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Agriculture, IITA, and the International Center for Tropical Agriculture,
CIAT**



**Monitoring and Evaluation Trip to Tanzania and Malawi
October 27 - November 9, 2001**

Ver 105320

TRIP REPORT

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INTRODUCTION

Following the activities planned in the workplan a monitoring and evaluation trip was conducted in Tanzania and Malawi. An agenda of visits was organised by SARRNET officers in Dar es Salaam and Malawi including the private sector industries that have been identified during first 2 rounds of visits (November 2000 and March 2001). During the last visit in March some activities have been proposed and during this trip an review and evaluation was made of the advances and the resources obtained as well as identification of the constraints that have been affected the implementation of the new activities. In general the team observed important advances in both countries in the process of building closer linkages and mutual trust with the private sector partners. The following sections present a report on:

- Findings that the team was able to see on the ground,
- Suggested new actions and
- Some recommendations.

Structure of the report:

This report includes the following topics:

ANNEX 1:

ANALYSIS AND ADJUSTMENT OF THE ORIGINAL WORKPLAN ACCORDING TO THE ADVANCES MADE

A critical analysis was made of each of the four themes that have been initially included in the workplan. As a result some activities were eliminated, others were adjusted given the limited time available up to the end of SARRNET II (September 2002). Emphasis was put on identifying those activities that can be realistically achieved during the remaining 10 months of the project and assigning responsibilities for its implementation.

ANNEX 2

INFORMATION GATHERED IN TANZANIA: THIRD ROUND OF CONTACTS AND VISITS TO INDUSTRIES

During first round of visits ("Industrial demand study) the team contacted in total 32 companies. During the second round of visits, some concrete activities were jointly planned with 4 different size animal feed milling companies. SARRNET Tanzania and the Kibaha root crops programme have given logistical support to these field activities. During the visit covered by this report these industries were contacted again, a review was made of the results obtained and a new action plan was jointly developed. This information is presented in Annex 2.

ANNEX 3

IDENTIFICATION OF A POTENTIAL SITE IN TANZANIA FOR THE ESTABLISHMENT OF A PILOT PROJECT

As part of the workplan (Theme III, activity 2) SARRNET is expected to identify potential site in Tanzania and Malawi and potential partners to establish pilot project based in the integrated research and development approach. Given the time constraint and the need to move forward with this activity SARRNET coordination has taken the initiative of speeding up the establishment of the pilot project. During this trip the team, based on secondary reliable data on the potential of one cassava production

region, decided to visit one village (Bungo, 140 Km south of Dar es Salaam). Annex 3 presents the first data collected by the team during the visit.

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ANNEX 4

ESTABLISHMENT OF A BUSINESS CENTRE TO SUPPORT FEED SECTOR IN TANZANIA
TAFMA (Tanzanian Animal Feed Millers Association) comprises a broad collection of millers, most of whom are small-scale operators as it was confirmed during the survey undertaken by SARRNET. This group is characterised by the poor linkages with research institutes and limited access to new technology and information about animal nutrition advances. The millers are not using feed optimisation software (apart from 2) due to lack of awareness.

SARRNET/FOODNET have been discussing with this group about the possibility of establishing a business service centre that can help the sector to become more efficient and improve the access to modern technology in the animal feed business. These discussions have been advancing and resulted in the motivation of a group of millers to formalise the formation of a business centre named initially TAFIC (Tanzanian Animal Feed Information Centre).

During the team visit to Tanzania a meeting was organised to which 13 animal feed millers attended. During this meeting a set of functions for TAFIC was discussed and a provisional coordination committee was appointed to lead the process that will transform TAFIC into a established, legal group. Annex 4 presents some of the conclusions reached during this meeting.

ANNEX 5

INFORMATION GATHERED IN MALAWI: THIRD ROUND OF CONTACTS AND VISITS TO INDUSTRIES

During first 2 rounds of visits the team contacted in total 11 companies. During the second round of visits, various follow-up activities were jointly planned with 9 companies. SARRNET Malawi have logistical support.

A report prepared by Vito Sandivolo that summarises the results obtained in these activities is presented in Annex 5, complemented with action plans proposed during the team's visit.

ANNEX 6

IDENTIFICATION OF A POTENTIAL SITE IN MALAWI FOR THE ESTABLISHMENT OF A PILOT PROJECT

As part of the work plan (Theme III, activity 2) SARRNET is expected to identify potential side in Malawi and potential partners to establish pilot project based in the integrated research and development approach. Given the time constraint and the need to move forward with this activity SARRNET coordination has taken the initiative of speeding up the establishment of the pilot project.

During this trip, based on previous contacts and information gathered by the SARRNET Team, the team decided to visit the Cristain Service Committee office in Mulanje, an NGO working in villages on both sides of the border with Mozambique. The findings of the meeting are presented in the annex 6.

**ANNEX 1: WORPLAN (after reviews and adjustments made in November,
2001)**

Theme I Establish a private-public consortium to support research and development of Sweet potato and cassava in at least one country (2001-2002)

Activity and dates	Participants	Expected output	Indicator (s) for monitoring progress	Pending Activities
1. Participation in cassava / sweet potato workshop (SARRNET/ ARPTU Bunda College) <i>(Workshop was organized late May 2001)</i>	SARRNET Malawi team	Potential partners identified First by-laws drafted Follow-up agenda defined New: SARRNET to be recognized as a 'technology clearing house' for cassava and sweet potato production and processing technologies	<ul style="list-style-type: none"> • # Participants • Draft document circulated • Agenda of the workshop 	SARRNET Malawi team to organise a database including: <ul style="list-style-type: none"> • Final list of participants (addresses) • Media coverage & pictures, video, etc.. • Proceedings of the workshop • Follow up contacts and effects of the workshop
2. Contacts with Malawian industries identified as having interest in using cassava/sweet potato products <i>(Ongoing activity)</i>	SARRNET Team CIAT/CIAYUCA and local private and public partners	Specific interests identified Action plans developed Information on technology options delivered	Document available with potential partners' characteristic and needs identified and action plans elaborated.	See annex of M&E trip report November 2001 for updated information
3. Contacts with Tanzanian industries identified as having interest in using cassava/sweet potato products <i>(Ongoing activity)</i> ¹	SARRNET Team CIAT/CLAYUCA and local private and public partners	Specific interests identified Action plans developed Information on technology options delivered	Document available with potential partners' characteristic and needs identified.	See annex of M&E trip report November 2001 for updated information
4. Formulation of the Consortium framework for at least one country and define a tentative research and development agenda. ² <i>(ongoing activity)</i>	SARRNET Team CIAT/CLAYUCA and local private and public partners	draft document circulated among potential stakeholders revised version of document available	draft document revised version of document	draft document (in preparation)

¹ Given the limited time and manpower activities in Zambia will not be pursued intensively.

² Potential partners of the private sector are starting to work with SARRNET, Consortium will more feasible later on.

Theme I Establish a private-public consortium to support research and development of Sweet potato and cassava in at least one country (2001-2002)

Continuation

Activity and dates	Participants	Expected output	Indicator (s) for monitoring progress	Pending Activities
5. Preparation of materials on root crop processing (catalogues, prices, layouts, information) for business plan development <i>(On-going activity)</i>	SARRNET CIAT/CLAYUCA	<ul style="list-style-type: none"> Technology options identified according to specific requests and interests expressed by potential partners Technology package available 	<ul style="list-style-type: none"> List of technologies available according to each potential option Document available with specifications, prices, capacities, etc 	<ul style="list-style-type: none"> List of technologies documented and available in both SARRNET Offices Technology information available in electronic and paper form with specification in e.g. prices, capacities, etc <i>To be done by: Sicco Kolijn, Bernardo Ospina, Rupert Best, Julian Buitrago.</i>
6. Meeting for launching the Consortium, if needed, in at least one country ³ <i>(Conditional activity)</i>	SARRNET Team CIAT/CLAYUCA and local private and public partners	At least one consortium established and operating	Official documents like Acts, by laws of the consortium, list of activities/workplan.	Activities will continue to raise awareness about the importance of the consortium approach. <i>To be done by: SARRNET Teams, CIAT/CLAYUCA</i>
7. Implementation, Monitoring and Evaluation <i>(On-going continuous process)</i>	SARRNET Team CIAT/CLAYUCA	<p>feedback information on project results available</p> <p>feedback information delivered to stakeholders</p> <p>Make information available through SARRNET Webpage, ROOTS, to stakeholders including SC, partners</p>	Progress reports, annual reports, SARRNET WebPages, ROOTS, special documents prepared.	Create data base with information related to all the activities that are conducted by SARRNET: <i>To be done by:</i> <i>Malawi Team: Costa & France</i> <i>Tanzania team: Vianey & Sicco</i>

³ If activity number 4 proceeds as expected

Theme II. Detailed understanding of the sub-sector and marketing opportunities to increase a wareness among stakeholders of potential opportunities for the crops in the region

Activity and dates	Participants	Expected output	Indicator (s) for monitoring progress	Pending Activities
1. Review and analysis of information gathered through literature review to make a preliminary identification of market opportunities in Tanzania and Malawi. ⁴ <i>(On-going)</i>	SARRNET Team CIAT/CLAYUCA and local private and public partners	<ul style="list-style-type: none"> • Potential market opportunities for each crop identified <i>(done)</i> • Preliminary cost structure for each market opportunity elaborated for each country <i>(pending, will be done on the results of the on-going field trials)</i> 	<ul style="list-style-type: none"> • List of market options <i>(available)</i> • List of cost structure for each option <i>(pending)</i> 	<p>Cost structure for each market opportunity needs to be created.</p> <p><i>To be done by:</i> <i>Malawi Team: Costa & France</i> <i>Tanzania team: Vianey & Sicco</i> <i>CIAT/CLAYUCA</i></p>
2. Review and analysis of information gathered through surveys currently being implemented (quantitative data on characterisation of market chain for cassava and sweet potato in Tanzania, Malawi and Zambia) <i>(Pending activity)</i>	<p>Consultant teams (Phiri et al.)</p> <p>SARRNET Team CIAT/CLAYUCA CIP</p>	Market chain for cassava flour and sweet potato characterized in Malawi Preliminary data on market chain for cassava products and sweet potato in Tanzania and Malawi available	<p>Reliable data available for Malawi</p> <p>Preliminary data available for Tanzania</p> <p>Preliminary data available for Zambia</p>	Awaiting for final reports prepared by Phiri et al group.

⁴ As discussed before, activities in Zambia will be limited to a minimum due to time constraints.

Theme III Sustainable and appropriate processing technologies adopted by farmers and industrial processors

Activity and dates	Participants	Expected output	Indicator (s) for monitoring progress	Pending Activities
1.Undertake feed formulation and industrial trials with private sector partners on the use of sweet potato and cassava in animal feeds with emphasis on poultry and cattle in Malawi and Tanzania . <i>(On-going activity)</i>	SARRNET Team CIAT/CLAYUCA and local private and public partners	<ul style="list-style-type: none"> • Animal feed trial using cassava <i>(initiated)</i> • Economic analysis of results elaborated <i>(pending)</i> 	<ul style="list-style-type: none"> • Biological data available • Technical data available • Economic data available⁵ 	<ul style="list-style-type: none"> • Technical, economical and biological data of the experiments conducted in Malawi needs to be collected <i>to be done by Vito.</i> • New experiences will be formulated, starting late November 2001 in TZ and Malawi. <i>To be done by:</i> <i>Tanzania: Dev & TAFIC</i> <i>Malawi: Vito & partners</i>
2. Establishment of at least one pilot plant project using the integrated product development approach in at least one country <i>(On-going activity)</i>	SARRNET Team CIAT/CLAYUCA and local private and public partners	<ul style="list-style-type: none"> • One pilot project in operation in Malawi • One pilot project in operation in Tanzania 	<ul style="list-style-type: none"> • Pilot plant build and operating • Farmer's group using the pilot plant • Volumes processed and commercialised 	<ul style="list-style-type: none"> • Identification of local partner (institution and farmers) • Demonstration (sensitisation) of integrated project concept • Establishment of pilot processing plant • Operation of pilot processing plant • Complementary activities (production technologies) • Monitoring and evaluation (participatory) <i>To be done by:</i> <i>Tanzania: Sicco. Vianey,</i> <i>Malawi: Vito. France, Mahungu</i>

⁵ Based on information provided by SARRNET, private sector partners conducted in Malawi (Transglobe and Land O' Lakes) some animal feeding trials. Data on the results of these trials will be collected.

Theme III Sustainable and appropriate processing technologies adopted by farmers and industrial processors

Continuation

Activity and dates	Participants	Expected output	Indicator (s) for monitoring progress	Pending Activities
3. Participation in process of translation of the book "The use of cassava in animal feeding" into English and formatting for web publication ⁶ <i>(On-going activity)</i>	B Ospina / J. Buitrago	Book on "Use of cassava in animal feeding" translated into English and available for web publishing	Book available on the Web for stakeholders	<ul style="list-style-type: none"> • This activity will only be finished by March 2002
4. Participation in translation of relevant cassava post harvest handling and processing technology information into English. ⁷ <i>(On-going activity)</i>	B Ospina/ R. Best/ J. Buitrago/ SARRNET team	Information system available in English in various electronic and hardcopy documents	List of publications and documents available at SARRNET Offices in the form of : WebPage publications, CDs, Video, Powerpoint presentation Paper documents.	<ul style="list-style-type: none"> • Finish translation of the book by March 2002 • Finish translation of document "Cassava in poultry feeding" (March 2002) • Translation of other publications to be identified

⁶ This activity is financed by FOODNET

⁷ Some documents have already been made available at SARRNET offices

Theme IV. Stakeholders trained in new skills to support the market driven strategy

Activity and dates	Participants	Expected output	Indicator (s) for monitoring progress	Pending Activities
1. Facts finding trip and participation in workshop to formulate action plan, Oct.-Nov. 2000. <i>(done)</i>	R Best B Ospina	Activities related to a market and enterprise orientation integrated into SARRNET's workplan. Potential private and public stakeholders in Malawi identified. Action plan defined.	<ul style="list-style-type: none"> • Trip report • Draft report on results of preliminary meetings 	Include documents into project data-base <i>To be done by:</i> <i>Malawi: Costa</i> <i>Tanzania: Vianey</i>
2. Participation in Steering Committee Meeting, May 2001 and May 2002 <i>(done)</i>	R Best	Members of SARRNET's Steering Committee conversant with the redirected orientation of the Network and the desired situation at the end of the project	Report of the Steering Committee	Include SC meeting proceedings as well as other presentations made by participants into project data-base <i>To be done by:</i> <i>Malawi: Costa</i> <i>Tanzania: Vianey</i>
3. Participation in the design, preparation and execution of a Rural Agroenterprise Course, Uganda, May 2001 <i>(done)</i> ⁸	R Best CF Ostertag S. Kolijn 3 sponsored SARRNET participants	26 national technicians from government and non-governmental organisations trained in aspects related to rural enterprise development	<ul style="list-style-type: none"> • Report of training course • Action plans of participants 	Include documents into project data-base <i>To be done by:</i> <i>Malawi: Costa</i> <i>Tanzania: Vianey</i>
4. Participation in the design, preparation and follow-up of a course on integrated root crop agroenterprise projects. Date to be determined in 2002.	R Best CF Ostertag M Lundy SARRNET FOODNET	Technical personnel of the national institutions involved in the integrated root crops agroenterprise projects trained in project design, execution and monitoring.	Report on training course Project proposals and reports	<ul style="list-style-type: none"> • Define course program and date • Select candidates and resource persons <i>To be done by:</i> <i>Mahungu/Sicco (SARRNET)</i> <i>Shaun Ferris (FOODNET)</i> <i>Rupert Best (CIAT)</i>

⁸ Activity jointly financed between FOODNET and SARRNET

**ANNEX 2
INFORMATION GATHERED IN TANZANIA: THIRD ROUND OF CONTACTS AND VISITS TO INDUSTRIES**

Organization & key persons	Identified Need / Problem	Potential Technology Intervention by SARRNET	Results obtained	Follow up Activities
<p>Interchick Co Ltd. Po Box 5774 Dar es Salaam Tanzania</p> <p>Managing Director Mr. N. Nambiar</p> <p>Dr. Ralph Pinto Veterinarian</p> <p>Email: Interchick@twig.a.com</p> <p>Visited: 1st November 2001 Mahungu, Sicco, Bernardo, Julian, Marianne</p>	<ul style="list-style-type: none"> • Use of cassava and Sweet potato chips and leaves as competitive raw materials in animal feeds 	<ul style="list-style-type: none"> • Validate and adopt Improved production technology for cassava roots and leaves and sweet potato. • Experiment 1: Production plots of cassava and sweet Potato were installed using organic manure as a source of fertilizer • Experiment 2: Animal feed trials installed later this year using raw materials produced in the experiment (cassava roots, cassava foliage and sweet potato) 	<ul style="list-style-type: none"> • Experiment 1 Field trial: Problems with field lay out. Field chosen has for experiment has been used in the past as dump side for chicken manure; thus hiding the effect of the treatment Good development of the plants; some difference are visible (see picture); difficult to obtain reliable data Lack of rain affected tuberization of SP plants. Spill over of water tank caused water logging in one sector of the Cassava trial. The spacing of the plants use in the Cassava Leave experiment was not according to the original design. • Experiment 2 Feed trial: Poor results of trial 1 did not allow the installation of this experiment. 	<p>Experiment 1:</p> <ul style="list-style-type: none"> • Discuss trials results and agree on new action plan with Interchick management • Collect previous field monitoring data (score evaluation of stand, pest & disease incidence) • Try to recover some reliable data • Improve marking of plots and identification of treatments • Try to select a new plot for a new trial with the upcoming Vuli rainy season⁹ • For leave production: repeat trial with proper spacing <i>To be done by: Marianne, Kibaha team and Sicco</i> <p>Experiment 2:</p> <ul style="list-style-type: none"> • Try to get sufficient raw material • Install the experiments Monitor and document results <i>To be done by: Dev and Jabal (Interchick staff)</i>

⁹ The design of the experiments for this upcoming season is presented in annex....

Organization & key persons	Identified Need / Problem	Potential Technology Intervention by SARRNET	Results obtained	Follow up Activities
<p>Malika Investment</p> <p>Pugu Hills, 25 Km South west of City Centre DSM</p> <p>Visited: 31st October 2001</p> <p>Mahungu, Sicco, Bernardo, Marianne</p>	<ul style="list-style-type: none"> Use of cassava and Sweet potato chips and leaves as competitive raw materials in animal feeds 	<ul style="list-style-type: none"> Validate and adopt Improved production technology for cassava roots and leaves and sweet potato. Experiment 1: Production plots of cassava and sweet Potato were installed using organic manure as a source of fertilizer 	<ul style="list-style-type: none"> Experiment 1 Field trial: Problems with field lay out. Very poor development of the cassava plants observed. Lack of rain affected tuberisation of SP plants. The experiment on cassava leaves production was not installed. Heavy incidence of Mosaic Virus Disease in part of the plots Following the constraints above very little reliable data will come out of the current experiment 	<ul style="list-style-type: none"> Collect previous field monitoring data (score evaluation of stand, pest & disease incidence) Identify and plots and treatments in the experiment with sticks and labels Try to collect some reliable data at harvest time. Document the results <p><i>To be done by: Marianne and Vianey</i></p>

Organization & key persons	Identified Need / Problem	Potential Technology Intervention by SARRNET	Results obtained	Follow up Activities
<p>Prof. C. Kihamia</p> <p>Plot situated 3 Km north of the Morogoro highway, 10 km west of Ubungo.</p>	<ul style="list-style-type: none"> Use of cassava chips and leaves as competitive raw material in animal feeds 	<ul style="list-style-type: none"> Validate and adopt Improved production technology for cassava roots and leaves and sweet potato. Experiment 1: Production plots of cassava and sweet Potato were installed using organic manure as a source of fertilizer 	<p>The team did not visit the experiment during this trip due to time constraints</p>	<ul style="list-style-type: none"> Need to visit this experiment and try to obtain reliable data. If production of roots and leaves is sufficient try to establish a animal feeding trial using the formulations recommended by Julian Buitrago <p><i>To be done by: Dev</i></p>

Organization & key persons	Identified Need / Problem	Potential Technology Intervention by SARRNET	Results obtained	Follow up Activities
<p>Farmers' Millers</p> <p>Contact person : Salim Msellem</p> <p>The farm is located 10 km south of the intersection road between Kigamboni and the connection with Kilwa road. (25 km south of town using the ferry)</p> <p>Visited: 31st October 2001</p> <p>Mahungu, Sicco, Bernardo, Marianne</p>	<ul style="list-style-type: none"> Use of cassava and Sweet potato chips and leaves as competitive raw materials in animal feeds 	<ul style="list-style-type: none"> Validate and adopt Improved production technology for cassava roots and leaves and sweet potato. Experiment 1: Production plots of cassava and sweet Potato were installed using organic manure as a source of fertilizer Experiment 2: Animal feed trials installed later this year using raw materials produced in the experiment (cassava roots, cassava foliage and sweet potato) 	<ul style="list-style-type: none"> Experiment 1 Field trial: Problems with field lay out. Problems with the application of the manure (applied in the rows, not within the lines). Difficult to obtain reliable data due to improper manure application. Lack of rain affected tuberisation of SP plants. No data collected at harvesting time for Sweet Potato experiment. The experiment on cassava leaves production was not laid out properly.. Experiment 2 Feed trial: This has not been initiated. Depending on the harvest it will be installed. 	<p>Experiment 1:</p> <ul style="list-style-type: none"> Improve marking of plots and identification of treatments Collect previous field monitoring data (score evaluation of stand, pest & disease incidence) Try to recover some reliable data Discuss trials results and agree on new action plan with local staff and key contact Try to select a new plot for a new trial with the upcoming Vuli rainy season¹⁰ For leave production: repeat trial with proper spacing and fencing of the new plot. Arrange dried cow manure Proper application of manure Collect samples for soil fertility analysis at IITA Ibadan? <p><i>To be done by: Marianne, Kibaha team and Sicco/Vianey.</i></p> <p>Experiment 2:</p> <ul style="list-style-type: none"> Try to get sufficient raw material Install the experiments Monitor and document results <p><i>To be done by: Dev and Salim Msellem</i></p>

¹⁰ The design of the experiments for this upcoming season is presented in annex....

Organization & key persons	Identified Need / Problem	Potential Technology Intervention by SARRNET	Results obtained	Follow up Activities
<p>Root Crops Research Program SRI-Kibaha</p> <p>Principal Researcher: Mrs. Kiddo Mtunda & Marianne</p>	<ul style="list-style-type: none"> Use cassava and Sweet potato chips and leaves as competitive raw materials in animal feeds 	<ul style="list-style-type: none"> Validate and adopt Improved production technology for cassava roots and leaves and sweet potato. <p>Experiment 1: Production plots of Sweet Potato were installed using organic manure as a source of fertilizer</p>	<ul style="list-style-type: none"> Sweet potato experiment has already been harvested. Data has been collected and needs to be analysed and provided by Kibaha team. 	<ul style="list-style-type: none"> Report on the results of the experiments has to be presented and discussed Discuss new trials related to experiment 1 for the coming growing period with Kibaha team. Need to work out budget. <p><i>To be done by: Kibaha Team & Sicco</i></p> <ul style="list-style-type: none"> If production of roots and leaves is sufficient try to establish a animal feeding trial using the formulations recommended by Julian Buitrago <p><i>To be done by: Dev</i></p>

ANNEX 3
**IDENTIFICATION OF A POTENTIAL SITE IN TANZANIA FOR THE ESTABLISHMENT OF
A PILOT PROJECT**

Location: Bungo village, 140 km south on Dar es Salaam – Kilwa road.

Participants: N.M. Mahungo, Marianne, Bernardo Ospina, Sicco Kolijn, Vianey R, Bertha Mjawa.

Date: 2nd November 2001-11-08

Meetings with Agricultural Ward officers and cassava farmer. (names ?)

General observations:

- In this community cassava is widely grown and used by farmers as both food and cash crop. Farmers sell the cassava for low prices due to lack of strong marketing linkages.
- Traders with trucks buy cassava from farmers in field. Farmers process cassava into Makopa; dried whole root
- In some cases traders buy both fresh cassava and Makopa for the same price.
- Farmers know how to process cassava into two forms: Makopa and other form that uses fermented roots that are later pounded and dried.
- Cassava yields are good (estimated by farmer at 12 MT/ha but under a very specific growing system that uses wider spacing and intercropping with Maize; 2 meters by 2 meters). See pictures!
- Diseases pressure seems to be low according to farmer and agricultural officer and own observations.
- Farmer are organised in smaller groups at village level and receive good regular training and technical assistance from Agricultural extension workers.
- Farm gate prices were estimated at 3,500 – 4,000 Tsh/bag of 200 Kg ~ 15-20 Tsh/kg fresh (16-21 US\$/MT).
- Processing seems feasible because farmers mention that many plants are left in fields up to 2-3 years for security and lack of markets.
- Within the coming year the district will be connected with a paved road which will boost trade linkages with Dar es Salaam.

Actions recommend:

1. Organise within the coming 2 a meeting with potential farmers' groups weeks in collaboration with the agricultural extension agencies during which SARRNET team will bring in chipping processing equipment and organise a demonstration.
2. Allow farmers to use the equipment, test the product and organise a discussion with the farmers about the potential of this technology in the village.
3. Try to come to the meeting with a first approximation of the costs of producing cassava chips using the information provided by the farmers about labour costs, raw material and other costs.
4. Get samples of the dried chips to be taken to potential buyers and markets
5. Two weeks later; organise a second meeting with farmers to work out a deal on the establishment of a pilot project. This 2 weeks period between the meetings will allow farmers to have their own discussion and reflections about the potential of this technology intervention proposed by SARRNET.

ANNEX 4 ESTABLISHMENT OF A BUSINESS CENTRE TO SUPPORT FEED SECTOR IN TANZANIA

List of miller attending meeting (including contacts addresses)

Action: Dev



Presentation by Julian Buitrago (CIAT/CLAYUCA) on alternative feed sources

Action: Dev to compile presentation into a word document

General Outlook (questionnaire)

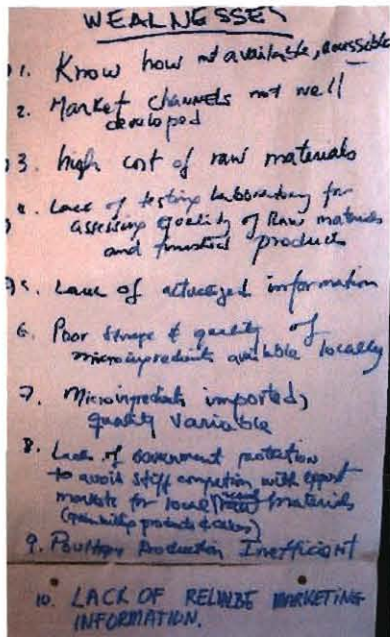
Action: Dev to give outcome of the questionnaire

SWOT analysis (Strengths, Weaknesses, Opportunities & Trends)



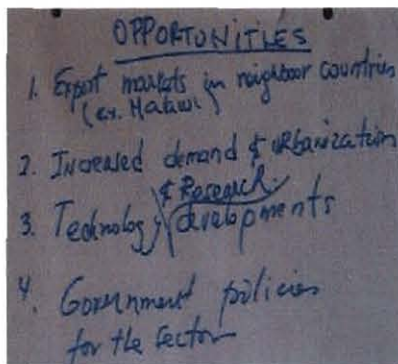
Strengths:

- Historical background; formerly public sector business (Umajaa)
- Demand
- Infrastructure already available
- Support from government
- Support from NGO and international organisations
- Support from NARS and Universities
- Existing sector group's organisations (TAFMA)
- Machinery for milling locally available
- Local availability of raw materials
- Existence of qualified human expertise



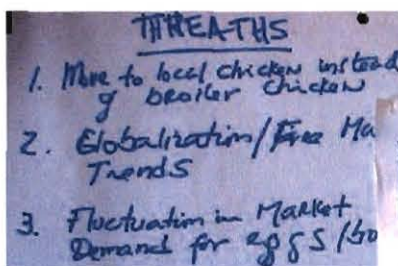
Weaknesses:

- Know-how available, accessible
- Market channels not well developed
- High cost of raw materials
- Lack of testing laboratory for accessing quality of raw materials and finished products
- Lack of actualised information
- Poor storage and quality of micro-nutrients available locally
- Micro-nutrients imported, quality variable
- Lack of government protection to avoid stiff competition with export markets for local, scarce raw materials (grain milling products and cakes)
- Inefficient poultry production
- Lack of reliable market information



Opportunities:

- Export markets in neighbouring countries
- Increased demand & urbanisation
- Technology & Research developments
- Government policies for the sector



Threats:

- Move to local chicken breeds instead of broiler chicken
- Globalisation/ free market trends
- Fluctuations in market demand for eggs/broilers

Proposed services/functions discussed:

- Collect and provide marketing information access on final feeds and ingredients.
- Assist individual millers with developing feed formulation.
- Develop an update catalogue of feed tables that are suitable for Tanzanian conditions regarding to climate, processing method used and the origin of the ingredients.

- Coordinate the testing of some raw materials and processed feed (i.e. proximal analysis, microbiology, amino acids, minerals, nutritional and anti-nutritional factors, etc.)
- Organize/develop client-oriented seminars and facilitate specific study groups on particular topics related to animal feeding and nutrition.
- Organize/develop sensitisation activities for poultry producers and feed processors on the advantages of using quality feeds and value added agricultural products.
- Linking feed millers with SUA and other research organization from inside and outside the country to develop specific client driven research activities.
- Explore and promote the use of alternative animal feed sources like Root crops, Soya and Quality Protein Maize.
- Provide consultancy in new milling techniques like pelletizing and extrusion as well as facilitating the procurement of these modern processing equipments.
- Collect and provide general updated information on the animal feed and feeding.

Provisional coordination committee appointed

Action: Dev to provide names and company names

First planning meeting (November 8th)

Action: Dev/Julian to produce document

Activities developed by Dev and Julian

- Findings of trip to Kilosa and SUA

Action: Dev/Julian to produce document

Feed trials proposed for Tanzania

EXPERIMENT I

DEMONSTRATION TRIAL WITH CASSAVA ROOTS AND LEAF MEAL FOR BROILER DIETS

Planning: IITA - Sarnnet – Clayuca - Tatic
 Execution: Dev-Anand Jani
 Salim Msellem
 Location: Nguva Farm – Kigamboni
 P.O. Box 22565
 Dar es Salaam
 10 m.s.n.m. 28 – 30 oC

OBJECTIVES:

1. To evaluate the effect of replacing 50 percent of grain cereals by cassava root meal in commercial broiler diets.
2. To evaluate the effect of including a low level of cassava leaf meal as a protein and pigment source for broilers.

MATERIALS Y METHODS:

Experimental animals:

160 one-day old chicks will be included in a 4 x 4 x 10 treatment arrangement in order to compare four different diets. The first group of birds will be fed a commercial diet based on common ingredients. The other three groups will be fed diets based on different combinations of cassava roots and cassava leaves as a partial replacement of the conventional energy and protein sources.

Ten chickens will be assigned to each pen (1 m²). There will be four treatments and four replications/treatment for a total of 16 pens and 160 birds.

Sanitary and management conditions will be the same in all groups. *Ad libitum* feed will be provided for all treatments.

Housing:

The sixteen groups will be housed in covered houses with a density of ten birds / m². Feeders and water will be available all the time for *ad libitum* consumption.

Experimental diets:

Four experimental diets will be included in the present evaluation. The diets will be prepared at the farm facilities under the supervision of Tatic technicians and using local good quality commercial ingredients. The control diet will be a normal broiler diet based on maize, maize bran, fishmeal, blood meal, cottonseed cake and micro ingredients.

In the three experimental diets, maize will be partially replaced by cassava root meal and cassava leaf meal, keeping the nutritional profile close to the control diet. Cassava leaf meal will be used as a protein and pigment source, whereas cassava root meal will be mainly used as an energy source.

All diets will provide similar protein (22.0 % and 19.0 % for starter and finisher) and energy (3,000 and 3,150 kcal/kg for starter and finisher) concentrations in each phase.

The detailed composition of the four starter and finisher diets is included in Table 1.

Experimental design:

A total randomised design will be used, where each pen (replication) will be the experimental unit for feed consumption and feed conversion, whereas each bird will be the experimental unit for weight changes.

Experimental Controls:

Weight records at days 1, 21 and at the end of the experiment.

Daily feed consumption per pen

Total feed consumption per pen

Feed conversion (feed efficiency) per pen

% Mortality per pen

Daily observations on litter conditions (dry, wet ?)

Skin and internal fat pigmentation at the end of the trial.

Sanitary conditions in each pen

Costs: Cost (per kilogram) of commercial and experimental diets.

Total production costs

Selling price of birds (per kilogram)

Starting date of trial:

Ending date of trial:

EXPERIMENT II

DEMONSTRATION TRIAL WITH CASSAVA ROOTS AND LEAF MEAL FOR LAYER DIETS

Planning: IITA - Sarrnet – Clayuca - Tatic
Execution: Dev-Anand Jani
Salim Msellem
Location: Nguva Farm – Kigamboni
P.O. Box 22565
Dar es Salaam
10 m.s.n.m. 28 – 30 oC

OBJECTIVES:

- To evaluate the effect of replacing 50 percent of grain cereals by cassava root meal in commercial layer diets.
- To evaluate the effect of including a low level of cassava leaf meal as a protein and pigment source for layers.

MATERIALS Y METHODS:

Experimental animals:

100 layers will be included in a 4 x 25 treatment arrangement in order to compare four different diets. The first group of layers will be fed a commercial diet based on common ingredients. The other three groups will be fed diets based on different combinations of cassava roots and cassava leaves as a partial replacement of the conventional energy and protein sources.

Twenty-five layers will be assigned to each pen. There will be four treatments for a total of 100 layers. Sanitary and management conditions will be the same in all groups. *Ad libitum* feed will be provided for all treatments.

Housing:

The four groups will be housed in covered houses. Feeders and water will be available all the time for *ad libitum* consumption.

Experimental diets:

Four experimental diets will be included in the present evaluation. The diets will be prepared at the farm facilities under the supervision of Tatic technicians and using local good quality commercial ingredients. The control diet will be a normal broiler diet based on maize, maize bran, fish meal, blood meal, cottonseed cake and micro ingredients.

In the three experimental diets, maize will be partially replaced by cassava root meal and cassava leaf meal, keeping the nutritional profile close to the control diet. Cassava leaf meal will be used as a protein and pigment source, whereas cassava root meal will be mainly used as an energy source.

All diets will provide similar protein (16.5 %) and energy (2,700 kcal/kg) concentrations. The detailed composition of the four diets is included in Table 1.

Experimental design:

A total randomised design will be used, where each pen (replication) will be the experimental unit for feed consumption, egg production and feed conversion.

Experimental Controls:

Layer weight records at starting day and last day of the experiment.
 Daily egg production per pen.
 Daily feed consumption per pen.
 Total feed consumption per pen.
 Feed conversion (feed efficiency) per pen.
 % Mortality per pen.
 Daily observations on litter conditions (dry, wet ?)
 Weight and pigmentation of egg yolks twice a week: a sample of 5 eggs in each pen will be weighted and measured for yolk pigmentation using the Roche Fan.
 Sanitary conditions in each pen.
 Costs: Cost (per kilogram) of commercial and experimental diets.
 Total production costs
 Selling price of eggs (per kilogram)
 Starting date of trial:
 Ending date of trial:

TABLE 1. COMPOSITION OF EXPERIMENTAL DIETS FOR STARTER BROILERS

	CONTROL	CASSAVA GROUPS		
Cassava root meal	--	200	200	200
Cassava leaf meal	--	--	50	100
Maize		29	104	43
Cottonseed cake (28)		80	80	80
Sesame meal (40)		150	120	120
Fish (sardine) meal		70	70	62
Maize bran		100	100	100
Rice polishings		110	110	110
Wheat bran		93	10	10
Sunflower cake		80	80	80
Salt		3.5	3.5	3.5
Lysine		2.5	2.33	1.82
Methionine		0.81	1.27	1.35
Anticoccidial		1.00	1.00	1.00
Vit-min premix		2.00	2.00	2.00
Blood meal		30	30	30
Vegetable oil		48	36	55
MAIN NUTRIENTS				
Met. energy, kcal/ kg	2.900			
Protein, %	21.0			
Lysine, %	1.22			
Methionine, %	0.55			
Met + Cyst, %	0.90			
Calcium, %	0.85			
Av. Phosphorus, %	0.43			
E. extract, %	8.5			

TABLE 1. COMPOSITION OF EXPERIMENTAL DIETS FOR FINISHER BROILERS

	CONTROL	CASSAVA GROUPS		
Cassava root meal	--	200	200	200
Cassava leaf meal	--	--	50	100
Maize		159	95	83
Cottonseed cake (28)		80	80	24
Sesame meal (40)		85	84	100
Fish (sardine) meal		70	70	65
Maize bran		100	100	100
Rice polishing		150	150	150
Sunflower cake		80	80	80
Salt		3.5	3.5	3.5
Lysine		2.10	1.15	1.00
Methionine		0.95	0.90	0.95
Anticoccidial		1.00	1.00	1.00
Vit-min premix		2.00	2.00	2.00
Blood meal		30	30	30
Vegetable oil		34	52	60
MAIN NUTRIENTS				
Met. energy, kcal/ kg	3.000			
Protein, %	19.0			
Lysine, %	1.10			
Methionine, %	0.50			
Met + Cyst, %	0.80			
Calcium, %	0.85			
Av. Phosphorus, %	0.42			
E. extract, %	8.9			

TABLE 1. COMPOSITION OF EXPERIMENTAL DIETS FOR LAYERS

	CONTROL	CASSAVA GROUPS		
Cassava root meal	--	200	200	200
Cassava leaf meal	--	--	50	100
Maize		143	127	107
Cottonseed cake (28)		32	--	--
Sesame meal (40)		80	80	80
Fish (sardine) meal		52	43	45
Maize bran		100	100	100
Rice polishings		150	150	150
Sunflower cake		100	97	56
Salt		4.0	4.0	4.0
Calcium carbonate		82	80	78
Methionine		0.60	0.85	0.92
Vit-min premix		2.0	2.0	2.0
Blood meal		30	30	30
Vegetable oil		20	30	40
MAIN NUTRIENTS				
Met. energy, kcal/ kg	2.700			
Protein, %	17.0			
Lysine, %	0.80			
Methionine, %	0.40			
Met + Cyst, %	0.68			
Calcium, %	3.85			
Av. Phosphorus, %	0.40			
E. Extract, %	6.9			

ANNEX 5
INFORMATION GATHERED IN MALAWI: THIRD ROUND OF CONTACTS AND VISITS TO INDUSTRIES

Organization & Key Persons	Planned follow up activities	Results obtained	Planned activities not accomplished	General comments	Future activities and recommendations
<p>RAB Processors Ltd</p> <p>Physical Address: Off Masauko Chimpembere Highway, Behind Toyota Malawi, Maselema, POB 5338 Limbe, Malawi</p> <p>Contact Person: Mr. Sai Kiran Josyabhatla (Operations Manager) Phone: (265)-645914 (direct) Cellular: 821516</p> <p>Email: rab@malawi.net</p> <p>Fax: 651804/651815</p> <p>Visit: 5th November Bernardo, Sicco, Mahungu, Vito Sandifolo</p>	<p>Maintain contacts</p>	<p>RAB has launched recently maize-cassava blend flours.</p>	<p>Animal feed trial</p>	<ol style="list-style-type: none"> 1. The product is not available in 5 and 10 Kg packs. 2. 10 Kg bag sold at 208 MK, initial price was 180 MK; attracting high demand. 3. RAB has been buying dried roots (Makaka) at 9 MK from middleman. RAB estimates it needs 2000 MT Makaka for Nov-April period to keep product going. Maize sold at 319 MK. 4. Makaka needs to be scrapping before milling; this increases costs. RAB prefers to buy mini-chips as they also store longer. 	<ol style="list-style-type: none"> 5. Would like to establish contacts with cassava farmers as potential providers of mini-chips. 6. If cassava farmers with good production potential are identified, try to establish marketing links with RAB. To be done by SARRNET Team.

Organization & Key Persons	Planned follow up activities	Results obtained	Planned activities not accomplished	General comments	Future activities and recommendations
<p>Universal Industrials <u>Managing Director:</u> Mr. Jeff Salisbury</p> <p><u>Factory Manager:</u> Mr. Jeff Salisbury</p> <p><u>Manager Sweets:</u> Mr. C.K. Dutt</p> <p><u>Farm Manager:</u> Mr. C.J. Amin</p> <p><u>Location:</u> Blantyre</p>	<ol style="list-style-type: none"> 1. Provide a chipper to Njuli farm 2. Send commercial offer about CLAYUCA artificial drying plant 3. Send information about croquettes 4. Plan and implement cassava commercial plots at Njuli farm 5. Provide names and contact in India 	<ol style="list-style-type: none"> 1. Done in June, working very well 2. Two different complete commercial proposals were delivered 3. Done 4. Seeds were delivered and a commercial scale planting was established (30 acres) 5. Done by BO. 	<ul style="list-style-type: none"> • Need to agree on payment of chipping machine <i>To be done by: Vito/Mahungu</i> 	<ul style="list-style-type: none"> • Company has bought 80 MT of Makaka from farmers. • Has continued use of cassava flour for biscuit production (estimated 30 MT/month). • Coffee and cassava intercropping is used at Njuli farms. Droughts have affected coffee plants while the cassava plants were doing fine. (see picture). • Near future development plan: Set up balanced feed plant using cassava and sweet potato as ingredients (Goal capacity: 2000 MT/month). • A proposal submitted to DFID in which SARRNET/CLAYUCA are included as technical collaborators. • Plans to launch cassava maize blend flour. • Longer term future: Start production of starch and glucose for Malawi market. 	<p>Universal want to establish a out-growers scheme for cassava production for food and feed.</p> <p>To install experimental plot at Njuli to validate production packages including fertilisation, varieties, crop husbandry. Could be a good site for demonstrations and training activities with farmers.</p> <p><i>To be done by: Vito/Mahungu</i></p>

Organization & Key Persons	Planned follow up activities	Results obtained	Planned activities not accomplished	General comments	Future activities and recommendations
ITL Plywood	Send samples of high quality flour to ITL in June for tests in glue preparation.	<ul style="list-style-type: none"> • SARRNET initiated contacts between ITL and Kay Marketing (one of the suppliers of cassava flour in Blantyre) to supply the samples. • 100 Kg sample of cassava flour was delivered and tested. • Results were positive to the extent that ITL has now stopped buying more wheat flour and now is using 57 MT of cassava flour per annum. 	none	<p>7. The manager is now convinced after testing him self, that cassava is viable competitive ingredient in glue production. <i>See pictures</i></p> <p>8. ITL is currently buying from middleman but prefers to buy directly from farmers' groups.</p> <p>9. Wheat flour prices: 32 MK/Kg Cassava flour prices: 15 – 20 MK/kg</p>	<p>10. If possible link ITL with cassava framer groups that could supply the flour directly.</p> <p><i>To be done by: Vito/SARRNET Malawi</i></p>

Organization & Key Persons	Planned follow up activities	Results obtained	Planned activities not accomplished	General comments	Future activities and recommendations
<p><u>Trans Globe Produce Export Ltd.</u></p> <p>Mr Andrew C. M. N Dalasini Business Development Manager</p> <p>Mr. Abubakar Swira Factory Manager</p> <p><u>Email:</u> transglobe@malawi.net</p> <p><u>Address:</u> Box 5035, Limbe, Malawi Phone : (265)-643488/643967/642761 Fax : (265)643620/642440</p> <p>Visited: 7th Noveber by Bernardo, Sicco, Mahungu & Vito</p>	<ol style="list-style-type: none"> 1. Provide commercial samples of peeled and non-peeled cassava 2. Provide samples of cassava leaves flour 3. Send quotation of a chipper 4. Maintain follow up on contacts with a south African company 5. Maintain follow up on the experiment on the use of cassava leaves for dairy feeding 	<ol style="list-style-type: none"> 1. Samples were delivered (Transglobe sent them to contacts in RSA). 2. A sample of 20 Kg of cassava leaves was delivered 3. Quotation was send. 4. Follow up was made and confirmed that a 100 MT Makaka was exported to contacts in RSA. Price of Makaka paid to farmers: 3-4 MK/kg, while export prices was 90 US\$/MT fob Blantyre. 5. Experiment was conducted; data will be made available soon 	<p>none</p>	<p>Transglobe is still interested in export market of cassava chips to RSA despite this years' scarcity and high prices of cassava. Would be interested in buying chips from Zambia or Tanzania producers to re-export to RSA.</p> <p>Expressed interest in identifying farmer groups to supply high quality chips for export to RSA</p> <p>Document with information about the use of cassava in dairy feeding in Thailand was delivered .</p>	<ul style="list-style-type: none"> • Provide market information and cost-price of cassava chips in Zambia and Tanzania and identify local partners <i>To be done by: Sicco</i> 11. If possible link Transglobe with cassava framer groups that could supply the flour directly. <i>To be done by: Vito</i>

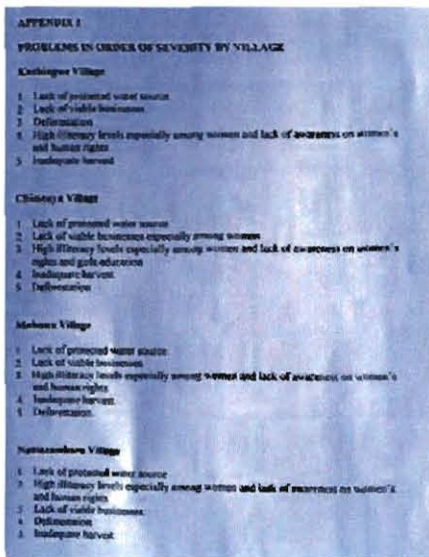
Organization & Key Persons	Planned follow up activities	Results obtained	Planned activities not accomplished	General comments	Future activities and recommendations
Land O'Lakes	<ol style="list-style-type: none"> 1. Analyse the protein levels of cassava leaves from 3 different varieties 2. Deliver samples of processed dried leaves from 3 different varieties for running feed trial (about 1 MT/variety) 3. SARRNET to plant root and leaves and Sweet potato production plots at Chitedze for testing and demonstration. 	<ol style="list-style-type: none"> 1. Results of 5 Samples of 5 varieties were obtained from Bunda College. Silira (21%) , others had 16% (Maunjiri, Manyokola, Mkondezi and Gomani) 2. Processing cassava leaves from 3 varieties (Maunjiri, Manyokola, Mkondezi) is being conducted. A total of 250 Kg has been obtained sofar. First delivery will be done after preparing 600 Kg. 3. Plots have been planted at Kandiyani using irrigation (October 2001). 3 Varieties have been planted, spacing used are 1x1 meter, 90x50, 50x50 and 30x30 cm. First leave harvest will be done by December. 	Feed trial has not been started yet due to lack of sufficient amounts of cassava leave flour.	<ul style="list-style-type: none"> • Dairy industry is still steadily growing. • Demand of dairy products higher than local supply • Increased support and interest of international organisation and companies (ie. importation of heifers from Ireland) • Interested in linking contact farmers with SARRNET to conduct silage and feeding trials • Document with information about the use of cassava in dairy feeding in Thailand was delivered. 	<p>Trial proposal on silage to be delivered to Land O' Lakes and discuss implementation <i>To be done: Vito & Sicco</i></p> <p>Video on cassava silage and dairy feeding to be delivered to LOL <i>To be done by: Vito</i></p> <p>Look carefully into the possibility of SARRNET directly with Dairy farmers Association with logistical and technical support by LOL to conduct the trials on silage. <i>To be done by: Vito & Mahungu</i></p> <p>To set up a silage production trial at Chitedze for demonstration to farmers purposes. <i>To be done by: Vito & Mahungu</i></p>

ANNEX 6

IDENTIFICATION OF A POTENTIAL SITE IN MALAWI FOR THE ESTABLISHMENT OF A PILOT PROJECT

Christian Service Committee of the Churches of Malawi is an international NGO with operations in Malawi. The Mulanje branch is closely involved in providing technical assistance and educational services for 2000 households in villages on both sides of the border in Mulanje District. Households comprise of 7-8 members and average landsize is 0.2-0.4 for Mulanje to 0.4 – 0.6 Ha for Palombe area. Palombe farmers have some plots across the Mozambique borders. CSC is using PRA tools in their daily work :

PRA diagnostics with farmers in various villages have ranked lack of business opportunities as one the most important constraints.



Problem identification and prioritising by Mbirima Village:

1. Declining crop yields (27)
2. Limited business opportunities and unprofitable business (20)
3. Water (9)
4. High disease incidence (5)
5. High Adult illiteracy (2)
6. Declining tree cover (1)

PRA in Mulanje / Palambo area by Christian Services Council Malawi

A proposal was made to CSC to link with SARRNET and discuss the possibility of establishing a joint pilot project activity in the Palomobe area. A follow up action agreed upon was to organise a meeting with the farmers in which SARRNET team will bring a power chipper and demonstrate the technology to farmers. Based on the results in this activity and the interest and willingness to participate shown by the farmers, the next step will be to establish a memorandum of understanding with CSC defining responsibilities including budget for the pilot project operations. The initial idea is that SARRNET will provide the equipment (including chipper, drying trays) and improved varieties as well as technical assistance on improved crop husbandry, processing and marketing of produce. CSC should provide technical assistance and backstopping and farmers to provide land and labour.

Follow up to be done by: Vito, Mahungu, France

Follow Up activities Tanzania:

1. Need to work on contract Marianne

2. Trials on leaves:

Create a plot of 2 acres for leave production at Kibaha (30 x 30 cm).

Need to analyse the protein levels of the different varieties (USDM): Fibre, ash and protein, dry matter.

3. Soil analyses:

N (available N), P, K, N, CEC, Ph. Do it at the beginning of the experiment. Explore the possibilities of using Kwanda/John Wendt.

4. The different trials with the feed millers:

Interchick: trials should be monitored up to the end. Need to discuss the progress of the experiment with Nambiar and make a plan for the coming 3 months. Propose and discuss 3 options how to proceed; advantage of complete uprooting is to destroy the mealybug and other diseases. (page 66)

Salim Msellem: Need to establish a new field for experiment, including green manure. Field design discussed with Marianne and Salim. Need to fence and document the experiment with a fence. Need to identify a green manure (contact Chambezi through ARI-Mikocheni).

Willing to implement a feed trial with leaves. Need to identify a source of leaves and obtain dry leaves. Need to do a chemical experiment.

What is the planting material used for the leaves. Dev and Julian

Sweet potato: due to late planting yields were very low and not existing.

Malika: recommendations is to finish the trial; collect/recovery as much as possible information from the experiment.