have come together to form a functional Apex Organization currently operating as a fully fledged Limited Liability Company.

**The target to attain Oorganic Certification has been achieved:** The MHQP Ltd farmers have received organic production certification from Tancert (Tanzania certification body) and are in the final stages of getting the international Fair Trade certification that would allow them access foreign markets. Already, according to available information, MorgenLand, an organic buyer from Germany has committed to buying all the farmers' processed produce.

### 3.1.4 Project Impacts

In this section, an analysis of the impacts of MATF involvement in Masasi district is provided.

*Impact on cashew nut yield:* Through agronomic intervention, the project had targeted to attain short term yield increases of 400kg/ha as a strategy to net the 500% yield increase previously documented by NARI. However, available data indicate that this target is yet to be achieved as some farmers have even reported decrease in yield upon adoption of organic farming while non-cashew farmers reported higher production. From the 22 farmers sampled from three groups for the economic study, a marginal yield increase of 0.6kg per tree equivalent to 4.5% was observed. Ten of the 22 farmers reported yield declines sometimes to the range of 74% which was blamed on low potency of elemental sulphur dust whose impact is short-lived due to inability to coat onto the trees. As such, adoption of organic farming is yet to make a mark on the yield of cashew nuts. This is so in spite of there being reported a generally good season for cashew production in 2010.

*Non-member villages have adopted the Organic Farming and Fairtrade Model:* Inspired by the great success of the FFS, some villages not originally participating in the project have also joined and adopted the Organic Farming Model including pursuit of fair trade labeling. Already, two such groups have formed and are operating on their own outside of MATF support. As such the project is self marketing.

*A fully fledged farmers Company has been formed:* This is the only project whose activities have given birth to farmers owned company-the Masasi High Quality Farm Products (MHQFP) Ltd as an apex of the FBUs.


Plate 3.4: Replication by non-members (a sign of project success)

*Farmers have attracted a cashew nut shelling factory:* On account of activities of this project, participating farmers have been able to attract a cashew shelling plant constructed with support from the FAO. A second processing factory is under construction and both are valued at Tsh 100 million.

*Jobs have been created by the cashew shelling factory:* The MHQFP factory has created jobs in shelling, steaming, sizing, packaging, storekeeping and warehousing which have provided alternative means to livelihood for local households. At the time of the evaluation, the factory had 18 employees-mainly local ladies but his was anticipated to rise to 190 at the peak of the nut harvesting season. As such, one of the most drastic and dramatic impacts of the MATF presence in Masasi is the fact that jobs that were originally exported with the raw nut are now being retained for the local labour.


**Plate 3.5: Employment in the shelling factory**

*New marketing outlets for cashew have been up:* Towards marketing of semi-processed nut, the MHQFP has entered collaboration with a local cashew exporter-OLAM Tanzania Ltd who currently buys all nuts processed at the farmers' factory. Offshore based market players are also keen to buy locally processed nuts once the standards for quality are achieved.

*Economic impacts:* As the project comes to a close in early 2011, the economic merits of organic grown cashew are yet to be fully documented given the following;-

- Divergences in interpretation of GOT Policy on cashew nut marketing: The GOT only recognises either the warehouse system or total processing of cashew whose exact interpretation is not quite readily available. This divergence in policy interpretation has triggered a public debate pitting MHQFP on one side and the Regional Administration on the other and there is likelihood that the MATF supported farmers will carry the day.

- Marginal impacts on market price: The price for organic cashew is just marginally higher than that of non-organic cashew- Tsh 1500per kg compared to the Tsh 800per kg paid through the newly introduced warehousing system operated by Primary Cooperatives.

An analysis of the potential profitability of organic produced cashew is provided in sections below.

### 3.1.5 Economic Analysis

Table 3.2 below provides an analysis of the profitability of the cashew nuts project based on computation of benefit cost ratios and gross margins for the 3 years of project implementation. The analysis is based on identification of both the fixed and variable costs attributable to an individual cashew tree and the corresponding nut production in any one year. An analysis of production data based on questionnaires administered on a sample of 22 farmers indicated an average holding of 90 trees per farmer which is the equivalent of one acre. The study further revealed an average cashew yield of 5 kilos per tree annually based on sale of acres cashew yield should fetch between Tsh 360,000 and 675,000 depending on the market price. Based on such sales data, the cashew nut enterprises were observed to post positive gross margins from the second year of project implementation. Corresponding benefit/cost ratios are also positive but quite weak-one of the key lessons from the study is that like any other rain-fed cropping, production of cashew nuts is affected by vagaries of weather which easily erodes gains from agronomic intervention including organic production.

The net return to the MATF investment attributable to agronomic intervention is 2.12 but when other project benefits such as the value of the shelling factory and attendant jobs are factored in, this return escalates to 2.77 in only three years. However, by far, the fact that through MATF involvement, local farmers have been empowered to break from tradition and pursue value addition for their own cashew produce in a trend which economic impact is likely to be drastic, substantial and long lasting-current short-term performance patterns notwithstanding. This is decidedly a venture whose up-scaling will unlock the local economic potential through fetching of better prices for cashew while repatriating jobs that otherwise could have been exported with the raw nuts.

**Table 3.2: Analysis of economic performance for the cashew nuts project**

| **Cost/benefit streams in production** | | ***2007*** | ***2008*** | ***2009*** | ***2010*** | ***Total*** |
|---|---|---|---|---|---|---|
| **Fixed costs** | Tools | 167 | | | 127 | 294.00 |
| | Gap filling | (1000 per seedling) | 0 | 0 | 0 | (5,000.00) |
| **Variable costs (per tree)** | Costs to land @ 1000/tree | 1,000 | 1,000 | 1,000 | 1,000 | 4,000.00 |
| | Pruning | 2,000.00 | 0 | 0 | 0 | 2,000.00 |
| | Weeding | 2,000.00 | 1,000.00 | 1,000.00 | 1,000.00 | 5,000.00 |
| | Elemental sulfur | 3,000.00 | 3,000.00 | 3,000.00 | 3,000.00 | 12,000.00 |
| | Spraying | 50 | 50 | 50 | 50 | 200.00 |
| | Harvesting | 312.5 | 312.5 | 312.5 | 312.5 | 1,250.00 |
| | Bagging | 66.7 | 66.7 | 66.7 | 66.7 | 266.80 |
| | Transport | 13.3 | 13.3 | 13.3 | 13.3 | 53.20 |
| Production cost per tree | | 8,609.20 | 2,400.00 | 2,400.00 | 2,400.00 | 15,809.20 |
| **Production cost for 90 trees (1 acre)** | | **799,825** | **216,000** | **216,000** | **216,000** | 1,447,825 |
| Benefits | Production per tree (kg) | 5 | 5 | 5 | 5 | 20.00 |
| Income from sale of cashew (90 trees) | Price for cashew=Tsh 800-1500/kg | 360,000.00 | 360,000.00 | 360,000.00 | 675,000.00 | 1,755,000.00 |
| Income from sale of firewood | | 120,000.00 | | | | |
| **Gross income (nuts firewood)** | | **480,000** | **360,000** | **360,000** | **675,000** | 1,875,000.00 |
| *Net benefits* | | *(319,825.00)* | *144,000.00* | *144,000.00* | *459,000.00* | 427,175.00 |
| *Benefit cost ratio* | | *0.6* | *1.7* | *1.7* | *3.1* | *1.3* |

| | |
|---|---|
| Cumulative net benefits per farmer of average 90 trees (Tsh) | 427,175.00 (4,746.40 per tree) |
| Cumulative benefits for project | Tsh 378,904,225.00 (£ 169,912.21) |
| Value of the shelling factory (Tsh) | 100,000,000.00 |
| Employment in factory (1 yr only)-Tsh | 14,800,000.00 |
| Gross value of MATF involvement (Tshs) | 493,704,225.00 |
| Gross value of MATF Involvement (£) | 221,392.03 |
| MATF Investment (£) | 79,993.50 |
| **Return on MATF investment (crop)** | **2.12** |
| **Return on MATF investment (gross)** | **2.77** |

*Note: All the Figures shown are in Tshs unless otherwise stated. The Exchange rate used is Tshs 2230.00 to the GBP (£).*

### 3.1.6 Outstanding issues/challenges

i) Leadership capacity of the nascent MAHQFP Board

The challenges faced by the MHQFP Company are enormous;-a hostile local administration, inadequate support from the Cashew Board, competition from vested interests and a membership that is still faltering between organic versus chemical based cashew farming. However, there is no turning back for this group as the future of the industry lies in local value addition in line with GOT policies for Poverty alleviation, Rural Development, Mkukuta etc which implies that the only option for way forward is continued capacity building for this group.

ii) Impact of pests on cashew yield
Pests remain a major challenge to yield of organic grow cashew and the efficacy of elemental sulphur dust has been put to question. The search for solutions should continue.

iii) Relationship with the local administration
Admittedly, this aspect of the project the relationship between the project and the local administration is strained apparently due to divergent interpretation of the GOT policy of cashew marketing. The efforts by Project collaborators to positively engage the GOT in policy debates should be sustained and if possible facilitated by the MATF as a way of securing gains already made.

iv) Stability of market prices

The fact that organic farming is yet to transform to better yield or premium market prices is quite sore to young farmers while the older ones remain quite optimistic. The project collaborators are intensely aware of the need to work toward better prices for organic grown cashew.

### 3.1.7 Lessons Learnt

From this evaluation, it is apparent that, the capacity for rural cashew farmers to transform their economic fortunes is in their hands. All that is needed is some trigger mechanism as offered by the MATF through collaboration with the Dutch Connexxion. In only a three year lifespan, the empowered cashew farmers have been able to engage the GoT in policy debate on value chain management and have even attracted 2 shelling factories from like-minded well wishers. The core lesson from Masasi is that, leadership in rural transformation must not necessarily emanate from the top but can actually be bottom up.

Introduction of organic farming of cashew nut utilised the FFS model previously introduced in the area through the CIP. This method proved quite superior compared to others as results are practically demonstrated to participants who then adapt the same to their farms and later on are able to train other farmers. The FFS therefore, is an innovation that is ready for up-scaling.

## 3.2 Enhancing Regional Trade Alliances for Bulb Onions, targeting the Nairobi Onion Market Share

### 3.2.1 Project background

Bulb onion production in Endarasha -Kenya and Mango'ola in Tanzania dates back to 1969 and 1974 respectively. However, the production systems have remained relatively weak due to poor access to improved technologies, fragile marketing systems and low credit

worthiness. As well, in spite of the **emergence of market oriented rural focus** in development in Sub-Saharan Africa and increasing urbanisation which would has expanded the demand for bold market for bulb onions, small holder producers are yet to benefit owing proliferation of market intermediaries in the production chain who command the lions share of the profit leaving farmer to wallow in poverty.

The proposed project on "**E**nhancing **R**egional **T**rade **A**lliances for Bulb **Onions** Targeting the Nairobi Onion Market Share" (ERTA-Onion Project) was conceived against such backdrop to strengthen and institutionalize the **marketing value chain** for the bulking and marketing of the bulb onions so as to harness the crop as a premier business enterprise.

### 3.2.2 Project goals

The Purpose of the project is to increase the market share of smallholder farmers by 50% and increase household incomes by 30% through strategic business alliances between private and commercial villages within 3 years of project implementation. Enhanced commercialization and market access was envisaged to trigger technology adoption particularly of improved seeds, improved agronomic practices, efficient curing methods and enhanced storage. Market access and value chain efficiency will increase farm gate prices by over 40% and collective access to inputs is envisaged to reduce unit cost by 25%, a relatively high farm investment saving for smallholders. Market-led Commercial Villages will be a business attraction to private sector investors' e.g. financial services, input suppliers and buyers. Subsequent to this rational, outputs were envisaged as follows:-

i) Current onion management practices assessed; livelihoods analysed, and market opportunities and threats analysed.
ii) Commercial Villages established and governance structures built
iii) Capacity of Commercial Villages and Community Based Technical Experts enhanced.
iv) Partnerships among Commercial Villages and private business sector established and strengthened.
v) Sustainable and gender sensitive access to markets by smallholder farmers developed.
vi) Enhancement of bulb onions commercialization, trade alliances, and household income are monitored and evaluated.

### 3.2.3 Project Design strategy:

This project set out to enhance regional trade alliances for bulb onions targeting the Nairobi Onion Market Share. The preferred vessel towards this was The Commercial Villages Approach-CVA in which a market-led approach would be used to trigger technology adoption while market forces trigger technology adoption and the project facilitates smallholders to access business-oriented and viable technologies. Market-led approaches would thus enhance the process of evolving smallholder producer groups into market support units clustered into commercial villages, and strategically linked to value- and market chain players.

Under the model, FCI clusters smallholder farmers within a neighborhood into commercial groups of 20 to 30 households and further cluster approximately 20 commercial groups to form the Commercial Village. Commercial Villages comprises of 300 to 500 Household depending on the density of project sites. Recognizing that there are numerous impediments that make the smallholder producer communities unable to access the high value markets and mainstream value chains, the CVA thus endeavour to answer these bottlenecks through five strategic areas all geared to making the rural communities be able to participate in the

marketplace as a respected partner. CVA has 5 pillars for its success and which will be applied in the proposed project;

- Pillar 1; Market Research
- Pillar 2; Establishment of the Commercial Villages
- Pillar 3; Capacity Building and Extension Support
- Pillar 4; Private Sector Partnerships
- Pillar 5; Market Access and Development

### 3.2.4 Proposed technologies:

Project implementation further targeted introduction of technologies as follows:-

i) ***Improved agronomic practices and environment management:*** Best agronomic practices, commercial villages'-based protection & management of environment and natural resources will be introduced to commercial villages. Participatory commercial value assessment of environment and natural resources will be conducted with an aim of triggering resource protection.

ii) ***Enhanced access to improved seed:*** Farmers in Tanzania and Kenya ordinarily record an average yield of 11.2 and 16 MT per Ha, while top world vegetable producers Japan, and USA record 46.6 and 46.4 MT per Ha respectively. With Kenya and Tanzania performance estimated at 30% of the Japan and USA, an estimated 70% incomes is lost to poor yield. However, through the project, smallholder farmers would have an opportunity to access improved seeds from leading private sector companies achieving an average 50% increase in productivity. The public and private sector has extensively invested in hybrid seeds presenting maximum which offers farmers a platform to increase rural incomes by 30-50% per season.

iii) **Drum irrigation drip kit technologies** which were introduced in one village in a previous pilot project would be exploited to irrigate ¼ an acre by the small holder farmers. Farm Concern Intl' in partnership with USAID Horticulture Programme has been conducting trials on drip irrigation kits with farmers in Kieni Endarasha region and it's impact on production will be assessed and results shared with new commercial villages under the ERTA project.

iv) ***Enhanced post maturity management of bulb onion:*** High post harvest losses recorded at farm gate level, along value chains and at various selling points in Kenya are predominantly contributed by low post maturity and post harvest skills particularly on bulb onion pre- harvest, curing and storage skills. While, farmers in Tanzania have adopted simple sun-drying curing techniques however post harvest losses for onion along value chains in Mang'ola has still not been fully solved. These processes will be assessed, streamlined and validated for adoption in both Mangola and Endarasha target sites. 'Field curing 'technology will be promoted where the length of curing will be promoted to be 2-3 weeks after bending the tops of the onions crop as opposed to the current 2-3 days in Mang'ola and lack of curing in Endarasha. A Farmer-to Farmer learning model and exchange programme will allow smallholders in from both sites to learn and adapt cost effective techniques from proven smallholder approaches.

v) ***Improved storage technologies:***
Improved semi- curing structures will be promoted after full validation by FCI and other partners in the form of well aerated mud-wall ,grass thatched and 'semi forced air' storage facilities which have proven even before validation to offer longer shelve

life for bulb onion. These technologies are expected to reduce post – harvest losses by over 20%

### 3.2.5 Partnerships

Project implementation was spearheaded by 2 primary partners namely:

- Farm Concern International as the lead institution and main implementing agency.
- Ministry responsible for Agriculture in both Kenya and Tanzania whereby extension staff at Divisional level in Kieni- Kenya and Kata level in Karatu-Tanzania would be the main collaborators.

FCI was proposed as lead agency whereas MOA of both countries would offer extension support and seeds companies would supply the farmers with seeds, run demonstration plots and offer technical support to farmers in a unique Public/ Private Sector collaboration model. Technical backstopping would be provided for free by seed companies who would also fully cater for seeds in demonstration plots with other costs being shared between FCI, farmers and Seed companies to ensure that optimal results are realized in the target sites. Equity bank (Kenya), Pride Africa - Tanzania and other financial institutions were approached to offer credit facilities to onions value chain players.

The proposed collaborative model bringing together Farm Concern International, Ministry of Agriculture Tanzania, Seminis seed company (Kenya), Alpha Seeds (Tanzania), Equity Bank (Kenya), etc was to build on existing successful partnerships established between FCI and Unga Feeds, Kenchic and diverse players in the meat sub-sector. The project was also to build on extension services and create synergy links between Ministry of Agriculture in both countries and Hort Tengeru in Tanzania along linkages previously established by the FCI.

Towards enhancing market penetration existing partnership between the FCI and Uchumi Supermarkets, Nakumatt Supermarkets, Yaya Fresh Produce store, Tusker Mattresses and various grocery shops who are currently sourcing from various horticultural commercial villages established and supported by the FCI was to be exploited and re-energised.

A Project Management Co-ordination Unit comprising of project partners would be established and meet quarterly to review meetings.

### 3.2.6 Project outputs

As at the time of the evaluation in November 2010, this project was in the traditional 6-month No-Cost extension period having completed the programmed 36 quarters in October 2010. This project was evaluated against stated objectives and targets as envisioned at project design and captured in the Project Logframe in a study that also utilised discussions with project implementing, project reports, encounters with target beneficiaries in both Kieni and Mang'ola and this team's own study of the onion market in Nairobi. Our impressions are as follows:-

**Mobilisation of Commercial Villages:** This project is active on the ground in both Kieni and Mang'ola where a total of 2600 farmers (2000 in Kieni and 600 in Mang'ola) were mobilised to participate in the project. 13 producer groups in 4 Commercial Villages namely Barazani (5), Meleckchand (4), Endamaghan (2) and Mikocheni (2) were formed in Mangola while 4 CVs had been mobilised in Kieni (Embaringo, Kinyaite, Kabati, Gitegi and Charity) formed by end of quarter 9. The CVs are however still weak and farmers still exposed to manipulation. Within each production group, participatory identification of Community based Technical Experts (COTEs) was concluded by quarter 8 and three workshops to further build the capacity of COTEs held by end of quarter 9.

**Linkage with service providers:** In line with the proposal, producers were linked with providers of services in diverse seed supply, agrochemicals, credit, finance and banking services etc all towards enhancing production. Extension service providers in both Kieni and Mang'ola were also brought on board where the preferred entry point was field demonstration of the products for consumers to make informed decisions. Towards this, FCI and partners established demonstration plots and routinely mounted field days to enhance farmer-TSP contacts as a result of which, producers were equipped with all skills pertaining to the production and post-harvest handling of bulb onions.

**Linkage with markets:** Elaborate attempts were made to link producers in both Mang'ola and Kieni to the market. Producer groups were mobilised to form marketing communities for purposes of negotiating and fixing prices for the bulb onion. By March 2010, 48 Traders (15 in Kenya and 33 in Tanzania) including wholesalers and intermediaries had been identified and linked to the farmers.

### 3.2.7 Project Impacts

This project set out to enhance the regional trade alliances for bulb onions targeting the Nairobi Onion Market Share whereby the Kieni and Mangola crops which enjoy a 3 month lag was to be used as the test case. Indeed, agronomic interventions targeting improvement of quantity and quality of bulb onions were planned to support stronger market presence and penetration in the alliance. This notwithstanding, it is not clear that an alliance between competitors to the Nairobi bulb onion market was forged let alone enhanced and neither is it clear which its strategic the and impact in the bulb onion market was to have been. Indeed, and quite surprisingly, project implementation seems to have lost sight of this goal right from inception as it's **not** even captured in the Planning Matrix for this project, subsequent to which oversight, routine reports have given this aspect a very clear berth. In the opinion of this Study, even as this project comes to a close, its very essence-the primary goal is yet to be addressed. In spite of this, the project returned impressive outputs which have had impacts as follows:-

**Production of bulb onions has gone up:** Yield of bulb onion recorded a growth of 220% -from 2-3 tonnes (28 bags) to 6-10 tonnes (89 bags) per acre equivalent to 3.2 tonnes/ha, possibly due to adoption of better agronomic practices, use of improved seeds, among others. However, the production is still far way below the 46 tonnes per ha yield reported for US and Japan based growers implying that the full economic potential of the 3000 and 5000 acres of land annually committed for onion production in both Mang'ola and Kieni respectively is yet to be tapped.

**Plate 3.6: The bulb onion**

**Prices have increased 7-fold:** Farm gate prices paid for bulb onions increased from an average of 5 shillings per kg to average Ksh 40 per kg. Market prices however still swing between Ksh 35 to over 85 per kilo of produce depending on the season implying some element of proneness to instability but, the 7-fold shift in prices is certainly of benefit to the producer. Indeed, a major impact of the FCI intervention was the streamlining of marketing to by linking wholesalers directly to the farm-gate which has essentially cut-off the up-to 4 levels of intermediaries who previously pestered on the market chain often leaving the farmer to count the losses. An analysis of the net economic impacts of such gains is presented elsewhere below.

**60% of participants adopted the culture of savings:** Farmers in Kieni were linked to the Taifa Sacco and Equity Bank Ltd both of which provide financial and banking services to the producers. It is claimed that the FCI initiative in Kieni was instrumental in fast-tracking the opening of a Branch of the Equity Bank in Mweiga Mweiga town to serve the hinterland including the Kieni Onion Growers. Over at Mang'ola, attempts to partner with Pride TZ did not work but farmers have now formed their own SACCO to back up the mandatory table banking required of participants in Round V Grants.

### 3.2.8 Economic Impacts

Economic impacts of the grant to FCI is provided below based on analysis of gross margins, benefit to cost ratios and return on investment. Tables 3.2 and 3.3 below show an impressive return of MATF investment of 10.67 and 8.68 for Mang'ola and Kieni respectively.

From the evaluation (Tables 3.3 /3.4), it was observed that even if all the entire £79,809.44 were to be disbursed to the Mangol'a project alone, a return on MAFT investment in the tune of 5.33 would still have been realised. In the case of Kieni, the return on investment of 4.34 would have been realised had the entire MATF fund been put into use at the Kieni project.

**Table 3.3: Gross margin analysis for bulb onion enterprises in Kieni**

| | | Year 1 | *Year 2* | *Year 3* | *Totals* |
|---|---|---|---|---|---|
| Fixed costs | Slasher | 100.00 | | | 100.00 |
| | Hoes | 150.00 | | | 150.00 |
| | Panga | 200.00 | | | 200.00 |
| | Knapsack | 5,000.00 | | | 5,000.00 |
| | Rake | 100.00 | | | 100.00 |
| Variable costs | Ploughing | 1,200.00 | 1,200.00 | 1,200.00 | 3,600.00 |
| | Hire of land | 4,000.00 | 4,000.00 | 4,000.00 | 12,000.00 |
| | Harrowing | 600.00 | 600.00 | 600.00 | 1,800.00 |
| | Pitting | 800.00 | 968.00 | 1,600.00 | 3,368.00 |
| | Seeds | 1,350.00 | 1,633.50 | 1,800.00 | 4,783.50 |
| | Nursery costs | 3,000.00 | 3,000.00 | 3,000.00 | 9,000.00 |
| | Transplanting | 500.00 | 1,000.00 | 1,920.00 | 3,420.00 |
| | Fert.DAP | 6,400.00 | 6,400.00 | 6,400.00 | 19,200.00 |
| | Herbicides | 1,264.00 | 1,264.00 | 1,600.00 | 4,128.00 |
| | Topdressing (CAN) | 4,800.00 | 4,800.00 | 4,800.00 | 14,400.00 |
| | Fungicides | 5,000.00 | 5,000.00 | 6,050.00 | 16,050.00 |
| | Spraying | 200.00 | 200.00 | 200.00 | 600.00 |
| | Weeding | 2,000.00 | 2,000.00 | 2,000.00 | 6,000.00 |
| | Harvesting | 2,000.00 | 2,000.00 | 3,000.00 | 7,000.00 |
| **Total cost** | **Total Cost** | **38,664.00** | **34,065.50** | **38,170.00** | **110,899.50** |
| **Benefits stream** | Production (Kg/acre) | 2,000.00 | 2,500.00 | 6,000.00 | 10,500.00 |
| | Price (Ksh/kg) | 5.00 | 15.00 | 35.00 | 24.52 |
| | **Total benefit** | **10,000.00** | **37,500.00** | **210,000.00** | **257,500.00** |

| | | | | | |
|---|---|---|---|---|---|
| | Net Benefit | (28,664.00) | 3,434.50 | 171,830.00 | 146,600.50 |
| | Benefit/cost ratio | 0.26 | 1.10 | 5.50 | 2.32 |
| | Cumulative benefits (Ksh) | 146,600.50 | | | |
| | Cumulative benefit for 300 acres | 43,980,150.00 | | | |
| | Cumulative benefits (£) | 346,300.39 | | | |
| | MATF Investment (£) | 39,904.72 | | | |
| | *Return on MATF Investment (prorata)* | *8.68 (4.34)* | | | |

Exchange rate £ 1.00 = Kshs 127.00

(Assuming total fund was invested in Kieni alone

**Table 3.4: Gross margin analysis for bulb onion enterprises in Mang'ola**

| | | Year 1 | Year 2 | Year 3 | Total |
|---|---|---|---|---|---|
| **Fixed costs** | Knapsack | 45,000.00 | | | 45,000.00 |
| | Hoes | 4,000.00 | | | 4,000.00 |
| | Panga | 2,000.00 | | | 2,000.00 |
| | Gumboots | 15,000.00 | | | 15,000.00 |
| **Variable costs** | Seed | 1,000.00 | 1,210.00 | 4,500.00 | 6,710.00 |
| | Hire of land | 120,000.00 | 120,000.00 | 120,000.00 | 360,000.00 |
| | Ploughing | 42,298.00 | | 60,000.00 | 102,298.00 |
| | Nursery | 175,000.00 | - | | 175,000.00 |
| | Pitting/trenching | 12,500.00 | | | 12,500.00 |
| | Planting | 175,000.00 | | | 175,000.00 |
| | 1st Weeding | 35,000.00 | | | 35,000.00 |
| | Fungicide | 180,000.00 | | | 180,000.00 |
| | Foliar | 48,000.00 | | | 48,000.00 |
| | 2nd weeding | 75,000.00 | | | 75,000.00 |
| | Uprooting | - | | 75,000.00 | 75,000.00 |
| | Top cutting | 75,000.00 | 75,000.00 | 75,000.00 | 225,000.00 |
| | Transport | 30,000.00 | 30,000.00 | 30,000.00 | 90,000.00 |
| | Storage/preservation | 114,540.00 | 114,540.00 | 270,000.00 | 499,080.00 |
| **Total cost (Tsh)** | | 1,149,338.00 | 340,750.00 | 634,500.00 | 2,124,588.00 |
| **Production (Bags/acre)** | | 38.00 | 38.20 | 90.00 | 166.20 |
| **(90kg bags/acre)** | **Price/Bag(Tsh)** | 8,000.00 | 8,000.00 | 50,000.00 | 30,743.68 |
| **Total benefits** | **Total Income / acre** | 304,000.00 | 305,600.00 | 4,500,000.00 | 5,109,600.00 |
| **Benefit/Cost Ratio** | | 0.26 | 0.90 | 7.09 | 2.40 |
| **Net benefits** | **Net incomes** | (845,338.00) | (35,150.00) | 3,865,500.00 | 2,985,012.00 |
| **3 yr net benefits** | **2,985,012.00** | | | | |
| **Net benefit for 318 acres** | **949,233,816.00** | | | | |
| **Net benefits (£)** | **425,665.39** | | | | |
| **MATF Investment (£)** | **39,904.72** | *Exchange rate 1£ = TSh 2230.00* | | | |
| *Return on MATF Investment (prorata)* | *10.67 (5.33)* | (Assuming total fund was invested in Mang'ola alone). | | | |

Table 3.5 below shows the combined outcome of the Kieni and Mango'la projects. From the table, the combined return on MATF investment is 9.67 on the entire funding totalling to £ 79,809.44 with benefit/cost ratio of 1.32, signifying that the project has been profitable to the farmers.

**Table 3.5: Composite gross margins for Kieni and Mang'ola operations**

| Description | Amount (£) |
|---|---|
| Total cost (£) | 912.98 |
| Production (Kg/acre) | 12,729.00 |
| Total benefits | 2,159.43 |
| Benefit/Cost Ratio | 2.37 |
| 3 yr net benefits | 1,246.45 |
| Net benefit for 618 acres (£) | 771,965.78 |
| MATF Investment (£) | 79,809.44 |
| Return on MATF Investment | 9.67 |

## 3.3 Fresh Fruit Processing and Enterprise Development in West Kenya through the use of Solar Drying Technology

### 3.3.1 Background

The horticultural sub-sector in Kenya comprises mainly fruits, vegetables and cut flowers, and accounts for about 10 percent of urban food consumption and a much larger percentage in rural areas. Vegetables dominate horticultural production, followed by fruits and cut flowers. In 2003, a total area of 373 000 hectares was dedicated to horticultural production, producing 4.35 million tonnes of horticultural products, valued at US$494.4 million. The contribution to Gross Domestic Product (GDP) and Agricultural Gross Domestic Product was 3.5 and 14.5% respectively. However, the value of production was lower than that of 2002 and 2001 which were US$503.6 million and US$528.4 million, respectively. The subsector also provides direct and indirect jobs to an estimated 2 million Kenyans.

Figure 3.2 below provides production trends for major fruit crop in 2002/03 and in terms of area and total production over the last ten years, banana and pineapples have been the most important fruits commanding a 60-70% share of the production. At national level however, postharvest loss of fruit remain a major concern with rotting, insect damage and softening being the major causes. Within western Kenya alone, out of 96 tons of fresh pineapple and 400 tons of fresh banana produced annually, close to 60% reportedly goes to waste, 30% is sold in the local market while 10% is consumed at household level. Inability of the farmers to quickly market the produce which seasonally floods the market coupled with lack of post-harvest storage technology with capacity to prolong the shelf life of the fresh produce no doubt rank high among the major factors that perpetually fuel poverty in the region.

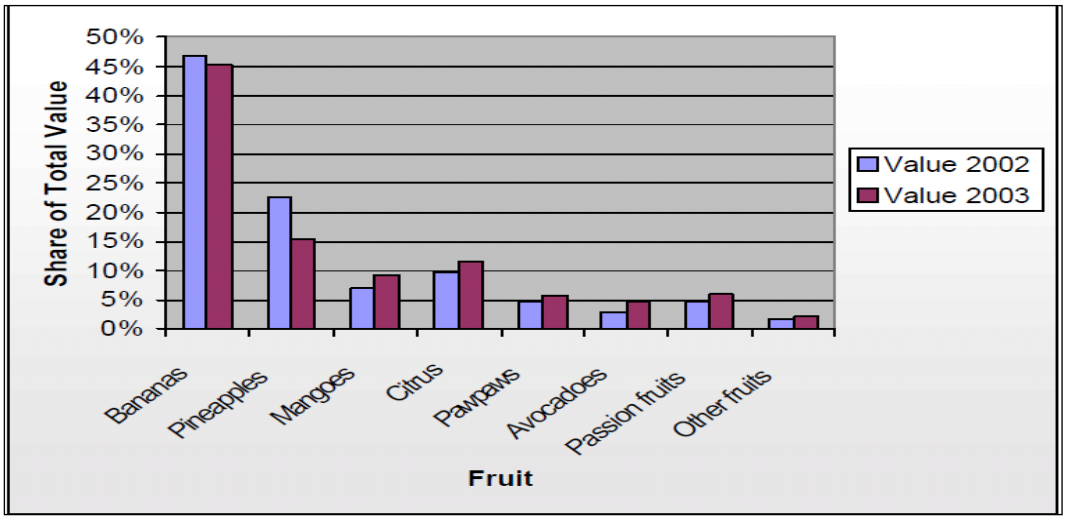


**Figure 3.2: Value of major fruit crops grown in Kenya (% of total value)**

According to Africa-Now, inadequate post-harvesting technology, hampered by lack of electricity to power processing equipment causes farmers to lose out on a potentially lucrative market. Africa Now thus sought to introduce a simple solar-drier technology that would help small-scale farmers to process their fruits and guarantee a market that would pay cash-on-delivery. Through the intervention, originally targeted at banana farmers in Busia and Vihiga Districts and pineapple farmers in Homabay, fruit producers be empowered to cash-in on an existing high demand for dried fresh-fruits in the local supermarket chains while simultaneously increasing household incomes through quality fruit-farming and competitive pricing.

### 3.3.2 Project Goal

The goal of this project is to improve the livelihood of local fresh fruit-farmers through capacity-building on value-addition and guaranteed markets in West Kenya. According to the proposal submitted to the MATF, project goals were to be realised through pursuit of specific objectives as follows:

- Income increased directly for 600 farmers and indirectly for another 3,000 farmers through value-addition and competitive pricing through higher dried fruit prices of up to between 50 & 100% as compared to the existing fresh-fruit prices.

- Market-access improved through sustainable linkages between research institutions, private-sector technology developers, processors, Financial Service Associations (FAS) and farmer groups.

- To put in place P/M&E systems & tools to continually assess project progress in several areas including fruit yields, quantities sold, price obtained, gender issues related to labour, employment opportunities, household income, number of farmers accessing credit facilities at the FSAs and/or MFIs, number of farmers accessing agro-inputs from agro-vet stores, number of farmers utilizing KARI & MOA backstopping services, processed quantities of dried fruit, dried fruit supplied to HCA and so on.

- To ensure gender balance in all the steps of project implementation by being pro-active in encouraging women and youth to be involved the project and in leadership while enlightening the rest of the community of the benefits of the same.

- To document both in written and electronic form, experiences and lessons learnt in the project cycle through dissemination activities e.g. field days, exchange visits, farmer-to-farmer extension, etc.

### 3.3.3 Project Design and Implementation

(a) Project Strategies

The project targeted to collaborate and benefit 600 farmers drawn from the three Western Kenya Districts of Busia, Vihiga and Homa Bay whereby 10 farmers groups would be mobilised per districts. Farmers in each district would be organised to establish a Drying Center as the focal point of enterprise development. “3 drying centres will be established, each serving 10 member farmer-groups (each comprised of 20 farmers) who will constantly supply fresh fruit to the centres. Two drying centres, in Vihiga & Homabay Districts, will be managed by Management Committees consisting of representatives from the farmer groups. The other drying centre will be managed by a private entrepreneur in Busia District whilst working with 200 small-scale farmers. Farmers will be allowed to purchase shareholding into the drying centres especially after they reach break-even point (BEP).

Though the proposal was clear on the need to establish solar drying technology so as to forestall documented spoilage of fresh fruit, project activities were expanded to include establishment of tissue culture-based banana orchards in both Busia and Vihiga districts with a view to creating a banana production base whose surplus yield would be processed in the drying centers. Thus, establishment of the drying centres went hand in hand with planting of banana orchards- the latter of which take 18 months to reach maturity and as will appear below, this is where things started going wrong.

Over in Homabay district which is rapidly making a name as a pineapple growing center, project intervention was designed to capitalise on the already existing pineapple production base which was to be expanded, improved and supported to penetrate distant markets through sale of solar dried fruit. A solar drying center was established in Rangwe Division-the pineapple growing nucleus of Homabay District.

Towards technology transfer, Africa Now and its partners sought collaboration with existing groups of which 10 were recruited in each district. Selected members of each group were trained on agronomic practices, group formation and leadership, etc were given exposure through exchange visits mainly to the local ASK shows. Ultimately, groups in each district were expected to form an apex organisation which would provide leadership in enterprise development and growth. Partnerships were also forged with other groups so as to provide inputs required to complete the investment mix proposed. Members of the partnership are analysed elsewhere below.

(b) Technology

Activities of African Now under MATF support focussed on introduction of solar drying technology (Plate 3.6 below) to be achieved through establishment of a drying enter in each of the districts. Introduction of solar drying technology was to be backed up by an outreach programmed to promote yield and market development for the processed produce.

**Plate 3.6: The Drying Center at Homabay**

(c) Partnerships

There were six partners in this project under the leadership of Africa Now. They include, Honey Care Ltd, KARI-Kakamega Station, Financial Support Associations, District Agriculture Offices of the Ministry of Agriculture and the farmers who were to produce the commodities. An analysis of the roles and duties of the partnership is provided in Table 3.6 below.-

**Table 3.6: Analysis of partnerships in the fruit processing project**

| Name of institution | Operating base | Role in the Project | Status |
|---|---|---|---|
| Africa- Now | Country Office in Kisumu | Coordinate project and partner activities, liaison with MATF, overall quality of project. | Still the lead Agency |
| Honey Care ltd | Nairobi | Introduce the solar dryers and attendant training, provide market-linkage and further product development | Pulled out after project start up |
| KARI (RRI-Kakamega) | Kakamega | Advise on suitable agronomic processes and quality control. | Provided tissues culture bananas to Busia farmers |
| Mache natural Resources Ltd | Nairobi | Replaced HCA | On board to provide market linakge and technical maintenance of dryers. |
| Find-us-in Africa | Nairobi | To provide market for processed fruit | Third part purchasing agent with no direct linkage to the farmers. |
| Gambogi FSA | Homabay | Provide financial services | Yet to start operations |
| KREP | Busia | | Maintains accounts for groups/ will manage the revolving fund. |
| | Homabay | | |
| Ministry of Agriculture | DAO in each of the 3 districts | Provide extension service | No evidence of involvement |

(d) Project set-up

The project was implemented and a managed from the Africa-Now offices in Kisumu but funds were disbursed through the UK office. Towards this, the NGO deployed a Project Coordinator and a Field Officer based at Kisumu. In addition to office space, a serviceable four- wheel- drive vehicle was designated for use by the project.

### 3.3.4 Study Findings

Project implementation was scheduled to take off in late 2007 during campaigns for elections scheduled for later the same year. Start-up was differed till January of the following year but was again affected by the post election violence that ensued following the disputed election outcome. Recruitment of collaborating groups essentially took off in March of 2008, well into the implementation period and will close operations in March 2011. This evaluation study makes observations as follows:-

(i) On Project design

Thus study observed that though the original focus of the project was introduction of solar drying technology, the projected deviated so as to undertake promotion of banana growing apparently in anticipation of a surplus to be absorbed through the solar driers. A major impact of this development was the development of solar driers that had no produce to process as is the case with Vihiga. Additionally, the project recruited groups stated as far as 26 kilometres away from the drier and it's not clear how ripened fruit was to be transported for processing, economic implications notwithstanding. Of necessity,

this drier is currently idle and in disrepair which raises doubts as to whether its development was indeed driven by a confirmed need.

(ii) On project performance:

**Availability of participating groups:** The project sought to establish operations in Busia, Vihiga and Homabay through collaboration with existing groups. This project was able to interact with groups that are participating in the Fruit processing project but could not confirm the availability of the full complement of 10 groups that were to participate in each district. Groups were encountered during the study as documented in Table 3.7 below.

**Table 3.7: Summary of organization status of groups met**

| District | Groups met | Stutus | Activity | Organisation |
|---|---|---|---|---|
| Busia | Medembu Farmers SHG | Parent Group for district. Has recruited 9 other groups which the study team did not meet | Members have established banana orchards. Total 2430 TCBs planted. | Has Apex Association |
| Vihiga | Jitahidi Women Group | | This is the group that received dryer on behalf of other Vihiga based groups | Vihiga is yet to form an apex association |
| | Jitahidi fruit processing group | | | |
| | Vision fuelwood women group | Both operate under auspices of the Kipiri Community Forest Association | These groups are located upto 20 kilometres from the drier and would face challenges transporting ripe fruit to the drier. | |
| | IFECO Women Group | | | |
| Homabay | Homabay Pine apple Farmers Farmers Community-based SHG | Apex association registered with Dept of Culture and SS | Oversees activities of other 10 groups | Has an Apex Organisation with a constitution. Each member group requires to plan over 6000 pineapples in addition to members own |
| | Kiemiya WG | 20 members | 10,000 plants | |
| | Wimenya WG | 15 members | 6000 plants | |
| | KajuangWG | 18 members | 6000 plants | |
| | Ngou WG | 22 members | 5000 plants | |
| | Ojojo Tailors YDG | 25 members | 25000 plants | |
| | Komulo WG | 25 members | 60000 plants | |
| | Bienja Kenda SHG | 18 members | 8000 plants | |
| | Kaduolo SHG | 17 members | >6000 plants | |
| | Nyalianga YG | 20 members | 10000 plants | |
| | Kisosya WG | 34 members | >10000plants | |

This Study noted that though it was mandatory for groups in each district to form an Apex Association to provide leadership especially on matters pertaining to management of the revolving fund, Vihiga is yet to form such a group and it's not clear how the revolving fund will be disbursed.

**Total number of farmers reached:** This project set out to directly access and work with 600 fruit farmers but given that Homabay, the most active group had only 214 members, it was not possible to clarify that this target was met.

**Capacity building far farmers:** All the farmers met in Busia and Homabay at least confirmed to having been trained while in Vihiga, some leaders of the groups admitted to having gone through some training. Given that the the TOT methodology was adopted fro training, it was not always easy to ascertain the degree of penetration and effectiveness of the training.

**Establishment of drying centers:** This study confirmed that Drying Centers were indeed established in each District. Each dryer unit was reputed to have cost Ksh 65,000 to install and each drying centre was provided with a 2 roomed office block and a plastic water tank as part of the MATF funding.

**Processing and marketing of fruits:** None of the three drying centres is operational on a fulltime basis. While experimental processing has been demonstrated at Buisia and Homabay, the Vihiga driers are yet to be tried. As such, the solar drying technology is yet to take root as anticipated. Apparently, farmers still prefer to divert fresh produce into local markets with none being left for processing at the dryers. Indeed, given that bana growing was introduced to Busia and Vihiga alongside the solar drying technology, it was not clear that production was adequate to leave a surplus for processing through the driers.

(iii) On performance of the partners

Project implementation suffered delay on account of non-functioning of partnerships:
Firstly, the instability caused by the PEV displaced some of the extension personnel whose replacement took time. Secondly, core strategic partners such as HCA who was originally enlisted to provided the solar drying technology and arrange marketing pulled out and this apparently delayed the introduction of solar drying technology. As well, the anticipated market linkage to be provided by Mache NR did not quite work as bankable orders for processed fruits are yet to be secured while the saving and credit scheme is yet to take off. It was however noted that some banana germplasm for Busia was originally sourced from KARI.

(iv) On the solar drying technology as introduced

The often stated mission of the MATF is bridge the gap between the Research and Consumer which would imply that technologies piloted with MATF support have gone through a substantial degree of trial and are ready for field testing as the final stage before up-scaling. In this respect, diverse research institutions such as KIRDI, KARI, JKUAT, Approteck have conducted advanced research on diverse solar-based drying technology some of which have possibly been rolled out. However, in the sourcing of solar drying technology for fruit processing, it is actually strange that the packing of the technology was not always apparent and neither was it standardised. Details on the ideal mode of operation, recommended moisture content of final produce, modalities for temperature control when not in use were not provided as at the time of assembly. As such, even with the best performing driers at Homabay, some degree of self damage from excess heat build-up has been experienced.

(v) On the merits of centralised driers

In the case of Vihiga, some groups participating in the project came from places beyond a 20km radius of the Drying Center which raises questions on the practical possibility of being served by the drier effectively given that ripe bananas are difficult to transport especially on rough roads. As well, transport costs and time incurred in transporting bananas to the drying center can potentially eat into the gains netted from value addition which raises questions to the overall efficacy of the centralised driers. On the contrary, given the relatively low technological level of the dryers whose construction requires timber and polythene sheets, it

probably would have been more viable to target introduction of this technology directly at household level.

### 3.3.5 Analysis of Project Impacts

Commercial operation of the driers is yet to start on which account full benefits of fruit processing are yet to be reaped. In spite of this, the project has made substantial impacts on other fronts as follows:-

(i) Introduction of alternative livelihoods in Busia:

Project intervention in Busia targeted the sugarcane growing belt when poverty is rampant on account of non-performance of the sugarcane industry. From discussions and testimonies of Mudembu farmers, introduction of banana growing has provided them with alternatives since where returns from one acre of sugarcane was 60-10,000 in a 2 year period, the same acre under banana yields a minimum of Ksh 18000 continuous income and also contributes to the family diet. Lady owners of the banana plants are optimistic of economic independence from sale of bananas. This project is further empowering local farmers to benefit from the banana trade which was previously dominated by produce from across the border.

(ii) Elevation of market prices in Homabay:
Upon introduction of solar drying technology for pineapples, a revolving fund was created by Mache NR through pineapple would be bought at Ksh 17/ kg with a 3 kg fruit fetching Ksh 51 which compares quite unfavourably with the original price of Ksh 35 offered by the market. Following this development, the market was forced to adjust the buying price for pineapples upwards to the benefit of the farmers.

### 3.3.6 Return on Investment

In this section, an analysis of the economic impact of MATF investment in Western Kenya is provided based on a study of operations in Busia and Homabay where Africa Now intervened to both provided banana germplasm and later on construct solar dries that are operational. The Vihiga initiative is left out of the computations since MATF money was not invested in cropping of bananas and the solar driers are not functional. For this analysis, the study has relied on data from 23 farmers from Busia and 9 farmers from Homabay. Gross margin calculations has assumed pineapple yields of 8000 per acre from the second year and banana yields averaging 11.4 and 15 tonnes per acre in the second and third years respectively. The study further assumed a conversion ration of fresh to dry fruit of 10:1 and 10:4kgs for both pineapple and banana respectively.

The financial indicators sought in the computations are gross margins, benefit/cost ratios and the return to MATF Funds over the 3 year lifespan of the driers as summarised in Table 3.8 below.

**Table 3.8: Summary of financial indicators for fruit processing enterprises in Homabay and Busia**

| Parameter | Pineapples in Homabay | | Bananas in Busia | |
|---|---|---|---|---|
| | Sale in local market | *Sale after solar drying* | *Sale in local market* | *Sale after solar processing* |
| *Yields* | Pineapple yields of 800pc ( each weighing 1.5kg) annually | | Banana yield of 11.4 and 15kg in second and third year | |
| *Benefit/ cost ratio* | 2.68 | *6.03* | 0.62 | 4.43.99 |
| *Net befit in 3yrs (Ksh)* | 3,764,864.00 | 12,013,760.00 | (3,022,770) | 14,827,229.87 |
| *Net benefit (£)* | 29,879.90 | 95,347.30 | (23,801.34) | 117,676.43 |
| *MATF Investment (£)* | 80,007 | 80,007 | 80,007 | 80,007.00 |
| *Return on MATF investment* | 0.37 | 1.19 | (0.3) | 1.47 |

From Table 3.8, it appears that sale of fruits in the open market has returns to the project investment with bananas actually posting a negative margin. However, upon processing and successful sale of dried fruits the profit margin greatly improves to the point where either of the driers at Homabay or Busia can recoup the entire MATF investment in 3 years. Sale of solar dried fruits is therefore potentially quite lucrative with net margins of Ksh 12 and 14 million being possible from only 10 acres of pineapples and bananas. However, for this to be realised, the driers must be put to productive use.

### 3.3.8 Project Constraints

This project faces one major constraint in that, the beneficiaries are yet to adopt the culture of enterprise which is demanded by initiatives in value addition. It will be noted that, in spite of this relatively low cost technology being demonstrated, it is yet to be adopted by private entrepreneurs within the project area which implies that the project may just stagnate at the experimental stage.

### 3.3.9 Project Challenges / Concerns and proposed solutions

Despite the positive project impact, the evaluation identified four weaknesses in project implementation that need to be addressed by the implementing agency and its partners.

(a) Durability of the technical package

The solar driers as introduced in western Kenya re not durable and are prone to destruction by excess heat. A better packaged, cost effective product is an absolute necessity.

(b) Viability of support systems:
Where as each district was supposed to establish a mandatory apex association as a vehicle for business development, this is yet to happen. Further, some of the groups especially in Vihiga have quite divergent views and interests which may undermine unity of purpose and group dynamics. This matter should have been resolved at the mobilisation stage and is likely to be outstanding even by the time the MATF funding expires.

(c) Coherence of Partnerships
A critical challenge in this project was the withdrawal of Honecare Africa, a key partner in the initial stages in providing low cost solar driers. The project eventually managed to replace

the partner with Mache NR whose intended development of market linkages did not quite materialise.

(d) Viability of market linkages

Though this project set out to resolve issues relating to inadequacy of markets for fruits in western Kenya, as at the time of this evaluation, viable market linkages were yet to be established and availability of markets for both fresh and processed produce remains outstanding. Indeed, the fact that this project went out to expand production of bananas and pineapples without corresponding expansion of markets is of great concern since the maturing fruits will end up flooding the market with attendant escalation of losses. Thus, while the project has successfully demonstrated the potential financial impact of solar processing of fruits, failure to create viable markets for the anticipated produce remains outstanding currently.

### 3.3.10 Lessons Learnt

Durability of the technical package notwithstanding, Africa Now was able to demonstrate the potential economic impacts of low cost technologies on rural economies. However, by far, the greatest lesson by default is a demonstration of the critical role of market development as a backup to technological innovation. Indeed, the lack of viable markets is the only obstacle between fruit farmers and economic fortunes currently.

## 3.4 Promoting NERICA III Upland Rice Production, Processing and Marketing in Namutumba District, Uganda

### 3.4.1 Background

Rice is an important food and cash crop in Uganda and forms a significant proportion of the diet of urban dwellers. It is one of the major foods in institutions like schools, colleges/universities and hospitals, as well as at social functions. Rice is also a viable enterprise with proven high returns to investment with gross margins from an acre ranging from 755,000/ to 1,327,500/ in both low external input and high external input scenarios respectively. Commercially, the demand for rice is high as Uganda imports US$ 90 million worth on an annual basis.

Despite the importance of this crop, availability of improved technologies in the production-to-consumption continuum at research institutions, and governments' efforts to commercialise agriculture, smallholders have not benefited substantially from these opportunities. This has largely been due to limited access to production inputs, markets and market information, post harvest losses and weak farmer institutions. These are the challenges that Africa 2000 Network sought to address in the project financed under the MATF Round V.

### 3.4.2 Project Goal

The purpose of the project is to enhance income security of smallholder farmers in Namutumba District through improved access to markets by promoting production, processing and marketing of New Rice for Africa (NERICA).
The specific outputs were:

- Production and productivity of upland rice for the market among smallholder farmers increased.
- Smallholder farmers' incomes significantly increased through improved access to existing and new rice grain and seed sustainable markets.
- Smallholder farmer's institutional capacity to competitively participate in the rice value chain built and strengthened.

- Project achievements, successes and challenges tracked, documented and disseminated for wider uptake by development practitioners in Uganda and the East African region.

In the recent past, the Namutumba area has witnessed increased encroachment onto wetland areas by farmers seeking to cultivate paddy rice and there are fears that this trend could impair long-term ecological balance with detrimental effects. Thus, in addition to addressing the question of food insecurity, the Africa Now project also sought to encourage conservation of wetlands, through introduction of upland growing rice.

### 3.4.3 Project Design and implementation

a. Project strategies:

The project was designed to enhance income security of 3,000 smallholder households in Namutumba District through improved access to markets by promoting production, processing and marketing of NARICA III Upland Rice. The target was to reach out to 100 farmers groups constituted into 5 associations engaged in rice production and marketing activities. Africa 2000 Network (A2N) and its partners implemented the project by conducting:

(i) Inception meetings with partners through which the project was conceptualised, designed and identified roles and responsibilities at all project operation levels;

(ii) Community mobilization to form farmers groups that included capacity building for leadership, sustainable agriculture, savings, upland rice agronomy, financial management and collective marketing.

In addition, the project sought to offer extension services and conduct routine monitoring missions on quarterly basis. The project also organised stakeholders meetings and shared experiences with the farmers in order to increase interaction in farmers groups as well as improving on the various aspects of upland rice agronomy and marketing.

Arrangements were made for FICA Seeds to advance credit lines to farmers in form of seeds, fertilisers and tarpaulin materials (for shielding rice from predators) which would then be recovered from sale of the produce.

b. Technology

Most rice in Uganda is grown swampy lowlands and is therefore limited to communities who have access to such land. Introduction of upland rice presented an opportunity for many communities to produce rice to meet food security and to generate incomes. NARICA III rice is early maturing, high yielding and tolerant to harsh environmental conditions compared to lowland rice. There are also opportunities to grow the rice in twice a year. Promotion of NERICA III upland rice production and marketing in Namutumba District entailed activities in access to quality seed and agronomic practice backed up by , processing, branding and marketing of the commodity. This entailed capacity building in areas across the value chain with the technologies geared towards building of economically viable and environmentally friendly enterprises.

c. Partnerships

There were six partners in this project namely: Africa 2000 Network (A2N), FICA Seeds, AFROKAI, Upland Rice Millers, Namutumba District Local Government (NDLD), Agricultural Productivity Enhancement Programme (APEP) and the National Agricultural Advisory Services (NAADS). Respective roles are tabulated below.

**Table 3.9: Partnerships in the NARICA III Rice growing project in Namutumba**

| Partner | Roles |
|---|---|
| A2N | • Facilitator role by linking different partners in the value chain<br>• Build capacity of smallholder farmers<br>• Offer extension services and conduct routing monitoring missions on quarterly basis<br>• Report project progress quarterly to FARM Africa<br>• Organise stakeholders meetings and share experiences |
| FICA Seed Ltd. | • Supply high quality inputs (seed, fertiliser, tarpaulin)<br>• Offer advisory support on the use of the inputs<br>• Train famers on seed production |
| Afrokai | • Guarantee and procure paddy/milled rice from the farmers on contract basis.<br>• Quality assurance especially at post harvest level through a price guarantee arrangement.<br>• Packaging and branding of rice into small packs |
| Upland Rice Millers | • Mill rice for farmers<br>• Offer advisory support in value addition and grading |
| NDLD | • mobilisation of the beneficiaries, provision of advisory services, office space and demonstration sites among others |
| APEP | • Offer technical assistance in technology transfer, post-harvest handling, input supply linkages and output market linkages |
| NAADS | • Provide support in farmer institution strengthening, advisor services as well access to selected farm inputs |

### 3.4.4 Study Findings

The project had initially been designed to reach out to 3000 farmers but ended up registering a total of 3195 all of whom underwent training in sustainable agriculture, upland rice agronomy, group and financial management, market research and marketing among others. Farmers were also motivated to abandon cultivation of lowland rice in favour of upland rice which has many documented merits including guaranteed higher yields income from sale of the rice. In all, the project was able to achieve an average yield of 461kg (9 bags) per acre (Table 3.10) computed for cultivated plots that averaged 0.6 acres per farmer.

**Table 3.10: Upland Rice Production among sampled farmers**

| | Total | Mean | Minimum | Maximum |
|---|---|---|---|---|
| Farmers sampled | 36 | | | |
| Production area (acres) | 65.3 | 1.9 | 0.5 | 4 |
| Yield (kg) | 30,100 | 885.3 | 350 | 1500 |
| Mean yield (kg/acre) | | 462 | | |

### 3.4.5 Project Impacts

From the observations and interviews on the ground, the project has contributed positively towards elevating the farmers' lifestyles. The evaluation observed the following:

a) Project has improved household food security

Although the project suffered a dry spell from Dec 2008 to Feb 2009, famers have more food at their disposal. Prior to introduction of upland rice in Namutumba, only those accessible to wetlands could grow rice unlike the current situation where anybody accessible to land can engage and benefit from this new enterprise. From surveys undertaken as part of this study,

it emerged that most families retain at least one 90 kg bag of rice for subsistence hence confirming the positive impact on food security.

At national level, the upland rice project has had impact on food and income security since some of the rice is exported within the East Africa region.

b) Environmental sustainability

Promotion of upland rice has diverted pressure from wetlands which will hopefully serve natural functions in watershed and biodiversity regulation. This shift has had a positive impact on environment but needs to be applied consistently to ensure sustainability. This evaluation study was informed that about 90% of farmers have shifted from paddy rice in favour of upland rice with the result that prevalence of water borne diseases such as bilharzias has declined and considerably less investment is required in treatment of the same.

c) Social sustainability

This project has contributed to social sustainability by promoting the formation of strong and viable farmer groups. The farmers groups have written constitutions that govern the way they work. In total, 125 groups were mobilised and individual members have benefited through interaction with each other. As experienced, farmers have set up their own collection centres and some farmers groups have even gone as far as acquiring planting and milling machines. Farmers groups have marketing committees that help them in assessing market information.

d) Economic Analysis

Gross margin analysis undertaken based production and marketing data from a sample of 36 farmers who cultivated about 65.3 acres (Table 3.11). Analysis of the enterprises for the 36 farmers identified purchase of tools and tarpaulin material to be the main capital investments while recurrent costs mainly accrue from hiring of land, tilling, planting, tending, bird scaring, harvesting and packaging for the market. The gross three year yield from the 3153 farmers is estimated at 3,306,753 kg which retailed at an average of Ush 1250 per kg against a production cost of Ush 806 leaving a margin of Ush 446 per kg.

Overall, the upland rice based enterprises are profitable with benefit cost rations of 1.55 and possibility to recoup five-fold (4.97) the entire MATF investment of £ 80,070 in three years. Profitability of the enterprises was also manifested by farmers' testimonies of increased income with 28% reporting ability to pay school fees and access better clothes for their families. Some of the farmers have invested earnings from rice growing in other enterprises such as poultry, pig rearing etc while others still have purchased assets such as land and ox-ploughs.. Indirectly, rice farming was reported to have opened a job market to over 3000 persons who are employed on the farms in various tasks.

**Table 3.11: Gross Margin analysis for NERICA III Rice in Namutumba District**

| Cost/ benefit streams | *Year* | 1 | 2 | 3 | Total |
|---|---|---|---|---|---|
| **Fixed Costs** | Tarpaulins | 100,000.00 | | | 100,000 |
| | Tools | 30,000 | | | 30,000 |
| **Variable costs** | Land hiring | 26,892 | 26,892 | 26,892 | 80,676 |
| | Ploughing | 31,206 | 31,206 | 31,206 | 93,619 |
| | Seed | 91,773 | 91,773 | 91,773 | 275,318 |
| | Planting | 14,542 | 14,542 | 14,542 | 43,626 |
| | Fertilizer | 40,957 | 40,957 | 40,957 | 122,870 |
| | Weeding | 30,802 | 30,802 | 30,802 | 92,406 |
| | Herbicides Spraying | 25,000 | 25,000 | 25,000 | 75,000 |
| | Bird scaring | 11,250 | 11,250 | 11,250 | 33,750 |
| | Harvesting | 14,056 | 14,056 | 14,056 | 42,168 |
| | Bagging | 8,571 | 8,571 | 8,571 | 25,714 |
| | Transport | 6,000 | 6,000 | 6,000 | 18,000 |
| | Milling | 27,344 | 27,344 | 27,344 | 82,033 |
| **Total costs** | | **458,393** | **328,393** | **328,393** | **1,115,179** |
| **Total benefits** | Production (kg/acre) | 370 | 485 | 530 | 462 |
| | Price (Ush) | 1250.00 | 1250.00 | 1250.00 | 1250.00 |
| | Benefits | 462,500 | 606,250 | 662,500 | 1,731,250 |
| | Net benefits | 4,107 | 277,857 | 334,107 | 616,071 |
| | Benefit /Cost Ratio | 1.01 | 1.85 | 2.02 | 1.55 |
| | Cumulative net benefits per acre | 616,070.52 | | | |
| | Cumulative benefits for project | 1,473,024,617.76 | | | |
| | Gross value of MATF Involvement ((£) | 398,185.79 | | | |
| | MATF Investment (£) | 80,070.00 | | | |
| | Return on MATF investment (crop) | **4.97** | | | |

**Note: All the Figures are in Uganda Shillings unless otherwise specified. The exchange rate used is £1 = Ushs 3,699.34**

e) Impacts on the Value Chain:

A major goal for the project was to impact on rice marketing through processing and branding the commodity to enhance market penetration. The Upland Rice Millers who were originally targeted for milling the commodity are located in Jinja – 60km from the production area in Namutumba and farmers would have incurred transport costs in the range of Ushs 130,000 per tonne compared to Ushs 13000 incurred transporting rice to local millers. Likewise, the cost of milling at Jinja was reported to be high at Ushs 120 per kg compared to the Ushs 75 per kg charged at Namutumba in which case, farmers opted for local milling.

The project had also set out to promote branding of the commodity as a strategy towards enhancing market access. However, this was never achieved as Afrokai (the partner designated to handle marketing) was unable to procure markets for the commodity. The

branding and marketing therefore never took off as expected and farmers were left exposed to middle men.

### 3.4.7 Project constraints

The farmers faced a number of challenges in the implementation of the upland rice technology. While the anticipated benefits e.g., reduced pressure on ecologically fragile wetlands and reduction in water borne diseases were realised, unfavourable weather conditions and prolonged dry spell from December 2008 to February 2009 made the farmers hesitate in planting of the crop in the second season during the year. This is despite the fact that the farmers had already prepared the land for planting. A major issue of concern has been the proliferation of striga and other weeds in the rice fields which have proven to be labour intensive dealing with. Predation by mice and mole rats has also been reported to contribute to loss of crop causing farmers to realise low yields. By far, however, the main challenge to this project was the high default rate by strategic partners.

### 3.4.8 Project challenges / concerns and proposed solutions

The project has benefited the farmers to a larger extent, but not without challenges and concerns that will need to be addressed by the implementing agency and its partners. This evaluation identified some opportunities for improvement as follows:

a) Initiatives at provision of credit

A2N offered credit for farm inputs to farmers. The farmers collected the inputs from the FICA Seeds Ltd and A2N paid for the inputs and left to follow up loan payments with the farmers with some interest mainly for covering the administrative costs. This system was meant to create a revolving fund so that many more farmers could benefit from the credit facility. The loan recovery has however been low, at 20 % thus depleting the available funds. Farmers on the other hand are aware that the loan repayments are outstanding but shift blame to the poor rains experienced at project inception. To sustain credit terms to farmers, it would be prudent to have a system of running the facility with the farmers playing a major role in issuing loans to each other in form of cooperatives. This is a proven system since there are checks and balances and potential defaulters are under constant pressure to repay loans.

b) Inability to access commercial credit

Attempts by farmers to secure loans from a commercial Bank (Centenary) were thwarted by the prohibitive conditions which were out of reach for majority of potential applicants. From the questionnaire survey, over 90% of the famers sampled had no title deeds holding to their land making it difficult to access loans while others could not offer any prove of ability to repay.

c) Quality of seeds

The quality of seeds from FICA Seeds Ltd was wanting. There were several complaints of mix up of varieties, mixing with husks and foreign matters in the seeds supplied to the farmers. The farmers have had to sort out the seeds by themselves.

**Plate 3.7: (i) Rice planting machine (ii) Harvested rice ready for marketing**

d) Performance of partners

In general, the partners undertook their responsibilities with zeal. However, shortfalls were experienced as follows:-

*i)* *Afrokai*: This partner was unable to market the produce as originally expected and this responsibility gap only served to expose farmers to middlemen.

ii) *FICA Seeds Ltd.*: Delivered mixed variety of seeds a*s earlier reported.* A system of quality assurance and vendor rating ought to have been in place in order to ensure supply of quality seeds.

### 3.4.9 Lessons learnt

Adoption of upland rice has been documented to be immensely beneficial on social, economic and environmental impacts fronts. However, in spite of such benefits, cropping of upland rice is rain-fed and thus prone to impacts of climatic variability. There is probably need for research to focus on development of drought tolerant varieties.

Though production data indicate an otherwise successful project, the main goal of improving productivity of upland rice was undermined by non-availability of services in milling, branding and marketing which were to have been outsourced from 2 partners. To the largest extent possible, there is merit is prioritising support to projects where the core technology package is commanded by the main partner.

Attempts by farmers to access commercial credit was undermined by the stringent conditions imposed by financial institutions while the credit scheme introduced under the MATF support stalled on account of high default rates. There is probably need to transfer responsibility for credit management to the respective groups where peer pressure comes handy in minimising default.

## 3.5 Production and processing of Citronella and Lemon grass in Pallisa District

### 3.5.1 Background

The Pallisa District of Eastern Uganda is marginal climate area whose sandy soils and annual rainfall of 400-700 mm limits the range of possible crops and economic activities. Main crops grown include rice grown near the lake and in the swamps, cassava, millet, ground nuts, oranges, cow peas, sorghum for food. The district has for long relied on cotton as the cash crop but with the collapse of the cooperative movement, incomes from the crop have dwindled and poverty is reportedly on the increase.

In an attempt to redress economic problems in Pallisa, different groups have tried diverse options aimed at replacing cotton as the main income earning crop. One option tried under auspices of a partnership brought together by the national Agriculture research Organisation is cropping of Citronella and lemon grass both of which are high value crops with potential to generate income for small holder farmers. Both crops are not labour intensive and enjoy benefits of not being palatable to livestock, and can be easily produced by men, women and the youth while they produce essential oils with proven demand in local, regional and international markets in the making of soap and perfumery. The crops were relatively new in the district and farmers lacked enough planting materials as well as the knowledge and skills of production and processing. This called for mobilisation, sensitisation, capacity building and technology transfer activities.

### 3.5.2 Project Goal

To improve the farmers' welfare and household income through improved Essential oils crops production and processing technology, access to information and linkage to markets.

The specific outputs were:

- To commercialise Citronella and Lemon grass production in Pallisa district
- To improve the income and welfare of small-scale citronella and lemon grass farming households
- To mobilise and build capacity of farmers groups and other partners like Pallisa Farmers Association (PAFA) and local government.
- To build the capacity of the farmers to plan, monitor and evaluate own progress in a participatory manner

### 3.5.3 Project Design and implementation

Project strategies:

The project was designed to improve welfare and household income for 1875 to 2500 farmers through commercial production and extraction of Essential Oils from Citronella and lemon grass. The target was to reach out to 125 farmers groups each having a membership of 15 to 25 members.

Oil markets were identified by giving samples for testing to known users such as France, Italy and soap making factories. The inclusion of PAFA into citronella and lemon grass production was to complement Tororo which already had ready markets for the oil and was better leveraged for bargaining for both sale price and market volumes. There was also potential of local demand especially in the production of personal care products and in pharmaceuticals.

As part of the plan, PAFA bought land on which now stands the processing plant for extraction of oils from the grasses.


**Plate 3.8: Poverty in parts of the semi-arid Pallisa district is reportedly high**

Technologies

i) *Cultivation of the citronella and lemon grasses:* The farmers were trained in the cultivation of the grasses, quality control and postharvest handling. Planting materials were bought and ferried from Tororo and Kawanda. Field extension advisors were to be locally recruited by PAFA and trained by NARO and MAII&F then the trained farmers in Tororo would train the Pallisa lot in processing technology and linkage to markets. NARO and MAAIF (VODP) would train leaders and some partners in PPM &E, who were in turn to train other farmers. Collective training of farmers in production techniques including soil amendments that ensure continued soil fertility was adopted as a strategy for sustained supply of grass to the factory.

ii) *Distillation Process:* The Rabong Cooperative society had fabricated additional distillation equipment which was taken to Pallisa for processing of the grasses harvested by farmers. The distiller has been installed at Pallisa but is yet to be commissioned.

iii) *Introduction to agro forestry:* As part of meeting the energy needs for the factory, the farmers were introduced to agro forestry. This will further enable farmers meet their energy needs in their homes as well as earn income by selling firewood to the factory.

Partnership

There were four primary partners in this project that were earmarked for diverse roles as per the proposal financed by the MATF namely: National Agricultural Research Organisation (NARO), Ministry of Agriculture, Animal Industry and Fisheries / Vegetable Oil Development Project (MAAI&F/VODP), Pallisa Farmers Association (PAFA) and Rabong Cooperative Society are the primary partners. Uganda Export Promotion Board (UEPB) and District Agriculture Officer Local Government were also incorporated as partners to link the farmers with export market. The specific roles of the partners are shown in 3.12 below.

**Table 3.12: Roles of partners in the Citronella and Lemon grasses project at at Pallisa District**

| Partner | Roles |
|---|---|
| NARO | • Together with the primary partners will sign MoUs with Farm Africa and each partner<br>• Project coordination<br>• Receive and disburse funds, then prepare technical and financial reporting |

| Partner | Roles |
|---|---|
| | plus accountability.<br>• Conduct baseline and impact surveys plus the capacity building of partners in new technologies and group dynamics<br>• Acquire inputs<br>• Initiate demonstrations for new technologies and soil fertility amendments<br>• Plant mother gardens<br>• Co-ordinate tree planting activities<br>• Conduct market research<br>• Procure technical personnel from the private sector for specialised trainings and activities |
| PAFA | • Day to day project management<br>• Take charge of financial management in the district in the absence of Sophy<br>• Lead and manage the processing and marketing and own the factory<br>• Provide a business plan for the factory<br>• Make an MoU with MAII&F about the use and ownership of the processor<br>• Ensure the environmental impact assessment of the factory<br>• Input distribution<br>• Technology dissemination and monitoring of mother gardens<br>• Farmer mobilisation and group formation<br>• Capacity building of CBT and farmers<br>• Organise farmer study tour |
| Rabong | • Train CBT in production, processing and marketing<br>• Train Group leaders in PPM&E plus savings & credit<br>• Ensure good processor maintenance<br>• Give guidance on markets and pool marketing<br>• Participate in exposure visits |
| DAO – Local Government | • Mobilise and sensitise communities<br>• Lobby and advocate for project sustainability at the district level<br>• Provide project social and political marketing in the district<br>• Capacity building of CBT and farmers<br>• Monitor the cooperative society<br>• Participate in the market search<br>• Ensure that farmers get maximum benefits from the factory |
| MAAI&F/VODP | • Provide for the use of processing equipment and vehicle<br>• Train in PPM&E, savings and credit to CBT<br>• Train farmers in farming as a business<br>• Disseminate proven technologies<br>• Market identification<br>• Participate in annual gross margin analyses |
| UEPB | • Conduct market research & link PAFA to external markets<br>• Coordinate export standardisation and provide market information<br>• Coordinate capacity building in packaging and marketing<br>• Set up farmer groups and develop institutional frameworks<br>• Link with private sector for specialised training of PAFA staff<br>• Coordinate, promote & guide on export market entry strategies<br>• Assess export readiness of PAFA. |

### 3.5.4 Study Findings

Based on returns from 74 questionnaires administered on farmers supplemented by Focus Group Discussions, this study made observations as follows:-

Outreach programme: A total of 2392 farmers were recruited into the project compared to a target of 1875 to 2500 farmers that had initially been targeted. This clearly shows the enthusiasm and support that the farmers gave to the project.

Capacity building : Capacity building was conducted for partners and community based trainers (CBT) drawn from farmers groups. The training covered production and processing of the citronella and lemon grasses. A field visit to Tororo immensely improved farmers' motivation towards the project as manifested by renewed enthusiasm. Since the farmers cannot market the oil as individuals, special interest groups (SIGs) were formed and trained production techniques, group dynamics, participatory planning, monitoring and evaluation (PPM&E) among others.,In total, about 2438 farmers underwent training.

Production: The project reached most of the farmers targeted. Forty were selected to establish mother gardens to cultivate the citronella and lemon grasses. These farmers were to provide seedlings to the rest of the farmers after the first harvesting. In total, 14 more farmers managed to cultivate citronella grass.

**Table 3.13: Citronella and Lemon Grasses Production among sampled farmers**

| | *Total* | *Mean* | *Minimum* | *Maximum* |
|---|---|---|---|---|
| *Farmers sampled* | 73 | | | |
| *Production Area* | 36.3 | 0.6 | 0.25 | 2 |
| *Yield (kg)* | 18929 | 291.2 | 120 | 3800 |
| *Mean yield (kg/acre)* | | 522.2 | | |

Improved farmer income and standard of living: From the interviews with farmers, it emerged that the project helped participants to meet some of their financial needs with 30% of the respondents confirming ability to pay school fees, 14% indicated that they got money from the project to meet their domestic needs, and another 11% reported that they could afford decent clothing from the benefits of planting citronella. However, these claims could not be ascertained as it also emerged that farmers spent their money and did not profit from the sale of the crop to PAFA. Indeed, some farmers are still waiting for their crop to be delivered to the factory.

Environmental sustainability: The planning of the project took into consideration the fact that the distiller required energy to process the grasses. To prepare for this, tree planting was introduced and the farmers have indeed planted trees towards meeting the energy needs at home and for delivery to the factory.

Social sustainability: This project has contributed to social sustainability by promoting the formation of strong and viable farmer groups. The farmers groups have written constitutions that govern the way they work. In total, 125 groups were mobilised and individual members have benefited through interaction with each other.

Gender balance: The project organised training for both men and women there striking a gender balance. Of these, there were 426 participants (161 females and 265 men) who underwent the TOTs training.

### 3.5.5 Economic Analysis

By the time of undertaking this evaluation, only one harvest of lemon grass had been delivered to Rabong farmers cooperative society and in respect of which, payment was yet to be made to the farmers. The second harvest of grass was overdue but frames were hesitant to sink more in the project. Gross Margin analysis for the lemon grass has therefore relied on data for the one crop that was harvested and sold. Within this cropping season, 45 farmers planted both Citronella and Lemon grass in a total of 36.25 acres from which a total yield of 18,929kg of grass was harvested equivalent to an average yield of 522kg per acre. This

harvest was delivered to Rabong Coop Society who had offered to purchase at the rate of Ush 100 per kg of dry grass.

Investment in cultivation of lemon grass is devoid of huge capital costs and only farm implements (holes, jembe, slasher, etc) were identified. Variable costs entail hire and preparation of the land, planting and tending of the crop, harvesting and delivery to the market. To produce an average half a ton of grass, farmers incurred costs of Ush 491, 893 but only earned Ush 52,200 at the sale price of Ush 100 per kg thus incurring a huge loss averaging Ush 439,692.74.

Going by the current production and marketing trends (table 3.14) it is not possible for the farmers to make money from lemon grass based enterprises. However, when either the production (grass yield in kg) or market price (Ush per kg) is increased ten-fold, a marginal break-even of 1.06 is possible at farm level but the same would be inadequate to recoup the MATF investment. Recouping of the MATF investment would only be possible in a scenario where both yield and market prices increase ten-fold based on a 100 acre production base.

Gross margin analysis has further revealed that oil extraction at current market prices of Ush 10,000 per litre is far from profitable.

Financial sustainability: Thus, towards securing the financial viability of the lemon based enterprises, efforts should be invested in the following aspects:

i) Improve grass yield to at least 5 tons to an acre. The current yield of 0.5 tons is equivalent to only 8.3% of the 6 ton per acre yield anticipated in the proposal.
ii) Market prices have to be adjusted to at least Ush 1000 per kg. Going by analysis in table 3.14 below, the producer price per kg of lemon grass is Ush 942 which compares quite unfavourably with the selling price of Ush 100 for the same produce.
iii) More farmers have to be recruited to bring the production base to minimum of 100 acres.

**Table 3.14: Gross Margin analysis for Citronella grass and Lemon Grass (based on one harvest only)**

| Cost and benefit streams | | Scenario1: current practice | Scenario2: Ten-fold yield increase | Scenario3: Ten-fold increase in prices | Scenario 4 : Tenfold increase in yield and market price | Scenario5: Tenfold increase in production /oil extracted for sale. |
|---|---|---|---|---|---|---|
| Fixed Costs | Tools | 75,000 | | | | |
| Variable costs | Land hiring | 52,000 | | | | |
| | Bush Clearing | 24,550 | | | | |
| | Ploughing | 59,351 | | | | |
| | Planting* | 61,645 | | | | |
| | Weeding | 65,890 | | | | |
| | Harvesting | 72,000 | | | | |
| | Loading | 39,000 | | | | |
| | Transport | 42,456 | | | | |
| **Total costs** | | **491,893** | **491,893** | **491,893** | **491,893** | **590271.29**** |
| **Benefit streams** | Production (kg/acre) | 522 | 5,220 | 522 | 5,220 | **52.2** |
| | Price (Ush) | 100 | 100 | 1000 | 1000 | **10000** |
| | Benefits | 52,200 | 522,000 | 522000.00 | 5220000.00 | **522000.00** |
| | Benefit Cost Ratio | 0.11 | 1.06 | 1.06 | 10.61 | **0.88** |
| | Net benefit per acre | -439,692.74 | 30107.00 | 30107.00 | 4728107.00 | **-68271.29** |
| | Cumulative benefits for 34 farmers-36.25 acres | -15,938,861.90 | 1091378.75 | 1091378.75 | 171393878.75 | **-2474834.26** |
| | Cumulative benefit (£) | -4,308.57 | 295.02 | 295.02 | 46330.93 | **-668.99** |
| | MATF Investment (£) | 54,499.00 | 54499.00 | 54499.00 | 54499.00 | **54499.00** |
| | **Return on MATF funds: (i) from 36.25 acres** | **-0.08** | **0.01** | **0.01** | **0.85** | **-0.01** |
| | **(ii from 100 acres** | **-0.22** | **0.02** | **0.02** | **2.38** | **-0.03** |

Note: All the Figures are in Uganda Shillings unless otherwise specified; The exchange rate used is £1 = Ushs 3,699.34; *Planting material was provided for free and is therefore a project overhead cost ; **Assuming 20%increase in production costs to cater for oil extraction and packaging.

### 3.5.6: Challenged to implementation

Various challenges were encountered during the implementation of the project as highlighted in sections below.

Resource constraints: The PAFA office is seriously understaffed. Currently, the ,single staff member dedicated to the citronella and lemon grasses project is considered not adequate to manage a project of such magnitude with a focus in the entire district. Finances have been another constraint altogether as reports of delay in project implementation due to lack of funds is widely reported. Movement form one place to the other to serve farmers has also been difficult for the PAFA coordinator and it would be prudent for MATF to fund projects that are sufficiently resourced, especially when considering human resource.

Farmers' reluctance to meet seedlings and transport costs: PAFA purchased seedlings from Tororo and delivered this to Pallisa. There was reluctance by farmers to meet the costs of transporting the seedlings from PAFA to their own farms. PAFA felt duty bound to deliver the seeds door to door thereby meeting additional expenses that were not part of the projects budget. The same applied after the first cutting. Likewise, the famers were not willing to meet the cost of delivery of product to PAFA for onward delivery to the Rabong Cooperative Society distilling plant in Tororo. Instead, PAFA met the costs of delivery to Tororo. This has set precedence with farmers expecting that it is the responsibility of the PAFA office to meet such costs.

Challenges in operationalizing the pant: Though a distilling plant was installed at Pallisa, its operation has been constrained by inadequacy of water required for cooling and hopefully, this hurdle will be resolved when the proposed borehole becomes operational. However, there are concerns that salinity in the borehole water could end up clogging the pipes implying the need for periodic maintenance of the entire plant. There are concerns that parts of the distiller were fabricated from wrought iron as opposed to stainless steel which could potentially cause increased iron content in the oil and thus thereby leading to early oxidation and rancidity both of which lower the quality of end product. The distiller is designed to run on heat generated from fuel based heating of the distillation. If not checked, there could overexploitation of trees in search of firewood. This implies that there will be need to get a reliable and sustainable source of firewood or even alternative sources of energy.

**Plate 3.9: (i) Distilling plant at Pallisa**

**(ii) Feeding fuelwood into the distiller**

Non collection of product from farms: PAFA collected and delivered the first cutting to Rabong in February 2010. The second cutting was due in July 2010. At the time of evaluation, the second cutting had not been done and the farmers have been waiting for PAFA to confirm when this will be done. On the other hand, PAFA has been unable to collect and transport the produce to Rabong since the finances have ran out after funding the initial cutting. It was reported that Rabong had not paid PAFA for the initial delivery thus compounding the financial doldrums further. The non payment by Rabong was blamed on the slow update of the oils by the export customers, supposedly because of the poor quality of initial delivery. The non collection has therefore led to the grass overgrowing and flowering on the farms and farmers have been feeling disillusioned because of having put in money into labour and other associated costs to grow the grass.

**Plate3.10: (i) Citronella grass withering on the farm after failure to collect (ii) Overgrown citronella grass remain uncollected 3 months down the line**

Performance of partners: The choice of partners was well thought out. It is clear that each one of them played a role in ensuring that the sound project implementation. However, it seems PAFA was overwhelmed by the workload which is clearly not matched by personnel available. As proposed earlier on, choice of partners should endure adequacy of resources to avoid such shortfalls in future projects.

### 3.5.7: Lessons learnt

**(i) This project has potential to aggravate poverty:** Introduction of oil extraction from citronella and lemon grass originally was intended to provide alternatives to resource poor farmers in Palissa and ultimately help them out of poverty. However, this evaluation has established that so long as the market price for lemon grass is set at Ug Sh 100 against a production price of Ug Sh 798.34, farmers will continue losing money and thus sink deeper into poverty. Thus as currently designed, this project could aggravate rather than alleviate poverty.

**(ii) Need for economic analysis upfront of funding:** Before inception of a project, the BEP and NPV need to be ascertained in order to evaluate the viability of the project, the market demand notwithstanding. From the questionnaire surveys, it emerged that average land holding is 8.8 acres where that devoted to citronella averaged 0.6 acres equivalent to 6.8% of the family land holding. As discussed under sensitivity analysis elsewhere above, cultivating grass on land below 1 acre may not be economically viable. And this advice should be communicated to the farmers in good time so that reallocation may be effected.

Efforts were made to factor in environmental benefits of the project. Famers have been encouraged to plant trees to meet their own energy needs as well supply firewood to the distilling factory. In itself, the initiative of tree planting ahead of the project implementation was a move in the right direction and full of foresight.

**(iii): On the viability of capital investment projects**: Under the MATF support in Palissa, interventions targeted introduction of oil crops coupled with a distiller for oil extraction. Viability of the distiller is dependent on achievement of a critical mass of farmers with capacity to fully engage the distillation plant but as things stand now currently, this is a tall order. With grass cropping having stalled at only 36 acres, and the plant already facing technical challenges, it is doubtful whether this plant will ever be put to economic use and this casts doubts on the merits of investing MATF funds on technology transfer projects that entail construction of capital intensive facilities.

# CHAPTER FOUR: FACILITATION AND MANAGEMENT

## 4.1 Overview

Since inception in 2002, MATF has been offering competitive grants to institutions involved in generation and/or dissemination of proven agricultural technologies to farmers and other end-users. The key elements of the strategy adopted by the Fund have been facilitating linkages between diverse technology transfer practitioners, encouraging greater participation of farmers in technology transfer processes and using innovative cost-effective transfer approaches and methods in order to enhance the dissemination and use of existing viable technologies. As a catalyst in technology adoption, MATF therefore has to strive to remain relevant among other players in a sector. It is therefore fitting for the MATF to routinely pause and review the relevance, effectiveness and appropriateness of their mission strategies which is probably a major motivation in undertaking programmed evaluation studies. In sections below, we present some observations on the role of MATF as the engine behind Round V grants.

## 4.2:The Grant Management cycle

The MATF originates the Grant Cycle by advertising a call for concept notes in annual cycler which has now gone to cycle Round Seven. The most appropriate applicants are short-listed by an Advisory Panel (AP) comprising seven agricultural development experts from Kenya, Tanzania and Uganda based on set criteria and are eventually invited to submit detailed proposals. The proposals are subjected to a review entailing both desktop and field investigations to assess the capacity of the applicants, their partners, and ensure that the projects are feasible.

The fund prioritises projects which move beyond production and into value addition and access to markets. The technologies must have been tested under farmer conditions, yield impact within a short period of time and have the potential for scaling out. Successful projects receive grants of between £ 8,000 and £ 90,000 for a project that can last up to 3 years.

## 4.3: Grant management process

To ensure there is accountability, the AP members along with representatives from both donor organisations and FARM-Africa, provides support and strategic direction for the management of the fund.

MATF builds capacity of grantees in relevant areas such as participatory monitoring and evaluation (PME) and financial management. Quarterly and annual reports are submitted by every project to the MATF secretariat. Grantee organisations and selected partners also participate in annual experience sharing workshops. Field monitoring visits are undertaken annually by members of the Advisory Panel together with MATF monitoring officers. These provide valuable feedback, and learning is documented and shared among all partners through workshops, conferences, newsletters, booklets, videos and its website - www.maendeleo-atf.org. Impact studies and external evaluations are conducted within 6 months of the completion of each project. FARM-Africa carries out robust external mid-term evaluations and financial audits for all rounds of projects.

## 4.4:Efficiency in grant management

In the view of this study, and with the exception of monitoring (see below), the support and leadership offered by the MATF in grant management is adequate, professional and ethics based. Indeed, even after the departure of 2 key MATF personnel in form of the Fund Manager and the Monitoring Officer, Round V seems to be proceeding well owing to the

institutional mechanism applied in administration of the grant. To enhance the support provided by the MATF, some suggestions are made as follows:-

**(ii) Need to minimize geographical scatter of projects**

Round V projects displayed a very wide geographical scatter with the Masasi case being extreme. This must of necessity pose challenges to management and monitoring as a lot of time is taken travelling in between sites implying less time available for actual contacts with project implementation. MATF would probably achieve better value for funds if the competitive selection of projects was also sensitive to their geographical scatter. With all objectivity, this study did not clearly understand the merit of spreading activities of once project across three widely scattered districts or even across national borders.

**(ii) Need to minimize instability of partnerships**

Evaluation of Round V projects came across numerous incidents of partners who had with drawn from project implementation for diverse reasons. Indeed. Each of the 5 projects had incidents of partners who had to be replaced in course of project implementation causing projects to suffer delays. In some cases, withdrawal of partners entrusted with introduction of the technology caused some projects irreparable delays. The proposal here is for the MATF to ensure commitment in the partnership upfront of funding. Further, the role of main grantees should actually shift from 'coordination' to actual implementation of the technology. MATF should be careful with lead proponents who do not command the targeted technology.

**(iii) Effectiveness of Programmed Monitoring**

Programmed monitoring of the MATF takes the form of grants progress reports that assess project achievements against targets specified in log frames while each Round of Grants is then subjected to both internal and external evaluations through which, the MATF is able to remain in touch with and hopefully steer project implementation. Additionally, the MATF routinely commissions *ad hoc* reports and experience sharing workshops through which lessons accruing across projects are drawn out and shared. This study observed that the MATF Programme is highly documented, is actually driven by feedback from monitoring but lacks a centralised repository into which information feeds for ease of storage, retrieval and synthesis. Instead, monitoring information is scattered in numerous progress reports through which one has to plough to obtain summary data on a project- a case best illustrated by the non-availability of basic data such as number of project beneficiaries in Vihiga in the case of the Fruit Processing project, etc. Recommendations are made as follows:-

- MATF to introduce an MIS programme that facilitates easy retrieval and summary of incoming monitoring data. Such data should then be periodically summarised to provide fact sheets on each project possibly through editing and collaborating returns from the Progress Monitoring Tables currently filled as part of Quarterly Progress Reports.

- The evaluation team recommends that MATF should simplify and harmonize monitoring reports so that lead agencies can focus on reporting key deliverables in not more than two pages every quarter. Such a move would also enable the project staff to identify problems early enough and increase the effectiveness of monitoring visits.

- In addition to reporting lessons learnt in formal reports and newsletters, key lessons from MATF experience should be fed-back not only to implementing grantees but also to potential grantees (applicants) as guidance notes so as to raise the overall quality of proposals submitted to the programme. MATF has confirmed that information accruing from evaluations is used in capacity building from new grantees.

During discussions on root causes of the few observed deviations from action plans, the MATF Team did voice concerns regarding the inadequacy of the annual cycle of programmed monitoring which effectively limits their physical interaction with the projects. Indeed, this study team concurs and finds no other effective substitute to intensified activity monitoring through field work. Subsequent to this, our recommendation is that, Project Monitoring visits by MATF Staff be increased to two annually.

# CHAPTER FIVE: SYNTHESIS OF FINDINGS AND LESSONS LEARNT

## 5.1: Performance of the MATF Round V Projects

An analysis of the design, implementation process and outcome of specific Round V project was provided in chapter 3 above. In this section, a synthesis of performed of the entire Round V is attempted based on outcomes in Chapter 3 and other requirements of the study TORs.

### 5.1.1: Overall performance

Table 5.1 presents a matrix in summary of the performance of Round V projects when assessed against both the MATF objectives and criteria as amplified in the Study Terms of Reference and the internal targets set by each project as per approved Log-frames. Total scores for different projects were then compared to facilitate performance ranking and from the matrix (Table 5.1 below), it's clear that with the exception of the Citronella/ Lemon Grass Project which is still under implementation, all other Round V projects netted over 50% score with three projects scoring over 79%. It can be concluded the objectives and targets of the MATF were served and fulfilled in Round V. The success of the Round is further confirmed by the fact that three projects namely; - Organic labelling of Cashew nuts, ERTA Onion and NERICA III rice moved beyond mere demonstration to actual implementation. As well, through agronomic intervention was not a major focal area for the Solar fruit processing project, it did nonetheless provide alternative means to livelihood for sugarcane growing farmers. These therefore were essentially good projects whose effects and impacts and possible shortfalls are collated here below.

### 5.1.2: Performance against overall goals

a) Contribution to the overall MATF goal and purpose

Evaluated against the MATF Goal of improving the agricultural GDP and rural livelihoods in East Africa through agricultural innovations while enhancing productivity of natural resources, all projects attained full scores on this parameter implying that, their respective designs were aligned to the overall MATF goals and objectives. This revalidates the effectiveness of the selection process employed by the MATF.

(b) Some projects failed to address own overall goals

Towards evaluation of the focussing of projects to own goals, this study undertook to evaluate project success towards achieving internal self goals starting with the overall goal. It emerged that, with the exception of the ERTA Onions project, all other projects maintained their sites trailed on overall goals which were subsequently addressed as borne out but reports and outputs. However, the ERTA Onions project ultimately failed to define the kind of alliance anticipated and neither was one ever created or enhanced. This should serve a big learning point for the MATF.

(c) Relevance of technologies piloted

When evaluated for adoption of Technology against sub-criteria identified in the TORs, 3 projects performed quite well given the following observations;-

- Farmers in Masasi have adopted organic cashew production and are aggressively recruiting others to join thus implying deep faith in the process;
- Farmers in Mangola and Kieni have adopted better agronomic practices and have expanded acreage under bulb onions;

Such direction is indicative of the fact that, the projects were needs-driven and strategically aligned to local interests. The exception again is the case of solar drying technology which, in spite of demonstration, farmers are yet to adopt the same but have on the contrary aggressively taken to production of tissue culture bananas which were introduced as a side

activity to the technology-thus creating the impression that banana cropping was indeed a felt need but not necessarily for processing. The same could be said of the proposed processing of citronella and lemon grass oils where the distillery is lying idle while growing of the oils crops has essentially stalled due to poor pricing mechanism. At Namutumba, then proposed branding, milling and marketing of upland rice did not take off due to factors that were apparently overlooked during project design. The lesson here for the MATF is stark clear-data submitted in support of proposals has to be ascertained and collaborated. Without prejudice, the MATF may find it cost-effective to expose the selection process to external inputs so as to afford a closer and objective review of the final shortlist of proposals.

**Table 5.1: Summary of Project Performance as per Evaluation Criteria**

| Evaluation criteria | Parameter | Possible score | Cashew nuts in Masasi | Solar fruit drying | ERTA Onions | NERICA III | Citronella |
|---|---|---|---|---|---|---|---|
| Contribution to MATF goal | Relevance of outputs | 2 | 2 | 2 | 2 | 2 | 2 |
| Achievement of internal goal | Relevance of outputs | 2 | 2 | 0 | 0 | 2 | 2 |
| Technology | Need driven | 2 | 2 | 0 | 2 | 2 | 2 |
| | Impacts and FS | 3 | 2 | 2 | 3 | 3 | 1 |
| | Social/gender impacts | 3 | 3 | 3 | 1 | 3 | 2 |
| | Safeguards for sustainability | 3 | 3 | 1 | 2 | 2 | 1 |
| | Credit and saving scheme | 3 | 0 | 0 | 3 | 3 | 0 |
| | Feasibility of replication | 3 | 3 | 2 | 3 | 3 | 2 |
| Methods | Effectiveness | 3 | 3 | 0 | 3 | 2 | 1 |
| | Innovativeness | 3 | 3 | 3 | 3 | 2 | 1 |
| | Cost sensitivity | 3 | 3 | 2 | 3 | 3 | 1 |
| | New methods for tech transfer | 3 | 3 | 2 | 3 | 2 | 1 |
| Partnerships | Adequacy | 3 | 2 | 2 | 3 | 3 | 2 |
| | Effectiveness of role play | 3 | 2 | 1 | 3 | 3 | 2 |
| | Triggers for effectiveness | 2 | 2 | 2 | 2 | 2 | 2 |
| Impact assessment | Outputs, yield and distribution | 3 | 3 | 1 | 1 | 1 | 1 |
| | Economic impacts | 3 | 2 | 1 | 3 | 1 | 0 |
| | Env. Impacts | 3 | 3 | 2 | -2 | 3 | 2 |
| | Value chain development | 3 | 3 | 1 | 2 | 1 | 1 |
| | Trigger to new enterprises | 3 | 3 | 2 | 2 | 2 | 2 |
| | Achievement of impacts (targets) | 3 | 2 | 0 | 1 | 1 | 0 |
| *Total Score* | | *55* | *49* | *28* | *46* | *45* | *25* |
| *Percentage Score* | | | *89.1* | *50.9* | *83.6* | *81.8* | *45.5* |
| **Rank** | | | **1** | **4** | **2** | **3** | **5** |

### 5.1.3: Status of technology adoption

Discussion of impacts of the MATF Round V Projects would be incomplete without comments on the status of adoption of the respective technologies. In this section therefore, the Rogers Innovation Adoption Model (RIAM) was applied in an attempt to understand the status of adoption and the possible direction to expect. According to the RIAM, technology adoption is never spontaneous but progresses with time from a take-off stage accelerating through mainstream adoption and tappers off when saturation is attained in a pattern that closely resembles the normal growth (sigmoid) curve (Fig 5.1a &b). This tool was applied in the analysis of status and progress of adoption of the MATF Round V projects with a view to gauging performance and direction.

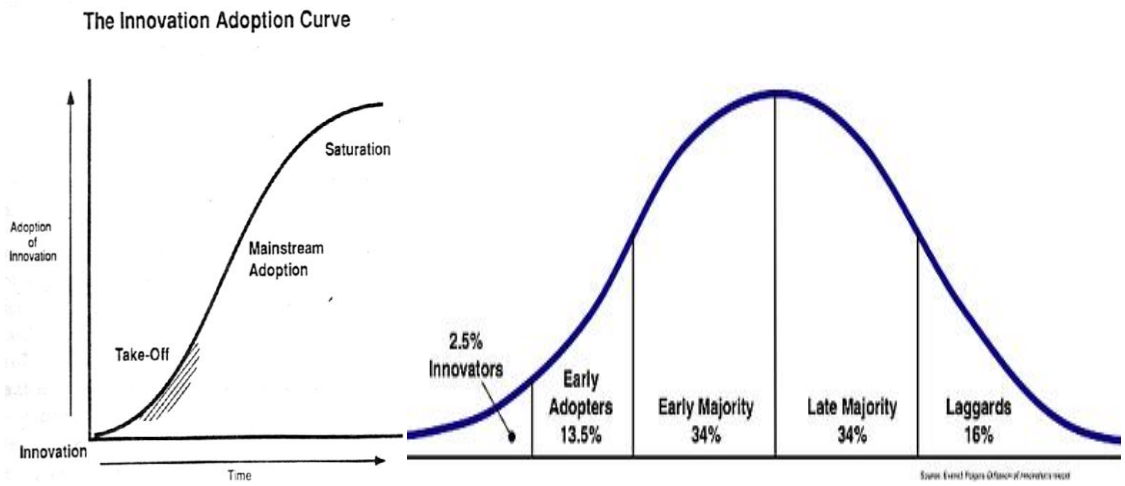


**Figure 5.1: The Rogers Innovation Adoption Model**

Status of progress in technology adoption and project development is summarised in Table 5.2 below. Analysed against this model, it is apparent that two projects, namely organic farming of cashew nuts and NERICA III Rice have fully taken off as they are in the Early Majority Stage. As well, though the ERTA Onions project is at the early Adopters Stage with Commercial Villages Concept yet to take root, this project is certainly in the right track. Subsequently therefore, 3 out the 5 Round V projects are certainly headed for takeoff and full adoption. As well, though the Citronella project is stuck at the Innovators, stage, it could still be rescued if marketing problems are resolved implying that this project is also essentially not lost. The exception to this trend however is the Solar Fruit processing project whose driers apparently have no market in all the three districts where farmers prefer to sell the fresh fruit. The worst case scenario is Vihiga where the driers are in a poor state of disrepair even before commissioning. The solar drying aspect of this project may never actually take off.

**Table 5.2: Stage and status of technology adoption**

| Project | Status | Indicators | Future direction |
|---|---|---|---|
| Organic farming of cashew | Early majority | Villages have started adopting organic farming outside of the MATF | Project is growing |
| Solar processing of fruits | Still at take off stage | While Homabay is at the Innovators stage, Busia and Vihiga have failed to attract innovators | Project faces an uncertain future |
| ERTA Onions | Early Adopters | Commercial Villages yet to take off in both Mang'ola and Kieni | Project is certainly growing. Support needed to enhance adoption of commercial villages model. |
| NERICA III Rice | Early | Expansion of upland rice | Agronomic aspect was successful but |

| Project | Status | Indicators | Future direction |
|---|---|---|---|
| | Majority | is taking root.<br><br>Marketing initiatives have essentially stalled | marketing essentially failed. Project made no impact on improving profitability |
| Citronella and lemon grass in Palissa | Project stuck at Innovators stage | Even the originally targeted farmers pulled out due to poor market prices | Successful rehabilitation of the project will demand that hectarage under oil crops be increased to at least 100 acres ie beyond the early majority stage. |

### 5.1.4: Performance of the credit and saving scheme

An essential component of Round V Grants was the mandatory savings among groups as a strategy to firstly create a revolving fund for on-lending amongst members but also to create a culture of saving and austere financial management upfront of income anticipated from technology adoption. Further, and in partnership with a Financial Institution, the MATF will release additional funds to complement the farmers' savings towards the revolving fund to be managed by the Apex Association. Some groups such as Africa 2000network also experimented with an in-kind credit scheme where farmers were advanced form inputs at a small fee by repayment has been challenged whereby impacts of poor rains on rice crop has been blamed for inability to pay. Our general observations on this component are as follows:-

i) The revolving fund was to be implemented under auspices of the Apex Organisations which are yet to be established and operationalized in respect of some grants.
ii) From past efforts, grants originally advanced to members were never recovered as is currently the case with NARICA III rice in Namutumba District. This problem is likely to persist as rural communities view NGO funds as free money never to be repaid. We would recommend that the revolving fund be administered only to groups that have successfully implemented other components of the grant. Where technology adoption has failed or stalled, administration of the revolving fund would be self defeating.

Two out of five projects are yet to start the mandatory saving schemes while the credit scheme operated under NERICA III is already facing poor loan recovery. As well, attempts by lemon grass farmers to access commercial credit from a bank failed because of the attendant stringent conditions. In the feeling of this study, it is probably unrealistic to demand savings of people subsisting below the poverty line (as were targeted by the Citronella/ lemon grass project) since their main preoccupation is to earn the next meal and any pseudo saving will most certainly be recovered through borrowing elsewhere. Default rate among such category of creditors is quite high, little wonder that banks have no place for them. On the contrary, were such a group to be empowered to undertake sustainable production of either goods or services, they immediately become creditworthy with the bank in which case, the revolving fund as currently proposed by the MATF would be more useful in the expansion of business rather than a consumer product. As a principle, this study recommends that more emphasis be laid on development of sustainable enterprises contingent to which a revolving fund to expand the businesses can be advanced. At no time should funds be extended to groups where adoption of technology has stalled.

### 5.1.5: Comments on viability of implementation methodologies

MATF interventions in the seven projects evaluated were channelled through groups, some of which pre-existed the project while others such as in the case of Oyster mushrooms were created purposely for the project. Within the groups, technology transfer was mainly achieved through either Training of Trainers (Fruit processing) and Farmers Field Schools based on demonstration plots (cashew nuts, upland rice). From Table 5.3 below where an

analysis of the status of specific projects against methodology used is provided, it is apparent that, the methodology had little role to play towards success of the project. Several projects applied the same methodology with diverse results implying that the perceived relevance of the technology to the strategic interest of farmers had overriding influence on the success of the technology other than how it was packaged. The case of organic cashew farming in Masasi is again unique as it had no component of capital investment yet the farmers fully identified with it given that it addressed the cashew industry which is the dominant source of livelihood in the Mtwara Region.

**Table 5.3: Impact of dissemination methodology on project outcome**

| Project | Methodology used | Status of technology | Opinion |
|---|---|---|---|
| Organic farming of cashew | FFS with community based Extension providers | Has taken root | Intervention targeted local strategic interests |
| Solar processing of fruits | TOT based on practical demonstration of solar fruit processing using driers. | Solar drying technology has not been utilised let alone replicated. | Intervention not quite aligned to local strategic interests |
| ERTA Onions | Demonstration by technical service providers backed up by COTEs | Agronomic impact is substantial but CVM yet to take off | Project addressed concerns in local strategic interests |
| NERICA III Rice | TOT backed up by credit scheme | Growing of upland rice has taken root but intervention in value addition has all but failed. | Project directly addressed local food and income poverty which are strongly felt needs |
| Citronella and lemon grass in Pallisa | TOT, provision of seedlings and construction of oil extractor | Project has failed to attain critical mass for production. Economic viability will require massive intervention on both production and market process. | Project failed to meet farmer expectations for income generation. |

### 5.1.6: Economic soundness of projects

Of the four Round V projects that have been completed, three displayed excellent returns on investment as exemplified by high gross margins, B/C ratios and return on MATF finances implying that these were worthy investments. The highest returns to investment were posted by the ERTA Onions with both Mang'ola and Kieni posting returns of 10.67 and 8.68 respectively implying that the MATF investment was recouped from operations both in Kieni and Mangola. The ERTA Onions represents the most lucrative of the projects as they also posted high benefit to cost ratios implying that farmers made money.

In the case of solar drying technology, return on MATF investment is negative to very low when both pineapples and bananas are sold in the open market. However, with processing, returns to MATF investment increases to over 6 pounds thus confirming the future impact of adoption of this technology. However, recouping of MATF investment is doubtful as farmers still prefer to divert produce to destinations other than processing implying that their interests probably lie elsewhere. The import of this pattern is that, while there is a ready market for both green and ripe bananas, that of solar dried fruit is yet to develop and farmers cannot afford to speculate with their limited means to daily livelihood.

**Table 5.4: Return to MATF Investment**

| Project | Return on production costs | (Return on MATF Investment) | Future outlook |
|---|---|---|---|
| 1. Increasing Farmer Incomes through Improved Farm Management, Organic Certification and Fair-Trade Labelling of Cashew Nut Production in Masasi District , Mtwara Tanzania | 1.2 | 1.67 | Cost recovery will improve once yields and market prices stabilize. |
| 2. Enhancing Regional Trade Alliances for Bulb Onions, targeting the Nairobi Onion Market | Kieni 2.32<br>Mang'ola 2.40 | Kieni 8.68<br>Mangola 10.67<br>Cumulative 9.67 | This project has taken off but a Regional Trade Alliance marketing alliance is yet to be put in place |
| 3. Fresh Fruit Processing and Enterprise Development in West Kenya through the use of Solar Drying Technology | Pine apple 2.68<br>Bananas 0.62 | Pineapples 0.37<br>Bananas (0.3) | The justification of provision of solar driers in this project remains doubtful |
| 4.Promoting NERICA III Upland Rice Production, Processing and Marketing in Namutumba District Uganda | 1.55 | 4.97 | MATF Investment has been recovered in spite of failed marketing initiatives.. |
| 5. Production and processing of Citronella and Lemon grass in Pallisa district | -0.2 | (0.08) | This project requires to be refocused to enhance cost recovery even to farmers. |

### 5.1.7: Relevance of value addition and market penetration

Round V had a deliberate bias towards value addition and market penetration which are the preferred interventions in the strategy to commercialise small scale farming and poverty alleviation in East Africa. Assessed against this policy direction and strategy (Table 5.5), only the Masasi Project was successful as all others either missed out on this goal or were dogged by technological challenges. Indeed, the case of cashew nuts in Mtwara did confirm that leadership in policy implementation can also successfully emanate from grass roots.

**Table 5.5: State of achievement of value addition and marketing goals**

| Project and strategy | Proposed marketing strategy | Observed performance | Opinion |
|---|---|---|---|
| 1. Organic Certification and Fair-Trade Labelling of Cashew Nut Production in Masasi District , Mtwara Tanzania | Organic certification and eco-labelling for market penetration | Organic certification achieved while eco-labelling is underway. Top niche market accessed, certification | Project met all set goals |
| 2. Enhancing Regional Trade Alliances for Bulb Onions, targeting the Nairobi Onion Market | Creation of a marketing alliance between Mang'ola and Kieni producers | The market alliance is not clearly visible. | The alliance aspect was not achieved in spite high impact on production. |
| 3. Fresh Fruit Processing and Enterprise Development in West Kenya through the use of Solar Drying Technology | Solar drying of fruits for preservation and market penetration | Solar drying technology was not adopted as farmers favoured sale of fresh produce. | Processing and marketing aspect was not successful |
| 4.Promoting NERICA III Upland Rice in Namutumba District | Milling and branding for market | Milling and branding failed to take off. | Marketing goal not achieved. |

| Project and strategy | Proposed marketing strategy | Observed performance | Opinion |
|---|---|---|---|
| Uganda | penetration | | |
| 5. Production and processing of Citronella and Lemon grass in Pallisa district | Production, processing and marketing of oil crops for increased income. | Cropping and processing of oil crops has stalled. | Project goals far from being achieved. |

### 5.1.8: Viability of Partnerships

Analysis here focussed on whether assembly of partnerships was needs-driven, cost effectiveness, availability of partners for the project, skills mix and team harmony. Projects had mixed performance on this and indeed projects that did well had particularly wanting partnerships. While some partnerships were apparently quite engaged in the projects, others appear to have faded off; others were just hanging -on while others apparently had no value added to the project. This finding underscores the need to rationalise partnerships as earlier proposed.

### 5.1.9: Potential for Sustainability

Assessment of project sustainability based on existence of support structures such an Apex Association, etc (table 5.6) revealed that most projects have fair to high potential for sustainability. The core issues undermining sustainability are obstacles to technology adoption e.g. high investment costs, lack of commitment on part of members and environmental concerns.

**Table 5.6: Availability of Apex Associations**

| Project | Viability of Apex Association | Future direction |
|---|---|---|
| 1. Increasing Farmer Incomes through Improved Farm Management, Organic Certification and Fair-Trade Labelling of Cashew Nut Production in Masasi District , Mtwara Tanzania | Has the MHQFP Co Ltd which is a company limited by guarantee comprised of 6 registered producer groups | Association will oversee pursuit of organic and fair trade certification and processing of cashew as planned |
| 2. Enhancing Regional Trade Alliances for Bulb Onions, targeting the Nairobi Onion Market | Has formed 8 CVs but which still require strengthening. Both Mang'ola and Kieni are yet to establish Apex Associations | CVs will probably develop to regulate production and marketing of bulb onions |
| 3. Fresh Fruit Processing and Enterprise Development in West Kenya through the use of Solar Drying Technology | Both Busia and Homa bay have 2 parallel Associations but Vihiga is yet to form one. | Apex associations will impact on banana and pineapple marketing but solar |
| 4.Promoting NERICA III Upland Rice Production, Processing and Marketing in Namutumba District Uganda | Has an Apex Association | Focus has to be on increasing land productivity and value addition |
| 5. Production and processing of Citronella and Lemon grass in Pallisa district | Association is yet to be formed. | Association could assist partners in addressing the array of challenges to this project |

### 5.1.10: Social Impacts

Positive and adverse social impacts were assessed on the basis of tendency of project to overwork some segments of society, creating of social strive, domestic strive, tendency to

empower/marginalise/ impoverish some groups. All projects scored high on social impacts as they equally provide opportunities for men, women and children. However, it was noted that that some projects do have potential to leave behind adverse social impacts as exemplified by households that are already owed money in the Citronella project.

### 5.1.11: Environmental Impacts

Round V was unique as it was devoid of adverse environmental impacts. On the contrary, most projects had positive impacts on the environment. An analysis of the environmental scenario of round V is provided in Table 5.7 below.

**Table 5.7: Environmental impact assessment of Round V projects**

| Project | Positive impacts | Adverse impacts | Net effect |
|---|---|---|---|
| 1. Increasing Farmer Incomes through Improved Farm Management, Organic Certification and Fair-Trade Labelling of Cashew Nut Production in Masasi District , Mtwara Tanzania | Controls chemical use through adoption of organic farming, non use of fire etc. | None | Positive |
| 2. Enhancing Regional Trade Alliances for Bulb Onions, targeting the Nairobi Onion Market | Has promoted soil conservation and tree planting | Heavy reliance on agrochemicals | Potentially adverse |
| 3. Fresh Fruit Processing and Enterprise Development in West Kenya through the use of Solar Drying Technology | Promotes exploitation of solar energy | Poor disposal of waste polythene | Positive |
| 4.Promoting NERICA III Upland Rice Production, Processing and Marketing in Namutumba District Uganda | Promotes wetland conservation through uplands rice | Tendency to revert to wetlands | Need to strengthen the apex association |
| 5. Production and processing of Citronella and Lemon grass in Pallisa district | Promotes extraction of natural oils to safe on over-extraction of natural resources | Use of trees in oil extraction | Intensify agro forestry to reverse potential damage |

### 5.1.12: The case of Lemon grass processing at Pallisa

This project is in its second year of operation having taken off in January 2009. However, implementation of this project is dogged by challenges ranging from farmer participation, production, processing, oil marketing, return on investment etc all of which point to a possibility of failure. This study is also aware of past separate intervention by both the Kilimo Trust and MATF to resolve the management problems apparently to no avail. This study is of the view that unless the twin problems of inadequate production and market prices are resolved, the project is headed for failure. Indeed, as currently operated, it risks causing participating farmers to slide deeper into poverty.

## 5.2: Overall ranking

Evaluated against set criteria as outlined in sections above, this Study concludes as follows:

i) The project on organic farming of cashew nuts has clear merits as it scored 89.1% of the total score. This is the project that has empowered cashew farmers to provide leadership in transforming the cashew nut industry in southern Tanzania. It is a project whose impacts are likely to be felt far and wide.

ii) The projects on ERTA Onions and NERICA II Rice came a close second and third respectively with total scores upwards of 80%. Essentially, the three projects were well aligned to strategic interests and this accounts for the high degree of enthusiasm attracted. Interventions to enhance market penetration however remain elusive.

iii) The Solar fruit processing project came a distant fourth on account of introducing a technology that was apparently not in demand. The move by this project to introduce tissue culture banana is inadvertently paying dividends.

iv) Production of lemon grass for oil extraction in Pallisa is clearly facing challenges- the most fundamental of which is failure to guarantee return for farmers' investments. This project is distinct in that, it could cause farmers to slide deeper into poverty.

## 5.3: Key Lessons from the MATF Round V Projects

In sections below, we draw the core lessons on accrued from implementation of Round V projects. The same lessons should serve as the core recommendations of this study.

### 5.3.1: There is need to interrogate proposals much more closely:

This lesson accrued from the cases of ERTA Onions, Solar drying of fruits and production of citronella oil whereby:-

i) The proposal to enhance a regional alliance in onion marketing was never at all addressed in project implementation implying that it was just that- a good title. This study has however established that both Mang'ola and Moshi account for the lion's share of bulb onions traded in Nairobi and the idea of forming an alliance between sounded quite interesting.
ii) The proposal to introduce solar processing of fruits in Western Kenya used data that indicated a surplus in fruit production that goes to waste in this region as justification for introduction of solar drying. It eventually turned out that proceeds from the Grant were applied firstly in the production of the same fruits targeted for processing and preservation.
iii) Data on crop-oil based income was used to defend the proposal on cultivating lemon grass for oil production. It however turned out that that prices actually paid to farmers are way below the production costs and the same project threatens to push farmers into deeper poverty.

The recommendation here is that the MATF should consider the merits of exposing the final shortlist of proposals to external review so as to afford them a much closer scrutiny to facilitate ascertaining of facts, orientation of partnerships etc.

### 5.3.2: MATF needs to factor in an after-projects evaluation

Based on analysis of the status of project adoption, it became clear that the final evaluation of MATF-funded projects actually occurs when projects are possibly at the Innovators and Early adopter's stage which represents less than 20% in project development. A scenario in which the project is concluded at the early adopter stage has critical implication to attainment of objectives since, attempts to document such projects after a three year implementation period will basically capture lessons accrued from involvement of innovators and early adopters and largely leaves out that of later entrants. The impression of this study is that, the MATF stands to gain a lot from taking stock of status of concluded more than 2 years ago. Based on such a study, it probably would MATF may find it prudent to consider funding the scaling up of technologies that are already tried on the ground other than playing extension of the research field.

### 5.3.3: Revolving funds should be tied to technology adoption

The role of revolving funds within projects was not always clear. Indeed, this project came across one Round V group which is yet to adopt the primary technology but is now mobilising towards receipt of revolving funds. Indeed, the relationship between the revolving fund and the technical intervention was not always clear and our recommendation is for revolving funds to be released as part of an approved and negotiated business strategy. Further, revolving funds should only be released as an incentive to groups where technology adoption is evident.

### 5.3.4: Extreme geographical scatter is counter-productive

On the MATF V projects was implemented across national boundaries, a second one was replicated in three districts while a third one was isolated deep in southern Tanzania and of necessity, the cost effectiveness of such design comes to focus. Indeed, this study failed to document any merit pertaining specifically to replication of projects across administrative boundaries given that the same were later on managed as separate entities and often lacked the attention accorded to a single centralised project. In the view of this study, the project recruitment process should aim to minimise geographical scatter while maximising on Grant Value.

### 5.3.5: Merits for investing MATF resources in construction projects remain unclear:

Under the Round V grants, MATF supported two projects that involved construction of physical infrastructure in form of solar driers and an Oil Distillery both of which have but stalled. In the case of solar driers, farmers are apparently in favour of selling fresh produce whereas at Pallisa, production of lemon grass for processing has stalled causing the plant to remain idle. Further lessons can be borrowed from Round IV Grants whereby Rice mills constructed in Luweero with MATF support proved non-viable while cost recovery from masonry tanks constructed in Western Kenya (SANA project) proved impossible. In the opinion of this study, MATFs funds should largely target capacity building for target groups who can then explore means of accessing desired technologies within the market in which, case, the example of Masasi where empowered farmers have been able to attract shelling factories outside of MASTF provides an ideal case study.

### 5.3.6: Some Round V projects require continued support

As Round V comes to a close, several issues remain outstanding and the same are flagged out as recommendations:-

Ordinarily, the final evaluation takes place at the conclusion of a Round of funding and when the MATF is already clear on which grants to extend. However, in the impression of this study, two cases require additional support to extend capacity building as follows:-

- The Dutch Connexxion requires support to build further capacity for the board of MHQFP Ltd.
- The ERTA Onions project merits funding to build capacity for the Commercial Villages which are still threatened by market intermediaries.
- The MATF should make a decision as to the merits of extending the revolving fund to grantees where technical intervention has stalled.

### 5.3.7: Price instability remains a critical barrier in the commercialisation of agriculture

Round V of the MATF Grants was heavily oriented towards promotion of value addition and other strategies aimed at attaining market penetration to secure higher return on agricultural investments. As it turned out, with the exception of EARTA Onions where market project activities achieved higher prices for produce all other projects were dogged by poor market prices and inability to effectively penetrate markets. Technologies that were anticipated to

facilitate value addition were either not accessible while attempts at market linkage were not entirely successful. The implication here is that, there are no clear lessons to carry forward and, given the critical importance of commercialisation as a strategy to rural development in East Africa, there is probably need for the MATF to consider committing additional resources towards promotion the search and transfer of workable technologies in this area.

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## APPENDICES

## Appendix 1.1: Terms of Reference

## Appendix 2.1: Itinerary for fieldwork

## Appendix 2.2: Data capture tool applied in the study

## Appendix 2.3: Project documents from the client

## Appendix 2.4: List of people met

## Appendix 2.5: Pictorial presentation of projects evaluated

## Appendix 2.5.1: Organic ceryficfication and fair trade labelling of cashewnuts (Masasi)

## Appendix 2.5.2: Enhancing Regional Trade Alkiances (EARTA) Mang'ola and Kieni

## Appendix 2.5.3: Fresh fruit processing and enterprise development in western Kenya through use of Solar Drying Technology

## Appendix 2.5.4: Upland Rice – Namutumba District

## Appendix 2.5.5: Citronella and Lemon Grass – Pallisa District