



International Institute of Tropical Agriculture

**Subcontract Agreement for the Execution of USAID/SADC/SARRNET
Grant No. 690-G-00-99-00258-00 between the International Institute for
Tropical Agriculture and the Centro Internacional de Agricultura
Tropical**

Semi-annual Report for the Period November 2000 to May 2001

Presented by: the Centro Internacional de Agricultura Tropical

Presented to: the International Institute for Tropical Agriculture

October, 2001



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Introduction

The Southern African Root Research Network (SARRNET) seeks to increase income and improve the welfare of the rural poor by increasing small farmer cassava and sweet potato productivity through:

- a) the adoption of improved varieties and practices,
- b) the strengthening of national root crops research capabilities, and
- c) commercialisation to increase added value to the crops.

The subcontract agreement between the International Institute of Tropical Agriculture (IITA) and the Centro Internacional de Agricultura Tropical (CIAT) is to provide professional and other related services to meet the overall objective of SARRNET, described above. CIAT will provide these services through its membership of the Latin American Consortium for Cassava Research and Development (CLAYUCA) and its own Rural Agroenterprise Development Project. These services will contribute to achieving the specific objectives of the following four Theme areas:

- Theme I: Establish of a private-public consortium to support research and development of sweet potato and cassava in at least one country.
- Theme II: Detailed understanding of the sub-sector and marketing opportunities to increase awareness among stakeholders of potential opportunities for the crops in the region.
- Theme III: Sustainable and appropriate processing technologies adopted by farmers and industrial processors
- Theme IV: Stakeholders trained in new skills to support the market driven strategy at regional level.

Report on activities undertaken in the period November 2000 – May 2001

A detailed work plan for this subcontract agreement was developed based on the meetings and discussions during the fact finding mission undertaken by Rupert Best and Bernardo Ospina in November 2000. This work plan, which details the activities, outputs and indicators, is presented in Annex 1. Table 1 provides a summary of the major interventions in which CIAT and CLAYUCA personnel have participated. In the following section of this report, a brief description is given of the progress achieved in each of the activities in the work plan, and future actions outlined, with explanations of where deviations from the original work plan are envisioned.

Table 1. Summary of major interventions in which CLAYUCA and CIAT personnel have participated. Nov. 2000 – May 2001

Action/intervention	CLAYUCA/CIAT personnel involved	No. of person-days	Countries visited
Fact finding and planning trip. 1-11 November 2000	Bernardo Ospina and Rupert Best	33	Nigeria, Uganda and Malawi
Contact with current and potential users of cassava and sweet potato in Tanzania, Malawi and Kenya. (February 17 to March 17, 2001).	Bernardo Ospina and Julian Buitrago	30	Tanzania, Malawi and Kenya
Training course in Agroenterprise Development. 2-11 May 2001.	Rupert Best and Carlos Ostertag	13	Uganda
SARRNET Steering Committee Meeting. 14-17 May 2001.	Rupert Best	6	Tanzania

Theme I: Establish of a private-public consortium to support research and development of sweet potato and cassava in at least one country.

Activity 1.1. Participation in cassava/sweet potato workshop (SARRNET/Bunda College, Malawi).

- This activity was not realised as scheduled initially. It finally took place in the period May 21-23, 2001. Participation of CIAT's staff was not possible at this date due to prior commitments.
- During the realisation of the activities 4.1 (October-November 2000), 3.1, 3.2 and 3.3 (February-March 2001), the workshop was promoted and potential participants were identified.

Activity 1.2. Contacts with Malawian industries identified as having interest in using cassava/sweet potato products.

- First contact with Malawian industries interested in cassava/sweet potato occurred during the realisation of activity 4.2, October-November 2000 (Annex 2).
- This contact allowed identification of a significant number of cassava farmers, processors, machinery manufacturers and actual and potential users of cassava and sweet potato in Malawi (IITA, 2000).
- A second round of contacts with this potential audience for SARRNET activities in Malawi was conducted during the period 12-16, March 2001. A more complete set of information was obtained on the characteristics of each industry, its potential to participate in concrete activities with SARRNET, and a first analysis was made of the next steps needed to concretise these activities (see Annex 3).

- SARRNET staff in Malawi (Vito Sandifolo) is responsible for follow-up and supporting the implementation of the activities proposed.
- In November 2001, a new round of visits and contacts will be conducted to analyse results obtained and plan future actions.

Activity 1.3. Contacts with current and potential users of cassava and sweet potato products in Tanzania and Malawi.

- This activity was planned to be realised in Tanzania based on the good results obtained with a similar activity conducted in Malawi during the execution of activity 4.1 in November 2000.
- Planning and execution of this activity was undertaken by staff from SARRNET (Tanzania) and FOODNET (Uganda). CIAT/CLAYUCA staff participated during the last two days of the exercise. Results obtained are presented in Annex 4.
- Based on the results obtained in this industrial survey, a new round of visits was organised with key potential users. These new contacts resulted in a set of concrete activities that were formulated (see Annex 5). Implementation of these activities has been under the co-ordination of SARRNET Post-harvest Specialist (Sicco Kolijn).
- In November 2001, a new round of visits and contacts will be conducted to analyse results obtained and plan future actions.

Activity 1.4. Formulation of the Consortium framework for Malawi and definition of a tentative research and development agenda.

- During the two visits conducted by CIAT's staff to Malawi (November 2000 and February 2002), the experiences of setting up a private-public sector partnership or consortium in Latin America (CLAYUCA) were discussed at length with cassava and sweet potato farmers, processors, industries, national agencies, universities and NGOs
- Information was provided in both opportunities about the experiences obtained by CIAT in Latin America and the Caribbean region in the promotion and establishment of this type of consortium to work on cassava research and development activities.
- Formulation of a framework for a possible consortium in Malawi was not achieved since CIAT staff were unable to participate in the workshop held in Malawi (Activity 1.1).
- Activities that are currently under execution in Malawi in which private and public sectors are working jointly with logistical support from SARRNET, would be the critical ground upon which the idea of the consortium could be worked out and the conceptual framework developed later this year.
- This activity was not originally intended to be conducted in Tanzania. However, due to the good results obtained in this country during the contacts with the private and public sector institutions and enterprises interested in cassava and sweet potato, greater and faster advances were obtained in the discussion about the importance of establishing a private-public partnership around cassava and sweet potato research and development work.

- To enhance this process, a meeting was organised with potential stakeholders in Dar es Salaam during which staff from SARRNET, FOODNET and CIAT made presentations and preliminary discussions were held. Based on these results, FOODNET and SARRNET started promoting the idea of establishing a business centre to support development of the poultry feed sector in Tanzania.
- Later on, FOODNET and SARRNET assembled a proposal to try to get support from CTA for the implementation of the business centre in Tanzania (see Annex 6).

Activity 1.5. Preparation of materials in root crop processing (catalogues, prices, layouts, information) for business plan development.

- During the visits to Malawi and Tanzania, some technological options have been identified according to specific requests and demands expressed by potential partners.
- Information available at CIAT and CLAYUCA related to these technological options was given to the SARRNET Post-harvest Specialist for analysis and possible adaptation to the specific conditions of SARRNET's area of influence.
- In most cases, the information provided included specifications, prices, capacities, documents, pictures, slides, videos and CD room material.
- This process will continue as more concrete information is obtained on the type of technologies that have potential to be implemented in SARRNET countries

Activity 1.6. Meeting for launching the Malawian Consortium.

This activity did not take place during the period covered by this report and will be scheduled based on the outcome of the contacts to be made in November 2002.

Activity 1.7. Implementation, monitoring and evaluation.

- Activities initiated with partners identified in Malawi and Tanzania are under implementation.
- Future activities are planned through which stakeholders will be invited to participate actively in the evaluation of the results obtained and planning of new activities based on these results.
- Monitoring of activities on a permanent basis is under the responsibility of SARRNET staff at Tanzania (Sicco Kolijn) and Malawi (Vito Sandifolo).

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

Activity 2.1. Review and analysis of information gathered through literature review to make a preliminary identification of market opportunities in Tanzania and Malawi and Zambia.

- This activity was conducted during the visits realized by CIAT's staff to the region, Malawi (February and June, 2001) and Tanzania (June, 2001).
- In Zambia, the SARRNET Post-harvest Specialist (Sicco Koljin) performed this activity with support from local staff (see Annex 7).
- Findings from the literature review were complemented with the results of activities 1.2, 1.3 and 4.1.
- Preliminary cost structures for market opportunities identified for each country will be elaborated later this year (October/November) based on preliminary results of activities that are being carried out.

Activity 2.2. Review and analysis of information gathered through surveys currently being implemented (quantitative data on characterisation of market chain for cassava and sweet potato in Malawi, Tanzania and Zambia).

- Execution of this activity was to be based upon the findings of a commissioned study titled "Detailed understanding of the subsector and marketing opportunities to increase awareness among stakeholders of potential opportunities of the crops in the region".
- The final report of this commissioned study has not been made available to CIAT's staff at the moment of preparing the present report.
- This activity will be conducted, as soon as the above mentioned document is made available.

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

Activity 3.1. 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.

- To accomplish this activity, CIAT/CLAYUCA hired a consultant (Dr. Julian Buitrago, Ph.D), with great experience in animal nutrition systems based on intensive use of roots and tubers, with emphasis in cassava.

- The consultant visited Tanzania (February 2000) and had the opportunity to interact with technical personnel from feed companies, as well as large, medium and small scale poultry and dairy producers. A comprehensive report submitted by the Consultant is presented in Annex 8.
- The Consultant by means of e-mail messages established contacts with an animal feed company and a large-scale dairy producer co-operative from Malawi. These contacts resulted in recommendations for alternative feed formulations, including cassava and sweet potato, that were to be tested by the two companies, in collaboration with SARRNET-Malawi.

Activity 3.2. Planning phase of pilot plants and linkage with previous activities of SARRNET.

- Discussions were held with SARRNET staff (Sicco Koliijn and Vito Sandifolo) and technical personnel from collaborating agencies in Tanzania and Malawi, trying to help in the identification and selection of the best possible technological options around which to promote the establishment of pilot plant operations.
- The experience of CIAT/CLAYUCA with the implementation of the Integrated Cassava Research and Development Projects in several Latin American countries was discussed in depth with technical personnel from SARRNET in Tanzania and Malawi.

Activity 3.3. Identification of sites and potential products for pilot plants and the actors involved.

- During the two visits realised by CIAT/CLAYUCA staff to Malawi (October, 2000 and March, 2001), a very interesting contact was made with NASFAM (National Smallholders Farmers Association of Malawi). This farmer-based organisation is assisting local farmers groups in the identification of alternative markets for several commodities among which cassava is included.
- Farmer groups that belong to NASFAM and are currently receiving technical assistance could be a sound choice to establish at least one pilot plant operation based on improved processing technology for cassava flour and improved varieties. Both of these inputs are current strengths and comparative advantages of SARRNET and could serve as the inception point of SARRNET to promote technology adoption with farmer groups.
- During the second visit to Malawi (February, 2000), the contact with NASFAM was strengthened and a concept note was elaborated with the purpose of promoting the establishment a pilot project in one of the farmer groups assisted by NASFAM. This concept note was presented to the Food Security and Food Program Delegation of the European Commission Office of Malawi. If approved, this initiative could be used as the testing ground for the pilot project concept (see Annex 7).
- Follow up on the outcomes of this initiative is being provided by SARRNET officer in Malawi (Vito Sandifolo).

Activity 3.4. Establishment of at least one pilot plant operation using integrated product development approach in each of the 3 lead countries for processing cassava and sweet potato, with complementarity with the Common Fund for Commodities financed project.

- This activity has not been realised yet.
- Based on the good results obtained in the contacts with NASFAM and assuming a positive answer by EU on the concept note presented, it is expected that a final decision could be made during October-November, 2001. Regarding the initiation of a pilot project in Malawi, another option to be considered by SARRNET could be to use its own funds to support the establishment of the pilot project.

Activity 3.5. Participation in the process of translation of the book “The uses of cassava in animal feeding” into English and formatting for web publication.

- This activity is being conducted with direct participation of the book’s author, Dr. Julian Buitrago.
- The content of the book is being updated and a new chapter on fish feeding will be included.
- CLAYUCA has hired a professional translator/editor who is producing drafts of each chapter of the book. These chapters are being edited/corrected by Dr. Buitrago.
- Financial support for this activity has been approved by FOODNET.
- This activity is expected to be finished by December 2001.

Activity 3.6. Participation in process of translation of cassava post harvest handling and processing technology information system into English.

- The Spanish version of the information system, which is being developed by CIAT and CIRAD-amis, is in its final stages of completion. The translation of the content will initiate in September 2001.
- It is expected that the English version of the information system will be available in web format early in 2002.

Theme IV: Stakeholders trained in new skills to support the market driven strategy at regional level.

Activity 4.1. Fact finding trip and participation in workshop to formulate an action plan.

- This activity took place from 29 October to 11 November 2000. Rupert Best (CIAT) and Bernardo Ospina (CLAYUCA) visited Nigeria, Uganda and Malawi. The purpose of the visit was to obtain first hand knowledge of the institutional objectives and progress in SARRNET related activities. Meetings were held with management and

scientists of IITA, ESARC and SARRNET. In Uganda and Malawi, cassava farmers, processors, machinery manufacturers and actual and potential users of cassava and sweet potato products were visited. In Malawi, meetings were held with officials of government institutions and the representative of USAID.

- Following the fact-finding activity, a two-day workshop was held on 9 and 10 November with ESARC and SARRNET personnel. The aim of the workshop was to find a common understanding of what is meant by “market driven research” and “enterprise development”. This understanding was developed collectively and helped to determine the changes that need to be introduced in the activities of the SARRNET project in order for it to become more responsive to the external environment and thereby better fulfil its objectives. As a result, the work plan was revised and budgetary adjustments made to incorporate new activities.
- A full report, with a set of recommendations and action points, was prepared for this activity (IITA, 2000). As an initial step towards achieving a common understanding among the principal SARRNET actors of the implications of a more market and business oriented approach towards setting the SARRNET R&D agenda, this activity was deemed a success by all participants.

Activity 4.2. Participation in Steering Committee Meeting, May 2001 and May 2002.

- Rupert Best participated in the SARRNET Steering Committee Meeting held in Dar Es Salaam from 14 to 17 May 2001. On behalf of CLAYUCA and CIAT, he made a PowerPoint presentation on ‘Integrated Cassava Research and Development: Opportunities in the SADC Region’. This presentation (Best and Ospina, 2001) gave:
 - a) an overview of the evolution of CIAT and CLAYUCA’s experience in integrated cassava R&D projects and establishing public-private partnerships,
 - b) summarised the results of the planning workshop held in Malawi in November 2000 (see Activity 4.1 above), and
 - c) outlined the activities proposed under the IITA-CIAT agreement.
- As recorded in the report of the meeting (SARRNET, 2001), the activities proposed for achieving greater participation of the private sector and towards public-private partnerships was endorsed by the Steering Committee. Decisions were also taken on the major cassava and sweet potato markets on which the network should concentrate its actions.

Activity 4.3. Participation in the design, preparation and execution of a Rural Agroenterprise Course, Uganda.

- Rupert Best and Carlos Ostertag of CIAT’s Rural Agroenterprise Development Project participated with members of Foodnet and SARRNET in the planning and execution of this course. The 9 day course was held in Entebbe, Uganda from 2 to 11 May 2001. 27 participants from East and Southern African countries participated.
- The course was made up of 5 modules:

Module 1: Setting the scene: you, agroenterprises and development. This module included sessions on a) Presentation of participants and review of expectations, b) Course objectives and content, c) Agroenterprises within the newly liberalised economies, and d) The enterprise spirit.

Module 2: Managing and organising agroenterprises. This module was made up of seven sub-modules. 2.1 Markets and marketing, 2.2 Business and market plans, 2.3 Strategies for enterprise development, 2.4 Technology: approaches and tools (including Internet), 2.5 Business development services, 2.6 Product development, 2.7 Profitability analysis.

Module 3: Exchanging information and learning from our experiences. In this module, whose objective was to share experiences among the participants, each participant made a 15 minute presentation on his or her work related to agroenterprise development, highlighting successes, limitations and lessons learnt.

Module 4: Improving market chain efficiency. In this module, a presentation was made on Integrated Agroenterprise Projects, which provided elements for the analysis, through a field visit, of specific agroenterprise chains (cassava, maize, coffee, spices and dried fruit). These cases were presented by the participants in plenary.

Module 5: Action planning and course evaluation. In the concluding module, participants prepared brief action plans on the proposed use of the knowledge gained during the course. In addition the course was evaluated (a) based on the uptake of concepts on the part of the participants, and (b) on the level of fulfilment of the participants expectations.

- Course participants provided feedback on the relevance of the course and the level to which the content had met their expectations, information that will be used to develop future courses. The very homogeneous nature of the activities of and institutions from which participants were drawn meant that not all expectations were fully met. If the interaction of researchers and development personnel is one of the principal objectives of this type of course, its design and content will need to be adjusted accordingly, making sure that the prospective participants are fully aware of the scope of the course that is being offered.



Some of the course's participants undertaking a group exercise, supervised by Carlos Ostertag.

Table 2. Evaluation by the participants of the Agroenterprise Development Course. Entebbe 2-11 May 2001. Scale: 0 – 10.

Module	Av, Score
Module 1.Setting the scene	7.50
Module 2. Managing and organising agroenterprises	
Module 2.1 Markets and marketing	7.48
Module 2.2 Business and market plans	7.88
Module 2.3 Model approaches and strategies	8.00
Module 2.4 Technology: approaches and tools	7.88
Module 2.5 Business development services	8.33
Module 2.6 Product development	8.15
Module 2.7 Profitability analysis	8.48
Module 3 Exchanging information and learning from our experiences	n.a
Module 4 Improving market chain efficiency	8.30
Technical organisation and educational methods	7.00
Logistics and administration	7.67

n.a not available

Table 2. shows the participants' evaluation of the course on a scale of 0 (negative evaluation) to 10 (positive evaluation). All technical modules were evaluated well, in the range 7.50 to 8.48. The 'technical organisation and educational methods', which includes aspects such as the division of time between theoretical and practical sessions, field work, sequence of topics etc. and the educational approaches and techniques used, was evaluated at 7.00, and this aspect could probably be improved in future courses.

Activity 4.4. Participation in the design, preparation and follow-up of a course on integrated root crop agroenterprise projects.

This course is planned for 2002. Organisation of this course will initiate in September 2001.

References

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ANNEX 1. IITA-CIAT COLLABORATION WORK PLAN
 Subcontract Agreement for the Execution of USAID/SADC/SARRNET
 Grant No. 690G-00-99-00258-00 – WORK PLAN

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	# days	Expected output	Indicator (s) for monitoring progress
1.Participation in cassava / sweet potato workshop (SARRNET/ Bunda College)	B Ospina	2	Potential partners identified First by-laws drafted Follow-up agenda defined	# participants Draft document circulating Agenda
2. Contacts with Malawian industries identified as having interest in using cassava/sweet potato products	B Ospina	10	specific interests identified action plans developed information on technology options delivered	
3. Contacts with current and potential users of cassava and sweet potato products in Tanzania and Zambia	B Ospina	10	potential opportunities identified potential partners identified	reliable data available on current situation # interested partners identified
4. Formulation of the Consortium framework for Malawi and definition of a tentative research and development agenda.	B Ospina	10	draft document circulated among potential stakeholders revised version of document available	draft document revised version of document
5. Preparation of materials on root crop processing (catalogues, prices, layouts, information) for business plan development	B Ospina	10	technology options identified according to specific requests and interests expressed by potential partners technology package available	1. List of technologies available according to each potential option 2. Document available with specifications, prices, capacities, etc
6. Meeting for launching the Malawian Consortium	B Ospina	4	Consortium established Consortium working	
7. Implementation, Monitoring and Evaluation	B Ospina	10	feedback information on project results available feedback information delivered to stakeholders	

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	Participants	# days	Expected output	Indicator (s) for monitoring progress	Collaborators
1. Review and analysis of information gathered through literature review to make a preliminary identification of market opportunities in Tanzania, Malawi, and Zambia	B Ospina	5	Potential market opportunities for each crop identified Preliminary cost structure for each market opportunity elaborated for each country	List of market options List of cost structure for each option	
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)	B Ospina	5	Market chain for cassava flour and sweet potato characterised in Malawi Preliminary data on market chain for cassava products and sweet potato in Tanzania and Malawi available	Reliable data available for Malawi Preliminary data available for Tanzania Preliminary data available for Zambia	

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

Activity and dates	Participants	# days	Expected output	Indicator (s) For monitoring progress	Collaborators
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 (?)	B Ospina	10	Animal feed trial using cassava initiated Economic analysis of results elaborated	Biological data available Technical data available Economic data available	
2. Planning phase of pilot plants and linkage with previous activities of SARRNET	B.Ospina	5			
3. Identification of sites and potential products for pilot plants and the actors involved	B.Ospina	5			
4. Establishment of at least one pilot plant operation using the integrated product development approach in each of the 3 lead countries for processing cassava and sweet potato, with complementarity with CFGC project	B.Ospina	10			
5. Participation in process of translation of the book “The use of cassava in animal feeding” into English and formatting for web publication	B Ospina	4	Book on “Use of cassava in animal feeding” translated into English and formatted for web publication	1. Book available in the Web	
6. Participation in process of translation of cassava post harvest handling and processing technology information system into English. January -March 2001	B Ospina	3	Information system on translated into English and formatted for web publishing	1. Information system available in the web page of SARRNET	

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

Activity and dates	Participants	# days	Expected output	Indicator (s) for monitoring progress	Collaborators
1. Facts finding trip and participation in workshop to formulate action plan, Oct.-Nov. 2000.	R Best B Ospina	16 17	Activities related to a market and enterprise orientation integrated into SARRNET's workplan. Potential private and public stakeholders in Malawi identified. Action plan defined.	Trip report Draft report on results of preliminary meetings	
2. Participation in Steering Committee Meeting, May 2001 and May 2002 (tentative date)	R Best	10	Members of SARRNET's Steering Committee conversant with the redirected orientation of the Network and the desired situation at the end of the project	1. Report of the Steering Committee	
3. Participation in the design, preparation and execution of a Rural Agroenterprise Course, Uganda, March 2001	R Best CF Ostertag	26	20 national technicians from government and non-governmental organisations trained in aspects related to rural enterprise development	Report of training course Action plans of participants	Personnel of SARRNET, Foodnet, EARRNET, and the CFC project
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	30	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	National institutions in Tanzania, Malawi and Zambia selected for integrated project execution of SARRNET funded projects. CFC project personnel

ANNEX 2 INFORMATION GATHERED IN MALAWI – FIRST ROUND OF CONTACTS WITH INDUSTRIES

Organization & Key Persons	Basic Information	Relation to Cassava	Current Situation	Potential links to SARRNET	Next steps/ Follow up	General Remarks
<p>RAB Processors Ltd</p> <p>Physical Address: Off Masauko Chimpembere Highway, Behind Toyota Malawi, Maselema, POB 5338 Limbe, Malawi</p> <p><u>Contact Person:</u> Mr. Sai Kiran Josyabhatla (Operations Manager) Phone: (265)-645914 (direct) Cellular: 821516</p> <p><u>Email:</u> rab@malawi.net</p> <p>Fax: 651804/651815</p>	<p>Manufacturing and trading business in processed and unprocessed commodities and milling goods for local as well as export market 500 Employees. Main products: Maize flour (<i>Snow White Nutrious Ufa Woyera</i>), poultry feed, composite foods for, weaning foods Second large processors in Malawi (after Grain Millers) Export within the Region (mainly through donor agencies) and beyond</p>	<p>Buyer of cassava chips from farmers (not this year) Sells cassava flour to Biscuit Factories (ie. Universal) Produce Feeds mixing Cassava flour with maize and pre-mixed concentrates (Imported from Zimbabwe 400 US\$/ton) Last year RAB exported Cassava flour to Zimbabwe (Agrifoods); 4000 Tons</p>	<p>Pre-mixed concentrate + Maize flour is sold at 350 US\$/ton for Broilers Unreliable supply of raw material Today Maize is 45 US\$, last year 90 US\$/ton. No interest in buying Cassava chips as there is still a stock of last year</p>	<p>Interested in small size Cassava chips for Feed Interested in producing balanced feed, needs technical assistance and create awareness among potential users Interested in exploring Market opportunities for Composite flour with up to 20% Cassava flour (Donor /relief agencies are potential clients) Undisclosed use of Cassava for food products</p>	<p>Joint activity to develop composite flour incl. Link to donor agencies of food aid. Supply technical information on use of Cassava in animal feed formulas (Consultant?) Book on Cassava in Animal Feed needed? Invited to the APRU Symposium at Bunda College</p>	<p>Quality of Cassava chips in Malawi today is very poor If Cassava is processed into smaller chips, it will store better (less moulds) and will be easier to commercialise. Cassava chips sample from Mozambique were of better quality (chip size, colour, shelf live time) Half of Malawi's animal industry uses pre-mixed concentrates and prefers maize Look for and develop market were there is a more constant demand Cassava market unreliable if based on the substitution of the dynamic Maize market (policy issue)</p>

Organization & Key Persons	Basic Information	Relation to Cassava	Current Situation	Potential links to SARRNET	Next steps/ Follow up	General Remarks
<p>David Whitehead and Sons</p> <p>Contact Person: Mr. N. A. Williamson (Chief Executive), Head of Malawian Trade Development Delegation to SADDEC</p> <p>Mr. Wiseman Alidi (Production Manager) Cellular: 839785</p> <p>Physical location: Makata Road Chichiri, Blantyre POB 30070 Chichiri Blantyre 3</p> <p>Phone : 670589/670337/ 670191</p> <p>Fax : 671639/670260/ 670027</p> <p>Email: Whitex@malawi.net</p>	<p>Manufacture of textile and yarn (Spinning and fabrics)</p> <p>2500 employees, 24 hours operation 4 shifts</p> <p>Current modernization plans under review</p>	<p>Currently using Cassava ‘Starch’ (=flour) produced from dried chips</p> <p>Big technical problems in the use of current flour (cotton coagulating into balls causing bending of textile material, ‘terrible messy’ on the work floor)</p> <p>Words of Mr. Williamson: Is the application wrong? Do we use the wrong cultivars? Is the process wrong?</p> <p>Used to import Maize starch from Zimbabwe, moved recently into Cassava starch for economic reasons (lack of Forex)</p> <p>In Malawi textile industry lacks practical experiences in the use of Cassava starch (need to supply the formula to end users) Current use: 10 Tons/month but needs soon up to 90 MT</p>	<p>Local supplied Cassava ‘starch’ costs: 187 US\$/ton (factory delivered)</p> <p>Imported Maize starch from Zimbabwe (Chibuku Breweries/cif Blantyre plant): 486 US\$ plus 20 US\$ Transport</p>	<p>Interested in small scale starch processing plant (for own demand and local/regional supply) to benefit of operation of scale</p> <p>Interested information on use of Cassava starch in Textile industry (Africa, Thailand and Latin America)</p> <p>Can easily link a good business plan with investors</p>	<p>Work out a business plan for small-medium starch processing plant (what are the production costs?)</p> <p>Provide ‘real’ cassava starch sample by SARRNET</p> <p>Malawi for trial to convince that cassava starch can be appropriate</p> <p>Analysis sample taken for Starch/Fibre/ Protein content</p> <p>Invite him to APRU Bunda Symposium</p>	<p>New USA Policy. AGOA, 4 year window, to import fabrics and exports cloths quota/duty free to USA</p> <p>After 4 years all the materials have to be manufactured in Malawi before entry in USA.</p> <p>Industry need to develop very quickly, most likely Zimbabwe and South African investors will invest in the Malawian Textile industry.</p>

Organization & Key Persons	Basic Information	Relation to Cassava	Current Situation	Potential links to SARRNET II	Next steps/ Follow up	General Remarks
<p>NASFAM Mulanje</p> <p><u>Contact Person</u> : Ms. Gloria Kamalizeni (Agronomist)</p> <p>Physical location : Along Highway (on the right in Mulanje) POB 410 Mulanje (approx. 60 Km south of Blantyre)</p> <p>Phone : (265)-465389</p>	<p>Association with 3900 members, 3 Zones,</p> <p>Member ship based on Chilly production, association is exporting chilies to Europe</p> <p>Farmers get access to revenues to export</p> <p>Major cash crops: Maize, Pigeon peas (ICRISAT assistance in the past), Sweet Potato</p>	<p>Farmers plant Cassava for chip production and sell to middlemen</p> <p>Currently the production of cassava in each household is low (cassava is planted in single row in Maize plots each 5 meter)</p> <p>Production increased this year as people were told that RAIPLY (Mzunzu) were interested in buying</p>	<p>Current prices are low (<4 MK/kg) and farmers are forced to store chips and wait for better market prices. (RAIPLY's prices is too low as transportation costs too high for making a profit) (3.5 MK/kg transport cost)</p> <p>Large size chips (risk of weevil attack in February)</p>	<p>NASFA could be instrumental in linking existing farmers' groups to supply cassava products to larger industrial users</p> <p>Farmers' associations are already developing entrepreneurial skills.</p> <p>Large memberships will enhance farmers' bargain power and sufficient amounts to negotiate supply to industrial users.</p>	<p>Negotiate collaborative agreement</p> <p>SARRNET/NASFAM</p> <p>Possible activity: Introduction of chipping technology Farmers' participatory evaluation of improved (industrial) cultivars. Explore and develop links with new markets (starch, biscuits manufacturing)</p>	<p>NASFAM' mission matches SARRNET II new approach ie. expanded business opportunities diversification of market access and improved productivity</p>

Organization & Key Persons	Basic Information	Relation to Cassava	Current Situation	Potential links to SARRNET	Next steps/ Follow up	General Remarks
<p>Mr . Muhammed Hussein</p> <p><u>Location:</u> Along Blantyre south Road, approx 55 Km south</p> <p>POB ? Mulanje</p> <p><u>Phone:</u> (265)-478252/355</p>	<p>Core business: operating 54 rural mills</p> <p>Transport of produce (3 Trucks)</p> <p>Commodities: Maize, Pigeon peas, chilies, cassava chips, soybeans,</p>	<ul style="list-style-type: none"> • Export of cassava chips to Portugal (up to last year) and mills and sells for local market (industrial use) • Export price: 126 US\$ (fob premises)/ton • Buying season of chips: October-December • In February forced to use Phostoxin to prevent Weevil attack in Chips 	<ul style="list-style-type: none"> • Pays 3-3,5 MK/kg dried chips • No export market to Portugal this year • Local industrial markets is paying 9 MK/kg, milling and transporting met by supplier • Lack of market (in general) 	<p>Could be a focal point for local farmers to mill the cassava chips and transport them to the market (Blantyre)</p>	<p>Contact importer in Portugal (quality, volumes and applications)</p>	<p>Lack of markets is the biggest constraint for expansion and increased business</p> <p>Lack of aggressive market approach</p>

Organization & Key Persons	Basic Information	Relation to Cassava	Current Situation	Potential links to SARRNET II	Next steps/ Follow up	General Remarks
<p>Universal Industrials</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>	<p>Core Business activities:</p> <ul style="list-style-type: none"> • Biscuits • Sweets • Potato Crisps • Extruded snacks <p>Biggest biscuit manufacturer in Malawi while exports smaller amounts to Zambia and Botswana</p> <p>Exploring the South Africa market (high quality, without Cassava)</p>	<ul style="list-style-type: none"> • Use of Cassava flour up to 10-30% depending on products (currently 20 tons/month, potential 50 ton/month) • Prices: Maize Glucose (S.A) Wheat Glucose (Europe) at 540 US\$/ton Cassava flour at : 140 US\$/ton Wheat flour : 440 US\$/ton 	<ul style="list-style-type: none"> • Current buying of cassava flour: 4-5 MK/dried chips, 6.5 MK milled • Experimenting the use of cassava flour in extruded products (testing revealed that 10% is optimum) • Interest in exploring local glucose production of Cassava Starch 	<p>Needs information on:</p> <ul style="list-style-type: none"> • Cultivars suitable for starch and flour production • Processing equipment (flour, starch and glucose) • Interest in producing animal feed (difficult to get information of South Africa: tight lipped) • Interest in Consortium approach (technology clearing house) 	<p>Information on glucose manufacturing (business plan, equipment, cultivars)</p> <p>Farm could be a good place for variety trials</p> <p>Provide specific market information (prices glucose)</p>	<p>Cassava as an ingredient does not appear on the package; sensitive issue?</p>

Organization & Key Persons	Basic Information	Relation to Cassava	Current Situation	Potential links to SARRNET II	Next steps/ Follow up	General Remarks
<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>Exporters of agricultural produce, Dhal, pulses, Seeds and other commodities</p> <p>Processors and Millers of all types of Indian Dhal, rice, pigeon peas, guar beans, chilies, paprika, Maize</p> <p>Animal feed processing uses by-products like: Sunflower cake Soybean</p> <p>Importing fish meal and blood meal from S.A. and Namibia</p>	<p>Have exported Cassava Pellets to Portugal, Germany (stopped late '80s) because of declined Cassava production affected by CMB.</p>	<p>Maize prices are too low to make Cassava chips an alternative use of Cassava</p> <p>Three Months ago the Management considered to use more Cassava as feed and starch</p>	<p>Collaboration on testing and introduction of Cassava as an ingredient of feed</p> <p>Technical assistance/information on feed formula of Cassava chips</p>	<p>Information on glucose manufacturing (business plan, equipment, cultivars) Farm could be a good place for variety trials Provide specific market information (prices glucose)</p> <p>Marketing information and Equipment</p>	<p>-Expanding business operations (e.g. feed) and investing in Dhal splitting processing equipment -Member of Malawian Poultry Association. Promoting rural based poultry production using local processed feed -Transport costs in Malawi: 5.5 MK/ton/km -Only interested in larger volumes (10 Tons/week) -Maize Production Malawi: Production : 2.5 Mil MT Domestic Consumption: 1.6 MT -Low prices will force farmers to look for other options</p>

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET	Next steps	General remarks
<p>Agricultural Research and Technical Services, Ministry of Agriculture and Irrigation, P.O. Box 30779, Lilongwe 3.</p> <p>Contact person Dr Alfred Mtukuso, Director of Research and Technical Services</p>	<ul style="list-style-type: none"> Conduct research on various crops including livestock and capacity building 	<ul style="list-style-type: none"> Due to recurrent droughts, declining soil fertility, increasing population and decreasing land holding maize alone was not sufficient to feed the population. Govt policy included cassava and sweetpotato as food security crops due to their tolerance to drought and ease to grow. 	<ul style="list-style-type: none"> Production in the last 10 years has increased a lot. In urban consumers the two crops are replacing bread while in some areas they are replacing tobacco as cash crops. Industry is also opening up to use these crops particularly cassava. Research work has been done in the areas of germplasm development, plant protection, crop husbandry and postharvest. Some varieties have been released and postharvest technologies are on demonstration 	<p>Some of the constraints include human resources, capacity building and funding. The traditional donor in the next five year plan has changed focus into off farm activities.</p>	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> These crops could also be used in the livestock feed industry

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARNET	Next steps	General remarks
<p>Malawi Investment Promotion Agency</p> <p>Address: Aquarius House, P/Bag 302, Lilongwe 3, Malawi</p> <p><u>Contact persons:</u> Alfred Joabe, Investment Promotion Executive</p> <p>Mr T.M. Win, UN Volunteer specialist</p> <p>Tel.(265) 780800/781716 Fax.: (265) 781781 E-mail: ajoabe@eomw.net mipall@malawi.net</p>	<p>Promote local entrepreneurship. Provide information to attract investors.</p>	<p>Have identified cassava as one of the commodities with great economic potential</p>	<ul style="list-style-type: none"> • Have identified 1 or 2 people willing to go into starch processing. • Have explored the local market for starch and have contacted Malawi Export Promotion Council to explore more markets abroad • Trying to provide linkages between producers and end users. 	<ul style="list-style-type: none"> • To provide information on the right size of technology for small to medium size production of starch • Could provide more market information from the sub sector analysis studies of Dr Phiri • Help create sustainable consumer-producer linkages 	<ul style="list-style-type: none"> • To liaise with Dr Phiri so that information obtained by both parties could be shared. 	<p>More information on markets in the region could be obtained from the Zambia, Malawi, Mozambique – Growth Triangle.</p>

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET	Next steps	General remarks
<p>Raiply</p> <p>Physical address: About 280 km north of Lilongwe on Mzuzu road.</p> <p><u>Contact person:</u> Mr Kirshna Das, Factory Manager</p>	<ul style="list-style-type: none"> Making plywood and related furniture using ureah formaldehyde as a binding agent while wheat flour is used to provide the required tackness prior to pressure application when binding the various layers. 	<ul style="list-style-type: none"> Cassava flour is used to replace wheat flour because it can be sourced locally and therefore more readily available. Cassava chips are bought at MK7.00 per kg while wheat flour is going at MK18.00 – MK30.00 per kg. 	<ul style="list-style-type: none"> At current production of about 200 to 250 cubic metres of plywood per month, the plant uses about 100 tons of cassava flour per annum. It also uses about the same amount of wheat flour for the same period. The plant is expanding. When fully operational the plant may use up to 300 tons per annum. The problems faced with cassava flour sometimes is uneven binding of the plywood. This was attributed to impurities like sand from the flour. 	<ul style="list-style-type: none"> Provide expertise on formulations that could reduce uneven binding and more incorporation of cassava flour. 	<ul style="list-style-type: none"> SARR NET to pure starch from different cassava varieties for Raiply to try if the variety or the purity could improve the quality of plywood being produced 	<p>Flour used may be contaminated as there is no grading particularly that the colour does not matter.</p>

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET	Next steps	General remarks
<p>M'bama Enterprises</p> <p>Physical address: Area 49</p> <p><u>Contact person:</u> Mr Owen Nyirongo</p>	<p>Fabricate machines</p>	<p>Contracted by SARRNET to fabricate chippers and slicers</p>	<ul style="list-style-type: none"> Fabricated a few slicers and manual chippers Petrol Engine slicer costs \$970 while electrical slicer costs \$671 	<ul style="list-style-type: none"> Link him with potential buyers Look at possibility of producing the machines at a cheaper price 	<ul style="list-style-type: none"> Identify markets to continue fabricating 	<ul style="list-style-type: none"> Durability of the machines needs to be established.

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET	Next steps	General remarks
<p>Grades & Standards debriefing at Capital Hotel</p> <p><u>Contact Person:</u> Mr Charles Jumbe APRU- Bunda College of Agriculture in conjunction with Michigan University for USAID/RCSA</p>	<ul style="list-style-type: none"> • Identified a number of commodities with potential for export • However most commodities require to be graded before they could be accepted at the International markets. • Info on standards and grades seem not to be known to the producer • In some commodities the G&S are not their for Mw 	<ul style="list-style-type: none"> • Cassava has been identified to have very high potential for export due to its nature of being multipurpose in use 	<ul style="list-style-type: none"> • Individuals already exporting chips to Portugal • No International G&S • Regional markets not yet clear 	<ul style="list-style-type: none"> • Help identify specific varieties for specific end use • Provide and strengthen producer through end user linkages • Provide markets info in its target countries 	<ul style="list-style-type: none"> • Capacity strengthening • Business market linkages initiatives • Create a one stop export shop • Establish G&S in private sector forum (ZMM-Growth Triangle) 	<ul style="list-style-type: none"> • Market for industrial inputs largely untapped

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET	Next steps	General remarks
<p>Lilongwe produce markets</p> <p>Contact persons: Vendors: John Kadzem'mawa, Charles Bweya</p> <p>Transporter: Yotam Chaula</p>	<ul style="list-style-type: none"> • Various agricultural products are sold 	<ul style="list-style-type: none"> • Cassava sold in fresh form and sometimes cooked • Sold in three phases: Lilongwe phase, Dedza cassava – December, Kasungu cassava – after December 	<ul style="list-style-type: none"> • Cassava being sold now is from within Lilongwe • About twenty 1.5 –3ton trucks per day come into the main market. There are two other smaller markets within the city 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • SARRNET to collect data on volume of cassava coming into the Lilongwe main market 	<ul style="list-style-type: none"> • The prices for fresh roots in the market were too high to encourage people to process their cassava for the market

ANNEX 3. INFORMATION GATHERED IN MALAWI SECOND ROUND OF VISITS WITH INDUSTRIES

	Company Name	Sector	Location
1	Land O Lakes Inc.	Promotion of Dairy industry/feed	Lilongwe
2	Press Bakeries	Bakery of loaf	Blantyre
3	Universal Industries	Biscuit Manufacture	Blantyre
4	Transglobe Produce Exports	Animal feed/commodity trader	Blantyre
5	Chibuku Breweries	Brewery	Blantyre
6	Packaging Industries Limited	Packaging materials	Blantyre
7	International Timbers Limited	Plywood	Blantyre
8	Farmer 1	Farmer of root crops	Blantyre-Lilongwe road
9	Farmer 2	Farmer of root crops	Blantyre-Lilongwe road
10	EU	EU	Lilongwe
11	Meadows	Animal Feed Miller	Lilongwe
12	NASFAM	Farmer Association	Lilongwe

Other persons/institutions met:

- Dr. Saki (Head of Chemistry Department, Chancellor's college, Zombe, 13/3/2001). The team was briefed on past and current work on cassava utilization research by the Department. Past efforts were focussed on research of starch adhesives (with likanges with PAM), product development and marketing. Currently it is implementing a SARRNET grant proposal in collaboration with partners (Oxfam Universal, RDP) and farmers in Mulanje.
- Mr. Afred S. Joabe (Assistant Manager, of Malawi Investment Promotion Agency, 19/3/2001) and Mr. Shambe (private entrepreneur, interested in starting marketing of cassava flour)

Organization & key persons	Basic information	Relation and interest to cassava	Follow up activities
<p>Land O Lakes Inc.</p> <p>Malawi Dairy Business Development Programme</p> <p>Mr. Austin Ngwira Country Coordinator</p> <p>Location: Akulenje Arcade, Murria Road, Private Bag A148 Lilongwe</p> <p>Phone: 757372 (O) 766285 (Home) Fax: 757373 Mobil: 833366</p> <p>Email: Lolmalawi@sdpn.org.mw Angwira@hotmail.com</p> <p>Visited: 12/3/2001</p>	<p>Activities by LoL in Malawi: promote the production of milk and its utilisation through technical assistance, introduction of AI techniques, extension services and training and policy issues</p> <p>Good results on technology intervention: using improved feed (with molasses) yields increase from 3 to 5 liters milk/day (average of 305 days during lactation period)</p> <p>Main activities concentrate in Lilongwe, Mzuzu</p> <p>Renewed interest in the Dairy; currently there is a shortage of meat and dairy products. Current dairy plants run at <10% of their capacity (Lilongwe plant).</p> <p>LOL sees a role for cassava and Sweet potato as an component of the balanced feed</p> <p>Current prices of ingredients: (Kwacha/kg):</p> <p>Cotton seed cake: 10 Sunflower cake: 10 Calcium Phosphate: 90 Salt: 15 Minerals/Premix: 300-350 Maize: ?</p> <p>Current formulas includes cement, molasses, maize, etc..</p> <p>Feed formulas using cassava leaves and roots were delivered</p> <p>Strong economical change of the Malawian economy over the last 1 year: 1) Interest rates have gone up from 30 to 65% and 2) The depreciation of the MK (Sep'2000): from 40 to 80 MK/US\$.</p> <p>Animal feed milling industry in Malawi is dominated by just a few big companies (no small scale operations):</p> <p>Meadows (near Lilongwe airport) Transglobe (Blantyre) Bhanar Trading (i.e. by products) (Blantyre) National Stock Feed Mills (Blantyre) Universal Agencies (Blantyre)</p> <p>Prices of milk: K17/litre, Beef: K40/kg (farm gate Lilongwe)</p>	<p>Interest in running an experiment on balanced feed based on the use of cassava leaves (20 % Crude protein)</p>	<ul style="list-style-type: none"> • Deliver the samples (dried leaves): 3 different varieties • Need to analyse the protein levels of different varieties • Work on Chipper for processing leaves • Provide similar data from CIAT • Provide more information on feed formulas based on actual prices • SARRNET to plant own plot at Chitedze for roots/leaves and SP trial for animal feed (testing and demonstration purposes) and Soya beans?

Organization & key persons	Basic information	Relation and interest to cassava	Follow up activities	Organization & key persons
<p>Press Bakeries</p> <p>Mr. Wesley D. Mlozi Quality Assurance Manager P.O. Box 30066 Chichiri, Blantyre 3 Malawi</p> <p>Phone: 265670006 Fax: 265671773 Direct: 265 677541</p> <p>Visited: 14/3/2001</p>	<ul style="list-style-type: none"> • Utilize 3,500 bags of 50 Kg per week of wheat flour; 175 Tonne/week • Current price wheat flour: 1500 kwachas per bag of 50 Kg (locally produced) (=0.37 US\$/kg) • Price imported wheat flour: 1750 Kwacha/bag of 50 kg • Imported from Zimbabwe, Argentina, RSA • Produces different types of bread, current share of national market = 45% by 11 bakeries across the country • Have conducted research on different types of non-cereals breads, including cassava. • Does not foresee any technical problem in substituting cassava flour for wheat flour in levels between 10-20% • Problems they see: Reliable supply of cassava flour Quality Different taste of bread 	<ol style="list-style-type: none"> 1. Conduct a Consumer acceptance test for a wheat/cassava bread (80/20) 2. Could become consumer of high quality cassava flour (HQCF) 3. Has agreed to buy 500 kg of HQCS at 15 kwacha /kg 4. SARRNET will have access to the results of the consumer acceptance test 	<p>Prepare a sample of 500 kg of cassava dry chips, of a very good quality</p> <p>Deliver them to factory of Press Bakeries at Blantyre</p> <p>Send information about bread making using cassava flour, experiences in other African countries</p>	<p>Vito</p> <p>Vito</p> <p>Bokanga? IITA? Others?</p>

Organization & key persons	Basic information	Relation and interest to cassava	Follow up activities
<p>Universal Industries</p> <p>Manufacturers of high quality biscuits, confectionery, savoury snacks</p> <p>Factory Manager: Jeff Salisbury P.O. Box 507 Blantyre, Malawi Phone: 265670055 Fax: 265677408</p> <p>e-mail: unibisco@malawi.net</p> <p>Factory Manager: Mr. Jeff Salisbury</p> <p>Manager Sweets: Mr. C.K. Dutt</p> <p>Farm Manager: Mr. C.J. Amin</p> <p>Visited: 14/3/2001</p>	<p>Government encouraging tobacco farmers to move in to cassava production</p> <p>Malawi continues to be a relief-aid dependent country and 'lack of cash in the economy'</p> <p>Continues to use cassava up to 20% in the fabrication of biscuits meant to be consumed for lower income strata of the population, especially in rural areas</p> <p>Sales of cheaper biscuits are on pressure due to the lack of purchase power among the lower income group</p> <p>Is currently using a mechanical peeler for potato and told us is also being used for peeling cassava roots</p> <p>Produces cassava fired flavoured chips (snacks)</p> <p>Uses extrusion technology for corn pops and other products</p> <p>Very active in product development, constantly trying new ideas</p> <p>Company perceiving a great potential in animal feeding, are interested in moving into this area</p> <p>Have land and are currently producing cassava</p> <p>Interested in artificial drying of cassava, requested information about CLAYUCA processing plant</p> <p>Interested in improved chipper from SARRNET</p> <p>Interested in information on cassava croquettes</p>	<ol style="list-style-type: none"> 1. Very interested in setting up an experiment at the company's own farm, using improved varieties, fertilizers (cow manure), and good management practices. 2. Requested formal commercial offer of Colombia drying plant (CLAYUCA technology) 3. Requested information about type of extruder utilized in croquettes fabrication. The rest of the equipment needed for this is available at the factory 4. Requested information about balanced diets for animal feed using cassava flour (roots and leaves) 5. Requested a chipper from SARRNET 6. Requested information about contact in India (cassava sector), General Director had just visited this country and wants to get information on small scale cassava glucose processing technology 	<ol style="list-style-type: none"> 1. Send commercial offer about CLAYUCA artificial drying plant 2. Send information about croquettes 3. Plan an implement cassava commercial plots at their farms 4. Provide a chipper 5. Provide names of contacts in India

Organization & key persons	Basic information	Relation and interest to cassava	Follow up activities:
<p>Transglobe Produce Exports</p> <p>Address: Tempel Road Box 5035, Limbe, Malawi</p> <p>Phone: 265643967 Fax: 265643620</p> <p>Importer, exporters and producers of agricultural products and by-products</p> <p>Managing Director Salim A. Tayub (265)-643930 (direct)</p> <p>Mr Andrew C. M. N Dalasini Business Development Manager</p> <p>Mr. Abubakar Swira Factory Manager</p> <p>Email: transglobe@malawi.net</p> <p>Visited: 14/3/2001</p>	<p>Cassava is not a new crop for them. Exported 1500 MT of fresh cassava roots 15 years ago to South Africa</p> <p>Over 40 years in commodity business (importing/exporting) Promotion of a crop needs good knowledge of the product, is an art</p> <p>Currently trying to strike a deal with a South African company interested in buying cassava chips (for animal feed)</p> <p>Samples have already being sent to RSA : analysed there and company replied maintaining interest in the deal</p> <p>Good quality cassava chips is a must for this potential business</p> <p>Interested in collaborative action with SARRNET to set up this business</p> <p>Also interested in cassava use in animal feeding, especially for dairy production</p> <p>Sell feeds to local producers</p> <p>Good infrastructure for processing feeds and for storage of agricultural products</p> <p>Good knowledge of the import/export business</p> <p>Balanced feeds formulations prepared by Julian Buitrago were delivered</p>	<ol style="list-style-type: none"> 1. Requested samples of cassava flour, from peeled roots and from non-peeled roots. If non-peeled roots are acceptable to South African consumers, costs of processing could be cheaper and potential margins for the business will improve 2. Requested samples from cassava leaves flour, will be sent to RSA for concept and assessment of viability 3. Interested in chipper from SARRNET 4. Interested in conducting experiment with dairy cows using feed formulations delivered by SARRNET. Will implement it with commercial farmers that are clients. SARRNET will have access to the results 5. Interested in CLAYUCA artificial drying technology. Requested a commercial proposal 	<ul style="list-style-type: none"> • Send commercial samples of peeled and non-peeled cassava flour • Send samples of cassava leaves flour • Maintain a close follow up contact with them as the business with South African market is being cooked and could concretise at any moment • Maintain a close follow-up contact regarding the experiment that will conduct on dairy production using cassava roots and leaves flour • Send quotation for a chipper

Organization & key persons	Basic information	Relation and interest to cassava	Follow up activities	Follow up by:
<p>Chibuku Breweries Blantyre</p> <p>Producer of popular maize-based beers in various countries of Southern Africa (SA Breweries)</p> <p>Mr. Joel Mungoni</p> <p>Pone: 670399 Mobil: 836729</p> <p>Email: joemungoni@sdpn.org.mw</p> <p>Visited: 14/3/2001</p>	<ul style="list-style-type: none"> • Preparation of popular beers is mainly based on fermentation of solids : maize (90%) and sorghum (10%) • Two products: Chibuko Napobolo (sorghum seed is soaked and sprouted, milled and dried) • Aware of possibility of substitution of maize and sorghum starch by other starchy products • Aware of variations in flavour and consumer acceptance that may arise as a consequence of this substitution • Cassava could be an option, would it give a different flavour to the two brands they produce currently? • Would it have to be a third brand? A cassava-based beer? • Substitution of maize for beer is not seen as a big technological problem, involves changes in some technological steps • Two key factors could be: a) consumer's acceptance/potential volume b) costs advantage • Maize prices (coming crop) expected to cost > 7 Kwachas /kg • Last year it was 4,5 kwacha/kg • Beer is sold at 20 kwachas liter (25 centavos de dolar) • Production per day: (Lilongwe factory: 60-150,000 litres): per year for Malawi: 5 Million litres per year 	<ol style="list-style-type: none"> 1. Requested samples of cassava chips (10-20 kg) to make a test production of beer using cassava. They will mill chips. Could be delivered at Lilongwe or Blantyre plant 2. SARRNET will have access to results 	<ul style="list-style-type: none"> • Deliver samples of cassava chips, two sources, locally available and improved ones • Send information about other countries experiences producing beer with cassava as a component • Supply Kibuko factory Dar es Salaam to compare results 	<p>Vito</p> <p>Vito Sicco</p> <p>Sicco</p>

Organization & key persons	Basic information	Relation and interest to cassava	Follow up activities	Follow up by:
<p>Packaging Industries Limited</p> <p>P.O. Box 30533 Chichiri Blanthyre 3 Malawi</p> <p>Peter I.S. Chiligo Quality assurance Manager</p> <p>Yoweri Kawiya Quality Assurance Supervisor</p> <p>Telephone: 265 670533 Fax: 265 671283</p> <p>E-mail: pim@malawi.net</p> <p>Visited: 14/3/2001</p>	<ul style="list-style-type: none"> • Three main products are: liquid packaging, corrugated boxes and paper bags • Starch maize is used as binder • 30 tn per month, 50 tn per month in high season • Conducted work in past years to assess feasibility of using cassava starch • Tests were not finished because minimum amount needed per batch of machine is 450 kg and product used was a blend 50/50 of maize and cassava starch • Complains that complete results of this study were not made available to them yet • Current price of maize starch imported from South Africa is US\$ 415 per ton , FOB Lilongwe, road transport might have been 80 US\$/tonne) • Surprised with information provided by Sicco on prices of cassava starch in South Africa and Thailand • Consider that a cassava starch plant in Malawi could be a good investment given the increasing demand 	<ul style="list-style-type: none"> • A trial to assess feasibility of cassava starch in their operations. • To get the minimum amount they need could be a problem • Connect them with factory visited by SARRNET mission in South Africa • Willing to purchase cassava starch from this factory • A clear example of an industrial sector eager for information about technologies, prices, availabilities, etc. 	<ul style="list-style-type: none"> • Send address of South African Factory and www information on starch factories • If at all feasible, deliver sample of cassava starch although minimum required batch seize is large (at least 450 Kg!) 	<p>Sicco</p> <p>Vito</p>

Organization & key persons	Basic information	Relation and interest to cassava	Follow up activities	Follow up by:
<p>International Timbers Limited</p> <p>P.O. Box 5050 Limbe, Malawi</p> <p>Mr. M.K. Sichinga Plymill manager</p> <p>Phone: 640399 Fax: 640959</p> <p>Visited: 15/3/2001</p>	<ul style="list-style-type: none"> • Uses currently wheat flour from Rab Processors and Grain Mills (K 32/kg) • Has experimented with cassava as binder • Encountered problems: <ul style="list-style-type: none"> a) glue tends to sink down, very thick, needs more stirring than when use wheat flour b) Tends to form granules. • Recently received sample of cassava flour that appears to have better quality (• Will conduct test next week • Price of wheat: 32 Kwachas per kg, factory delivered • Uses 12 Kg per mix and prepares 400 mixes per month • A mix will include: <ul style="list-style-type: none"> 25 kg of FFD (=raiser) 1.8 kg of THDA (=hardener) 12 kg wheat flour (=extender) 23 kg water • 50 kg of mixture provides glue for 1 m³ of plywood • Requires 5 tons per month, 60 tons per year • Very interested in mastering the technology to use cassava instead of wheat flour 	<ul style="list-style-type: none"> • Willing to conduct trials with cassava flour (sieved and unsieved) and with mixes of wheat and cassava flour • Requested technological support to solve the problem, feels that cassava could help him produce plywood at cheaper prices 	<ul style="list-style-type: none"> • Send samples of high quality cassava flour • Sicco/Vito to look into the possibility of sieving the flour • CLAYUCA to search and send to SARRNET information about experiences in Latin America with this technology • What kind of mixture is using Raiply? 	<p>Vito</p> <p>Sicco/Vito</p> <p>Bospina</p> <p>Sicco/Vito</p>

Contact	Discussion topics	Potential Joint Actions with SARRNET
<p>Farmer 1</p> <p>Man visited along the road Blantyre – Lilongwe high way</p> <p>Visited: 15/3/2001</p>	<ul style="list-style-type: none"> • Principal crops: cabbage, maize, sweet potato • Sells sweet potato in nearby market • Received improved variety from church group and is finding it better than traditional one • Gets one crop per year • Stores vines and when they sprouts uses them as planting material • Plants cassava for own consumption • Uses fertilizer for cabbage and maize • 36 years, 4 children 	
<p>Farmer 2</p> <p>Woman visited along the road Blantyre-Lilongwe (70 km form Lilongwe)</p> <p>Visited: 15/3/2001</p>	<ul style="list-style-type: none"> • Principal crops: cassava, maize, Irish potato • Sometimes buys stakes from neighbours, most of the time uses her own material • Uses fertilizer in maize, bought by the income out of the sales of fresh cassava • Plants cassava at 30 within the row and 0.8 meter between rows. Does so because sells the crop in the road, 20 meters from her plot, and customers passing by prefer small size roots. Admits that increased spacing will give larger roots buy they will not be sold easily. Yield estimate: 10-12 tonne/ha • Receives 10 kwachas pre a bunch of roots (1-1,5 kg) • Has never taken crop to sell in town (Lilongwe) • Has some problems with diseases, mosaic virus. • Finds strange that people could be interested in buying cassava chips for animal feeding, prefers to sell roots 	

Contact	Discussion topics	Potential Joint Actions with SARRNET	Next steps	Who
<p>Food Security & Food programme Delegation of European Commission in the Republic of Malawi</p> <p>Europe House P.O. Box 30651 Lilongwe 3 Malawi</p> <p>e-mail: mbecfoodsec@malawi.net</p> <p>Tel: 774061 774483</p> <p>Fax: 774073</p> <p>Contacts:</p> <p><i>Maurizio Borzini</i> Economic Diversification</p> <p><i>Elizabeth Minofu-Sibale</i> Programme Officer</p> <p>Visited: 16/3/2001</p>	<ul style="list-style-type: none"> • Food security programme exists in Malawi since 1995 • Emphasis in the past was on food availability • Introducing now a longer term project with a change in emphasis, now is aimed to improve access to food • Improving rural livelihoods conditions • Generating on and of-farm employment • Introducing economic activities, post harvest, value-added • A call for proposals is available. Mr. Borzini in charge of evaluating projects that can go from 400,000 to 3 million Euros , up to 60 months. • Requested a copy of the proposal currently being negotiated by IITA with the EU for activities in Malawi. • Wants to know about it in advance so that when Brussels officers send it to him for review he will be already informed • A concept note was delivered to him requesting support to finance a pilot project in a rural community of Malawi (Mulange region), based on natural drying of cassava chips as a source of animal feeding <p>Team has already identified a potential private industry interested in buying the chips. Amount requested is around US\$ 20,000 Mentioned that he does not have a fast track framework to process this small project. Will refer it to another sector that deals with micro project.</p> <p>Will revise the concept notes and send comments</p> <ul style="list-style-type: none"> • Interested in market-development approach 	<p>Potential source of funding for complementary activities in Malawi, involving Malawian institutions, that could lead to enhanced sustainability of SARRNET results</p> <p>Potential source of financing for badly needed pilot scale operation in Malawi</p>	<p>Follow up activities on the concept note upon receiving his comments</p>	<p>Sicco</p> <p>Vito</p> <p>Mahungu</p>

Contact	Discussion topics	Potential Joint Actions with SARRNET	Next steps
<p>Meadow Feed Company</p> <p>Manager And Consultant</p> <p>Visited: 16/3/2001</p>	<p>Largest producer of animal feed in Malawi, accounts for 80% of the market</p> <p>Produces currently 1500 tons per month but expects to raise production soon up to 3000 tonne per month as the layer and broiler sector is booming</p> <p>Currently poultry sector is booming in Malawi due to policies established recently that put duties on processed feeds when raw materials are imported. Also in imported chicken and animal products</p> <p>Price of maize: 5,80 MK per kg, factory delivered (this is the highest price of the previous crop). Most likely the opening price of the new crop will be lower.</p> <p>Company with branches in most Southern African countries. Technical assistance from South Africa (linked with Tiger Feeds in Lusaka)</p> <p>Consultant mentioned that current broiler systems in South Africa are based on:</p> <ul style="list-style-type: none"> •37 days •1.8 conversion factor •1.4 kg of final weight •4% mortality rate 	<p>Very difficult to push cassava as a component in the animal feed sector given the current price structure for maize.</p>	<p>None</p>

Contact	Discussion topics	Potential Joint Actions with SARRNET	Next steps
<p>NASFAM</p> <p>National Smallholders Farmers' Association of Malawi</p> <p>1st Floor, St. Martins House, City Centre, Lilongwe P.O.Box 30716, Lilongwe 3, Malawi</p> <p>Phone: (265) 772866/883/887 Fax: (265) 770858 Email: mdu@nasfam.malawi.net</p> <p>Mr. Duncan Warren (Marketing Development Manager)</p> <p>Ms. Cecilia Aipria (Programme Assistant Marketing) Cel: 842006</p> <p>Visited: 19/3/2001 Vito and Sicco</p>	<p>NASFAM is the national farmers association with its HQ in Lilongwe.</p> <p>The market department is assisting the local groups with identifying markets for several commodities, trying to cut out the middlemen as they are currently scooping up a large share of the price.</p> <p>Currently a technical visability study is conducted on small-scale starch processing at farmer's level (e.g. in Mulanje)</p> <p>NASFAM would be very much interested in developing activities towards expanding the market/utisliation of cassava.</p> <p>Briefed NASFAM about SARRNET interest to develop a joint activity funded by EU. (see EU Food Security Box)</p> <p>NASFAM made similar contacts with industries like SARRNET did last year (e.g. contacts with David Whitehead Textile, Universal.)</p>	<p>There is a clear interest and need to link up SARRNET and NAFAM as both organisation can strengthen each others own efforts towards commercialisation.</p> <p>Proposed to identify a NASFAM member to participate in the FOODNET/CIAT/SARRNET Agro enterprise development course.</p>	<p>Discuss and develop joint proposal for EU funding</p>

ANNEX 4 INFORMATION GATHERED IN TANZANIA – FIRST ROUND OF CONTACTS WITH INDUSTRIES

List of companies visited

No	Company Name	Sector
1	A-Z Animal Feeds	Animal Feed Milling
2	Golden Mills	Animal Feed Milling
3	Igo Animal Feeds	Animal Feed Milling
4	Interchick	Animal Feed Milling
5	Jadide Enterprises	Animal Feed Milling
6	Kibaha Educational Centre	Animal Feed Milling
7	Mkuza Chicks	Animal Feed Milling
8	Riamia Millers	Animal Feed Milling
9	Top Millers	Animal Feed Milling
10	Dar Brew; Kibuko	Brewery
11	Kibo Breweries	Brewery
12	Sergenti Brew	Brewery
13	TBL	Brewery
14	OK Plast	Biscuits
15	Soza Plast	Biscuits
16	Tabisco	Biscuits
17	Bahresa/Azam	Bread/Biscuits
18	Asante Dar Bakery	Bread
19	Asha Bakery	Bread
20	Esam Bakery	Bread
21	Qooch Bakery	Bread
22	Royal Bakery	Bread
23	Saasi Bakery	Bread
24	Supa Loaf	Bread
25	Top Bakery	Bread
26	Yombo Bakery	Bread
27	Henkel Chemicals	Chemicals
28	MCC Products	Flour/Biscuits
29	Power Foods	Flour
30	Solile Products	Flour
31	Tanzania-China Textile	Textile
32	TBS	Food inspection

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET	Next steps	General remarks
<p>A-Z Animal Feeds</p> <p>Location: Kimara Mwiho Morogoro Road P.O. Box 78336, DSM</p> <p>Mr. Revo Mbuya and wife</p> <p>Vistited: 28/2/01</p> <p>Lekule, Buitrago and Laswai</p>	<p>Firm in business since 1998</p> <p>Owner is businessman while wife is veterinarian</p> <p>10 major feeds including (50 Kg): Layers (Tsh 7000/=) Broilers (Tsh 7000/=) Growers (5,900) Dairy Meal (4,500) Pigemeal (4,500) Broiler starter (7,700) Chick starter (7,700)</p> <p>Concentrates (25 kg) : Broiler (6000). Layers : (5,800) Growers (5000)</p> <p>Formulations given though keeps on changing depending on the availability of raw materials</p>	<ul style="list-style-type: none"> • Does not use any cassava as ingredient 	<ul style="list-style-type: none"> • The company stocks processed feeds and sales both mixed feeds as well as ingredients to customers • Selling of products is influenced by season depending on chicken production • Selling average per week: 100 bags/week • Some clients come with their own formulae and ingredients, asking for mixing services 	<ul style="list-style-type: none"> • Facing problems with high moisture content in some ingredients e.g. maize bran (would like to get a solution) 	<ul style="list-style-type: none"> • Invited to Animal feed meting 	

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET	Next steps	General remarks
<p>Gold Mills</p> <p>Contact person: Jaque</p> <p>Met 2 collegeus at the town office (dealing in cotton belts export)</p> <p>Visted: 26 Feb 2001 Shaun, Sicco and Lekule</p>	<ul style="list-style-type: none"> • Company established 3 months ago • Makes layer and broiler mash feeds • Formulation is available • Business contacts with family contacts • Supplying small-scale farmers ie with less than 150 birds. These people buy the mix and actually supplies most people with premixed feeds. • Some larger clients will come to the mill with their own ingredients and then ask for the formulation to be made on site. 	<ul style="list-style-type: none"> • Non e 	<ul style="list-style-type: none"> • Just started the business and is learning the trade • Main clients are family friends and some of their partners • Main point of interest from family friends is access to credit from Gold Mills • Selling 10 t / month 	<ul style="list-style-type: none"> • Needs information on formulations • Would like further training on computer usage and internet 	<ul style="list-style-type: none"> • Invited to Animal feed meting • Would like further training in use of computers for animal feed 	<ul style="list-style-type: none"> • Main requirements are business support. First requirement How to find a Market for produce? • Would like training and access to information • Would come to an information centre if also trained in use of computer and formulation software.

Organization & Key Person	Basic Information	Relation to cassava	Current situation	Potential link to SARRNET	Next step	General Remarks
<p>Igo Animal feeds Co. Ltd</p> <p>Location:</p> <p>Old Bagamoyo Rd Mikocheni Tel:72045</p> <p>C/o Mr Kinabo G. Manager</p> <p>Visited: 27/2/01 John, Nicolas Mlingi</p>	<p>Manufacture poultry feeds</p>	<p>none</p>	<p>Produce 24 tonnes of feeds per day and are operating at 60% capacity</p>	<p>Mr. Kinabo is a founder member of TAFMA (Tanzanian Animal Feed Millers Association) hence it would be important to work closely with him.</p>	<p>Invitation to workshop on Friday</p>	<p>This company is a key player among the local feed manufacturers in Tz. Further links sh'd be developed.</p> <p>The owner, Mr. Godfred A. Lema, is the chairman of the Tanzanian Animal Feed Millers Association Phone: 0744-293237 P.O. Box 4087, DSM</p>

Organization & Key	Basic Information	Relation to cassava	Current situation	Potential link to SARRNET	Next step	General Remarks
<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@twiga.com</p> <p>Visited: 26 Feb 2001 Shaun, Sicco and Lekule</p>	<ul style="list-style-type: none"> Animal Feed merchants supplying 7 products but focussed on layers and broiler feeds. Currently hatch 70,000 1 day chicks for broilers per week Hatching 12-15,000 layers on own farm Use of Soya (imported from India) 	<ul style="list-style-type: none"> None, were aware that cassava had been used, but do not consider that cassava will be a commercial option. Particularly with the current cost of Maize at 80 Tz S / kg from Food Reserve Depot. Currently buying 400 tonnes / month <p>IC were involved in a research study with UNIDO on the feasibility of using cassava as a component in animal feed. Study results showed that cassava could be used in small quantities ie 5% of mix if the chips were available at approx 30 Tsh/kg.</p>	<ul style="list-style-type: none"> Interchick is a key player in the Tanzanian Animal Feed Association. IC are also providing farmer associations with technical advise. Focus is on quality products through quality feed and high standards of hygiene. Selling 10-12,000 50kg bags of feed per month. Also using another 12,000 50 kg to Interchick farm for poultry production. 50 sales agents around the country to sell the feed. Market Share for chicks is 60%. Market share for feed is 25%. It was higher up to 40% but prices of feed have increased due to introduction of 20% VAT market is now more competitive, with a larger number of small companies and farmers are also milling their own feed. 	<ul style="list-style-type: none"> Would be interested to meet with CLAYUCA people. Would be interested in ideas of information sharing 	<ul style="list-style-type: none"> Invited to Animal feed meeting. Would like separate meeting with B.Ospina and J. Buitrago 	<ul style="list-style-type: none"> Interchick are interested in working with SARRNET, aspects of most interest are:- Policy issues include: Reduction in tax on animal feed so that do not have to pass this cost onto clients. High costs of electricity to industrialists, which means that use of equipment is restricted Standards IC future strategies Tanzania is experiencing a large influx of SA companies in the fast food and retailing sector. IC intends to supply these industries with high quality products, ie processed chickens. Note that several small feed mills and farmers are using non sterilised food stuffs such as bone meal and blood products which cause disease problems such as salmonella. Interested in information on extruders for feed, have analysed the situation but was US\$200,000 – 250,000 to adopt extrusion technology but deemed too expensive.

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Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET	Next steps	General remarks
<p>Jadide Enterprises Corner junction of Ubungo / Kibaha road</p> <p>Mr Mligi Accountant</p> <p>Tel 0744 310602</p> <p>Visted: 26 Feb 2001 Shaun, Sicco and Lekule</p>	<ul style="list-style-type: none"> Company has been operating for past 6 years. Produces 4 main feeds including <ul style="list-style-type: none"> Layer mash 7800 Broiler mash 7800 Chick mash 7800 Grower mash 6800 Formulations given in annex 1 	<ul style="list-style-type: none"> Do not use cassava and are unlikely to do so. 	<ul style="list-style-type: none"> Small company producing both mixed feeds and selling ingredients to clients for them to make their own formulations Sales pattern, no clear figure at hand, but figures from one day?? (check) sold as follows:- <ul style="list-style-type: none"> 26 bags Broiler 104 bags layer mash 11 bags grower 10 bags chick feed 7.5 tonnes of premixed feed, plus estimated 23 tonnes of ingredients, therefore selling 30 tonnes per day. 	<ul style="list-style-type: none"> Would be interested to get information on formulations Would like access to software which could work out formulation options given lack of key ingredients Would like access to business software and accountancy software to develop figures. Would like access to internet but does not know how to do this. Would be interested to buy a computer at low return loan. 	<ul style="list-style-type: none"> Invited to animal feed workshop. Can SARRNET set up an office with computers to train Feed merchants in use of formulation software Can SARRNET FOODNET set up projects to supply information technologies Can SARRNET / FOODNET set up a loan scheme to supply business partners with computers. 	<ul style="list-style-type: none"> Wants to know how to gain access to larger markets How to access cheap raw materials How to reduce labour costs How to analyse the business more effectively How to use computer software to make the business financial operations more effective.

Organization & Key Person	Basic Information	Relation to cassava	Current situation	Potential link to SARNET	Next step	General Remarks
<p>Kibaha Educ. Center Feed Mill. (KEC)</p> <p>Morogoro Rd. P.O. Box 30131 Kibaha</p> <p>Mr. Kinenekoje Mill Manager Tel: 2402282 (off) Tel: 2402610 (Res)</p> <p>Visited: 1/3/01 Laswai, John, Julian, Kiddo</p>	<p>-This mill was purposely set up to produce feeds for the animal units at the KEC</p> <p>-At present feeds are sold to the various poultry farmers in the neighbourhood.</p> <p>Prices in Tsh. per 50Kg for products are; Chic mash @ 8,200 Br Mash @ 8,000 Layer mash @ 7,600 Growers mash @ 6,800 Breeders mash @ 8,200</p> <p>They make egg trays and sell them @ 80/-</p>	<p>-None has been used before</p> <p>-if cassava is to be used, a sieve of screen size >16mm should be used to avoid dust in the mash</p>	<p>-The mill produces about 14 tonnes of feed per week and of this is the broiler and layers mash</p> <p>-The raw materials used are; Maize bran 45-50/- per Kg Maize flour 120-150/- per Kg Cotton S.cake at 90/-per Kg Sunflower 75-80/- per Kg Fish meal 350-400/- per Kg Bone meal 150-180/- per Kg Molasses 45-50/- per litre</p> <p>-some clients come with their own formulae</p>	<p>The mill manager has shown willingness to conduct joint trials with cassava</p> <p>There is need for further training in feed formulations</p>	<p>Manager invited for the feed millers workshop on Friday.</p>	<p>Major constraint is working capital deficiency</p> <p>Feed analyses are very costly</p>

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<p>Mkuza Chicks Ltd.</p> <p>Location: Mandela Rd. near TAZARA</p> <p>Rose Binagi Marketing manager Tel: 2139246 Tel: 2139248</p> <p>Visited: 27/2/01 John, Nicholas</p>	<p>Makes poultry feeds and imports fertilised eggs from Uganda, S.Africa,</p> <p>The have the following products sold in 50Kg Bags</p> <p>Broiler Starter @ 8,400/= Broiler Finisher @ 8,000/= Chick starter @ 8,000/- Growers mash @ 6,500/- Layers mash @ 7,500/-</p> <p>The feed formulations are done with the aid of software packages.</p>	None	<p>25–30Tonnes of feeds are produced per day</p> <p>energy source; maize, Proteins source; Fish meal, seed cake Vitamin; premix from RSA</p> <p>Minerals & salts</p>	It is important to link up with the proprietor who is also a director with TAFMA	Invited for the workshop but won't make it because they are in Zimbabwe on a tour of farms	This company is a key player among the local feed manufacturers in Tanzania. Further links should be developed.

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET	Next steps	General remarks
<p>Riami Millers</p> <p>Mr. Mansoor Ubungo</p> <p>Opposite western entrance gate of University of DAR</p> <p>Visited: 26 Feb 2001 Shaun, Sicco and Lekule</p>	<ul style="list-style-type: none"> • Established within the past 6 months. • Making poultry feeds for layers and broilers • Production 2 tonnes / day • Ingredients maize, maize bran, cotton cake, fish meal • Sunflower cake 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • New establishment, 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Not invited for the workshop (2.3.2001) 	<ul style="list-style-type: none"> • Has just started the business and may need time to become more established before we can assist or develop a useful relationship • Owner only speaks understands Swahili, • A fish meal supplier is located in the same compound (buying bigger, smaller fish from Lake Victoria region). Prices: Small Fishes: 300-350 Tsh/Kg (buying at 200-250 Tsh/Kg in Mwanza) Bigger fishes: (slightly lower prices) Milled Nile Perch waste: 180 Tsh/kg

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET	Next steps	General remarks
<p>Top Miller</p> <p>Location: Kimara Mwisho Morogoro Road</p> <p>Mr. Shihab Salim Phone: 022-42-174 P.O. Box: 71673 DSM</p> <p>Visited: 28 Feb 2001 Lekule, Buitrago and G. Laswai</p>	<ul style="list-style-type: none"> • Started in 1998, produces 4 main feeds • Price (50 Kg): Broiler 7,700 Layer 7,150 Chick Starter 7,700 Growers 6,500 • Produces feeds only on order and most customers come with their own formula • Also sells ingredients to farmers 	<ul style="list-style-type: none"> • Not used before and scared of the problem of dust in the mash 	<p>Small companies produce both mixed feeds and sell ingredients to clients who come with their own formulae.</p> <p>Prices of ingredients vary from season and place to place</p> <p>This companies sells 5 MT per week</p> <p>Has a consultant to helps with formulas</p>	<ul style="list-style-type: none"> • Access to information on availability of raw materials 	<ul style="list-style-type: none"> • Invited for workshop on friday 	<ul style="list-style-type: none"> • Seller of day old chicks

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET	Next steps	General remarks
<p>Dar Brew Kibuko Brewer</p> <p>Production Manager: Mr. Sichillima M. Kazonda (Brewery Process Manager) Morogoro Road Box 21251 Dar Phone:0741-264024 Office: 2450382</p> <p>Visted: 22 Feb 2001 Shaun, Sicco, Berte and John</p>	<ul style="list-style-type: none"> • Only industrial source of Kibuko (formerly Chibuko Beer) • Company owned by Lonhro up to 1976, then nationalised and then sold recently to SAB (TZ government still 40 % stakeholder) • Beer is sold in returnable brown plastic yarns • Price of beer: 150 Tsh/bottle (180 Tsh retail) • Brewing technique: 8 hours mix at 60 degrees Add yeast and brewed up to 30 hours at 25 Degrees Bottled, distributed and consumed within 72 hours Alcohol content increased approx. 5% 	<ul style="list-style-type: none"> • Non e; never considered 	<p>Product (Kibuko) is 80 % maize and 20% sorghum Production: 8 tonne per day</p> <p>Two products: Kibuko (40-50.000 Liters/day) Sorghum beer: 3 – 4.000 liters/day</p> <p>By production of maize beer is sold as animal feed for 5 Tsh/kg to cattle/dairy farmers</p> <p>Company buys maize at peak/harvest period and stores in its own godowns at the premises or outside</p>	<ul style="list-style-type: none"> • Like to test one batch of cassava chips for analysis in their own company lab 	<ul style="list-style-type: none"> • Provide test sample for analysis 	<ul style="list-style-type: none"> • Launched recently a new product (fruit flavoured cold maize porridge) but this failed and production has stopped. • This beer is consumed by the lower urban income group • Manager suggested that sales were increasing as some people were shifting from lager beers to maize beer

Organization & Key Person	Basic Information	Relation to cassava	Current situation	Potential link to SARNET	Next step	General Remarks
<p>Kibo Breweries Ltd. Head office Tel: 2153416 Dar es Salaam</p> <p>Factory Tel 027 2754735 Moshi</p> <p>Mr Muftau Oshodi Purchasing Manager</p> <p>Visited: John, Berta,</p>	<p>-Produces beer and the bi-products are sold to animal feed industry</p> <p>-it is among the two leading beer manufacturers in TZ with market share of 20%</p> <p>- The Factory is situated at Moshi and owned by S. Africans.</p>	None	<p>-utilises 420MT of maize starch per year. It is purchased from CPC in Eldoret at a cost of \$500 per MT (del. factory)</p> <p>- utilises starch as an adjunct. Other raw materials used include malt at a cost of \$400 per MT and Sugar at a cost of \$370 per MT (del at Factory)</p>	<p>Could hold further discussions on cassava starch properties.</p> <p>-there is a possibility of using cassava starch as an adjunct</p>	-A sample of 10 Kg could be availed	Cost and availability of cassava are crucial issues to consider

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<p>Associated Breweries Ltd. (Serengeti)</p> <p>Tel:</p> <p>Mr Shah</p> <p>Visited: John, Berta,</p>	<p>-Probably the 3rd largest beer manufacturer in Tanzania with probably <10% of the market share</p>		<p>There is no starch usage at all. The formations used do not allow for the usage of adjuncts.</p>	none		<p>- Since the use of adjuncts is heavily discouraged as per the German beer formulations that are followed</p>

Organization & Key Person	Basic Information	Relation to cassava	Current situation	Potential link to SARRNET	Next step	General Remarks
<p>Tanzania Breweries Ltd</p> <p>Uhuru Rd. Ulala</p> <p>Mr G. Mkolwe</p> <p>Brewing Manager Tel:2182779/81 Mob: 0741 266734</p> <p>Visited: John, Berta,</p>	<p>-The company is owned by S. Africans under SABC</p> <p>-They hold 60% of the market share for beer in Tz</p>	Not used before	<p>-At present the factory utilises 600MT of Maize starch p.a and this is mostly from RSA at a cost of TSh 450 per Kg. (cif Dar)</p> <p>-Occasionally starch is purchased from CPC Kenya and from UK</p>	The potential is not so high due to the fact that if a change is to occur, it must involve the other sister companies within the region.	Could hold further discussions with the Technical Director if a sample is to be tried out.	<p>Cassava could be used if the following are taken into consideration;</p> <p>-Temperature at which starch gelatinises should be 68 – 72°C</p> <p>-the starch should be oil free because oil affects the stability of the foam</p> <p>-Starch should be free of any toxic substances & metals</p>

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OK PLAST Ltd. Plot 89-90 Vingunguti industrial area Tel: 2844223 E-mail: okplast@cats-net.com Mr. Mohammed Ali Ghaddar 26-2-01	Produces waffles and is planning to resume biscuits Plans to use 50 bags per day of 50 kg Has 3 years of manufacturing and employs about 40 labourers	Has not used cassava flour before . He is willing to use cassava for trials	Currently not producing biscuits. Produced biscuits in the past using wheat flour	Firm is willing to use cassava flour once the product is of a good quality and the price of cassava is good	Should get the formulation	This is a small factory, which is trying to establish itself in the market.

Organization & Key Person	Basic Information	Relation to cassava	Current situation	Potential link to SARRNET	Next step	General Remarks
Soza plast industries ltd. Mr. Ramzi Mikocheni B Plot 112 Dar-es-Salaam Tel: 2775926/2700880 E-mail: Soza@intafrika.com Visited: 26-2-01	Produces biscuits using wheat flour	Cassava flour can substitute wheat flour up to 30%	Has about 60% of the market Uses about 150 to 200 bags per day of wheat flour for biscuit making It's the biggest manufacturing concern in the biscuit sub-sector Operates a 2 shift production system	Is already convinced that cassava flour can be used to make quality biscuits. The concern, however, is about its marketability He suggested this should be done at the cost of Sarrnet. He is willing to assist use his distribution channel eg putting about 20 packets in each of his deliveries. He however needs to procure packaging material at a cost to sarrnet	Need to provide the flour Need to work out the cost of the samples immediately	Two crucial issues are marketability of the product and also the price of cassava flour. According to this industry, the cost of cassava should be about 1/2 that of wheat flour

Organization/ Key Person	Basic information	Relation to cassava	Current situation	Relation to SARRNET	Next steps	General remarks
<p>Tabisco</p> <p>Mr. Narandra-Care-taker manager</p> <p>Mr. Sanjay Yenugwar (Technical Mananger)</p> <p>Phone: 0742-787051 Tabisco@raha.com</p> <p>Address: Box 570</p> <p>Locations: 114 Mbozi Road, Chang'ombe DSM</p> <p>Visited Wednesday 21-2-01</p>	<p>Produces 8 brands of biscuits. The market is local, around the country. Firm enjoys about 10% of the market. It hopes to increase this to about 40 or 50%.</p>	<p>Have not used cassava products before. However, cassava products can partially substitute wheat flour as a raw material in biscuit making.</p>	<p>Uses wheat flour with quantities ranging from 40 to 100 tonnes per month depending on the demand of the product. It also uses other 7 ingredients that were not specified. The demand for the Product fluctuates with time and place eg. it is higher in Mtwara when people have sold their cashew-nuts and in Dar during time of festivities. Dar-es-Salaam constitutes the main market for the products. However, the company faces stiff competition from imports which still dominate the market. The current policy does not protect the local manufacturers against cheaper imports. The products produced have a shelf life of 12 months. Packaging material is also imported. The company uses smaller packets of 75 and 100 grams which sell at a much lower price of 50 and 100 Shillings respectively. This is done in order to increase revenue by targeting low income groups.</p>	<p>Interested in industrial trials to determine effectiveness of the technology.</p> <p>Already established distribution outlets, which he is willing to use to assess consumer acceptability. This is a crucial factor as the firm has a marketing strategy and has gradually built a name in the local market.</p>	<p>-Provide sample of cassava flour (about 175 kg) after 15th March</p> <p>-Should provide the formula for biscuit making.</p> <p>-Should provide technical backing at this time of industrial trials</p>	<p>-could make serious partner in the development and marketing of cassava based biscuits in Tanzania. Firm is willing to use cassava products if the cost of the raw material does not exceed 250 Tanzanian shillings per kilogram (factory delivered). As long as the quality is acceptable, this company might think of using cassava raw material in its products. Its crucial that the sample is provided and biscuits made to get practical economic figures as this is what will drive the company to include cassava flour its products. It might be a good idea for the industry to give the price at which it thinks cassava can be used given the competition from current cheaper raw materials</p>

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARNET/ FOODNET	Next steps	General remarks
<p>Bahresa / Azam Bakery</p> <p>Moses Tel: 0744-291610</p> <p>Visited: Monday 26-2-01</p>	<p>Makes bread and biscuits He is also a miller</p>	<p>Aware of cassava flour inclusion in bread making Doesn't think can work in bread Thinks it work in biscuits and cakes</p>	<p>One of the biggest producers Uses about 400 bags for bread and 50 bags for biscuits Employs 30 labourers in the biscuits section Each bag produces 20 boxes of biscuits with each box containing 100 packets of 35 grams each Each packet is sold for 33 TS</p>	<p>Is interested in using cassava flour in the biscuits Issues to resolve include the price of the cassava For bread thinks its not a viable idea</p>	<p>Should be availed with the sample</p>	<p>The technologist is already aware of the technology. This might be another good partner to push forward with</p>

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARNET/ FOODNET	Next steps	General remarks
<p>Asante- DSM Bakery</p> <p>Location: Uwarani street Magomeni-Mapipa,</p> <p>Tel: 0744-263322/363702</p> <p>Contact person Salim (manager) and Ahmed (owner) visited 28-2-01</p>	<p>Started in 1998. Makes bread only Products include box type, original round bread, French bread and scone The main product in terms of sales is what the industry calls the box type of bread. This product has relatively more sugar and oil</p>	<p>Cassava flour can be partially be substituted in bread</p>	<p>Employing 8 bakers running a 1 12 hr shift. Currently utilizing 15 bags of wheat flour per day. This is obtained from Coast millers (Nyati) at a cost of 12,500/= per bag, factory delivered. The flour is already partially mixed into bakers flour. However, the bakery adds more ingredients There is stiff competition amongst the flour millers leading to the practice of interlocking markets Bread is sold at 160/= per loaf factory price. The bakery too practices interlocking markets due to the stiff competition in the industry The demand for bread exhibits seasonal fluctuations. These depend on factors such the availability of substitutes in terms of cheaper farm crops like sweet potatoes, cassava during the harvest time. Substitutes lead to low demand</p>	<p>This factory is willing to explore marketing opportunities for the new product</p>	<p>Supply cassava flour sample Work together to produce the bread at the factory</p>	<p>This bakery thinks it would be better to introduce the cassava baking flour through millers Established millers know the type of quality that can produce good bread and the bakeries have their confidence</p>

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET/ FOODNET	Next steps	General remarks
<p>Asha Bakery</p> <p>Location: Kinondoni</p> <p>Phone: 022- 2760381</p> <p>Mobile: 0744-290931</p> <p>E-mail: shirwaally@hotmail.com</p> <p>Visited 27-2-01</p>	<p>Makes bread only</p> <p>Employs 6 labourers with 1 shift</p> <p>Started in 1998</p>	<p>Never aware of cassava as a raw material before</p>	<p>Uses about 4 bags of wheat flour per day to produce about 100 loaves of bread</p> <p>Reported stiff competition that has driven sales low. There are now too many bakeries</p> <p>Involved in interlocking markets-receives raw material on credit</p> <p>Factory price for the 400 gm bread is 400 TS, which is then retailed at 160 TS or more depending on the area.</p>	<p>Willing to try cassava flour if gets the formulation</p>	<p>Avail the formulation</p>	<p>This is a small bakery that is struggling to stay in business</p>

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET/ FOODNET	Next steps	General remarks
<p>Esam bakery</p> <p>Rubada-Ubungo area</p> <p>Manager: Mr. Said Zahoro</p> <p>Tel: 0741-324232</p> <p>Visited: 28-2-01</p>	<p>Only Bread is produced</p>	<p>Unaware of use of cassava in bread making</p>	<p>Using about 20 bags per day, running one shift from 6 am to 6 pm</p> <p>Employs about 15 laborers</p> <p>Obtains flour from Soza plast who deliver it to bakery at a cost of about 12,800/= per 50 kg bag</p> <p>There are many bakeries now and sales have reduced. Also, the purchasing power has reduced leading to low sales</p>	<p>Willing to receive new knowledge but is wondering what the incentive for adoption will be</p>	<p>Avail the sample</p>	

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET/ FOODNET	Next steps	General remarks
<p>Qooch bakery</p> <p>Location: Magila street, Kariako,Dar.</p> <p>Contacted Manager Mr. Mohammed – Mr. Qoosh –(owner)</p> <p>Phone: 0742-608656</p> <p>Visited : 28-2-01</p>	<p>Bakes bread alone of 500 grams Started June 2000</p>	<p>Unaware of cassava as raw material in bread baking</p>	<p>Uses wheat flour from bibi millers. The cost could not be obtained as respondent was not the owner Currently utilizing about 5 bags of 50 kg per day. Employs 3 laborers working 24 hours per day About 180 loaves are obtained from the 50 kg bag Other ingredients include sugar, salt, yeast, and maji mix Competition is stiff now and sales have gradually come down. This is attributed to more firms coming into the industry.</p>	<p>The bakery is willing to receive the novel technology and to test the product on the market</p>	<p>Sample and technology (formulation should be availed)</p>	<p>This is a small bakery. Details could not be obtained as the owner was not around</p>

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET/ FOODNET	Next steps	General remarks
<p>Royal Bakery</p> <p>Location: Swahili-Faru junction, Kariakoo</p> <p>Director: Ashraf M. Al-Mauly,</p> <p>Phone: 022- 2183850 Mobile: 0741-333128 E-mail: aalmauly@hotmail.com</p> <p>Visited: 24-2-01</p>	<p>Produces only bread</p>	<p>Lacks information about cassava based products</p>	<p>Uses only wheat flour obtained from millers. The grain is imported from Australia, Zimbabwe, Saudi-Arabia. The wheat flour costs 13,000 shs per 50 kg bag factory delivered. Before the price was 15,000/= but has now come down.</p> <p>The quality at times is not good for the flour. The firm thought this was due to over mixing the soft grain with the hard one thereby making the end product hard for bread.</p> <p>The bakery used to use 8 to 10 bags per day but since last year in August this has reduced to 4 to 6 bags. This was attributed to increased competition in the market and the fall in the consumer purchasing power.</p> <p>The current shelf-life of the product was 5 days in good storage conditions. This however reduced to about 3 days in poor conditions usually associated with smaller shops.</p> <p>A 50 kg bag of wheat flour produces about 170 loaves of 500gm.</p>	<p>This bakery would very much want to see the product from cassava. It is willing to try once the formula is provided along with the raw material sample.</p>	<p>A sample of 10 kg of high quality cassava flour should be provided to this bakery</p>	<p>This also could make a serious partner whom the project could and should work with to assess consumer acceptability. The bakery is willing to use its own marketing channels and experience to test the viability of the project.</p>

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET/ FOODNET	Next steps	General remarks
<p>Saasi Bakery</p> <p>Abdalhaman Ali and Sherif Alli Abdalla</p> <p>Tel: 022- 2856753</p> <p>Visited: 22-2-01</p>	<p>Produces bread only, with a specialized market - army</p>	<p>Cassava can be used as a partial substitute in the making of bread.</p>	<p>Could not divulge figures about the market size in terms of raw material usage and end product.</p> <p>Acknowledges stiff competition. The bakery enjoys a special market with the army</p>	<p>The bakery is willing to try using cassava flour in the products only on condition that the substitution rate is up to 50% and the price is not more than 130</p>	<p>No meaningful cooperation in the immediate future</p>	<p>There seems to be difficulties, as those some of those conditions cannot be met at the moment.</p>

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET/ FOODNET	Next steps	General remarks
<p>Supa loaf</p> <p>Tel: 022-2862194</p> <p>Mobile: 0744-692885</p> <p>Yahya</p> <p>Visited: 26-2-01</p>	<p>Started in 1996</p> <p>Produces normal sweet bread of 0.5 and 1 kg. Uses 100% wheat flour</p> <p>Employs 30 labourers working 3 shifts</p>	<p>Never used cassava flour in bread</p> <p>Willing to have trials conducted</p>	<p>Uses 60 bags of wheat flour per day with each bag producing about 150 to 155 loaves of a half kg</p> <p>The shelf life of the product is 4 to 5 days in a cool weather while it reduces to 3 in the very hot weather.</p> <p>Uses Australian wheat which was found to be good for bread.</p> <p>The cost of wheat is about 12,600/= per 50 kg bag from Bahresa-Azam</p> <p>Estimated total industry demand for wheat flour at around 1000 bags</p> <p>Reported stiff competition which has driven sales down</p>	<p>Wants to see the cassava bread</p> <p>Interested in trials and is willing to use once the quality is good</p>	<p>Should be availed samples of cassava as soon as possible.</p>	<p>This bakery is more concerned about quality and the price of the cassava flour</p>

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET/ FOODNET	Next steps	General remarks
Top bakery Tel: 2856216 Visited 22-2-01	Bakery produces bread only	This too does know that cassava can be used in bread making	It uses between 20 to 40 bags of wheat flour(50kg) per day depending on the market	This is not willing to try cassava. It says other big ones should try first and then it will also follow. They don't believe cassava can make good bread as bread requires soft grain	No immediate cooperation	Highly doubt marketability of cassava based bread

Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET/ FOODNET	Next steps	General remarks
Yombo Bakery Mr. Alfayo Tel: 022- 2864219 Visited: 27-2-01	Makes bread only 10 years experience Each loaf sells for 170 TS	Lacks information about cassava as a raw material	Currently using about 7 to 8 bags of wheat flour per day Source of the raw material is Soza plast Stiff competition at the moment which has reduced sales			Didn't talk to the owners so some information could not be availed

Organization & Key Person	Basic Information	Relation to cassava	Current situation	Potential link to SARRNET	Next step	General Remarks
Henkel Chemicals Changombe Ind. Area Mbozi Rd. Mr. Arif General Manager Visited: John, Betha	It is a sister company to Henkel EA in Kenya. It is involved in producing a number of chemicals					

Organization & Key Person	Basic Information	Relation to cassava	Current situation	Potential link to SARRNET	Next step	General Remarks
Tanzania – China Friendship Textile Co. Ltd Ubungo Ind. Area Tel: 2443344 Fax: 2443689 Mr. Joseph Kijeruda (Deputy Manager P&T) 022-2443110 Mr Edward Chikumbeni Purchases Manager Visited: 23/2/01 John, Berta, Sicco, Shaun	-Ownership is 51% Tz Govt and 49% Chinese Govt. - produces textiles -covers 40% of the market share of locally produced textiles.	none	-utilises 100MT of food grade Maize starch from China at a cost of \$0.28 per Kg (cif Dar) Maize starch from France was once used at a cost of \$0.40 per Kg (cif Dar)	Not in near future	-Sample of about 50Kg could be availed to them	-availability of the starch at a price lower than the current source is very important to consider - cassava starch has to meet the required quality specifications ie moisture content <10%, has to be odourless & white in colour

Organization & Key Person	Basic Information	Relation to cassava	Current situation	Potential link to SARRNET	Next step	General Remarks
MCC Products. Msasani Mrs Mnzava Tel: 2668910 Visited: John, Berta,	- produces composite flour, cakes, bread, snacks -1kg pack of composite flour is sold at Tsh. 1,000	none	-utilises 2MT of maize, 5MT of finger millet, 3MT of wheat, 1.5MT Soya & 0.5MT of G.nuts per annum.	Quite willing to incorporate cassava flour as a raw material	-a sample of high quality cassava flour could be availed	-if cassava is to be used, it should have a benefit in terms of cost. -at present maize flour costs 150/= per Kg while wheat costs 250/= & Soya 450/= per Kg.

Solile Products Ltd Bagamoyo Rd. Ms Solile Ramadhan Visited: John, Bertha,	Makes composite flours using maize, Finger millet, Soya & G.Nuts -1 Kg pack of composite flour is sold at Tsh.800	none	-60MT of the composite flour are made per annum. Maize is purchased at 150/= per Kg while Finger Millet at 350/= per Kg & Groundnuts at 450/= per Kg	The prospects for using cassava flour are quite high but there must be an advantage in terms of cost.	-50 Kg could be given as a sample for composite flour trials.	They are very willing to use cassava though they claim that the current cost of cassava flour is 600/= Per Kg hence there is no cost advantage.
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Organization & key persons	Basic information	Relation to cassava	Current situation	Potential links to SARRNET/ FOODNET	Next steps	General remarks
<p>Power Food Ltd.</p> <p>Kawa, DSM</p> <p>Mrs. Anna Temu Managing Director Powerfoods@hotmail.com Phone: 0744-274129</p> <p>Visted: 24 Feb 2001 Shaun, Sicco,</p>	<ul style="list-style-type: none"> Started milling operations with maize mid'80 Introduced Soya based products in the mid'90 Targeting the middle and higher urban income class Use of proper and well designed packaging material Supplying retailers, supermarkets and refugees (WFP and TZ-Mozambique friendship NGO) Works already with INCRISAT Bulawayo (David Robert ?) on sorghum processing (purchase of a destoner; 6,000 US\$) Interested in Soya milk processing: identified appropriate equipment from Malaysia (www.oceangrand.com) 	<ul style="list-style-type: none"> Has started a new line of 1 Kg Cassava flour using SARRNET provided grating and pressing equipment Price: Wholesale: 400-450 Tsh/kg Retail: 600-650 Tsh/kg Price of raw material: 30.000 Tsh/tonne (Kibaha): Approx. 120 Tsh/kg flour Sales volumes on the increase 	<p>Products lines: Sorghum Millet Soya Maize Blends of above Dried Soya blends for health drinks</p> <p>Cassava flour sales volumes are still low as there have not been any (aggressive) advertisement/promotion activities</p>	<ul style="list-style-type: none"> Despite delays in allocating funds for a joint project the company went ahead and started processing cassava 	<ul style="list-style-type: none"> Formulation of project between FOODNET and SARRNET on extrusion technology (based on a loan basis) for equipment (investigate the set up of a new separate company to run this facility and provide training and processing services to other private sector partners). Conduct Internet search to find appropriate equipment, prices, capacity and import costs Invite to next SARRNET and FOODNET SC meetings <p>Cassava work: Need to test different processed flours on various cooking characteristics (i.e. elasticity, taste, preference by consumers)</p>	<ul style="list-style-type: none"> Future market: will supply new RSA Score 1 (RSA Supermarket) UNCHR/WFP have requested that future supplies need to be extruded to meet new global WTO food standards New government regulations for supplies to institutes require micro-nutrients input (i.e. Vit A and iron). To meet above standards she is investigating possibility of purchasing extruder (capacity up to 5 tonnes per day). Looking at a Insta-pro extruder at 50,000.US\$. Looking also at packaging machine: 9,500 US\$, filling machine (9,300 US\$) as labour costs are high and interest in destoner (6,000 US\$). This complete set will enable the business to produce full range of food, staple, baby, snack food and pet food

Organization & Key Person	Basic Information	Relation to cassava	Current situation	Potential link to SARRNET	Next step	General Remarks
TBS Tanzania Bureau of Standards Visited 28-2-01	Sets product standards and gives specifications for the industry	Private sector producers would like to know whether the products will meet standards and whether they will be accepted	At present there are no standards for cassava flour Also, biscuits specifications do not include cassava flour Cassava based products can therefore not be dismissed TBS may only do informative tests on cassava based products The cost of testing includes 5000/= for moisture;8000/= for acid insoluble ash on dry basis;10,000/= for acidity of extracted fat(as oleic acid) and a service charge of 2000/=.	Interested in co-operation to come up with standards	Should see samples of cassava-based biscuits Should sensitise TBS about the usefulness of cassava in biscuit making	At the moment TBS does not offer any obstacles to the promotion of cassava-based biscuits

ANNEX 5. INFORMATION GATHERED IN TANZANIA. SECOND ROUND OF VISITS WITH INDUSTRIES

Organization & key persons	Basic information	Relation and interest to cassava	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@twiga.com</p> <p>Visited: 26 Feb 2001 Shaun, Sicco and Lekule</p>	<ul style="list-style-type: none"> • Animal Feed merchants supplying 7 products but focussed on layers and broiler feeds. • Currently hatch 70,000 1 day chicks for broilers per week • Hatching 12-15,000 layers on own farm • Use of Soya (imported from India) • Interchick is a key player in the Tanzanian Animal Feed Association. IC are also providing farmer associations with technical advise. Focus is on quality products through quality feed and high standards of hygiene. • Selling 10-12,000 50kg bags of feed per month. Also using another 12,000 50 kg to Interchick farm for poultry production. • 50 sales agents around the country to sell the feed. 	<ul style="list-style-type: none"> • Experiment on cassava and sweet production has been installed using organic manure as a source of fertiliser • Experiment on animal feeding will be installed later this year using raw materials produced in the experiment (cassava roots, cassava foliage and sweet potato) 	<p>Kibaha research Station Will provide planting material, field layout and technical assistance during planting, manure application and disease application.</p> <p>SARRNET Staff in Tanzania will provide logistic support during the experiment</p>

(These contacts were realized by Sicco Kolijn and collaborators in Tanzania)

Company and location	Picture	Land Preparation	Check visit 28 th June (John and Sicco) and August/September
<p>Interchick</p> <p>Kunduchi, 20 Km north of DSM City centre, along the Bagamoyo Road. The land is on a hill, 4 km from the Ocean</p>	<p>28 June 2001</p>	<p>Land preparation and planting completed late due to some internal constraints within Interchick. (2nd week of May). Estimated area: 1.5 acres of cassava 1.0 acre of sweet potato</p>	<p>Need to check late September and start harvesting sweet potato</p>
<p>Malika Investment</p> <p>Pugu Hills, 25 Km South west of City Centre DSM</p>		<p>Land preparation and planting was carried out late April. SARRNET financed purchase of manure and transportation costs to the farm. Estimated area: 4 acres of cassava 1.5 acres of sweet potato</p>	<p>Mr. Malika had travelled up to USA (3 months) SARRNET has financed hand weeding of the plot</p> <p>The company is now only selling one-day chicks as the feed milling operations have been suspended</p>

Company and location	Picture	Land Preparation	Check visit 28th June (John and Sicco) and August/September
<p>Kihamia</p> <p>Plot situated 3 Km north of the Morogoro highway, 10 km west of Ubungo.</p>	<p>25 April 2001</p> <p>28 June 2001</p>	<p>On 25th April Sicco checked out the plot with Prof. Kihamia. Chicken manure was bought from Interchick.</p> <p>Planting was done early May.</p> <p>As the ridges were big the spacing was not ideal.</p> <p>Estimated area: 1.5 acres Cassava, 1 acre sweet potato.</p>	<p>As planting was done rather late the crop did not grow very well due to shortage of rain.</p> <p>Need to weed some parts of the plot as grass is getting through.</p> <p>Sweet potato planted earlier seems to be ready to harvest .</p>

Company and location	Picture	Land Preparation	Check visit 28 th June (John and Sicco) and August/September
<p>Farmers' centre/ 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>4th April 2001 28 June 2001 6 August 2001</p>	<p>Planted was done early April with addition of cow manure as fertiliser. Salim Msellem requested for more planting material, as they wanted to plant a larger field. Crop development was also affected by short rainfall. Part of the field was planted with groundnuts and beans as intercrop. Estimated area planted: Cassava 2 acres Sweet potato 2 acres</p>	<p>Due to a communication mistake the farmer-applied manure in all fields... There is a clear, visible effect of the impact of manure application on the germination and growth of both crops.</p> <p>Farmer is very eager to use leaves as feed ingredient.</p> <p>Early September Sicco collected a grass chopper from the farm which needed some repairs. This chopper will be used for leave chopping in the 4 trial plots.</p> <p>Chopping of leaves will start late September after a visit by the Kibaha team to evaluate the effect of manure application on disease incidence in the different plots.</p>

Company and location	Picture	Land Preparation	Check visit 28 th June (John and Sicco) and August/September
Kibaha Root Crop Research Program 40 Km west of Dar es Salaam along Mogorogo high way		Sweet potato was planted late April 9 plots with different treatments, (Estimated area of 20 sq.mt each). In another plot 1 acre of sweet potato was planted for vines production. Poor rainfall affected crop development Early September the team tried to dry leaves but all turned brownish during sun drying. Just recently we founded out that drying in the shade could avoid the discolouring.	

General observations:

- Planting was done late at all 4 plots due to late land preparations and other commitments / activities by the Kibaha team (planting their own, earlier planed plant trials) in April.
- The effect of manure application on the growth is clearly visible, as the crop seems to have a better leave and stem production.
- Most of the cassava plots intended for leave production are growing slowly therefore periodic harvesting of leaves has been postponed until the unset of the coming rains. (Expected early October).
- The Kibaha team will evaluate the plots within the the coming 2 weeks and find out what the effect is on crop yield and disease infestation.
- Commercial growers of sweet potato in the region are expecting that sweet potato yields this season will be 30 to 40% lower than last year due to insufficient rains during May and June.

ANNEX 6. PROPOSAL PRESENTED BY FOODNET/SARRNET TO CTA FOR DEVELOPMENT OF A PRIVATE – PUBLIC SECTOR PARTNERSHIP BASED AROUND A BUSINESS CENTRE FOR SUPPORT TO THE POULTRY FEED SECTOR IN TANZANIA

Development of a Private – Public sector Partnership based around a Business Centre for support to the Poultry feed sector in Tanzania

Submitted to the CTA

Dr. Germana Laswai Sokoine University for Agriculture SUA, Project leader
Dr. Anna A. Temu SUA
Dr. Bernardo Ospina CLAYUCA
Mr. Sicco Kolijn IITA-SARRNET
Dr. S. Ferris IITA-FOODNET

- A. Background
- B. Problem statement and significance
- C. Research question
- D. Objective
- E. Methodology
- F. Policy implications and expected Output
- G. Workplan and roles
- H. The Budget and notes
- I. References
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A. Background

FOODNET project 17, entitled “Strategies for the Improvement of Poultry feed industry in Tanzania” <http://www.cgiar/foodnet/Projects/projects.htm> was developed to analyse the value-adding processes and quality control mechanisms in the production of poultry feeds and identify the major constraints and best opportunities available for promotion of good quality poultry feeds in Tanzania, with a focus on incorporating new lower cost substitutes into the feed such as roots and leaves from cassava and sweet potato.

Progress to date:

A market survey study was organised and executed in collaboration with the SARRNET, CIAT and CLAYUCA(Colombia), FOODNET, TFNC and TARP II-SUA (Cassava Commercialisation) projects, during the last two weeks of February 2001. The major purpose of the study was to find out possibilities of commercialising cassava through its inclusion in various processed products. The sectors visited were animal feeds, bakeries, small food processors and non-food firms. The information collected was mainly the types of products processed, volumes, raw materials and end products including prices. The opportunities for the inclusion of cassava in the various products were also identified.

A summary of the poultry feed processing sectors visited and their approximate annual volumes of the feed processed are presented in Table 1. Detailed information was collected on the sectors, including location, contact addresses, current production status and constraints to production. In addition the possibilities of including cassava into their products and potential collaboration in research were discussed and several joint projects were developed and are currently being implemented. This was a very encouraging development given that prior to the market survey, there were no linkages between SUA and the private sector.

Table 1: A list of feed processing firms visited in Dar es Salaam and Kibaha and their approximate volumes

Feed Sector	Volume (tons/Year)
Interchick	13,200
Riami Miller	720
Jadide	7,800
Gold Feed mills	360
Top Miller	520
A-Z Feed Miller	1,300
Km Animal Feed	NA
Igo	6,240
Mkuza chicks	10,000
Farmer Miller	10,000
Kibaha Education Centre (KEC)	728
Interfarm	200

The processors gave various feed formulations and they seem to vary between batches and sectors due to availability and price of the raw materials. The different types of poultry feed products produced by the different mills and approximate prices are shown in Table 2.

Table 2. Types of livestock Feeds produced by the feed mills and selling price

Product	Price range (Tsh./50 kg bag)
Broiler mash	7,500-8,000
Layers mash	7,000-7,500
Growers mash	5,900-6,500
Broiler starter	7,700-8,200
Breeder starter	8,200
Protein concentrate	5,000-6,000

4.3 Meeting of the market survey study group

Members who participated on the market survey study met on 1st March 2001 to synthesise the information collected during the survey with regard to livestock feed processing and marketing. The following is a summary of the observations made:

- a) The annual average production level of livestock feeds in the visited sectors ranged from 200 to 13,000 metric tonnes. The national capacity of the livestock feeds produced is about 300,000 metric tonnes. Production is mainly concentrated in Dar es Salaam.
- b) The types of the feed produced were mainly Broiler mash (55-60 %), layers mash (30-35%) and less than 5% of the other types shown in Table 2.
- c) Raw materials commonly used in the formulations were maize, maize bran, fishmeal, cotton seed cake, sunflower seed cake and wheat. Other ingredients include salt, bone meal, limestone, dicalcium phosphate and vitamin-mineral premixes. Essential amino acids, such as lysine and methionine are also used in some sectors. Cassava is not been used in livestock feed processing.
- d) The prices of the different raw materials are quite variable depending on the source and season. The strategic grain reserve was shown to skew the prices of maize hence cause price imperfection.
- e) Some large feed millers have vertical integration in their operations. Some have hatcheries, processes feeds, have farms, sell birds and buy birds from their clients, sometime on exchange with feeds and sell to their agents. Some provide extension services to their clients.
- f) The feed millers have recently revived their organisation, Tanzania Feed Millers Association (TAFMA)
- g) Minimal attention is being placed on the standards for the whole poultry industry, from production, processing to marketing. For example, only about 5% of birds produced are sold as processed chickens (dressed). The rest (95%) as live birds. Poultry keepers

prefer selling broiler at less than 6 weeks. There is no incentive for the quality of birds on the market and the like for the processed feeds.

- h) The major constraints identified with the feed processors were:
 - a) There is general lack of information on optimal feed formulations and other business aspects related to the industry
 - b) The millers had no contacts with research agencies within Tanzania, some companies did use local consultants on an adhoc basis.
 - c) The millers had little access to current information related to the feed industry and only one feed miller had access to a computer and the internet. This was the largest miller. Most other millers were either reliant on supplied information from trade sources or were not able to get new information.
 - d) No millers had regular access to formulation software to improve the quality of their feeds based on access to feed ingredients which are constantly changing.
 - e) Lack of update nutritional values of raw materials and processed feeds and no access to new ideas for substitution of higher cost materials with low cost substitutes such as cassava.
 - f) There are some unfavourable trade policies, such as taxes for manufactured goods versus imported goods and taxes for large-scale versus small-scale producers. For example manufactured goods pay a value-added tax (VAT) of 20% and less for imported goods. VAT is only been paid by large-scale producers and exempted for small-scale producers.
 - g) Marketing of feeds is also limited. Most of the time in cash as there is little customer loyalty.
 - h) None of the Millers, bar one, had access to business related software
- i) Basing on the above observations the following were suggested as possible interventions;
 - a) Supply of price lists of raw materials to the market
 - b) Provide business training and business information for feed millers, livestock keepers, etc.
 - c) Provide information accesses to feed millers and farmers (e.g. Internet e-mail, price optimisation software etc.)
 - d) Sensitisation on cassava usage as a raw material to feeds. Practical trials of cassava.
 - e) Demonstrations on the utilisation of cassava roots and leaves in various forms to farmers.
- j) In the part of FOODNET project, it was recommended that a joint business between the researchers and feed processors to be initiated and provide the following:
 - a) Market information access (e.g. internet e-mail, price)

- b) Feed optimisation/formulation software
- c) Catalogue of feed tables
- d) Testing of some raw materials and processed feeds
- e) Client oriented seminars
- f) New technologies
- g) Business information centre and training

B. Problem statement and significance

The Feed millers association is a broad collection of millers, most of whom are small-scale operators. This group has poor linkage with research institutes and also has significant problems in gaining access to new forms of IT based technology to obtain information regarding new animal feed based technologies, trade information in regard to their business interests. The millers are not using feed optimization software due to lack of awareness and are also not able to access simple business development software for accountancy and other decision making tools through which they could improve their competitiveness and business opportunities. The idea of using alternative feed sources such as root crops was not something that the group had considered.

C. Research question.

Is developing public-private sector partnership an effective and sustainable way of strengthening linkages between public research organizations, who are seeking to develop a market oriented or more commercial approaches to their technology generation and delivery activities and private sector organizations faced with lack of information on new technologies, poor access to IT communication systems and software for improving their product quality and ability to improve their sectoral competitiveness through training that links business acumen with new technology adoption.

D. Objective

To develop a public –private sector interface via the development of a joint business center to strengthen the ability and the availability of information and tools to plan and undertake agro-industrial research between the national agricultural research systems of Tanzania and the private sector; to support members of the Tanzanian Feed Millers Association to establish functional agroindustrial research partnerships, whereby both researchers from SUA, MinAgri and IITA can interact with members of the private sector organization TAFMA in improving

E. Methodology

The methodology for developing the partnership is based on the model developed by CIAT for CLAYUCA and that being developed by ISNAR for agro-industrial partnership development for Latin America. This is a relatively new area of research for agriculture, but is one that has good

prospects for sustainability as it is directed towards and hopefully eventually taken over by the private sector.

F. Policy implications and expected Output

The development of a Public-Private Partnerships for Agro-industrial Research will have far reaching policy implications if this proves to be successful and also provides a new approach to Public research for sustainable and competitive agroindustrial development. Public research organizations contribute to the knowledge base required for agroindustrial development and may guide agroindustrial development to minimize environmental risks and maximize the contribution to poverty alleviation. This may be done, for example, by the generation of technologies to reduce waste and by the development of value added chains that integrate small scale producers with consumer markets. More integrated farmers that better understand the market will be able to adapt their production and increases their incomes more effectively. In this way the public sector fulfills its function of setting an appropriate enabling framework for agroindustrial development.

By responding to the demands of the agroindustry, public research organizations in Latin America, such as CLAYUCA, widen their stakeholder base. They gain a new client who needs quality research services and may provide financial compensation if they positively respond to their research demands. Some agroindustries in the region are ready to invest substantially in research, such as the substitution of maize with cassava based products which either can be carried out by themselves or by research organizations on contract. Providing efficient and effective research results to agroindustry enhances the relevance of public research at a moment that the traditional production-oriented mandate is eroding.

An effective focus on the agroindustry can only be achieved when the changing role of public agricultural research in general is recognized. It has become apparent that technological innovations no longer solely originate from the research institutes that were established for this purpose in the 1950s. Donors, development theorists, and governments start to advocate more flexible research systems, in which public research organizations, universities, extension services, NGOs, private companies, and farmers organizations collaborate and compete freely (Byerlee, 1998). This movement is fueled by the concern about the limited success of the traditional agricultural research organizations and its technology generation and transfer approach to solve contemporary problems of agriculture and rural development. Agricultural research should rather take place within more pluralistic knowledge generation and information systems (Hartwich and Meijerink, 1999). Within these knowledge and information systems, the actors form partnerships according to their specific demands and expertise.

G. Workplan

Activities	Sept	Oct	Nov	Dec	Jan	Feb	Mar	May	June	July	Aug	Sept
Set up centre	Xx	xx										
Meetings with TAFMA and research group	xx	xx	xx	xx	xx	xx	xx	xxx	xxx	xx	xx	xx
Developing training		xx		xx		xx		xxx		xx		xx
Training activities			xx		xx		xx		xxx		xx	
Develop joint research activities		xx	xx	xx								
Implement joint research			xx	xx	xx	xx	xx	xxx	xxx	xx	xx	xx
Develop a business plan for long term							xx		xxx		xx	
Website development and updating	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
Report writing						xx						xx
Workshop with IITA / CLAYUCA						xxx						xxx

Roles and beneficiaries

SUA to provide technical support to TAFMA poultry feed members in terms of feed development and on-farm feed formulation trials.

IITA-SARRNET to develop the protocols of operation between the Tanzanian research group and the TAFMA members, management support and operational assistance as required.

CLAYUCA a public – private sector organization based in Latin America, with links to SARRNET, to provide input in terms of technical advise, training and conceptual development for the partnership.

IITA-FOODNET to provide technical support for business tools usage and skills development for software management.

TAFMA to provide technical support in terms of developing joint projects, business planning and being the recipient for the private – public sector agency.

Beneficiaries

Primary beneficiaries

TFMA members are the primary beneficiary from this process as they will be the main target of the business center and the research developments based on the poultry sector

SUA, will benefit from close contact with the private sector and through making their research outputs more aligned to the market needs.

IITA/CLAYUCA will benefit from fulfilling one of our more challenging targets that of public private sector partnerships developments

Secondary beneficiaries

Cassava farmers who are producing the raw materials that are intended for substitution in the animal feeds

Consumers who will gain from cheaper meat products

Other processing organizations such as the women's food processing association recently developed by SIDA, who would also benefit from association with the business center and associated linkage to the cassava processing group at IITA-SARRNET.

H. The Budget

Budget	No	Unit cost	2001	2002	2003
Project staff			7000	7000	Sustainable
Motorbike			1000		
Fuel			1500	1500	
Travel			3000	3000	
Computers	3	1000	3000		
CD-copier	1	600	600		
Email / internet connectivity	1	350	350	350	
Telephone connection	1	150	150	150	
Telephone costs	12	50	600	600	
Training	4	500	2000	2000	
Rent	12	60	720	720	
Security and electricity	12	100	1200	1200	
<i>Overhead</i>	22.8		4,794	375	
Total			25,914	16,895	
Supplemental support					
<i>IITA SARRNET</i>					
Staff time			2000	2000	
Transport			500	500	
Workshops			1000	1000	
Training			1000	1000	
<i>CLAYUCA support</i>					
Joint projects at sites			1500	1500	
<i>IITA-FOODNET</i>					
Training			1500	1500	
Staff time			2000	2000	
<i>SUA</i>					
Joint projects at sites			1000	1000	
<i>TFMA</i>					
Staff costs					7000
Recovery costs for services					3000
Total			12500	12500	10000

References

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- Hartwich, F. and G. Meijerink **1998**. Questioning the NARS Paradigm: An Alternative View on the Generation of Agricultural Knowledge: Revising the systems approach to national agricultural research. ISNAR Discussion Paper, 99-4, ISNAR, The Hague.

ANNEX 7. INFORMATION GATHERED IN ZAMBIA. FIRST ROUND OF VISITS WITH INDUSTRIES

List of companies visited in June in Zambia:

	Company Name	Sector	Location
1	Meadow Feed Company	Animal Feed	Makeni, Kawe Road
2	National Milling Cooperation Ltd.	Animal Feed	Industrial area
3	Bibi Biscuits	Biscuit	Makeni, Kawe Road
4	Musa Bakery	Biscuit and Bread	SADC area

Information gathered in Zambia. First round of visits with Industries

Contact	Discussion topics	Potential Joint Actions with SARRNET	Next steps
<p>Meadow Quality Feeds Ltd Managing Director and owner: Mr. Al-Noor Manji</p> <p>Address: 379 A Kafue Road, P.O. Box 32908, Lusaka, Zambia</p> <p>Phone: 272705/273331 Fax: 274315</p> <p>Email: manji@coppernet.zm</p> <p>Visited: 6/6/2001</p> <p>Ivor Mukuka, Maureen Chitundu and Sicco Kolijn</p>	<p>Meadow Zambia is not affiliated to other Meadow companies in southern Africa. The current owner bought the title of Meadow.</p> <p>Zambia Feed market:</p> <ol style="list-style-type: none"> 1. Tiger Feeds (owned by Meadow RSA); 5000 MT/month 2. National Grain Milling Corp. Ltd (1500 MT/month) 3. Meadow Feed (1000 MT/month) <p>Prices:</p> <p>Pure Protein: around 6 US\$/Kg: Soya Cake (43% protein) Fish Meal: 12kg/US\$ Soya Beans: 36% Amyloetus: 6.17 US\$/kg</p> <p>Maize Prices: Currently 80 US\$/MT August: 100 US\$ and December 125 US\$ (forecast) Average year price: 100 US\$</p> <p>Cassava flour prices currently in Mwanza (according to Maureen Chitundu): Dried chips: 15,000 ZK/50 kg = 80 US\$/MT Wheat prices are currently: 250-280 US\$/MT</p>	<p>Never considered cassava leaves or roots as a ingredient for animal feed and would be interested in further joint activities (testing of product) as long as price is technically interesting</p> <p>The team left photocopies of nutritional values of feed (Buitrago) with Meadow</p>	<p>?</p>

Contact	Discussion topics	Potential Joint Actions with SARRNET	Next steps
<p data-bbox="176 375 506 431">National Milling Cooperation Ltd.</p> <p data-bbox="176 467 432 524">Dr. Anthony Chacko (consultant Stockfeeds)</p> <p data-bbox="176 560 491 740">Address: Malambo Road, P.O. Box 31980 Lusaka Zambia Email: cahacko@zamnet.zm</p> <p data-bbox="176 773 386 797">Phone: 242587/241</p> <p data-bbox="176 894 365 919">Visited: 7/6/2001</p> <p data-bbox="176 954 470 1011">Ivor Mukuka, Maureen Chitundu and Sicco Kolijn</p>	<p data-bbox="548 375 1325 553">As we introduced ourselves we Dr. Chacko briefed us about his interest in cassava utilization. When he started his work for NMC 15 years ago he was very much interested in exploring the utilisation of cassava as an ingredient as he is very familiar with the crop back in India. Unfortunately due to marketing and distribution constraints he never managed to get the cassava chips commercially utilisid.</p> <p data-bbox="548 589 1276 768">As Dr. Chacko was interested in exploring the possibility of using cassava again he offered to test the viability by using the companies feed formulae software. Unfortunately the software rejected the use of cassava chips for all given formulas (poultry meshes), even when the maize prices were hiked above 150 US\$ and cassava for 20US/MT.</p> <p data-bbox="548 803 1268 860">For improving the yoke colour and broiler meat NMC is importing Carophyll (Roche product).</p> <p data-bbox="548 896 1268 953">NMC is running several pelletisers although they were by the team visited out of order for maitenance operations</p>	<p data-bbox="1348 375 1717 553">Investigate why dried Cassava chips were rejected by the software program (in contradiction with our thought that cassava should be 70% of maize price).</p> <p data-bbox="1348 589 1717 800">The first draft conclusion is that cassava is too much unbalanced (i.e. very low protein) and cheap wheat bran is price technical more attractive (25 US\$/MT as it is a by product of Zambian own wheat production).</p>	<p data-bbox="1743 375 1839 464">Contact Software company</p> <p data-bbox="1743 500 1902 557">Contact Julian Buitrago</p>

Contact	Discussion topics	Potential Joint Actions with SARRNET	Next steps
<p>Bibi Biscuits Lamise Investments Ltd. Batul Investment</p> <p>Managing Director: Mr. Mohammed Ali Ahmed</p> <p>Address: Freedom Way 828 Factory: Kafue Road, Makeni, Lusaka, Zambia</p> <p>Phone: (260)-1-223459/223488 Fax Factory: (260)-1-27</p> <p>Email: lamise@zamtel.zm (or Lamise@zamnet.zm)</p> <p>Visited: 6/6/2001</p> <p>Ivor Mukuka, Maureen Chitundu and Sicco Kolijn</p>	<p>Bibi biscuits is just one of the operations of Lamise/Batul investment. Within the same factory premise foam mattresses and plastic kitchen household utilisties were manufactured. Internationall the investment groups operates Bibi biscuits in Dar es Salaam among many others activities in the region.</p> <p>The team visited the factory at Makeni and discussed with the managing director the biscuit production and possible use of cassava flour. The whole idea was new to him but he showed much interest to test the idea/product.</p> <p>Wheat prices are currently: 80,000 ZK/50 Kg bag = 460 US\$/MT.</p> <p>The biscuit line uses between 15-20 Mt of wheat flour/day. A potential 20% cassava flour utilisation implies 3-4 MT per day.</p>	<p>Introduction of high quality cassava flour for testing within the biscuit production.</p>	<p>Mr. Mukuka will process 100 Kg flour and follow up the testing at Bibi . Try as well to test the 'Kaoma' flour.</p>

Contact	Discussion topics	Potential Joint Actions with SARRNET	Next steps
<p>Musa Bakery</p> <p>Mr. Ishaq Musa (Manager/owner)</p> <p>P.O. Box 30960 Lusaka, Zambia Phone: (260)-1-286961/286962 Fax: (260-1) 286684</p> <p>Email: musabake@zamnet.zm</p> <p>Visited 7/6/2001</p> <p>Ivor Mukuka, Maureen Chitundu and Sicco Kolijn</p>	<p>Musa bakery is the biggest bakery in Lusaka, with a strong/leading market in the milk loaf section, running a fleet of trucks, targeting the middle and lower income customers in the city.</p>	<p>Introduction of high quality cassava flour for testing within the biscuit production.</p> <p>?</p>	<p>Mr. Mukuka will process 100 Kg flour and follow up.</p>

ANNEX 8. CONSULTANCY REPORT BY DR. JULIAN BUITRAGO

February 26 – March 7, 2001

TRIP TO TANZANIA (AFRICA) TO PARTICIPATE IN A SCIENTIFIC EXCHANGE MISSION TO ANALYSE THE POTENCIAL OF CASSAVA USAGE IN ANIMAL FEEDING AND HUMAN FOODS

OBJECTIVES:

To provide technical information about the possibilities for the inclusion of cassava roots and cassava leaves in efficient feeding programs for poultry, swine and cattle.

To participate in meetings with feed manufacturers and animal producers interested in the improvement of animal feeds through the use of locally produce cassava in well balanced diets.

To provide technical information on the potential of cassava flour and full fat soybeans for well balanced human foods.

ITINERARY:

February 26 - 27:	Cali – Caracas – Amsterdan
February 27 - 28:	Amsterdam – Dar es Salaam
February 28:	March 6: Dar es Salaam
March 6 - 7:	Dar es Salaam – Amsterdam – Caracas – Cali

SUMMARY:

IITA – SARRNET have been developing important efforts to improve cassava production in Tanzania and other African countries. The introduction of high yielding varieties and improved management practices will generate an increment in the supply of cassava roots and leaves at prices which eventually will become competitive to stimulate their use in animal feeds, especially in broiler, layer and swine feeds. Although the animal feed industry in Tanzania is still very inefficient, through the use of proper balanced diets based on cassava roots and leaves plus protein supplements, a clear positive change should take place. Human food formulations could also be developed based on cassava flour combined with high protein supplements, including including processed whole soybeans, methionine and micronutrients. Total demand for cassava products could be largely increased through more efficient animal feeds and human foods, once the prices become more competitive, especially when compared to maize (Strategic Food Reserve). Considering an overall production of 320.000 tons of animal feeds, there is a potential for 160.000 tons of cassava meal or approximately 450.000 tons of fresh roots per year to be included in local animal feeding programs.

DETAILED REPORT:

February 27: Arrive in Dar es Salaam together with Mr. Bernardo Ospina from CLAYUCA (CIAT, Colombia) to meet Sicco Kolijhn and Shaun Ferris from IITA/SARNETT – East Africa. Lodging at the Smokiest Tavern Hotel in Dar es Salaam.

February 27 – March 6: Under the coordination of Sicco Kolijhn and Shaun Ferris, and together with other IITA technicians, several meeting and visits to feed manufacturers, animal producers, technical assistants and food processors were accomplished. As a complement, a Seminar – Workshop was presented on March 2, to the feed processors interested in the use of cassava in animal feeding.

The total animal feed production in Tanzania is around 320.000 tons per year with the largest participation for broilers (55 – 60%) and layers (30-35%). Broiler production has become the fastest growing and principal animal industry in the country with a total production of 25.000 tons of meat per year from 21 million bird (1.2 kg per bird).

The main feed processors are located in the Dar es Salaam area. Most feed plants (approximately 20) have a small capacity of not more than 100 tons per month. There are only 5-6 plants in the range of 500 – 1000 tons per month. The basic equipment include hammer mills and horizontal mixing machines. Extrusion and / or pelletizing facilities are not available at the present time.

From the observations obtained during the visits to the feeding plants, several deficiencies in the quality of the compound products were detected. However, two main factors are responsible for the low quality feeds: poor quality of the raw ingredients and the lack of control in the feed formulation at the processing plants. Most ingredients (cottonseed cake, sunflower cake, maize byproducts, wheat byproducts) have a large content of fiber and ash leading into a very low energy concentration. Besides protein: energy imbalances, the final feed formulations are not corrected for aminoacids and/or energy deficiencies. Since protein sources are relatively cheap, the main imbalances come from low energy concentration.

Due to the quality feeds and the deficient quality control mechanisms, performance of animals are far bellow the possible potential. Feed conversion rates in broilers are above 4:1 and market weight at 42 days is around 1.0 – 1.2 kg. Fundamental changes are needed to reach an efficient level of production. Although genetic, management and prevention health practices need additional improvement, better feeding programs will result in an immediate positive progress in production and profitability. A well balanced feeding program will provide a complete change in the broiler and layer productivity. With the same number of animals there is room to almost double the present productivity, as shown in the following summary:

Broilers	Present situation	Potential
Days to market wt.	45	40
Market weight, kg	1.0 – 1.2	1.7 - 1.8
Feed conversion	4 – 5	2 – 2.2
Cost/kg of feed, T shs.	155 – 165	180 –
190		
Cost/kg broiler. T shs .	620 – 825	360 – 418

Cassava is widely grown in most agriculture regions of Tanzania, mostly by small farmers, with very small yield (The national average is around 4 – 5 tons per ha.), for a total production of 6 million tons/year. Most of the cassava production is consumed locally as fresh or fermented products for direct human food preparations. A very small portion of the cassava roots are sun dried for further use as cassava flour in food recipes. The leaves are also used as a green vegetable in home recipes as a valuable protein source to complement the predominantly starchy diets.

At the present time, the use of cassava or sweet potatoes for animal feeding is of little importance due to the lack of information on proper balanced diets based in cassava and/or sweet potato meal and to the high price of the dried products, compared to maize. Maize prices are generally low due to government controls through the strategic Food Reserve Program. Considering the present price for maize (T shs. 100 – 110/Kg), a price for dried cassava root equivalent to T shs. 80 – 85 /Kg seems to be competitive for poultry and swine formulations.

IITA and other research-development organizations have developed cassava seed stock and management practices which could dramatically improve yields of roots which will guarantee a constant supply of roots and leaves at competitive prices. This movement will create important opportunities for the inclusion of cassava meal in animal feeds, especially in poultry, swine and dairy diets. Since good quality cassava meal can totally replace maize in animal feeds, the potential of the crop is extremely important. Recent experimental result obtained in Colombia (CLAYUCA – CIAT)) demonstrate the feasibility of developing efficient poultry and swine diets totally based on a mixture of dried cassava roots and leaves plus whole roasted soybeans. The performance results in broilers almost double when compared to the results observed with the present feeding programs in Tanzania. Through training, pilot demonstrations, effective processing of cassava – whole soybean products and well balanced feeding programs (including the use of aminoacids and micronutrients) equal results may be obtained in Tanzania.

Similarly, through simple processing techniques and proper mixtures with processed whole soybeans and micronutrients, several human food preparations could also be developed. Small scale food enterprises could be based on protein enriched cassava,

either as fresh preparations ("cassava – soybean croquetes") or as fortified blended flours. Simple – low cost equipment could be obtained to have an efficient process.

GENERAL RECOMMENDATIONS:

Based on the observations obtained during the visit to Tanzania and considering some of the initiatives that could be introduced to improve local animal productivity through feeding programs based on cassava as well as to stimulate the efforts in the improvement of human food programs, the following recommendations are emphasized:

a) Improvement of Animal feeding Programs:

- Attainment of more reliable information on the composition of all feed ingredients, with especial emphasis in the main products: fish meal, cottonseed cake, sunflower cake, maize byproducts, wheat byproducts. Besides the proximal analysis, it is important to obtain information on protein solubility and/or protein digestibility (especially in protein ingredients), mycotoxins (all products) and bacteriology.
- Introduction of techniques to improve the quality of some feed ingredients and of finished products: pelleting, drying equipment (for cassava and high moisture products), sieving equipment (for some high fiber ingredients to be used in poultry feeds).
- Preparation of workshops with animal producers, animal feed processors and animal production technicians to analyse and develop strategies to overcome the limiting factors in productivity already mentioned and to analyse the existing potential once the cost:benefit criteria is considered.
- Training of animal producers and animal feed processors on how to develop sound feeding programs including the use of improved ingredients, aminoacids, anticoccidials and other feed additives. Training to technicians on the importance of quality control of the feed ingredients and finished products.
- Introduction of cassava and sweet potato products (roots and leaves) in animal feeding programs once the availability and prices of these products provide the possibility to replace other energy ingredients, mainly maize.
- Introduction of full fat soybeans as an energy/protein reinforcement for all animal feeds, especially poultry.
- Specific training and field demonstrations will be needed once cassava, sweet potatoes and/or full soybeans are introduced in efficient feeding programs. Nutritional information as well as processing technology should be main criteria in the training strategies.

b) Human Food Products:

Based on the important potential for cassava and full fat soybeans as a high nutritive product for human consumption, some recommendations are also included:

- Development of processing facilities to demonstrate the use of cassava – soybean enriched products.
- Training workshops for nutritionists, technicians, government and institutions in order to provide information on the importance of including cassava – soybean enriched products as a high nutritive resource for human consumption.
- Establishment of a pilot project obtain simple precooked products based on cassava and soybeans as a high nutritional alternative for human consumption.

APPENDIX 1

PRICES OF MAIN INGREDIENTES USED FOR ANIMAL FEEDS IN TANZANIA.

(Dar es Salaam. March 3, 20001):

	<u>T shs. / kg</u>
Maize grain	80 – 100
Maize bran	40 – 50
Fish meal (Victoria Lake)	350 - 400
Fish meal (Indian Ocean)	300 – 320
Fish waste	200
Cottonseed cake	90 – 120
Sunflower cake	70 - 110
Wheat grain	100
Wheat bran	50
Soya beans	250 - 350
Rice polishings	50
Bone meal	180
Blood meal	400
Limestone	30 – 40
Dicalcium phosphate	800
Lysine	4.000
Methionine	5.000
Vitamin premix	2.500
Salt	80

PRICES OF FINISHED ANIMAL FEEDS IN TANZANIA

(Dar es Salaam. March 3, 2001):

	<u>T shs. / kg *</u>
Broiler starter	154 - 168
Broiler mash	150 - 160
Chick starter	150 – 160
Chick mash	140 - 150
Layer mash	140 – 150
Breeder starter	160 - 170
Dairy meal	80 - 90
Pig meal	90 - 100

*Exchange rate: US\$1 = T shs. 800

APPENDIX 2.

Information on the nutritional composition of cassava and sweet potatoes is included in tables 1 and 2. Little differences are found between the two products, except for a large protein and water content in fresh sweet potatoes. The green forage obtained from both products have a similar nutritional composition and can be used as fresh or dried products as a protein and natural pigment to supplement poultry, swine or dairy diets.

Table 1. Main nutrients in cassava and sweet potato

	Cassava Roots	Cassava Tubers	Cassava Foliage	Sweet Potato foliage
Dry matter, %	35,0	30.0	15.0	15.0
Met. Energy , MCAL/kg	3.1	3.0	1.3	1.3
Protein, %	2.8	5.0	18 – 23	18 – 22
Fiber, %	2.9	2.5	17 – 25	18 – 24
Ashes, %	1.8	1.9	5.2	5.5
Fat, %	1.2	1.3	5.3	5.0

Table 2. Cassava vs Sweet Potato

	Cassava	Sweet Potato
Vegetative cycle, months	8 – 12	4 – 5
Yield (roots), ton/ha	30	20
Dry matter in roots, %	35	30
Dry matter yield (roots), ton/ha	12.2	6.0
Nutritional value of roots/tubers	++	++
Nutritional value of green forage	++	++
Weed control	+	++
Propagation	+	++
Mechanized cropping	+	++
Antinutritional	HCN	ANTITRIPSIN

Since maize grain contains a larger protein and oil concentration than cassava or sweet potato, the price of the dried roots has to be penalized in a range of 20 to 30 % in order to replace maize in conventional diets for poultry and swine.

Once the price differential is considered, formulation of poultry and swine diets could be totally based on cassava meal plus a protein – micronutrients supplement. Whole soybeans provide a precise nutritional complement to cassava, since the protein and fatty acids present in whole soybeans cover the lack of these nutrients in cassava.

Examples of this type of diets are included in tables 3 and 4. Recent results in broiler performance fed experimental diets totally based on cassava root meal, cassava leaf meal and whole soybeans (CLAYUCA – CIAT) are included in table 5 and 6.

Table 3. Broiler diets with different levels of cassava meal - starter

	0% CM	20% CM	40% CM	44% CM
Cassava meal	-	20.0	40.0	44.0
Corn	52.8	28.8	4.7	--
Full fat soybeans	31.8	38.1	44.6	45.9
Soybean meal	11.1	8.9	6.7	6.2
Calcium carbonate	1.9	1.7	1.5	1.4
Dical phosphate	1.7	1.8	1.8	1.8
Salt	0.30	0.30	0.30	0.30
Methionine	0.24	0.25	0.29	0.30
Lysine	0.07	0.02	--	--
Vit-min-add premix	0.10	0.10	0.10	0.10

Table 4. Broiler diets with different levels of cassava meal – finisher

	0% CM	20% CM	40% CM	48.8% CM
Cassava meal	-	20.0	40.0	48.8
Corn	58.5	34.6	10.5	--
Full fat soybeans	27.7	34.1	40.6	43.3
Soybean meal	9.3	7.1	4.9	3.9
Calcium carbonate	2.2	1.9	1.7	1.6
Dical phosphate	1.6	1.7	1.7	1.8
Salt	0.30	0.30	0.30	0.30
Methionine	0.17	0.19	0.22	0.24
Lysine	0.09	0.04	--	--
Vit-min-add premix	0.10	0.10	0.10	0.10

Table 5. Broiler diets based on cassava and soybeans

	Started	Finisher 1	Finisher 2
Cassava meal	40.50	46.82	52.39
Cassava leaf meal	5.00	5.00	5.00
Full fat soybeans	51.25	45.60	39.8
Bone meal	1.90	1.80	1.70
Calcium carbonate	0.60	0.10	--
Salt	0.30	0.30	0.30
DL – Methionine	0.29	0.23	0.24
L – Lysine	--	--	0.04
Nicarbazin	0.05	0.05	--
Min & Vitamin Mix	0.10	0.10	0.05
Growth promotor	++	++	++

Table 6. Cassava – soybean diets on performance of broilers

	Control corn – soybeans	Cassava roots	Roots + Leaves
No. Days	42	42	42
Initial wt., g	39.8	39.5	39.7
Final wt., g	2139	2113	2301
Feed consumption, g	5.01	5.01	5.01
Mortality, %	13.6	13.6	14.8
Feed conversion	2.21	2.06	2.24

Based on the information's collected from Charles Kihamia (Internfarm Feeds), Salome Mutayoba (Sokoine University) and Bernad Kinenekejo (Kibaha Education Centre), a first alternative for commercial poultry feeds was calculated, based on the feed ingredients available in Tanzania at the present time (tables 7, 8, 9, 10 and 11). However, in order to meet the nutritional requirements needed for optimal performance, the inclusion of soybean cake is mandatory.

The second alternative was calculated for similar feeding programs, but considering the inclusion of cassava root meal and full fat soybeans (table 12, 13, 14, 15 and 16).

Samples from Tanzanian fish meal, cottonseed cake and sunflower cake were taken for proximal analysis. Once the results are obtained a more precise formulation can be calculated.

At the present time, most ingredients are deficient in energy due to a high fiber and ash content. Besides cassava meal, the inclusion of high energy – protein sources such as full - fat soybeans would largely improve the nutritional quality of animals feeds.

JULIAN BUITRAGO A.
CLAYUCA - Consultant

ANNEX 9. CONCEPT NOTE PRESENTED TO FOOD SECURITY & FOOD AID PROGRAMME DELEGATION OF EUROPEAN COMMISSION AT MALAWI

NATURAL CASSAVA DRYING FOR USE IN ANIMAL FEEDING: A PILOT EXPERIENCE IN MALAWI

GOAL: *Contribute to poverty alleviation and sustainable livelihood improvements in rural areas of Malawi through development of cassava-based small-scale agroindustrial enterprises*

PURPOSE: *To conduct a pilot experience with small-scale cassava producers and processor of Malawi, based on the development of links with alternative, more competitive markets.*

Small-scale agro-enterprises are one of the most efficient methods to diversify the incomes of the rural population. Although the establishment of these agroindustrial enterprises represents challenges for resource poor farmers, it also creates opportunities for adding value to their traditional crops, creating additional employment opportunities and increased incomes. Efforts realized by technology development and transfer institutions usually emphasize production aspects and expansion in production without expansion in markets could represent negative consequences for the farmers. Adding value to the production, through small enterprises that produce products demanded by identified growth markets, can improve rural livelihoods while also providing incentives for farmers to adopt improved technologies.

This situation is clearly present in the current situation of the cassava sector in Malawi in which farmers have very little connection and links with growth markets and are limited to the more traditional markets in which they usually receive very low prices. At the same time, there are several industrial sectors that are interested in cassava products and by-products and that would be able to offer more competitive prices. However, these industries are not being able to identify farmer groups that could become reliable suppliers of their demands. The project proposed here proposes to conduct a pilot experience with a rural community of cassava growers of Malawi with the objective of assessing the potential of using a market-development approach to stimulate development of the cassava sector in the country

This approach has being used with success in various countries of Latin America and is now part of the portfolio of methodologies that SARRNET(South African Roots and Tubers research network) is trying to apply in Malawi, to support and promote development of the cassava crop. The adaptation of this methodology to African countries is being conducted with collaboration of CIAT, the International Centre for tropical Agriculture, based in Cali, Colombia.

EXPECTED OUTPUTS:

1. Opportunities identified for a value-added post-harvest intervention in a rural community of Malawi, based on the cassava crop

Enhanced links and collaboration with private sector industries allows research institutions to identify market needs and products that have potential to become alternative markets for farmers. Recently, SARRNET has been implementing a series of industrial sector assessment studies in Malawi and some potential opportunities for value-added post-harvest interventions have been identified. Using participatory methods, it is feasible to test this opportunities with active participation of cassava producers and the industrial sector so that sustainable links among them start to be build. This output will provide the opportunity to assess these options and develop at least one of them into a market opportunity

2. Links developed between cassava growing rural communities of Malawi and at least one industrial growth market, with increased incomes for farmers and competitive quality and prices for market sectors

This proposed pilot project will provide the opportunity to test and adapt the market development approach under the specific conditions of the cassava production systems of Malawi. A rural community selected to produce the product identified for the potential market. Promising options appear to be cassava chips for animal feeding and cassava flour for industrial purposes. During the pilot project, the farmer group will be assisted to facilitate their adaptation to the new process and to develop sustainable links with the new promising market

ACTIVITIES:

OUTPUT 1.

- Analysis of industrial sectors surveys
- Identification of potential products
- Selection of target market and product
- Installation of infrastrure needed to implement the post-harvest technological intervention
- Operation of the processing infrastructure under farmer control to assess their adaptation and the quality of the product
- Pre-feasibility analysis of the costs structure
- Delivery of samples to selected market to assess their reactions to quality and price characteristics
- Analysis of results

OUTPUT 2.

- Increase in scale of operations
- Delivery of products to markets
- Cost / benefit analysis
- Participatory evaluation of pilot project
- Publication of results
- Formulation of future plans

PILOT PROJECT ORGANIZATION

The project will be conducted under the supervision of SARRNET

The farmer group will contribute with hand labour required in the construction of the processing infrastructure

SARRNET will contribute with the technical personnel required to run the project and to establish the linkages with the private sector

SARRNET will contribute with cassava equipment

Other institutions of the public sector that are interested in cassava will be invited to collaborate (ex. NASFAM)

Private sector industries will be invited to participate in the implementation of the project

ESTIMATED BUDGET (US\$)

Cassava processing Infrastructure	15,000
Operational Costs	5,000
Contingencies (5%)	1,000

TOTAL: US\$ 21,000

Contact persons:

Mr. Sicco Kolijn (Post-Harvest Specialist SARRNET) sarnnet@cats-net.com

Mr. N. Mahungu (SARRNET Coordinator) sarnnet@malawi.net

ANNEX 10. A SHORT VISIT TO SWEET POTATO GROWING REGIONS IN KENYA

Sweet Potato is widely grown in African countries, mainly as human food, with very little use in animal feeding. This situation is contrasting with other sweet potato producing countries such as China in which the crop is widely used in animal feeding, especially in pigs. There is a large potential in the crop to be exploited as a source of energy and protein in animal balanced feeds. With the use of improved varieties, appropriate crop and soil management and sound processing practices it is possible to produce sweet potato-based products (such as flour), for use in animal feeding.

During this two-days visit to CIP-Nairobi and to the Kakamega region, it was possible to get in contact with National research organisations, technical personnel that collaborate with CIP-Kenya, and with farmer groups (mostly composed by women). During the trip, arrangements were made to send samples of sweet potato flour from two varieties, to a private cooperative in Holland. The samples were analysed and the results are presented in next section. This data will be utilised in the formulation of cassava & sweet potato based balanced diets that will be tested in Tanzania and Malawi later this year.

Result of the analyses of two sweetpotato samples

<u>flour</u>	Variety Zapallo		Variety	
	<u>dry chips</u>	Kakamega PK004	<u>flour</u>	<u>chips</u>
Raw protein % 4,6	4,3	4,3	4,5	
Ashes % 3,2	2,9	3,0	3,0	
Raw fibre % 2,5	3,1	3,2	2,6	
Starch % 63,3	53,7	55,1	63,8	
Moisture % 10,5	10,2	10,2	10,6	
Energy Value Pigs (Ewx100)	113,7	113,6	119,6	119,2
Energy Broilers (kcal/kg) 3000	3009	2931	3000	
Energy Laying Hens (kcal/kg) 2930	2940	3000	2930	

Comparison with Energy Value, variety Zapallo chips = 100.

		<u>Pigs</u>	<u>Broilers</u>	<u>Laying Hens</u>
Zapallo Chips :	100	100	100	
Zapallo Flour :	100	97,4	102	
Kakamega Chips :	105	99,7	100	
Kakamega Flour :	105	99,7	100	
Wheat :	102	97,0	105	
Corn :	108,6	105,5	111,6	
Yuca Average Quality :	98	90,3	94	
Max. Incorporation Sweet Potato and mixture (%) :	20-25	10-15	10-15	

The Zapallo product has a significant lower energy value than Kakamega.

Sweet potato can contain tripsine inhibitor. This factor forms a complex with amino-acids and therefore the amino-acid digestion will be lower. This factor is destroyed when using higher temperatures. Therefore pelleting at higher temperature would be beneficial.

Sweet potatoes are rich in vitamine C, Iron and Potasium. There are varieties which you will know, with colour yellow till orange, due to higher amounts of beta-caroteen.

The content of sugar (ca 7 %) is relatively high, therefore will improve the pallatability of the feed, in which it is mixed.

Sweet potatoes have te be dried good, in such way that on the cutting sides they are well dried. If not, there will be significant growth of bacterias and fungis on these cutting sides.