

Annex 3

Impacts to Farmers' Group

3.1 Zirobwe

3.1.1 Changes/Impacts Caused in Farmers' Group

Changes and impacts were made in farmers' group, ZRM, in the course of the project implementation.

	When the Project Started	After the Project (as of May 2006)	Note
• Number of members	• 64	• 69	Figures are the number of farmers' groups under the umbrella of ZAABTA, which composes of ZRM with SAO, NGO. There are about 2,000 farmers in ZAABTA in total.
• Area of members	• All the groups are from Zirobwe Sub-County	• New groups joined from the outside of Zirobwe Sub-County	
• Frequency of general meetings holding	• –	• Twice/year (general) • Once/month (m.board)	
• Projects/supports by external donors (incl. technical assistance, grants of facilities)	• 3 ~SG2000 ~SAO ~BUGADEV (NGO : royal family), rice production, seeds distribution	• 6 ~SG2000 (training, one-stop center, etc) ~SAO (training, warehouse, etc) ~BUGADEV (NGO) ~JICA expert (seed distribution) ~NAADS (technical assistance in chicken farming. Technical assistance in rice production has not started yet) ~Pilot project (this project)	• The left column shows the projects/supports to ZAABTA.

In addition to the changes in the Table, the farmers' group experienced the changes internally and also relationships with external organizations.

Positive Changes/Impacts		
Internal	<p>Leadership (Chairman)</p> <p>Ref)</p> <ul style="list-style-type: none"> • Chairman=the top of ZRM as well as management board • Manager= non-member of management board, engaging in daily operation • Both positions are occupied by two persons. 	<ul style="list-style-type: none"> • Chairman recognized his own leader's role more than before the project. He had many occasions to demonstrate his leadership for construction of a new stock house next to the ZRM facility, sales contract with Makerere University and others. In the course of those experiences, his consciousness as a leader grew more. • Also, the chairman gained more leadership consciousness and pride in the project through receiving many visitors to the facility.

	Management capacity of management board	<ul style="list-style-type: none"> • Four of the management board members are composed of 2 members from ZAABTA, who had received many training opportunities through NGO's assistance by the project started, and 2 from SAO. Therefore, management capacity in the case of this project was able to start from the certain level. • Management capacity is also self-evaluated to grow in the course of the project along with the growing of leadership mind.
	Capacity and attitude of staffs on daily operation	<ul style="list-style-type: none"> • (Operator) In the beginning of the project, two operators took trainings to operate the milling machine. The operator (currently only one operator) can handle the machine without any serious mistakes. • (Manger) Thanks to the training of NGO, she had certain of knowledge of book keeping and accounting before the project started. She self evaluated to gain more capacity of accounting matters.
	ZRM members (farmers group)	<p>Followings are the impacts made by the project implementation:</p> <ul style="list-style-type: none"> • Many more farmers feel benefits to be members of ZRM. Members within the group increased. e.g) Members of Kakala Vanila Growers increased from 15 to 30 during the project. • Nearly all the farmers' groups opened the bank accounts by now. It indicates that they are willing and ready to start some business activities or actually already started. • Five farmers' groups started the chicken farming projects. It can construct effective relationships with the ZRM by using bran as chicken feedings, and husks as beds of poultry house.
	Unity of ZRM	<ul style="list-style-type: none"> • As the number of activities involving many more ZRM members groups such as the ZRM facility and seed distribution, relationship between management section of ZRM and each member group became tighter.
External	Relationship with other organizations	<ul style="list-style-type: none"> • As reputation of ZRM/ZAABTA grew, contacts from external organizations increased. It resulted in the actual increase of the projects and assistance from external donors • In addition, ZRM received many visitors to the facility, which amounted to about 600 visitors in 2005. Receiving visitors enhances the pride of staffs working on daily operations.
Negative Changes/Impacts and Counteractions		
		<ul style="list-style-type: none"> • Along with the rapid growth of the project's performance, power struggle within ZRM and ZAABTA is raised as a concern.

(Analysis of farmers' group)

The project gave positive changes and impacts on the farmers' group, ZRM during the project period. Looking at the inside of ZRM, it is confirmed that the capacity of persons on management sections improved. As to the farmers' groups of ZRM members, many individuals grew their interests in group basis activities along with the increase in their income significantly or partly due to rice sales. The growth of interests contributed to realization of new economic activities represented by chicken farming.

The relationship with external organizations also obtained positive impacts. In accordance with the growth of project's reputation, more farmers' groups asked ZRM/ZAABTA to join them as new members. ZRM/ZAABTA also gained more external supports than before the project in terms of

the number of coming organizations as well as contents of assisting activities.

On the other hand, power struggle within or between ZAABTA and ZRM is concerned under such rapid growth of business results.

3.1.2 Changes/Impacts Caused in Rural Society

Project implementation gave the following changes/impacts on rural society of the targeted area.

Positive Changes/Impacts in Community	
Effects on socio-economic aspect	<ul style="list-style-type: none"> • The project triggered SAO's assistance to become more active than before the project, resulting in construction of stock house, and maize mill facility. • SG2000 also supported more not only on technical assistance but also construction of One-stop center. • Those supports gave impression to neighbouring people as Ziobwe is the attractive place to be able to receive external supports much more than others.
	<ul style="list-style-type: none"> • The number of minibuses and bike-taxies entering Ziobwe central place increased, indicating more active logistics and business in Ziobwe.
	<ul style="list-style-type: none"> • People idling in the open space of Ziobwe central got decreased especially in the daytime (Members participated in the evaluation analyzed more people got jobs and/or became busier in rice cultivation than before).
	<ul style="list-style-type: none"> • Economy of Ziobwe became more brisk. Eight shops newly opened in the last year.
Relationship with rural government	<ul style="list-style-type: none"> • Relationship with LC3, government of sub-county, grew stronger. • Chairman of LC3 sometimes participated in the general meetings and supported ZRM/ZAABTA's activities.
Agricultural aspect	<ul style="list-style-type: none"> • Many more farmers are interested in rice cultivation. Many started to produce rice instead of coffee.
Negative Changes/Impacts and Counteractions	
	<ul style="list-style-type: none"> • Although disposal of husk had been one of the concerns on its operation, farmers recently started to take husk for materials of poultry house bed and energy source to burn brick. The concern has almost solved out now. • Noise problem might be raised due to operation at night time (there are no complaints yet, though). • Deforestation is one of the future concerns by land reclamation along with boom of rice cultivation.

Changes in Household	Detailed Examples by the Change
Family income increased more than before the project.	<ul style="list-style-type: none"> • Many became able to secure the school fee for their children. • Many became able to pay the school fee by the deadline. Many used to make their children absent from school until they acquire the fee. • Children entered high school (elder brothers/sisters did not go to high school). • Was able to fix houses, to build extension. • Was able to open a retail shop. • Was able to start chicken farming, to purchase cow. • Was able to purchase cellular phone, clothing, and others.
	<ul style="list-style-type: none"> • Owing to income increase, necessity of working away at big cities decreased.

(Analysis of rural society)

The project directly as well as indirectly gave positive impacts on rural society. From the viewpoint of community level, more brisk economy of Ziobwe is confirmed through the facts that more minibuses come to Ziobwe, which indicates more people and goods are transacted, and eight shops newly opened in the last year. At the same time relationship with rural government was also strengthened during the period.

As another viewpoint from household, many individuals now enjoy increased income through mainly sales of milled rice. The impacts are significant in their daily lives, and can be observed in such as security of school fee, improvement of housings, and less necessity of working away at big city to supplement their income, etc.

3.2 Kaliro

3.2.1 Changes/Impacts Caused in Farmers' Group

Changes and impacts were made in farmers' group, Bulamogi Rice Mill, BRM, in the course of the project implementation.

	When the Project Started	After the Project (as of May 2006)	Note
• Number of members	• 129	• 130	There was no distinctive increase in the number of members. As the general meeting held in April 06, determined the members' privilege, the increase of the number is expected.
• Area of members	• All the groups are from the same County	• All the groups are from the same County	No change
• Frequency of general meetings holding	• — (new group)	• once/month (management board) • 4 times/year (general meetings)	
• Projects/supports by external donors (incl. technical assistance, grants of facilities)	• 1 ~ Women's Trust (NGO) : small scale micro finance	• 4 ~ SG2000 (seed distribution) ~ JICA expert (seed distribution) ~ Women's Trust ~ Pilot project (this project)	NAADS programme is expected to start in 2006. The contents of activities are now under discussion.

In addition to the changes in the Table, the farmers' group experienced the changes internally and also relationships with external organizations.

Positive Changes/Impacts		
Internal	Leadership (Chairman) Ref) • Chairman=the top of BRM as well as management board • Manager= member of management board, engaging in daily operation • Both positions are occupied by two persons.	Leadership of chairman has been nearly the same as the project started. One of the reasons to be the same as before is that the chairman was busy in other his own jobs and he has not been in touch with daily operation at all. On the other hand, the manager who handles daily operation changed positively his attitudes towards the project. The fact that he worked without salary in the off season in order to cut the project's expense, etc. indicates his earnest efforts for project's improvement.

	Management capacity of management board	<ul style="list-style-type: none"> • Management capacity of the board has grown, though these are slow steps. • The board made business devices such as introduction of fixed days operation instead of every day operation in the off season, aiming at cost cutting. These actions/efforts are judged as building capacity of the board.
	Capacity and attitude of staffs on daily operation	<ul style="list-style-type: none"> • (Operator) The operator now handles the machine without any serious mistakes, and deals with repairs by himself (e.g. The operator changed the shafts by his own ability after he realized the disorder of the milling machine) • (Manger) Manager is in charge of book keeping and accounting. In the beginning of the project, it was a hard task for him, but now he can manage those without serious problems. As to the working attitude, see the “leadership” in the above line of this Table. • (Other) Although, in the beginning of the project, the staffs on daily operation conducted the operation in disorganized way by many waiting farmers, staffs now can handle the waiting farmers without any serious chaos.
	Unity of farmers’ group	<ul style="list-style-type: none"> • They had fewer chances to feel benefits as members of BRM in the first year. As a result, unity of each member of BRM has not been strengthened.
External	Relationship with other organizations	<ul style="list-style-type: none"> • Contacts from external organizations increased. It resulted in the actual increase of the projects and assistance from external donors such as SG2000, JICA and NAADS, which is planned to start soon. • There are no particular changes of relationship between BRM and GISPUB.
Negative Changes/Impacts and Counteractions		
		<ul style="list-style-type: none"> • None

(Analysis of farmers’ group)

The project gradually made positive changes on farmers’ group, BRM. One of the changes is the manager’s positive attitude and the growth of his ownership mind towards project’s management. As to the technical capacity of machine handling, the operator already acquired skills and knowledge enough to deal with daily operation and repairs.

It is confirmed to grow the capacity of those who are in touch with daily operation as such, but, on the other hand, those who are away from daily operation, ordinal members and some of management board members, do not show any particular changes in terms of their own capacity as well as ownership mind for the project. The reason of less ownership mind is analyzed by the project’s unique business character, whose existence is regarded as a milling service provider at the area. Under such common perception, people are likely to regard themselves as just a “user of the facility” instead of “one of owners of the facility”.

However, members and ownership mind are expected to grow by newly determined members’ benefits in the last general meeting. In addition, seed distribution program made through JICA expert and SG 2000 expectedly will be a driving force for the new members and ownership mind.

3.2.2 Changes/Impacts Caused in Rural Society

Project implementation gave the following changes/impacts on rural society of the targeted area.

Positive Changes/Impacts in Community	
Effects on socio-economic aspect	<ul style="list-style-type: none"> • One retail shop newly opened in front of the facility, which targets farmers to come to the facility (they use it for other purposes during the off season) . • Seven retail shops newly opened in the central of Namwiwa. Although it is difficult to ascertain the relationship between the project and the shops, at least one shop was opened by the BRM member owing to the increase of his income.
Relationship with rural government	<ul style="list-style-type: none"> • Relationship with LC3, government of sub-county, grew stronger.
Agricultural aspect	<ul style="list-style-type: none"> • Many more farmers are interested in rice cultivation. Many started to produce rice instead of cotton, which many farmers had suffered on its fluctuated sales price. Produce of upland rice is on the increase. • Many people, especially living in near the facility, newly started to cultivate rice by the project.
Negative changes/impacts and counteractions	
	<ul style="list-style-type: none"> • There are more complaints from cattle breeders about the encroachment of rice farm land into communal grazing area. • More children are absent from school because they are hired to keep birds away from farmland.

Changes in Household	Detailed Examples by the Change
Family income increased more than before the project.	<ul style="list-style-type: none"> • Many became able to secure the school fee for their children. • Was able to fix houses, to build extension. • Was able to open a retail shop (second-hand clothing). • Was able to purchase cow.
	<ul style="list-style-type: none"> • There are only a few seasonal workers in the area even before the project. There are no particular changes on this aspect.

(Analysis of rural society)

The project has provided the community with positive changes and impacts. Among those, agriculture in the target area particularly received impacts through the project. Many farmers started to grow rice instead of cotton, whose price fluctuates much more than rice. The appearance of the project also motivated people especially living near the facility to start cultivating rice.

At the viewpoint of household level, increase of income contributed to reservation of school fee, and financial resource of new side business.

On the other hand, there are some negative impacts happening in accordance with the growth of rice cultivation. One of them is that children resulted in more absence from school because they were hired to drive birds away from attacking rice in the field. As another impacts are seen in more complaints from cattle breeders about encroachment of rice cultivation area into communal grazing zone.

3.3 Nakasongola

3.3.1 Changes/Impacts Caused in Farmers' Group

Changes and impacts were made in farmers' group, Agali Awamu Cooperative Society, ACAPROMA, in the course of the project implementation.

	When the Project Started	After the Project (as of May 2006)	Note
• Number of members	• 181	• 180	Composition of the organization by Namila, Kisaalizi, and Kiwembi are the same.

• Area of members	• All the groups are from the same sub-county	• All the groups are from the same sub-county	No change
• Frequency of general meetings holding	• – (new group)	• management board meetings are held on demand basis • twice/year (general meetings)	
• Projects/supports by external donors (incl. technical assistance, grants of facilities)	• 1 ~ NADIFA (Farmers Association) supports production techniques (disease control of cassava)	• 2 ~ Pilot project (this project) ~NADIFA	

In addition to the changes in the Table, the farmers' group experienced the changes internally and also relationships with external organizations.

Positive Changes/Impacts		
Internal	Leadership (Chairman)	<ul style="list-style-type: none"> • Leadership of the chairman has been enhanced during the project period. For example, he checks the cassava market price through radio every day, works on deferred payment style, utilizes his own cellular, motorbike for the operation. • Those dedicated works has contributed to the growth of the reliability on him from members (Questionnaire survey showed increase of reliability from the mid term evaluation to the final evaluation).
	Ref)	
	• Chairman=the top of NTFP • Secretary= supporting chairman's work Both positions are occupied by two persons.	
	Management capacity of management board	<ul style="list-style-type: none"> • Capacity of the management board, which is composed of 9 members in total, 3 members from each group, is evaluated to develop during the project period. Particularly, chairman and accountant showed the distinctive changes since the project started. • Two of the management board members have recently discarded the roles of the board after they failed to get daily work assignment, which indicated the loss of income opportunities. In order to maximize the board's capacity, the board needs to rectify the members and roles of the board.
Capacity and attitude of staffs on daily operation	<ul style="list-style-type: none"> • (Supervisor) The supervisor can handle the daily operation work and book keeping jobs with confidence and skills. Effectiveness of the work has been upgraded. e.g) She can now estimate correctly the weight of bags by looking. • (Accountant) Through the training offered from the project beginning, the accountant can work properly accounting jobs. • (Workers: drying chips, peeling etc.) Working attitude has been diligent since the beginning. There are no technical problems in the process of every step towards the end of processing. 	
Unity of farmers' group	Unity of the management board has been strengthened except 2 members. In addition, ordinal members have more ownership mind than the beginning phase in accordance with the business development.	
External	Relationship with other organizations	• Contacts from external organizations increased; however, it has not resulted in the actual projects and/or assistance yet.

		<ul style="list-style-type: none"> The relationship with traders became tighter, but it has not reached the level as ACAPROMA can influence the sales price with its bargaining power.
Negative Changes/Impacts and Counteractions		
		<ul style="list-style-type: none"> In ACAPROMA there are more potential applicants of workers at the facility. There are some complaints from those who missed the chances.

(Analysis of farmers' group)

The project gave positive changes and impacts on the farmers' group, ACAPROMA during the project period. The growth of chairman's leadership and reliability on the chairman from other members is regarded as one of the immense changes occurred inside the group. Also, the developed capacity of accountant and supervisor is also distinctive achievement/change since the project started. Those capacity growths led to their own confidence and positive attitudes towards daily operation.

From the viewpoint of the unity of group, the members feel tighter relationship with the members and the growing of ownership mind on the project as well. It is analyzed that those have been nurtured by their direct involvement in operation such as their carrying cassava to the facility, peeling and other processes to cassava flour.

3.3.2 Changes/Impacts Caused in Rural Society

Project implementation gave the following changes/impacts on rural society of the targeted area.

Positive Changes/Impacts in Community	
Effects on socio-economic aspect	<ul style="list-style-type: none"> The project motivated to establish similar type project, which processes cassava flour by collaborative work of NADIFA and Farm Africa, NGO. It will launch this year 2006 near the ACAPROMA's site.
Relationship with rural government	<ul style="list-style-type: none"> Relationship with DAO got stronger though the project.
Agricultural aspect	<ul style="list-style-type: none"> Member farmers started to increase the produce of cassava, and many newly started to cultivate cassava.
Negative Changes/Impacts and Counteractions	
	<ul style="list-style-type: none"> None

Changes in Household	Detailed Examples by the Change
Family income increased more than before the project.	<ul style="list-style-type: none"> Many became able to secure the school fee for their children. Was able to fix houses, to build extension. Was able to purchase cow.
Women obtained the opportunities to earn cash income.	<ul style="list-style-type: none"> There are only a few seasonal workers in the area even before the project. There are no particular changes on this aspect. Women's opportunities to earn cash income had been severely limited before the project started.

(Analysis of rural society)

As the project's ripple effect, similar project to the ACAPROMA, cassava flour processing facility, is now under construction near the site by farmers' association with NGO. Although there are some of unforeseeable effects on the ACAPROMA, it is evaluated as positive impact on the community's economy¹.

¹ Increase in processing total amount of cassava flour at the area may make traders come to the area for the business, directly mitigating transportation tasks on ACAPROMA. On the other hand, there may be competition of purchasing price of cassava between the facilities, and reservation of incoming cassava.

The growth of family income is confirmed as a positive impact by the project. Moreover, significant and particular impact made by this project is to provide women with opportunities to earn cash income. Before the project started, women had few chances to access the chances to earn cash income. It is unique impact made by this project.

3.4 Kayunga

3.4.1 Changes/Impacts Caused in Farmers' Group

Changes and impacts were made in farmers' group, Natural Taste Food Processors, NTFP, in the course of the project implementation.

	When the Project Started	After the Project (as of May 2006)	Note
• Number of members	• 15	• 14	One member resigned by personal reasons, not by the project.
• Area of members	• All the groups are from the same Sub-County	• All the groups are from the same Sub-County	Most of them are within the same parish.
• Frequency of general meetings holding	• -	• held by demand basis • If including the actual working days, many extra meetings were done	
• Projects/supports by external donors (incl. technical assistance, grants of facilities)	• 0	• 1 ~ Pilot project (this project)	Communication is in the process with Makerere University, but not yet actualized.

In addition to the changes in the Table, the farmers' group experienced the changes internally and also relationships with external organizations.

Positive Changes/Impacts		
Internal	Leadership (Chairman) Ref) • Chairman=the top of ZRM as well as management board • Manager= non-member of management board, engaging in daily operation Both positions are occupied by two persons.	Leadership of chairman has been the same as the project started. One of the reasons to be the same as before is that the chairman was not able to exert his leading roles in the marketing activities such as finding sales routes partly due to his own conservative character. On the other hand, the secretary played parts of his roles to support him.
	Management capacity of management board Capacity and attitude of staffs on daily operation	<ul style="list-style-type: none"> • This project has no management board due to its small number of members. • Owing to consecutive trainings offered from external experts and the Study team, members are now able to make juice without serious technical problems. Wine making also has no problems on techniques of making process only but for some specified matters such as cost control and analysis. • Members' attitude of working is diligent and has no change until now. • Nearly all the members are now able to work on book keeping, although only some people could in the beginning of the project.

	Unity of farmers' group	<ul style="list-style-type: none"> Members self-evaluated that their unity has been strong and no change until now.
External	Relationship with other organizations	<ul style="list-style-type: none"> More visitors are coming to the facility. Although other supports to NTFP have not realized yet, NTFP has/had discussion with Makerere University and NGO for possible assistance/projects.
Negative Changes/Impacts and Counteractions		
Internal	Sharing of work and profit	<ul style="list-style-type: none"> Although wine and juice now acquired positive business prospects, dry fruit has still difficulties to find sales. In the future, restructuring of group composition among three groups, wine, juice, dry fruit, as well as profit sharing may be required.

(Analysis of farmers' group)

Capacity building of technical aspect on making wine, juice, and dry fruit is confirmed during the project implementation period owing to training supports. Not only the aspect of making product but also the techniques related to management are confirmed such in book keeping work.

On the other hand, it is difficult to confirm the positive changes in their organizational capacity. As to the leadership, the chairman is still gaining respects from farmers as a leader, however, the capacity as a leader has not changed a lot as expected. It is because he had difficulties to exert his leadership roles, for he had to engage in marketing work which was the first experience for him. Members also had few chances to experience their own organizational works under the unique condition of the beginning phase of this project, which had to focus on training and marketing work.

However, after the beginning phase, wine and juice are now showing positive business prospects, which entail many more opportunities to demonstrate their own organizational work and capacity.

3.4.2 Changes/Impacts Caused in Rural Society

Project implementation gave the following changes/impacts on rural society of the targeted area.

Positive Changes/Impacts in Community	
Effects on socio-economic aspect	<ul style="list-style-type: none"> One person* who received training in the project started to make juice and to sell at local market (only concentrate solution). *non-member More people expressed their wishes to be employed in the facility (At this moment, NTFP declines the applications due to its financial condition, but positive effects on rural employment is expected in the future if they can hire some applicants).
Relationship with rural government	<ul style="list-style-type: none"> The number of visits of District Agricultural Officer, DAO increased, and strengthened the relationship.
Agricultural aspect	<ul style="list-style-type: none"> Produce of pineapple in the area has increased. (Export to outside countries including Kenya is on the increase. It is judged that impacts made by the project is quite limited)
Negative Changes/Impacts and Counteractions	
	<ul style="list-style-type: none"> No

(Analysis of rural society)

Significant changes and impacts have not been occurred yet at the level of community. In the near future household will receive positive impacts derived from the project.

Annex 4

Newsletter

The Study on Improvement of Post-Harvest Processing and Marketing System
in the Republic of Uganda

The First Edition

INTRODUCTION

In line with the PEAP (Poverty Eradication Action Plan), Government's main planning framework, the Plan for Modernization of Agriculture (PMA) was formulated as a major policy framework for government action to transform small scale agriculture in Uganda. Agro-processing and Marketing is one of the seven thematic elements of PMA. The Study on Improvement of Post-harvest Processing and Marketing System was started in May 2003, in response to the request of the Government of the Republic of Uganda, as a technical cooperation project between the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and Japan International Cooperation Agency (JICA).

FRAMEWORK OF THE STUDY

1 Objectives of the Study

The objectives of the Study are:

- 1) To formulate a detailed development plan in accordance with the PMA, aiming at improvement of post-harvest processing and marketing system in Central and Eastern Uganda: Pilot project(s) would be implemented in the course of the Study; and
- 2) To carry out technology transfer to the Ugandan counterpart personnel as well as the communities concerned in the course of the Study.

2 Study area

The Study area covers 14 districts as follows:

Kamuli, Iganga, Jinja, Bugiri and Mayuge in the Eastern region Nakasongola, Luwero, Kiboga, Kayunga, Kampala, Mukono, Mpigi, Wakiso and Mbende in

the Central region

3 Scope and contents of the Study

The Study is being conducted for 42 months from May 2003 to October 2006, consisting of the following two phases:

- (1) Phase 1: Formulation of the draft Development Plan (June 03 - March 2004)
 - To collect and analyze relevant data and information;
 - To review the existing development programs and projects with direct relevance to the Study;
 - To conduct field surveys in the Study area;
 - To prepare pilot projects, including identification of the project sites and drawing up of the project plans;
 - To formulate a draft Development Plan for the improvement of agricultural post-harvest processing and marketing system.
- (2) Phase 2: Implementation of the pilot projects and finalization of the Development Plan (April 2004 - October 2006)
 - To implement the pilot projects in the selected model areas;
 - To monitor and evaluate the pilot projects implementation; and
 - To finalize the Development Plan with feeding back the results of the pilot projects

PROGRESS OF THE STUDY

The progress of the Study has been reported by the successive reports that include the following;

- (1) Progress Report-1 (August 2003).

- (2) Interim Report (January - February 2004)
- (3) Progress Report-2 (December 2004)

- 1) Strengthening the organizational structure
- 2) Construction of the buildings
- 3) Procurement of equipment and machinery
- 4) Training component

Outline of the Pilot Projects

Implementation of the four (4) pilot projects started including the following:

The pilot projects are as follows:

Name of the project	Location		Investment (Mil.Ush)			
	District	Sub-county	Building	Equipment	Others	Total
Zirobwe Rice Processing and Marketing Project	Luwero	Zirobwe	32.8	9.9	1.6	44.3
Bulamogi Rice Processing and Marketing Project	Kamuli	Namwiwa	44.2	17.0	2.2	63.4
ACAPROMA Cassava Flour Production and Marketing Project	Nakasongola	Luwampanga Lwabiyata	49.9	15.1	4.3	69.3
Kangulmira Fruit Processing and Marketing Project	Kayunga	Kangulmira	49.1	13.5	7.2	69.8

EXPECTED OUTPUT OF THE STUDY

Development Plan on improvement of post-harvest processing and marketing system will be prepared with feeding back experiences to be obtained through implementation of the pilot projects, with particular emphasis on collective action by farmers’ organizations.



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The Second Edition

Zirobwe Rice Processing and Marketing Project (Luwero District)

BACK GROUND

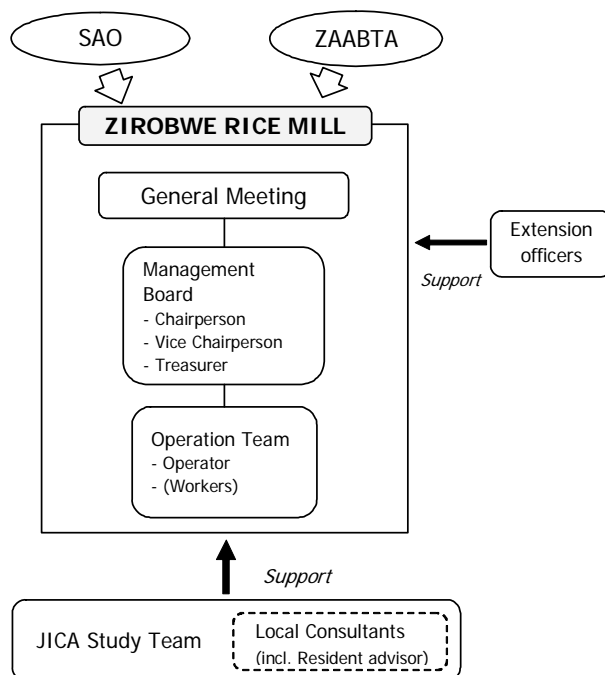
Upland rice is increasing its importance in the area as cash crop in Luwero District. However, expansion of the planted area is rather limited due to limited access to rice mill. Rice growing farmers in Zirobwe Sub-county are keen to have the rice mill for their paddy processing. The establishment and operation of a rice mill by farmers' organization is expected to contribute to the increased income of member farmers through improved quality and bulking..

OBJECTIVES

- To increase income of small scale farmers, through the improved post-harvest processing of upland rice.
- To encourage farmers to sell milled rice for value addition by farmers' organization with participation of the private sector.

OPERATING BODY

In the beginning, ZAABTA (Zirobwe Agali Awamu Agribusiness Training Association) was identified as the farmers' organization to execute the mill operation and management. However, for the smooth operation and management of the rice mill business, it was recognized that the private sector would better be invited. ZAABTA selected an NGO, SAO (Share An Opportunity - Uganda) as a business partner. ZAABTA and SAO thus established a partnership company as **Zirobwe Rice Mill**.



Organizational Structure

PROJECT FACILITY (Rice Mill)

The rice mill is located near the Sub-county's office, about one hour drive from Kampala. The mill house is constructed by bricks with plaster and colored roofing material having 100 m² space (10x10 meters) of milling and storing area and 30 m² veranda (10x3 meters). An office room has the space of 12.5 m².



Equipment

Rice mill	One pass type with rubber roll husker, 15kW electric motor driven, Processing capacity 0.5 – 0.6 ton/hour (paddy)
Other equipment	Moisture meter, Table scale, Sieves for broken rice separation, Husk stove, Office table, etc.

ON-GOING ACTIVITIES

- Establishment of a solid organization for rice processing and marketing.
- Providing rice milling services to rice growing farmers.
- Ensuring sustainable management and operation of rice mill.
- Disseminating appropriate post-harvest processing technologies such as drying and cleaning of paddy.
- Developing and disseminating new technology on effective utilization of by-products (e.g. rice husk).

Bulamogi Rice Processing and Marketing Project (Kamuli District)

BACK GROUND

Gadumire Iningo Saaka Panyol Busulumba (GISPUB: Area Cooperative Marketing Enterprise established by 5 primary cooperative societies and 3 farmers associations), engages in marketing of cotton/maize/groundnuts, covering the north-eastern area of Kamuli District. North and east part of the GISPUB area faces vast swampland connecting to Nakuwa Lake. Traditionally, in the swamp-edge, rice has been grown widely either by direct sowing or transplanting. The total rice production is estimated at over 3,000 tons of paddy in the area. However, electric power supply is not available yet and the road network and condition are very poor. No private rice mills are set up yet in this area. Most of rice

farmers in the area have to sell their paddy to middlemen at relatively low price. Farmers have been very keen to have a rice mill in their area.

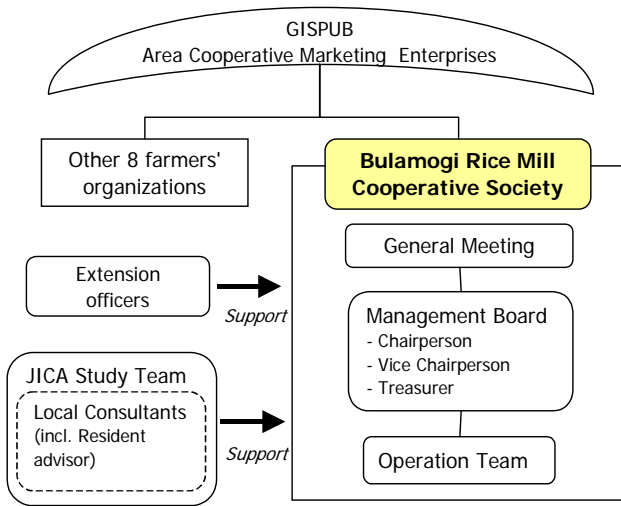
OBJECTIVES

- To increase in income of small-scale rice growing farmers through improved post-harvest processing.
- To encourage paddy bulking and collective milled rice marketing system.

OPERATING BODY

A new primary cooperative society named Bulamogi Rice Mill Cooperative Society has

been formed for the project as a new member of the GISPUB. Among about 1,200 rice farmers under the GISPUB, 126 farmers joined the new cooperative society as of early December 2004. Membership of the society is expected to increase.



Organizational Structure

PROJECT FACILITY (Rice Mill)

The rice mill is located at Namwiwa parish, about one hour drive from Iganga town. The mill house is constructed by bricks with plaster and colored roofing material having 150 m² space (15x10 meters) of milling and storing area and 84 m² veranda (15x3 + 3x13 meters). Concrete yard for paddy drying is provided adjoining to rice mill having the space of 200 m².



Equipment

Rice mill : One pass type with rubber roll husker, 20HP diesel engine driven, Processing capacity 0.5 - 0.6 ton/hour (paddy)

Other equipment : Moisture meter, Paddy cleaner (engine drive), Table scale, Sieves for broken rice separation, Husk stove, 2-wheels cart, Office table, etc.

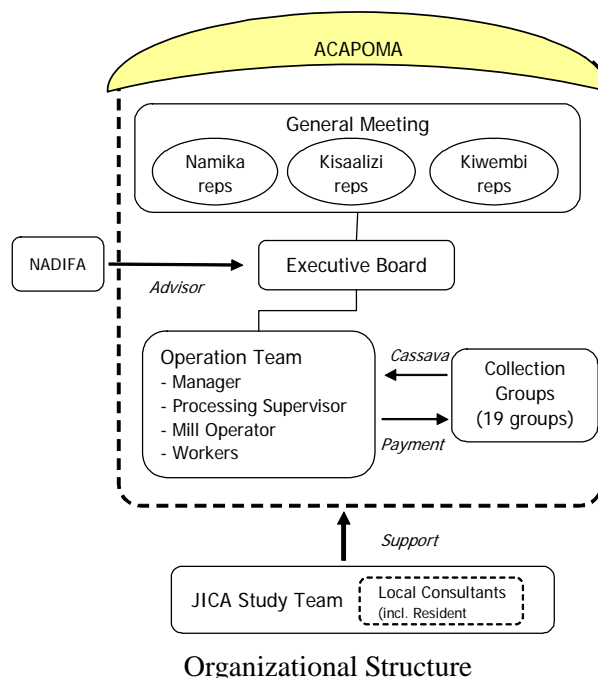
ON-GOING ACTIVITIES

- Establishment of a new primary cooperative society for collective post-harvest processing and marketing.
- Strengthening the capacity of the society on proper operation and management of rice mill enterprise.
- Providing milling services to rice growing farmers.
- Disseminating adequate technologies on drying and cleaning of paddy.
- Developing and disseminating new technology on effective utilization of by-products.

ACAPROMA Cassava Flour Production and Marketing Project (Nakasongola District)

BACK GROUND

Project site is located at the shore of Lake Kyoga in Nakasongola District, astride the Lwampanga Sub-county and Lwabiyata Sub-county. Cassava is widely grown in this area as one of the major staple food. Currently surplus cassava is sold to fishermen at lakeshore in a fresh form and sold to traders who come from Kampala mainly in a form of dried chip. According to the farmers, until quite recently no trader came to purchase fresh cassava in this area. Farmers in this remote area have limited access to the major market. On the other hand, the climate of this area is relatively dry which suits for sun drying of cassava.



OBJECTIVES

- To increase farmers' income through processing and marketing of high quality cassava flour by farmers' group.
- To introduce a package of processing technology appropriate to the rural area.

OPERATING BODY

A new Area Cooperative Marketing Enterprise, named Agali Awamu Cassava Processing and Marketing Cooperative Society (ACAPROMA), has formed for the project by three farmers' groups: Kiwembi Farmers Group, Eyebikire Kisaalizi Women's Group and Nyikira Okole Cotton Farmers' Primary Cooperative Society (Namika). ACAPROMA covers 181 farmers in total as of December 2004. Equal numbers of representatives from each group gather for the General Meeting and Executive Board.

PROJECT FACILITY

The processing facility is located at Kisaalizi trading center in Luwanpanga Sub-county, about one hour drive from Nakasongola town. Building of concrete slab floor with plaster, burnt brick wall and colored iron sheet roofing, has total floor area of 265m², consisting of 6 parts/rooms, Peeling & washing area, Chip store, Store, Office, Packing & Machine (Milling) room and Flour store





Equipment:

Mill (16HP diesel engine driven), Chipper (engine driven), Chipper (manual), Portable bag closer, Portable generator, Scale, Ox-cart, 2-wheels cart, Solar dryers, etc.

ON-GOING ACTIVITIES

- Establish new organization for cassava processing and marketing.
- Capacity building for operation and management of the business.
- High quality cassava flour production.
- Establish linkages between markets.
- Demonstration on the use of by-products (e.g. cassava peel).

Kangulumira Fruit Processing and Marketing Project (Kayunga District)

BACK GROUND

Project site is located at Kangulumira Sub-county in Kayunga District, nation's center for pineapple production, where pineapple is intensively grown in large area for commercial purpose. Though the area is the most advanced in fruit growing in the country, no farmers' groups are involved so far in fruits processing, except a limited number of those who do fruit-drying as out-growers of the exporters.

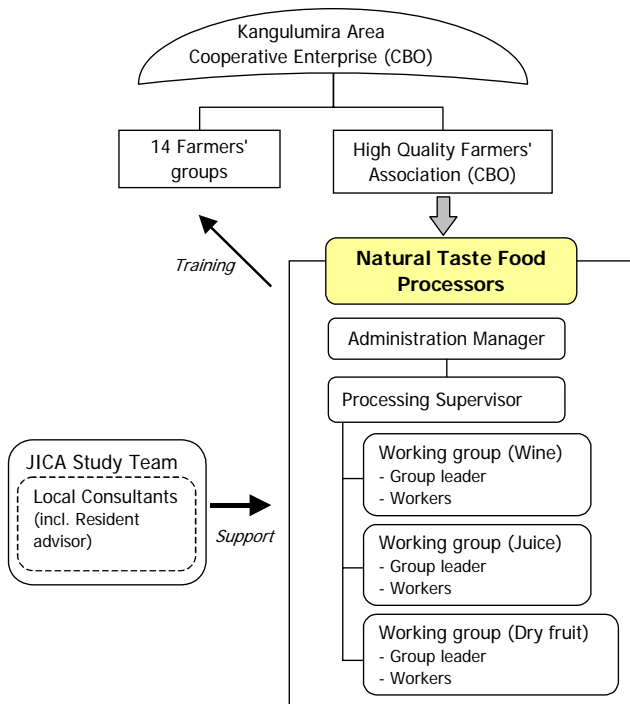
OBJECTIVES

The pilot project aims at verifying the viability of collective processing and marketing of fruit by farmer's group. In terms of post-harvest technology, the project

aims at improving the quality control technique and at introducing new fruit products to the Uganda market. It also aims at disseminating viable fruit processing technologies to other farmers' groups through providing on-the-job training.

OPERATING BODY

Natural Taste Food Processors (NTFP) is the organization carrying out the fruit processing business. NTFP is a partnership company formed for the business by the members of CBO, High Quality Farmers' Association which was selected as a representative group by Kangulumira Area Cooperative Enterprise (CBO). Processing operations are to be carried out by three Working Groups for specific product: wine, juice and dried fruits.



Organizational Structure

PROJECT FACILITY

The processing facility is located at Kangulumira Sub-county, about two km from Kangulumira town.

The building is of concrete floor with plaster, wall of burnt brick with plaster and colored iron sheet roofing. Total floor area is 175 m² with 7 parts consisting of Changing room, Store (raw materials), Store, Office, Preparation room, Stove room, Storage (wine & product) and Verandah & Corridor.



Equipment:

Aluminum pans, Kitchen utensils, Tanks/jerry cans for wine making, Fruit press, Slicer, Solar driers, Heat sealer, Brix meter, Thermometer, Alcoholmeter, Hydrometer, Scales, Water filter unit, Foot pump, Firewood stove, Sink, Work tables, Shelves, etc

On-going Activities

- Capacity building for operation and management of the business.
- Processing of fresh pineapple to juice, wine and dried fruits.
- Establish linkages between markets.
- Introduction of appropriate processing methods and new products.
- Technology transfer to other farmers' groups in the area.

For more information:
 Agricultural Planning Department, MAAIF (Tel: 041-320722)
 Study Team Office (041-234859)

The Study on Improvement of Post-Harvest Processing and Marketing System in the Republic of Uganda

The Third Edition

CASSAVA PROCESSING AND DRYING IN NAKASONGOLA

BACKGROUND

The quality of cassava chips in Uganda is very poor characterized by soil contamination, discoloration and moulds. The project set out to provide a facility to Nakasongola farmers organized as an Area Marketing Enterprise, named Agali Awamu Cassava Processing and Marketing Cooperative society (ACAPROMA) to produce a high quality flour that could be used as a wheat substitute or in making composite flour.

In order to achieve the production of high quality flour, the factors contributing to poor quality in the locally produced dried cassava chips had to be understood.



(Cassava Processing Facility)

DRYING TIME.

Because of the labour involved in chipping fresh cassava roots, local farmers tend to cut big pieces that are not suited to quick drying. This is very important because if chips retain a high moisture content for a prolonged period

they become susceptible to mould attack greatly affecting their quality and appearance.

For good quality cassava chips drying time should be one day but not more than three days as compared to three to five days for locally produced chips. In order to achieve quick drying at the Nakasongola facility a motor driven as well as manual chipping machines were provided. These rotary chippers are fitted with an aluminium cutting blade punched with holes in a cyclical orientation that have been sharpened to provide a cutting edge.



(Manual Chipping Machine.)

(1) Manual Chipper

The manual machine is operated by rotating a handle (cranking) which is attached by means of a shaft to the cutting blade. Peeled fresh cassava tubers are then placed against the cutting blade through a feed hopper and the chips are dispensed out the front into a container. The capacity of the manual chipper is about 200 kg per day.

The manual chipper is relatively cheap and more productive than hand chipping. It does not require electricity or a motor and so is suited to rural operation and provides quick drying chips. However its operation is highly labour intensive and not suited to commercial production. At the facility these were provided to enable continuous production in the event that the motorized chipper had to be repaired.

(2) Motorised Chipper.

A 1.5 HP engine drives the cutting blade by means of a belt and pulley system attached to the shaft. Peeled fresh cassava tubers are then placed against the cutting blade through a feed hopper and the chips are dispensed out the front into a container. The capacity of the motorised chipper is about 2000 kg per day.

The motorised chipper is relatively expensive though more productive than the manual chipper. It requires a motor and so is not suited to rural operation where maintenance services are not readily available. However its operation is quite efficient and better suited to commercial production.



(Motorized Chipper)

The chippers procured by the project were made in Uganda and in operation some problems have been experienced that can be traced to their manufacture. The following areas still need improvement.

- **Inefficient chipping** Because the cutting blade is not very straight the gap between the feed hopper and the blade fluctuates becoming too wide at

times and the last piece of tuber tends to fall through the gap rather than being chipped. This results in wastage and a proportion of oversized chips that must be recut by hand or dried as they are over a longer period thus reducing quality.

- **Pulleys** There has been a persistent problem with pulleys on the motorized chipper resulting in inefficient chipping and excessive repairs. This is mainly exhibited by wobbling, destruction of v belts, slipping of v belt during operation etc.
- **Materials** Aluminium has been used for a number of components like pulleys and the cutting blade. This material does not seem to be durable enough and cracking of blades, destruction of threads, and wearing out has been experienced.

CONTAMINATION DURING DRYING.

Contamination during drying is mainly due to dust and soil. Local farmers producing cassava chips have not invested in drying facilities of any kind and simply place the wet chips on the ground to dry.

The efficient and cost effective drying of cassava poses a unique problem due to its bulkiness and low value.

The project investigated several types of drying facilities before settling for the most practical and efficient one.

(1) Tunnel Dryers

A number of designs of tunnel dryers were tried. They essentially consisted of metal rebar supports bent into a dome like structure and covered with plastic film.

(a) Tunnel dryer with Fan

The first dryer tried was closed with ply wood at both ends with an electric fan placed at one end and an air outlet at the other. The chips

were placed on trays approximately 0.5 sq metres.

Advantages.

- Improved airflow from the fan resulted in more efficient drying.

Disadvantages.

- The fan required a power source which was not practical for a rural setting where there is no electricity.

(b) Tunnel Dryer Without Fan

Since the use of a fan did not seem practical a tunnel dryer without a fan was designed and ten units constructed on a trial basis for the project.



(Tunnel Dryers)

Advantages

- Plastic sheet cover minimized dust contamination.
- Plastic sheet cover protected the chips from the elements so no need to remove them at night or when it rained.

Disadvantages

During this trial the following problems were found with the dryers.

- All the materials had to be procured locally and locally available plastic sheet was of poor quality and not durable at all.
- The dryer was constructed at ground level so one has to bend to load and unload trays making this work very tedious.

- The mesh on the drying trays started to rust thus contaminating the chips.
- Each tray of 0.5 sq meters could only hold 2.5 kg of wet chips and one 10 meter dryer with 20 trays only 50 kg yet for efficient work at least 1.5 tons of wet chips must be processed at one time.

(c) Tarpauline/Plastic Sheet

Ten units of tarpaulins were also purchased to supplement the drying capacity.



(Plastic Sheets)

(d) Drying Shelf

In order to overcome the problem of tedious work the concept of a drying shelf was devised. This consisted of a raised wooden frame topped with a wire mesh on which a tarpaulin was attached.



(Drying Shelf)

(e) Combined/ Hybrid Design

A dryer combining the designs of the drying shelf and the tunnel type dryer was also

fabricated at the site. The idea was to improve convenience by raising the height of the drying trays to reduce on bending by the casuals during drying work while providing weather protection yet all within an affordable cost.



(Combined/Hybrid Dryer)

With the fabrication of this unit there were now four types of dryers/drying methods at the site namely;

1. Tunnel dryer.
2. Plastic sheets (Tarpaulins).
3. Drying shelf.
4. Combined/ Hybrid design.

The above four alternatives were evaluated by the staff at the facility based on the experience they had gained during operation, with the following outcome;

The plastic sheets if well anchored and protected by wind breaks are the best alternative for the following reasons;

- Most convenient to use for workers especially as there is low manpower.
- Can quickly be folded during bad weather and overnight to protect drying chips.



(Plastic Sheets folded For The Night)

- More durable than all the other 3 types.
- Do not cause discoloration of the chips even in wet weather.
- Have a large capacity per sheet.
- They can be moved from place to place if necessary.
- In good weather they provide the quickest drying times.
- They are the cheapest per unit of drying area.

So the plastic sheets have been fully adopted as the drying method for the facility. There still however remains the problem of minimal contamination by dust and durability of the locally available tarpaulins that need to be addressed.

*For more information:
Agricultural Planning Department, MAAIF (Tel: 041
-320722)
Study Team Office (041-234859)*

The Study on Improvement of Post-Harvest Processing and Marketing System in the Republic of Uganda

The Fourth Edition

INTRODUCTION OF IMPROVED, APPROPRIATE MACHINERY IN THE BULAMOGI RICE PROCESSING PROJECT UNDER THE STUDY FOR IMPROVEMENT OF POST HARVEST PROCESSING AND MARKETING SYSTEM IN UGANDA

INTRODUCTION

Rice growing in Eastern Uganda has been traditionally of wetland rice and the aromatic variety commonly called super is popular among consumers countrywide.

In Bulamogi County of Kamuli District Farmers from From Namwiwa, Buyinda and Bupyana had to mill their rice in Kaliro town 23 kilometers away. Further with unreliable power many had to wait several days before receiving the service leading to untold hardship.

Mills in Kaliro were of the Engelberg and friction type that cause a significant amount of broken rice resulting in poor milling recovery and lower market value.

(Picture of Engelberg/Friction Rice mill)

The JICA project set up a rice milling facility at Namwiwa under Bulamogi Rice Milling Cooperative Society with a superior Rubber Roll double pass type mill. This type of mill has superior performance as indicated by an interview survey to rice millers in Semuto which revealed the following.

EFFICIENCY

Type of Mill	Milling Recovery %	Broken Rice %
Rubber Roll	68-70	30
Friction	60	30-50
Engelberg	55-60	50

(Milling Recovery by Mill Type)

This has been confirmed by actual experience during operation as shown below.

Month	Paddy Kg	Milled Rice Kg	Recovery %
January	8,042	5,030	0.63
February	430	285	0.66
March	-	-	-
April	-	-	-
May	-	-	-
June	-	-	-
July	21,099	13,884	0.66
August	53,355	37,146	0.70
September	31,911	22,250	0.70
October	28,538	19,380	0.68
November	14,628	9,907	0.68
December	22,430	14,724	0.66
Total	180,431	122,604	0.68

(Milling recovery Bulamogi Rice Mill 2005)



(Rubber Roll Type Rice Mill)

BY-PRODUCTS

By-products from Engelberg and Friction type mills is a mixture of chaff, husk and rice bran, which cannot be effectively utilized.

In contrast the rubber roll type of mill separates the husk from the bran allowing them to be utilized separately.

(1) Husk

The husk can be used as fuel and in nursery beds.

(2) Bran

Rice bran is good for oil extraction, animal and fish feeds as shown by its nutritional content.

	g/100g
Crude Protein	11.3-14.9
Crude Fat	15.0-19.7
Crude Fibre	7.0-11.4
Crude Ash	6.6-9.9

Available Carbohydrate	34-62
Neutral Detergent Fibre	24-29
Energy Content	670-1990

Vitamins & Minerals	mg/100g
Thiamin	1.2-2.4
Riboflavin	0.18-0.43
Niacin	26.7-49.9
L-Tocopherol	2.6-13.3
Calcium	30-120
Phosphorous	1.1-2.5
Phytin Phosphorous	0.9-2.2
Iron	8.6-43.0
Zinc	4.3-25.8

However feed millers still prefer maize bran which they are accustomed to and need to be sensitized on the quality of bran obtained from the rubber roll type of rice mill compared to that from the other types which is of poor quality.

DESIGN AND USE OF APPROPRIATE EQUIPMENT IN THE KAYUNGA FRUIT PROCESSING PROJECT UNDER THE STUDY FOR IMPROVEMENT OF POST HARVEST PROCESSING AND MARKETING SYSTEM IN UGANDA.

INTRODUCTION

Kayunga district is one of the centres of pineapple growing in Uganda and the JICA project set up a facility for the processing of pineapple juice and pineapple wine operated by pineapple farmers in partnership as Natural Taste Food Processors.

One of the key concepts during the design, construction and procurement of facilities and equipment under the project was the idea of ease of adoption by farmers and farmers groups. A very important factor affecting ease of adoption is cost as well as effectiveness of the equipment.

FRUIT PRESS

A clear example of this kind of simple locally developed innovative design of equipment, constructed with locally available materials is the fruit press. This piece of equipment is used to finish the juice from pineapple pulp after pre-pressing by hand.

With a capacity of between 10-15kg of fruit pulp this press was designed and constructed by Mr. Yoshihiro Ban a member of the JICA study team at a material cost of Ushs 76,600.



(Fruit Press)

In comparison a number of juice presses can be found advertised on the internet like the one shown below from the United Kingdom.



(UK Fruit Press)

The above press with a 12 kg capacity comparable is quoted at British pounds 265 before shipping,

equivalent to about Ushs 874,500 a tenfold increase in cost compared to the one provided by the JICA team.



Evaluation of the press in operation showed that it exhibited the following characteristics.

- Convenience
- Robustness
- Durability
- Economy

In other words it provided the same utility as an imported model at a fraction of the price.

*For more information:
Agricultural Planning Department, MAAIF (Tel: 041-32
0722)
Study Team Office (041-234859)*

Omusomo ogukwata ku kutumbula omutindo gw'ebikungulwa, okubirongoosa n'okugaziya akatale kaabyo mu Uganda.

Ekitundu ekisooka

Omusomo ku kutumbula ebikungulwa okubirongoosa n'okubitunda mu Uganda

ENTANDI KWA

NGA bagendera ku nkola ya gavumenti ey'okulwanyisa obwavu eya PEAP (Poverty Eradication Action Plan), enkola y'okutumbula eby'obulimi ku mutindo ogwetagisa ekitongole kya (PMA) kyagiteeka mu nkola, kubanga kyalaba nti y'engeri yokka gavumenti gye yazuula nti yeggya okutumbula abalimi abato mu Uganda.. okulongoosa eby'obulimi n'okubitunda y'emu ku nkola ey'omusanvu ey'ekitongole kya PMA. Omusomo ku kutumbula ebikungulwa, okubirongoosa n'okubitunda yatandikibwa mu may 2003 olw'okwanukula omulanga gwa gavumenti ya Uganda ekitongole kino ekirina obuimanyirivu kyatandika nga kikolaganira wamu ne minisitule y'ebyobulimi, ebisolo n'obufubi n'ekitongole kya Japan ekiyamba amawanga ekya JICA{ Japan international Cooperation Agency.

EBI GENDERERWA BYOMUSOMO.

1 Ebiruubirirwa by'omusomo bye bino:

- 1) Okusawo enkola ennambulukufu eri egoberera enkola y'ekitongole kino ekya PMA eruubirira okutumbula, okulongoosa n'okutunda ebikungulwa mu masekkati n'ebugwanjuba bwa Uganda: pulojekiti okusomerwa zijja kuteekebwawo gyebujja emisomo nga bweginaagenda eyo mu maaso.
- 2) Okuleetaa tekinologiya ow'omulembe mu Uganda nga tumuyigiriza abantu n'ebitundu emisomo gyaffe mwekinaatekebwa.
- 3) 2 Ebitundu mwokusomera

emisomo gyakuba mu disitulikiti 14 z'ezino:

Kamuli, Iganga, Jinja, Bugiri and Mayuge in the Eastern region Nakasongola, Luwero, Kiboga, Kayunga, Kampala, Mukono, Mpigi, Wakiso and Mbende in the Central region

3 Ebinabeera mu misomo

emisomo gya kumala ebbanga lya myezi 42 nga gyatandika mu May 2003 okutuukao October 2006, era gyamitendera ebiri:

- (1) Ogusooka 1: okubanga enkola y'ekulaakulana enegobererwa (June 03 - March 2004)
 - Okukung'anya n'okwekenneenya amawulire gonna aganjibwa mu bantu;
 - Okwetegereza enkulaakulana ne pulojekiti ezisangiddwa mu kitundu ezinagasa emisomo gy'ekitongole kya PMA
 - Okutambula mu bantu nga tunonyereza mu kitundu omusomerwa.
 - Okutandikawo pulojekiti okunaasomerwa n'okuzuula wa wezinatekebwa ate n'okubanga enkola enaagobererwa.
 - Okuteekawo enkola enegobererwa okutumbula ebirimibwa n'ebikungulwa, okulongoosa ebikungulwa n'okubitunda.
- (2) Ogw'okubiri2: okussa mu nkola pulojekiti okunasomerwa n'okumaliriza plan y'okukulaakulanya mu (April 2004 - October 2006)
 - Okussaawo pulojekiti okunaasomerwa mu bitundu ebirondeddwa.
 - Okutunuulira n'okwekeneenya entambula yazo.
 - Okumaliriza Plan yonna n'okuzza

amawulire okuva mu bifo omusomerwa.

awasomerwa nga bwezatandikibwa era z'ezino:

OMUSOMO BWEKUTAMBUDDE

Engeri omusomo gyegutambuddemu efuniddwa okuva ku lipoota ez'omujjirano zetufuna:

- (1) Lipoota y'emirimu-1 (August 2003).
- (2) Lipoota y'ekipatiira Report (January - February 2004).

(3) Lipoota y'emirimu-2 (Dec 2004)

(4) Outline of the Pilot Projects

Okuteeka mu nkola pulojekiti (4)

- 1) Okunyweza ensengeka y'ekitongole kino nga bweyimiridde.
- 2) Okuzimba ebizimbe
- 3) Okugula ebikozesebwa n'ebiyuma
- 4) Okutendeka ababikozesa

Pulojekiti awasomerwa nga bweziyimiridde:

Name of the project	Location		Investment (Mil.Ush)			
	District	Sub-county	Building	Equipment	Others	Total
Zirowe Rice Processing and Marketing Project	Luwero	Zirowe	32.8	9.9	1.6	44.3
Bulamogi Rice Processing and Marketing Project	Kamuli	Namwiwa	44.2	17.0	2.2	63.4
ACAPROMA Cassava Flour Production and Marketing Project	Nakasongola	Luwampanga Lwabayata	49.9	15.1	4.3	69.3
Kangulmira Fruit Processing and Marketing Project	Kayunga	Kangulmira	49.1	13.5	7.2	69.8

EBIUSUBIRWA OKUVA MU MUSOMO

Enkola y'okukulaakulana eruubirira okutumbula ebikungulwa, okubirongoosa n'okubitunda eja kutegekebwa, obukukugu obuva mu pulojekiti awasomerwa bwakutekebwa mu nkola. Abalimi baakuganyurwa nga bayita mu kweggattira awamu mu bibiina byabwe..



*For more information:
Agricultural Planning Department, MAAIF (Tel: 041-320722)
Study Team Office (041-234859)*

Omusomo ogukwata ku kutumbula omutindo gw'ebikungulwa,okubirongoosa n'okugaziya akatale kaabyo mu Uganda.

Akatabo ak'okubiri

Ennongoosa n'akatale k'omuceere ku faamu ye Ziobwe (Luwero District)

Entandikwa;

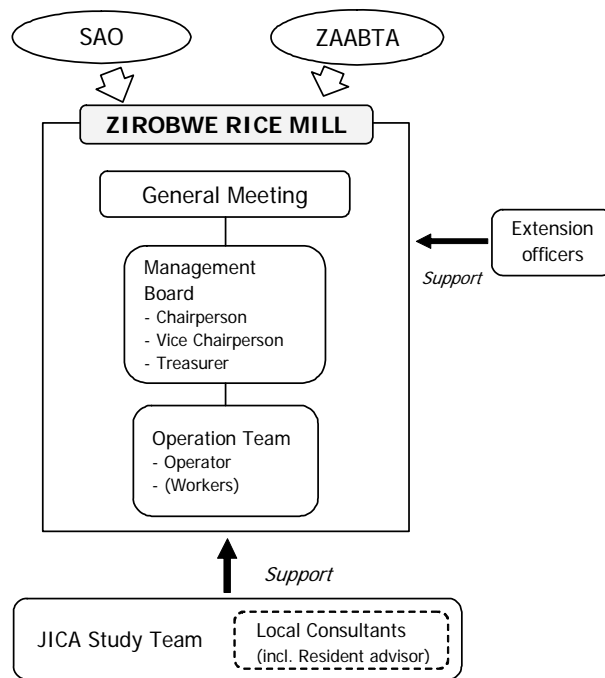
Ekika ky'omuceere gwa Upland buli luklya kyeyongerera omugaso ng'emmere evaamu ensimbi eri abantu ba Luweero.. Wadde kiri kityo abalimi tebettanidde nnyo kulima olw'ebbula ly'ebiyuma ebisunsula n'okulongoosa omuceere. Abalimi b'omuceere mu ggombolola ye Ziobwe bamalirivu okufuna ekyuuma ekiyinza okubayamba okutumbula ekirime kyabwe.Bwebanaaba bakituuikirizza, kijja kubayamba okutumbula embeera zaabwe ezabulijowamu n'omutindo gw'omuceere.

EBI GENDERERWA;

- Okwongera ku bungi bw'abalimi b'omuceere nga balimira mu bulimiro bwabwe obutono.
- Okuwa abalimi essubi nti ekirime kyabwe kijja kwongerwamu amaanyi kifune ettunzi.

ABALI MU MITAMBO

Mu kusooka, ZAABTA (Ziobwe Agali Awamu Agribusiness Training Association) kyekibiina ekyali kikwasiddwa omulimu guno.Oluvannyuma bakizuula nti kyetaasgisa okutekamu ebibiina ebirala ebya nnakyewa olwo omulimu gweyongeremu amaanyi.Kino kyawaliriza ZAABTA okulonda ekibiina ekirala ekya SAO (Share An Opportunity - Uganda) okukkakkana nga bafunye ekyuuma. **Ziobwe Rice Mill.**



Enkola y'ekibiina;

EBI YAMBA PULOJEKITI (Rice Mill)

Ekyuma kino kiri ku wofiisi z'eggombolola ovugira essaawa nga nnya okuva mu Kampala okutuuka wekiri. Ennyumba omuli ekyuma kino yazimbwa bbulooka era nsiige oluyinja, amabaati gaayo g'alangi, eriko miita 100(10 ku 10m) erina awaterekwa, olubalaza luliko 30m(10 ku 3m). wofiisi erina ekifo ekiweza 12.5m.



Ebyuma

Eky'omuceere' Ekyuma kino (One pass type with rubber roll husker), Kikozesa obungi bw'amasanyalaze 15kW electric motor driven, kisunsula tani 0.5 – 0.6 buli saawa.

Ebirala Ekyuma ekikungunta omuceere ogumenyesemenyese n'ebisunsuku, ekipima, n'ekipima obunyogovu etc.

Emirimu egikolebwa

- Okuteekawo ekyuma ekiri ku musingi omugumu ekisobola okusunsula omuceere.
- Okusaasanya ebyuma bino mu balimi
- Okulaba nga waliro obukulembeze obutuufu okukuuma omutindo gw'ekyuma.
- Okulabiririra emirimu egikolebwa mu kibiina ku kyuma kino.
- Okufuna tekinologiya omupya okufuna kyebakola okuva bintu ebirala ebiva mu bisunsuku by'obuceere.

OKULONGOOSA N'OKUTUNDA OMUCEERE E Bulamogi (Kamuli Disitulikiti)

ENJANJULA

Gadumire Isingo Saaka Panyol Busulumba (GISPUB: Kye kibiina ekyatekebawo ebibiina bya bannakyewa ebirala 5 n';ebyabalimi bisatu okukola emirimu egyo wamu n'okunoonyeza ppamba, kasooli ne n'ebinyebwa akatale mu bukiika kkono bwa Kamuli disitulikiti. Ebifo ebisanginbwamu GISPUB byalutobazi ebiriraanye ennyanja Nakuwa Okusooka omuceere ogwalimibwa nga mu ntobazi nga tegwetaagisa kulabirira nnyo era ng'osimba busimbi .Kati omuceere ogukungulibwa guli mu ttani 3,000 .Ng'ebyo bikyali awo, ebbula ly'amasanyalaze. Enguudo, n'embeera y'obudde eremesezza. Kuno bw'ogattako obutabeera nan byuma bisunsula muceere

bibeera bizibu. Abalimi balina okutunda omuceere gwabwe nga gukyali mu nnimiro baleme okufiirwa.

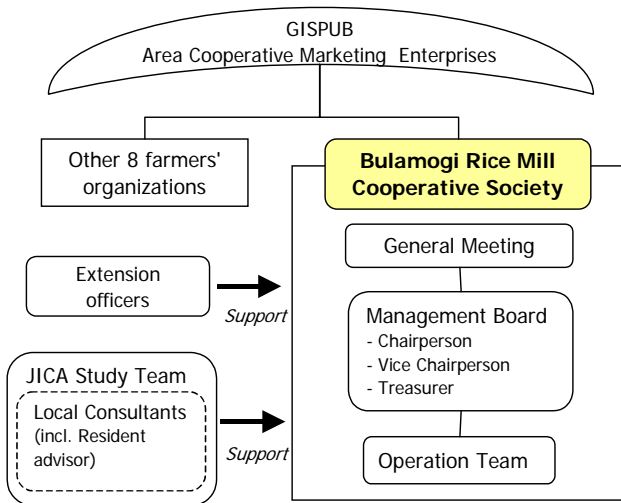
EBI GENDERERWA

- Okwongera ku bungi bwa ssente eziweebwa abalimi basobole okuganyulwa nga bakungudde.
- Okuwa abaliomu amaanyi okwegatta okufuna ebyuma.

OLUKI I KO OLUKOZI

Ekyuma ekipya ekisunsula omuceere kikoledwa wansi w'aba mmemba ba

Bulamogi Rice Mill Cooperative Society has nga bakozeekomu ekywa GISPUB. Muno mulimu abalimi abasukka mu 1,200 Ku bano,126 beegatta ku kibiina kino mu December wa 2004. Obungi bwa ba mmemba busubuulirwa okweyongera.



Enambika y’obukulembeze

ENKOLA Y’EKYUMA;

Ekyuma kino kisangibwa mu muluka gwe Namwiwa ovuga essaawa emu okuva mu kibuga Iganga.

Kyakokolebwa ku mutindo gwa waggulu nga kirina ekifo okwanikamu ttani 200.



Ebisuubirwa okukolebwa

- Okuteekawo ekyuma ekiri ku musingi omugumu ekisobola okusunsula omuceere.
- Okusaasanya ebyuma bino mu balimi
- Okulaba nga waliro obukulembeze obutuufu okukuuma omutindo gw’ekyuma.
- Okulabiririra emirimu egikolebwa mu kibiina ku kyuma kino.
- Okufuna tekinologiya omupya okufuna kyebakola okuva bintu ebirala ebiva mu bisusunku by’obuceere

ACAPROMA Cassava Flour

Pulojekiti enkola n’okutunda mu (Nakasongola District)

Entandikwa

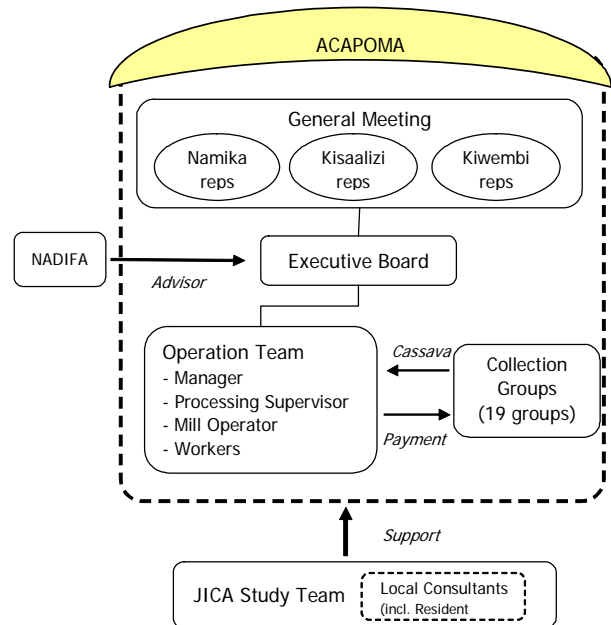
Pulojekiti esangibwa ku nnayanja Kyoga mu disitulikiti ye Nakasongola okuliraana amagombolola ga Lwampanga ne Lwabivata. Muwogo y’emmere esinga okulimibwa era bamutunza bavubi .wamu n’abasuubuzi okuva mu Kampala abawala nga mukaze.Okusinziira ku balimi,abasuubuzi babadde baludde okugula muwongo oyo nga ssi mukaze ate tebalina kif kirala mwebayinza kutunda muwongo oyo.Mu ngeri y’emu, embeera y’obudde naye mbi kubanga obudde bwa mukwale nnyo.

EBI GENDERERWA

- Okwongerera ku nsimbi z’abalimi nga bayita mu kulongoosa n’okutunda wamu n’okutumbula tekinologinya mu byalo.

Ekibiina ekibikola

Waliwo ekibiina ekipya ekya Agali Awamu Cassava Processing and Marketing Cooperative Society (ACAPROMA), has nga kino kikoze ebibiina eby’enjawulo mu balimi: Kiwembi Farmers Group, Eyebikire Kisaalizi Women’s Group ne Nyikira Okole Cotton Farmers’ Primary Cooperative Society (Namika). Ekibiina kino ACAPROMA kitwala abalimi 181 mu December wa 2004. Buli kibiina kiwerezayo abakungu okutuula ku lukiiko olufuzi.



Enkola y’ekibiina

Ekyuma kino kisangibwa Kisaalizi mu ggombolola ye Lwampanga okuva mu Nakasongola.





Ebikozesebwa

Mill (16HP diesel engine driven), Chipper (engine driven), Chipper (manual), Portable bag closer, Portable generator, Scale, Ox-cart, 2-wheels cart, Solar dryers, etc.

Emirimu egigenda mu maaso

- Okuzimba ekyuma ekiyambako okulongoosa n'okukungula muwogo.
- Okutendeka abakozi abagenda okukola mu byuma bino..
- Okufuna muwogo ali ku mutindi ogwa waggulu.okuteekawo entabiro wakati w'abalimi n'abaguzi n'okulaga abalimi omugaso gw'ebikuta ebiva mu muwogo .

OKULONGOOSA N'OKUTUNDA EBIBALA MU DISITULIKITI YE KAYUNGA.

ENTANDI KWA

PULOJEKITI eno esangibwa mu ggombolola ye Kangulumira mu disitulikiti ye Kayunga Kayunga y'esinga okulima ennanansi mu Uganda wonna.Ennanansi zino okusinga zirimibwa ku masamba.Kyokka wadde ennanaansi zirimibwa nnyo, abalimi babadde tebannekolamu mulimu kufuna kyuma kizirongoosa okujjako abo abakigezaako nga bazikaza.

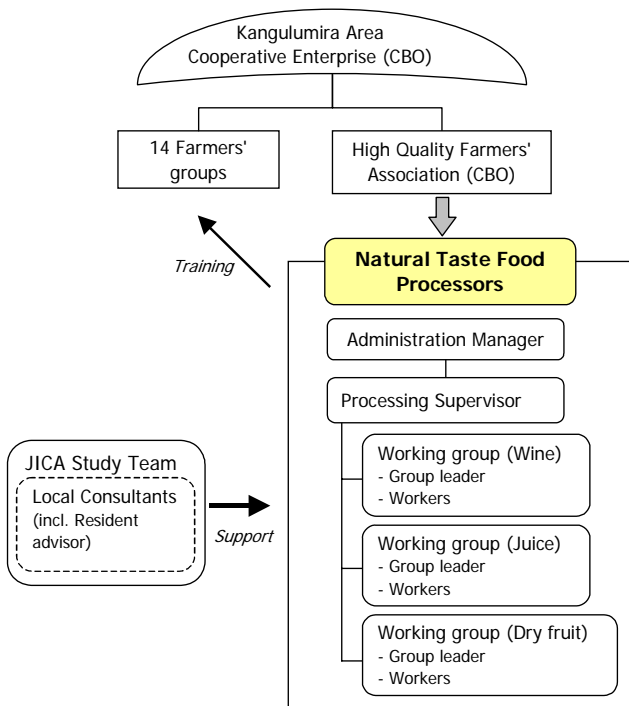
EBI GENDERERWA

Ekisooka kwekunoonya okulaba oba ddala kisoboka okuziimba ekyuma eky'omulembe mu Kangulumira wamu n'okuzuula oba wayinza okusoboka okuleeta tekinologinya

ow'omulembe wamu n'okuleeta ekibala ekipywa ku katale ka Uganda.Okwo kwebajja okugatta okusomesa abakozi abanaakola mu byuma ebyo.

EKI TONGOLE EKI DDUKANYA OMULIMU

Bakiyita Natural Taste Food Processors (NTFP).Kino kikolagana n'ebibiina eby'enjawulo wamu n'ebibiina by'abalimi okuva mu Kangulumira n'ebitundu ebirala.Okulongoosa n'okusunsula kujja kukolebwa ebibiina bisatu ebyalimi nga bikola emirimu egy'enjawulo nga okusogola omwenge,omubisi n'ebibala ebikaze...



Enkola y'ekibiina

Kisangibwa wa?

Kisangibwa mu ggombolola ye Kangulumira kiromita nga bbiri okuva mu kabuga ka Kangulumira.



EBIKOZESEBWA

Aluminum pans, Kitchen utensils, Tanks/jerry cans for wine making, Fruit press, Slicer, Solar dyers, Heat sealer, Brix meter, Thermometer, Alcoholmeter, Hydrometer, Scales, Water filter unit, Foot pump, Firewood stove, Sink, Work tables, Shelves, etc

Emirimu egikolebwa

- Okuzimba abakozi n'okubasomesa engeri y'okukwatamu bizinensi zaabwe.
- Okusomesa engeri y'okulongoosa ennaanansi ,omubisi gwayo n'ebibala ebikaze. Okukola ng'etambiro wakati wa'abalimi n'abaguzi. Introduction of appropriate processing methods and new products.
- Technology transfer to other farmers' groups in the area.

For more information:
Agricultural Planning Department, MAAIF (Tel: 041
-320722)
Study Team Office (041-234859)

Omusomo ogukwata ku kutumbula omutindo,okubirongoosa n'okugaziya akatale kaabyo mu Uganda

Akatabo ak'okusatu

OKULONGOOSA MUWOGO N'OKUMWANIKA E NAKASONGOLA

ENJANJULA

OMUTINDO gwa mutere mu Uganda guli wansi nnyo era nga kino kirabikira ku ttaka erimusangibwamu, okukyusa langi n'okuwumba. Pulojekiti eno yassaawo ebintu ebikozesebwa abalimi b'e Nakasongola abeegattira mu kibiina kya Agali Awamu Cassava Processing and Marketing Cooperative Society (ACAPROMA) basobole okufulumya obuwunga obuli ku mutindo ogwa waggulu obusobola okukozesebwa mu kifo ky'engaano.

Okusobola okutuuka ku omutindo gw'akawunga ogwetaagibwa, ensonga ezivirako mutere okubeera ku mutindo ogwa wansi zirina okusooka okwekenneenyebwa obulungi.



Ekifo awalongoosebwa muwogo

EKI SEERA KY'OKUKAZA MUWOGO

Olw'omuwendo gw'abantu abasalasala muwogo abeetaagibwa okubeera omutono, abalimi batera okusalasala ebiwayi bya muwogo ebinene mu kifo ky'okusala obutonotono obukala amangu. Kino kya kikulu nnyo kubanga muwogo bw'asigalamu amazzi amangi okumala ekiseera ekiwanvu awumba mangu ekimuviirako omutindo okufa n'okukyusa langi.

Okufuna omutindo gwa mutere omulungi kisaanidde n'akalira mu lunaku lumu oba obutasussa nnaku ssatu bw'ogerageranya n'abe Nakasongola akazibwa wakati w'ennaku ssatu n'ennaku ttaano.

Okusobola okukaza mutere amangu, ku kyuma ky'e Nakasongola wateekebwawo ekyuma ekyeyambisa 'Motor' okutambula wamu n'ebikozesebwa emikono okusalasala mutere. Ebyuma ebityibwa bya Rotary ebyeyambisibwa okusalasala mutere biteekebwako ekijambiya ekyakolebwa mu 'Aluminium' nga kiteekeddwamu ebituli ebyekulungirivu era nga biwagaliddwa bulungi okusobola okusalasala obulungi.



Ekyuma ekikozesa emikono okusalasala mutere

(1) Ekyuma ekikozesa emikono okusalasala mutere

Ekyuma kino kikozesebwa na mikono era nga kiteekebwako omukonda ogweyambisibwa okukyetoolooza nga guyungiddwa ku kijambiya. Muwogo amaze okususibwa ateekebwa mu maaso g'ekijambiya era olumala okusalasalibwa n'ayibwa mu ssefuliya oba ekintu ekirala kyonna. Ekyuma kino kisasalala obungi bwa mutere bwa kilo 200 olunaku.

Ekyuma kino kya ssente ntono naye nga

kifulumya kinene okusinga okukozesa emikono okusalasala. Tekikozesa masannyalaze yadde 'Motar' okukola omulimu guno ate nga kifulumya mutere akala amangu n'olwekyo kisobola bulungi okukozesebwa mu byalo

Wabula keetaagisa abakozi abawerako ate nga tekasobola kukozesebwa kifulumya bungi bwetaagibwa ku ddaala ly'obusuubuzi obwa waggulu. E Nakasongola ebyuma eby'enkola zombi byateekebwayo abalimi okusobola okusigala nga basalasala mutere ssinga ekyuma ekikozesa 'Motor' kibeera kyooneseemu.

(2) Ekyuma ekikozesa 'Motar'.

Yingini ya HP ey'amaanyi agaweza A 1.5 yeyambisa enkoba ne 'Pulley' eziyungibwa ku kyuma . Muwogo amaze okususibwa atekebwa mu kyuma olwo ne kitekebwa era ne kimusalasala nga bw'afulumira mu maaso n'ayiika mu ssefuliya. Ekyuma ekyeyambisa 'Motar' kifulumya obungi bwa mutere bwa kilo 2000 buli lunaku.

Ekyuma kino kya sseente nnyingiko wabula kifulumya kinene okusinga ekinyolebwa n'emikono. Kyetaagisa 'Motar' okutambula n'olwekyo ssi kirungi mu bitundu by'ekyalo abantu gye bayinza okufunira obuzibu okukiribirira olw'obutabeera na bakugu bayinza kubikanika. Kyokka kikola bulungi nnyo era kikola bulungi ku bakolera ku ddaala ly'obusuubuzi obuli ku mutindo gw'obusuubuzi obwa waggulu.



Ekyuma ekikozesa 'Motar'

Ebyuma bino ebyagulibwa pulojekiti by'akolebwa wano mu Uganda era waliwo obuzibu obusangibwa nga bikozesebwa nga byekuusa kuva ku gye byakolebwa. Bino wammanga bikyetaaga okwonhgerwamu

amaanyi.

- Ensalasala ya Mutere ekyabulamu. Olwokubanga ekijambiya ssi kitereeve bulungi, omuwatwa ogusigalawo wakati w'ekifo awatekebwa muwogo agenda okusalasalibwa mu kyuma n'ekijambiya ekimusalasala kikendeera ate oluusi ne kigaziwa ekiviirako obutundu bwa muwogo obusembayo buyitamu buyisi ne bugwayo nga tebusalasaliddwa. Kino kiviirako okufiirizibwa n'okwonoona ate n'okufunamu mutere eyetaga okuddamu okusalasala n'engalo oba okukazibwa nga bw'ali ekitwala ekiseera ekiwanvuko ekiviirako omutindo okukka.
- Ebyuma okwetoololera enkoba (Pulleys). Wabaddewo obuzibu bungi nnyo n'ebyuma bino naddala ku byuma ebikozesa 'Motar' ekiviiriddeko okusalasala mutere omuneneko n'okubikanika buli kiseera. Kino kyeragiira mu kukubagana kw'ekyuma, okukutula enkoba, enkoba okubuukako nga ekyuma kikozebwa, n'ebirala.

Ebikozesebwa (Materials). Aluminium akozeseddwa ku bintu eby'enjawulo nga ebijambiya ebisalasala ne 'Pulley'. Aluminium ssi mugumu bulungi era ebijambiya biribuka mangu, ewuzi zikutuka mangu era bifa mangu ddala.

OKWONOONEKA KWA MUTERE NG'AKAZIBWA.

Okwonooneka kwa mutere ng'akazibwa kusinga kuva ku nfuufu n'ettaka ebimugendamu. Abalimi abasalasala mutere tebatadde nsimbi zimala mu byuma ebyetaagisa mu kumukaza era bamukaliza ku ttaka.

Enkola y'okukaza obulungi mutere ewa abalimi obuzibu olw'obunene bw'ebyuma ate nga tekozesebwa nga bwe yetaaga okugyayo amagoba.

Pulojekiti yasooka kukola okunoonyereza ku ngeri ez'enjawulo mutere zaakazibwamu nga tennasalawo ku eyo esaanidde ekitundu.

(1) Enkola y'okukaza mutere mu

nnyumba (Tunnel driers)

Enzimba z'obuyumba buno ez'enjawulo zaagezesebwa. Mwalimu ezimbisibwa emitayimbwa egiwetebwa ne kikola akaswa nga kubikkiddwako akaveera ka pulasitiika.

(a) Akayumba akakazibwamu mutere akakozesa ekiwujjo (Tunnel dryer with Fan)

Akaasooka okugezesebwa kakolebwa ne 'Pulaayi ku njuyi zonna ne muteekebwamu ekiwujjo ky'empewo ekikozesa amasannyalaze n'ekituli awafulumira empewo. Mutere yateekebwa ku nsaniya ez'obugazi bwa 0.5 sq miita.

Ebirungi byayo

- Empewo okuva mu kiwujjo yakola bulungi mu kukaza mutere.

Akabi akalimu

- Ekiwujjo kyetaagisa amasannyalaze agatali mu byalo.

(b) Akayumba akakazibwamu mutere nga tekaliimu kiwujjo (Tunnel Dryer Without Fan)

Oluvannyuma lw'okukizuula nti okukozesa ekiwujjo tekisoboka mu byalo, akayumba omukazibwa mutere nga temuliimu kiwujjo kakolebwa, era obuyumba kkumi bw'azimbibwa pulojekiti okugezesa.



Obuyumba obukazibwamu mutere

Ebirungi byako

- Akaveera ka pulasitiika akabikkibwako kakola bulungi ne kalesa enfuufu okugwa ku mutere.
- Akaveera kano era kayamba okukuuma ebintu ebirala okwonoona

mutere era n'alekebwa ebweru ekiro n'enkuba ng'etonnya.

Ebizibu byako

Mu kugezesa akayumba kano bino bye bizibu ebyazuulibwa.

- Ebikozesebwa byonna byali birina kugulibwa mu kitundu ng'ate omutindo gwabwo gwali wansi nga tebuwangaala n'akamu.
- Obuyumba buno bwazimbibwa ku ttaka nga kyetaagisa omuntu okukutama ng'ayanika n'okwanula mutere ekyali kikooya ennyo.
- Akatimba akaakolebwamu ttule okwanikibwa mutere kaatalagga ne kamwonoona.
- Ensaniya ez'obugazi bwa 0.5 sq.miita ezaakozesebwa okwanikako mutere nga zigendako obungi bwa kilo 2.5 eza mutere omubisi nga olusaniya olw'obuwanvu bwa miita kkumi oluliko ensaniya 20 lugendako kilo 50 zokka ng'ate okukola omulimu omulungi ttani 1.5 eza mutere omubisi ze zisaana okukolebwako buli lwanika.

(c) Ettundubaali /Obuveera bwa pulasitiika

Obutundubaali kkumi bwagulibwa okuyambako mu kukaza mutere.



(Enveera za pulasitiika)

(d) Olutandaalo okukazibwa mutere

Okukendeeza ku kizibu ky'okukoowa ennyo olutandaalo okukazibwa mutere lwayiyizibwa. Luno lwakolebwa mu mbaawo ezaatekebwa waggulu nga ziteekeddwako akatimba ne kwalirirwako ettundubaali.



(Olutandaalo okukazibwa mutere)

(e) Ekkalizo erigattidwa (Combined/Hybrid Design)

Ekkalizo erigatta engeri zombi ey'olutandaalo n'akayumba nayo yagezesebwako. Ekigendererwa kyali kya kulongoosaamu nga basitula ku buwanvu bw'olutandaalo okukendeeza ku kukutama mu kwanika n'okwanula mutere kyokka nga mu kiseera kye kimu luyamba okumukuumira mumbeera ennungi nga byonna biri ku nsimbi ensaamusaamu.



(Ekkalizo erigattidwa- Combined/Hybrid Dryer)

Ekkalizo lino bwe lyamala okuyiyizibwa olwo ne wafunikawo engeri nnya ez'okukazaamu mutere ku kyuma e Nakasongola:

1. Akayumba akakazibwamu akali ku ttaka (Tunnel dryer).
2. Obuveera bwa pulasitiika (Amatundubaali)-(Plastic sheets Tarpaulins).
3. Olutandaalo olwa waggulu (Drying shelf).
4. Ekkalizo erigattidwa (Combined/Hybrid design.)

Enkola zino zonna zeekenneenyzebwa abakozi nga bakozesa obumanyirivu bwe baali bafunye nga bakola, e bafunamu bino: Obuveera bwa pulasitiika bwe gabeera gasibiddwa bulungi era nga gataliziddwa kibuyaga ge gasinga obulungi okukozesa olw'ensonga zino;

- Mangu okukozesebwa abakozi naddala nga bwe bali abatono.
- Obuveera bwa pulasitiika zanguwa okuzingako mu budde bw'enkuba n'ekiro okusobola okukuuma obulungi mutere.



(Obuveera bwa pulasitiika nga zizingiddwako ekiro)

- Obuveera buwangaala nnyo okusinga enkola endala essatu.
- Tebukyusa langi ya mutere yadde mu budde bw'enkuba.
- Buli kaveera kaanikibwako mutere mungi nnyo.
- Busobola okutambuzibwa oba okukyusibwa okuva mu kifo ekimu okudda mu kirala bwe kibeera kyetaagisizza.
- Mu budde bw'omusana bwe businga okukaza amangu mutere.
- Bwe businga okukozesa ensimbi entono buli yuniti ekazibwako.

N'olwekyo obuveera bwasalibwawo okukozesebwa okukalizaako mutere. Kyokka wakyaliiwo obuzibu bw'okwonooneka kwa mutere okutonotono olw'enfuufu n'okubeera nti obutundubaali obuliwo tebuwangaala bulungi, ebikyetaaga okukolebwako.

Bw'obeerako ne ky'obuuzza tuukirira::

Ekitongole ekivunaanyizibwa kunteekateeka y'eby'ob ulimi,, MAAIF (Tel: 041-320722) Study Team Office (041-234859)

Omusomo ogukwata ku kutumbula omutindo gw'ebikungulwa,okubirongoosa n'okugaziya akatale kaabyo mu Uganda.

Akatabo ak'okuna.

ENTANDIKWA Y'OKWONGERA KU MUTINDO N'EBYUMA EBIKOZESEBWA KU FAAMU Y'OMUCEERE EYE BULAMOGI ETUNUULIDDWA OLW'OKUTUMBULA EBYO EBIKUNGULWA N'OKUTUNDIBWA MU UGANDA.

ENTANDIKWA

Bino byebirabiddwaako mu nkola y'emirimu okumala ebbanga eggere.

Ebika by'omuceere ebirimibwa mu buvanjuba bwa Uganda okusinga bibadde ebyo ebimanyiddwa nti bikulira mu ntobazi nga ekiyitibwa super era guno nga gwettanirwa nnyo abantu.

Mu ssaza lye Bulamogi erisangibwa mu Kamuli District ,abalimi okuva mu bifo nga Namwiwa, Buyinda ne Bupyana balina okusa omuceere gwabwe mu kibuga kye Kaliro ekyesudde kiromita 23 ..Wabula bafua obuzibu bw'amasanyalaze oluusi nebalinda okumala ebbanga ng'omuceere gwabwe tegukolebwako.

Ebifo omukubirwa obuwunga mu Kaliro tebiri ku mutindo gwetaagisa era abalimu bafiiriddwa nnyo olw'ensonga nti omuceere wegufulumira nga teguli ku mutindo gwetaagisa ekibalemesa okutunda obulungi.

Wabula abalimi bajunibwa pulojekiti ya JICA bweyateekawo ekkolero ery'omulembe e Namwiwa nga liri wansi wa Bulamogi Rice Milling Cooperative Society..Ekkolero lino ly'akola ebyamagero bingi eri abalimu mu kitundu kye Semuto era bino byebyavaamu.

EBIRUNGI EBIFUNIDDWA

Ekika	Milling Recovery %	Broken Rice %
Rubber Roll	68-70	30
Friction	60	30-50
Engelberg	55-60	50

(Milling Recovery by Mill Type)

Omwezi	Ebisusunku Kg	Omuceere omusunsule Kg	Ebivaa mu %
Kasambula	8,042	5,030	0.63
Mukutulanjanja	430	285	0.66
Mugulansigo	-	-	-
Kafumulampawu	-	-	-
Muzigo/Togo	-	-	-
Sseboaseka	-	-	-
Kasambula	21,099	13,884	0.66
Muwakanya	53,355	37,146	0.70
Mutunda	31,911	22,250	0.70
Mukulukusabitungo			
tungo	28,538	19,380	0.68
Museenene	14,628	9,907	0.68
Ntenu	22,430	14,724	0.66
Omugatte	180,431	122,604	0.68

(Ebyavaamu mu muceere mu *Bulamogi Rice Mill* 2005)



(Ekyuma ky'omuceere ki *Rubber Roll Type Rice Mill*)

EBI KUNGUDDWA.

Ebimu kw'ebyo ebikunguddwa okuva mu kika kya Engelberg ne Friction type mulimu chaff, husk ne rice bran, ebitayamba nnyo Mu ngeri endala,ebyo ebikunguddwa mu nkola ya rubber roll ekyuma kyawula ebikuta n'ensogo.

(1) Ebikuta

Bino kikozezewa mu bulimiro obusookerkwammu n'okufumba.

(2) Obuwunga

Obuwunga bw'omuceere bulungi nnyo mu kukola butto,emmere y'ebisolo n'ebyenyanja nga bwebiragibwa wansi.

	g/100g
Emmere omuli ekiriisa	11.3-14.9

ENTEGEKA EY'EKIKUGU MU KUTEGEKA EBYUMA EBY'OKULONGOOSA EBIKUNGULIBWA N'OKUBINOONYEZA AKATALE MU UGANDA.

ENYANJULA

Disitulikiti ye Kayunga y'emu ku ntabiro z'okulima ennaanansi mu Uganda nga kino ky'awaliriza pulojekiti ya JICA okuzimba ekyuma ekinalongoosa ennaanansi zino nga kiddukanyizibwa abalimi abegaattira ,mu kibiina kya Natural Taste Food Processors.

Ekimu ku bigendererwa by'ekibiina kino kwekwagazisa abalimi okwanguyirwa n'okufuna ebikozesebwa amangu bibayambe okwanguyirwa mu mulimu gwabwe.

Butto/Amasavu	15.0-19.7
Ewuzi	7.0-11.4
Olufufugge	6.6-9.9
Emmere ewa amaanyi	34-62
Ssabbuuni	24-29
A maanyi agalimu	670-1990

Vitamins & Minerals	mg/100g
Thiamin(bwa musaayi)	1.2-2.4
Riboflavin(bwa musaayi)	0.18-0.43
Niacin(bwa musaayi)	26.7-49.9
L-Tocopherol(musaayi)	2.6-13.3
Calcium(bwa magumba)	30-120
Phosphorousa musaayi)	1.1-2.5
Phytin Phosphorous	0.9-2.2
Iron(Bukola musaayi)	8.6-43.0
Zinc(bwa musaayi)	4.3-25.8

Kyokka abakola emmere bagamba nti obuwunga bwa kasooli kubanga bbwo tebukosebwa kika kya kyuma kibukolako.

EKYUMA EKI KAMULA EBI BALA;

Eky'okulabirako ekisinga kyekyekyuuma ekyakolebwa mu bikozezewa ebyabulijjo naye nga kiyambye nnyo abantu.Ekyuma kino kyeyambisibwa okupakira omubisi oguva mu naanansi wamu n'okugutereka.

Ekyuma kino ekisobola okukamula obungi bwa 10-15kg z'ebibala kyakolebwa Mw. Yoshihiro Ban omu ku ba mmemba ba JICA nga kyatwala obukadde bwa Uganda 76,600.



(Ekyuma ekinyiga ebibala)

Bw'oba ogerageranya, oyinza okusanga ebyuma eby'enjawulo ku mikutu gya yintanenti ebikola omulimu gwegum, Okugeza ekyo ekiri wansi ekisangibwa mu Bungereza.



(Ekinyiga ebibala ekiva e Bungereza)

Ekyuma ekyo waggulu kya kg 12 kigula ensimbi

ezenkanankana Pawunda 265 bwe bukadde 874,500 kw'ezo ezaweebwayo aba JICA



Bwebekkaanya enkola y'ebiyuma ebyo, bakizuula nti kirina ebintu bino wammanga

- Kyangu okukozesa
- Kigumu.
- Kiwangaala
- Kikekkereza

Ekyuma kino kisobola okukolera ddala omulimu gwegumu ng'ekyo ekiragirizidwa okuva ebulaaya ate nga kikekkereza nnyo.

*Okumanya ebisinganwao :
Agricultural Planning Department, MAAIF (essimu: 041
-320722)
Study Team Office (041-234859)*

Annex 5

Manual

PRODUCTION OF HIGH QUALITY (DUST FREE) CASSAVA CHIPS

1. PEELING

Peeling is time and labour consuming work but has to be done manually with a knife since it has not been mechanized. Damaged parts are removed and peeled roots are washed for chipping.



2. CHIPPING

Peeled roots are chipped into small pieces for quick drying. Chipping must be done immediately after peeling. There are several types of chipping or slicing machine and ESARC's model is recommended. There are two types: manual type and motorized (petrol engine-driven) type. (Both of them are manufactured by TONNET in Kampala)



Manual type



Motorized type



3. DRYING

(1) Drying of chips should be done on the clean plastic tarpaulin sheets. Not on the ground.

- a) Purchase plastic tarpaulin sheets at market. 4mx3m is the popular size. There are several products and try to identify the most durable one. Recommended amount of wet chips is about 4 kg per square meter. So, one sheet ($3m \times 4m = 12m^2$) can dry roughly 50 kg of wet chips. Prepare the necessary numbers of sheets depending on your anticipated production.
- b) Spread the plastic sheet on the ground and secure it by means of metal pegs or weights.

- c) Spread 40-60 kg of wet chips (depending on the weather condition) on the sheet in an even layer leaving a space of about 10 cm all around the edges to avoid soil contamination.



- d) In case of prolonged drying over a number of days where chips are kept outside overnight or rain, the chips can be protected from moisture by folding the plastic sheet securely and holding it in place with weights.

- e) Check the dryness periodically. To hasten the drying, you may turn over the chips. In very sunny days, the chips are dried within a day, if you start drying at around 10:00 a.m..

The chips are ready for collection and storage

when they attain moisture content of about 14%. Do not over dry. Over dry means losing money. Recovery rate should be monitored (calculated) each time of processing, batch by batch.



- (2) In addition to drying on the plastic sheets, you should protect chips from dust conveyed by wind as well as from dust raised by workers during the work. There are two methods:

Method ONE :

Plant hedge tress (choose a kind of trees whose fallen leaves should not pose a problem) to form the windshield in/around the dry yard and plant grasses to cover the ground of dry yard to prevent dust fluttering. This is cheapest way but it takes time.



Methods TWO :

If climate/soil is not suit to grow hedge tress and ground cover grass or if you have no time to wait for trees/grasses to grow, you should make simple drying shelves (wooden frame with 2 inch wire mesh screen, about 60cm height) to place plastic sheets on them. In addition, make windshield with locally available materials such as papyrus mats.



4' x 16' drying shelf



8' x 12' drying shelf

Advantages of using drying shelves

Where resources allow using of drying shelves has the following advantages over method one:

- By raising the chips off the ground, soil and dust contamination are further reduced.
- Work is easier and faster as the chips are raised to about waist level so no need to bend to spread and collect the chips.
- Contamination by domestic animals is reduced as well as the plastic sheet being stepped on by workers while spreading chips.
- Termite damage of the plastic sheet and resulting contamination is avoided.
- No moisture transmission from the ground so more efficient drying especially during wet season.

Materials for making a unit of 8'x12' drying shelf

- 3.5 ft pole x 12 pcs. (must be anti-termite treated)
- 2"x1" x 12 ft timber x 5 pcs.
- 2"x1" x 4 ft timber x 8 pcs.
- 2"x1" x 8 ft timber x 2 pcs.
- 2" wire mesh, 4 ft x 8 ft x 3 pcs.
- 3" nails 0.5 kg
- U nails 0.5 kg
- 4m x 3m plastic sheet

This drying shelf can be assembled by a semi-skilled carpenter.



For the both cases, the drying yard should be distance away from unpaved roads, where vehicles pass, as far as possible. Install a barbed wire fence around the dry yard to protect chicken/pigs/goats, if necessary.

4. STORAGE

Dried chips are kept in PP bag and stored. Do not store not-well dried chips. Otherwise you will spoil chips because of mold and bad smell. Do not fill PP bag up to the top. Leave about 20 cm margins to hold and close the bag to avoid the contamination by small lizard, insects and dust. In case of storage for several months, it is recommended to seal the bag by sewing.

Pallets are an essential part of the store to avoid moisture from the floor.



5. OTHERS

(1) Suitable cassava varieties for chip production

Suitable variety for cultivation differs by place; depending on soil, climate and situation of mosaic virus disease. Therefore, suitable cassava variety for flour production may be selected from the varieties presently under cultivation at each place with the following criteria.

- Less water content of fresh roots (better recovery rate and quicker drying),
- Thin peel (better recovery rate) and
- Easy to peel.

With the limited experiences in the pilot project, it is observed that the best variety for flour production is NYALUBOKE (pink peel) which is popular at Kigumba, Masindi District. This type is easy to peel, dries fast and has a good recovery rate.



(2) Tools for material handling

Efficient handling is essential to dry the chips quickly as well as to minimize the labour cost. Durable and light weight containers and 2-wheels cart is one of the solutions for it.

2-wheel cart can be manufactured by local metal workshop where makes steel doors with bicycle wheels and mild steel round pipe (1/2" and 3/4"). Another type of cart for carrying a PP bag in the store (right photo) is also useful tool.



PINEAPPLE JUICE MAKING

This technical guide shows the method to produce a “**Dilute to taste juice**” which is consumed after dilution with water at a rate of 2 parts water to 1 part juice.

1. Prepare required quantity of pineapple about 2kg of fruit for every 1 liter of juice to be produced.
2. Sort fruit to ensure fruit are free from insect damage, disease, mould and are fully ripe.
3. Remove crown (leaves) and wash whole fruit thoroughly with brush removing all soil and other dirty.



4. Peel and dice fruit into small pieces approx 1 cubic inch. Mash the cut pieces by wooden bar.



5. Put the mashed fruit into muslin cloth and manually extract juice into suitably prepared perforated container with juice draining into collection bucket underneath. Finish the pulp with a fruit press for maximum yield and then strain juice using clean muslin cloth to reduce on suspended particles that settle later on.



6. Measure the sugar content of obtained pure juice by a refractometer. Sugar content of pure pineapple juice is usually 13% to 17%.



The final product shall have 36% of sugar content (Brix); 9% obtained from pure juice and 27% obtained by adding sugar.

7. Determine the final quantity of juice to be produced by the following formula.

(Sugar content of pure fruit juice / 9) x Quantity of pure juice obtained

For example, if you obtain 12 liters of pure juice having 15% sugar content, the final quantity of product is: $15 / 9 \times 12 = 20$ liters.

8. After determining the final quantity of juice, add the following ingredients:

- Sugar 270 gm/liter
- Sodium benzoate 0.3 gm/liter
- Citric acid 0.35 gm/liter
- Ascorbic acid 0.35 gm/liter
- Sodium metabisulfite 0.15 gm/liter
- Sweetener 0.175 gm/liter
- Food colour 0.175 gm/liter

Sugar should be dissolved in hot water separately, and sugar water (syrup) should be filtered through muslin cloth to remove particles of dirt, which are always present.

Top up with hot water to the earlier determined final quantity and stir thoroughly to mix all ingredients.

9. Bottling and capping must be done while the juice is hot to reduce the chance of contamination.

Pasteurize the juice in a water bath at 85 degrees centigrade for approx 30 minutes.



10. After Pasteurizing, the bottles laid on their bottom up (or on their sides) to cool prior to labeling.



11. Hygiene of persons, utensils and premises is critical to juice production.
- Persons involved in juice production should be provided with the proper protective wear to cover their heads, hands and feet. All persons entering the premises should wash their hands and arms and dip their footwear in sterilizing solution.
 - Utensils should be washed thoroughly with soap and water after use. A sanitizing solution of Sodium metabisulfite (dissolve 15gm of Sodium metabisulfite into 4 litera of water, approx. 2500ppm SO₂) should be used to rinse all washed utensils before use.
 - Premises should be kept clean at all times to avoid microbial build up.
12. Water to be used in juice production should be filtered to remove suspended particles and sterilized (boiled).

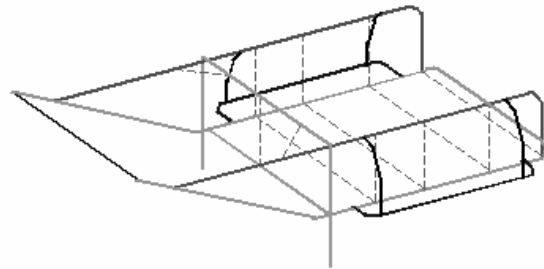
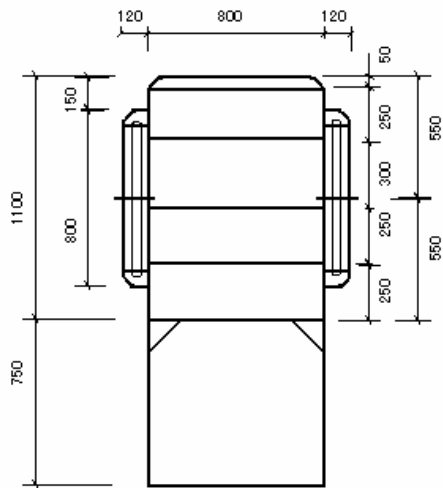


Detail photos and drawing of 2-wheel cart



Plan C

Available tyre size is 70cm (including tyre, outer diameter).



- Green : 3/4 inch square pipe
- - - Pink dotted line : Twisted steel bar 12mm
- Other : 1/2 inch round pipe

