



**Land O'Lakes
International
Development**

DAIRY BUSINESS DEVELOPMENT

IN

UGANDA

PROGRAM
DESCRIPTION

**LAND O'LAKES
UGANDA PRIVATE SECTOR DAIRY
DEVELOPMENT PROJECT**

PROGRAM DESCRIPTION:

Land O'Lakes Private Sector Dairy Development Program began in October, 1994 as an eighteen-month development project. Uganda was the perfect candidate for this type of programming as it was newly emerging, with the strong support of the Uganda President Yoweri Museveni, from years of civil war and was ready to begin the process of rebuilding the country. 95% of Ugandans work in the agricultural sector, and dairying is a part of the culture. The initial eighteen-month program duration has been extended through an amendment to continue through September, 1997. The program's success in meeting Uganda's need for a "modernized" dairy sector has resulted rapid expansion of the program and program staff throughout most of the country.

The initial program stressed training and technical assistance in dairy production and farm management, cooperative development, dairy processing, marketing and distribution, agribusiness management and other related issues. The two-year extension includes training and technical assistance in the above, as well as in water and range management, dairy livestock genetic improvement (working together with World-Wide Sires), dairy goat enterprise development, private producer and processor association development, and small credit opportunities for the private dairy sector.

GOAL:

To promote the growth of the Ugandan dairy sector to begin to meet local demand and export to other countries.

EXPECTED OUTPUTS:

- At least twenty-five dairy agribusinesses which have improved their operating and management activities and have increased their profit margins.
- Approximately 500 private dairy farm operations with improved herd and farm management skills.

OUTPUTS TO DATE:

- 35 dairy agribusinesses have improved their operating and management activities and have increased their profit margins.
- Over 700 private dairy farm operations have improved their herd and farm management skills.

IN ADDITION, THE FOLLOWING WORK HAS BEGUN:

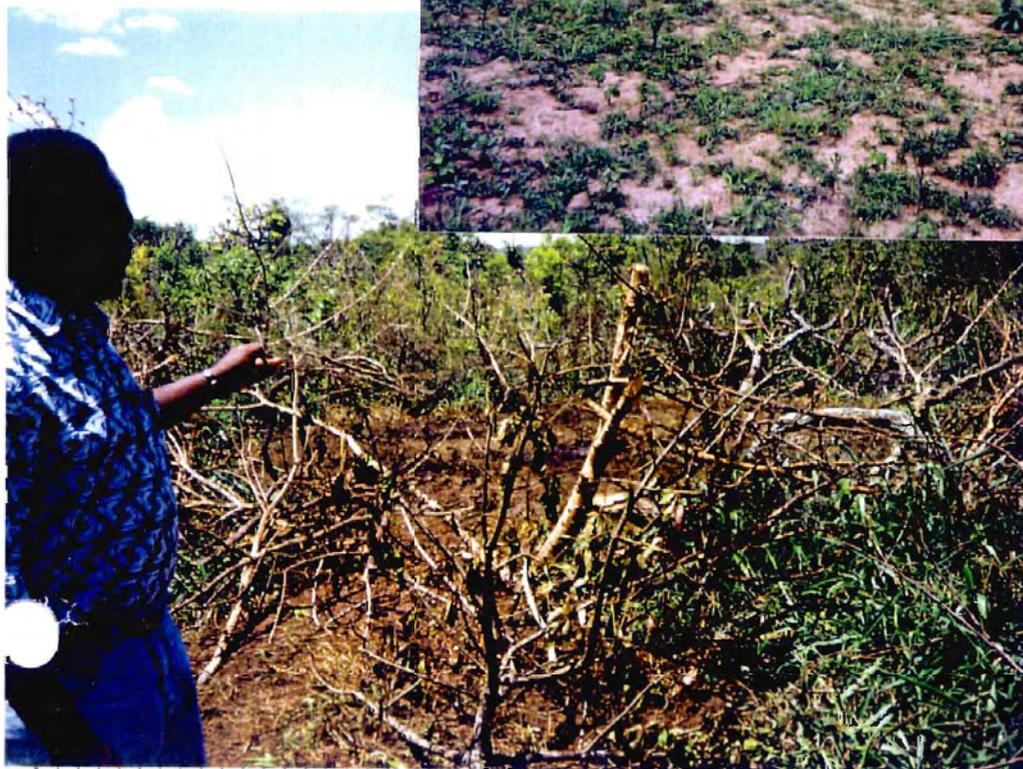
- 20 local dairy cooperative units have registered and begun to function as official cooperatives and begun to improve their management practices.
- Cooperatives have begun to organize “umbrella” cooperative units in order to capture the efficiencies of an organized, non-fragmented dairy sector. Cooperatives in the Mbarara area and Kampala milkshed area are working together towards this end.
- Cooperatives have begun to offer services to their farmers to improve the quality and quantity of milk produced on member farms. 35 artificial insemination technicians have been trained and will work from the cooperatives to extend A.I. services and dairy production training to member farmers.
- Three dairy cooperatives have purchased packaging equipment or resumed packaging their products after receiving technical assistance and direction from the program.
- Three women's groups have begun to process and sell or have improved their ghee production and sales capabilities.

- Land O'Lakes has initiated working relationships with the following organizations in order to tap the synergy's of work in the agricultural sector:
 - 1) three Peace Corps volunteers are currently working to assist participating dairy cooperatives and processors in improving their business and financial management activities;
 - 2) Heifer Project has been invited to send their small dairy producers to Land O'Lakes marketing and cooperative development courses in order to further benefit from the "gift" cows they are rearing;
 - 3) Land O'Lakes will send VOCA volunteers to assist in training activities;
 - 4) Ministry and University Officials are continually invited to assist in program development and training activities;
 - 5) Land O'Lakes will work with the International Livestock Research Institute (I.L.R.I.) as they conduct on-farm studies of legumes in Uganda.

PROGRAM IMPACT:

Land O'Lakes Private Sector Dairy Development Project in Uganda has caused a shake up of the dairy sector from which there is no return. The program began at a transition period for the sector in which the only dairy processor in the country, the Government-owned Uganda Dairy Corporation, was scheduled for privatization (by 1997), resulting in the opportunity for competition to be injected into the system. That competition has arrived, in the form of private and cooperative processors competing for milk. Dairy farmers have awoken to the value their milk has and the need to increase both milk quality and quantity, as well as the need to organize themselves for maximum benefits. Land O'Lakes program is seen as a critical component of the current changes in the dairy sector and its farmer outreach and organizing capability are appreciated for the long-term benefits that they will bring to the dairy sector.

**DAIRY
PRODUCTION**



Traditional cattle "management" resulted in poor health, nutrition and security of animals. Zero-grazing and pasture management have shown farmers a way to decrease animal numbers while increasing productivity.



Traditional management practices--free-roaming.

Zero-grazing method.



The choice--low producing, poorly managed herds or higher producing herds--all over Uganda farmers are learning to better manage what they have through Lan O'Lakes courses and follow up technical assistance.



A new zero-grazing unit under construction in Kamuli.



The final product--a zero-grazing unit which will hold four cows initially.



The owner of the new unit, Constantine, next to her newly planted field of legumes (Lab-Lab) and Napier grass, which will allow her to improve the nutrition and thus increase the milk production of her cows.





New zero-grazing units: Milk production has increased and animal health has improved due to better management and nutrition.





A "revolution" has begun through the efforts of Land O'Lakes to privatize artificial insemination (A.I.) activities in Uganda. Thirty-five A.I. technicians, each from dairy cooperatives, were trained to serve their membership and improve the genetic potential for increased milk in the dairy sector.



An A.I. trainee from Mpigi District is examined for competency in A.I. knowledge and was awarded his A.I. certificate for service.

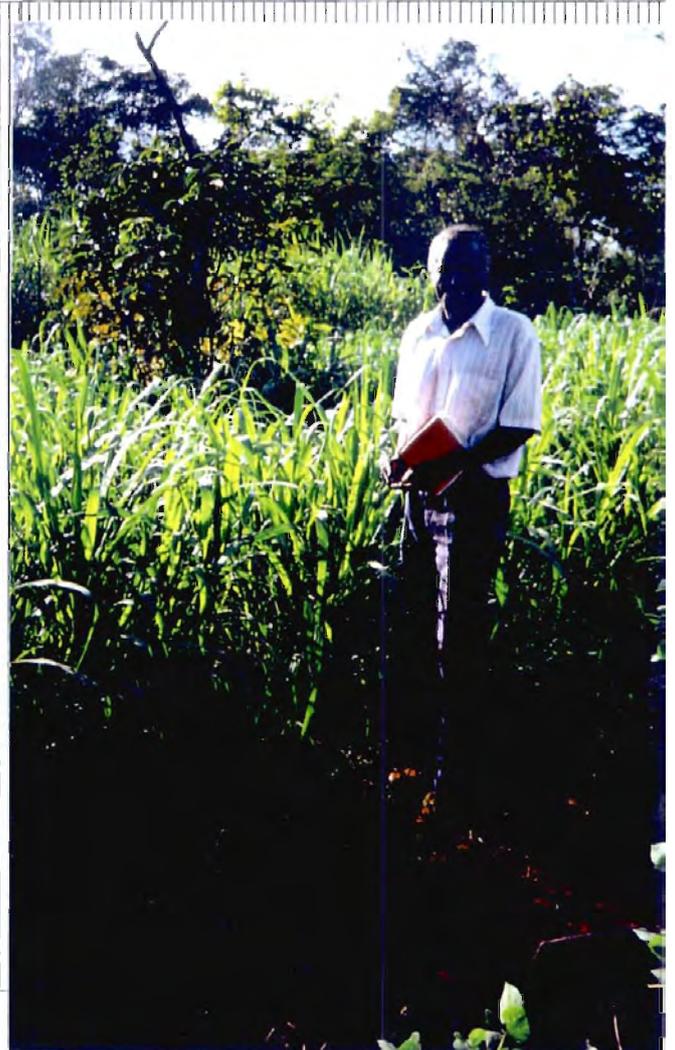


Legume seeds ready for planting following information gained through Land O'Lakes Dairy Production and Management course.



Increased milk production has occurred with cropping and feeding grasses, legumes and crops such as soybeans and maize.

Grasses and legumes planted following Land O'Lakes course.





Participants in Land O'Lakes Dairy Production courses have learned better feeding including planting soybeans, storage of stover and silage making. The latter two have allowed continued feeding of cattle during the dry season and have helped maintain milk production levels.





U.S. Congressional staffs are shown the trophy which is given to the best farm manager on a monthly basis.



Hands-on training: U.S. trainer and participant help dig a demonstration silage pit.

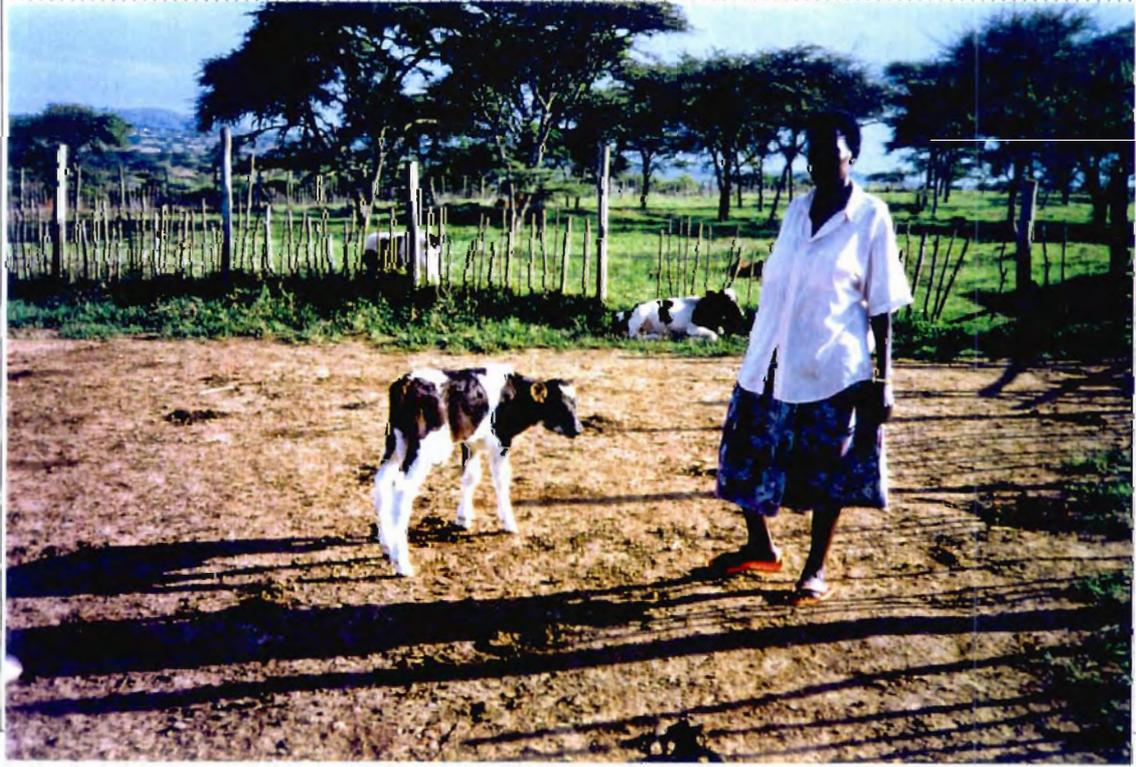


Participants learn to plant (and also collect for their own fields) Napier grass during the Dairy Production & Farm Management course.





Improved calf rearing methods taught by Lana O'Lakes trainer Astrid Gottschalk and her husband Scott have helped to decrease calf mortality. Participants learned to preserve colostrum (first milk rich in antibodies and nutrients), which has resulted in stronger, healthier calves.



HOME NEWS



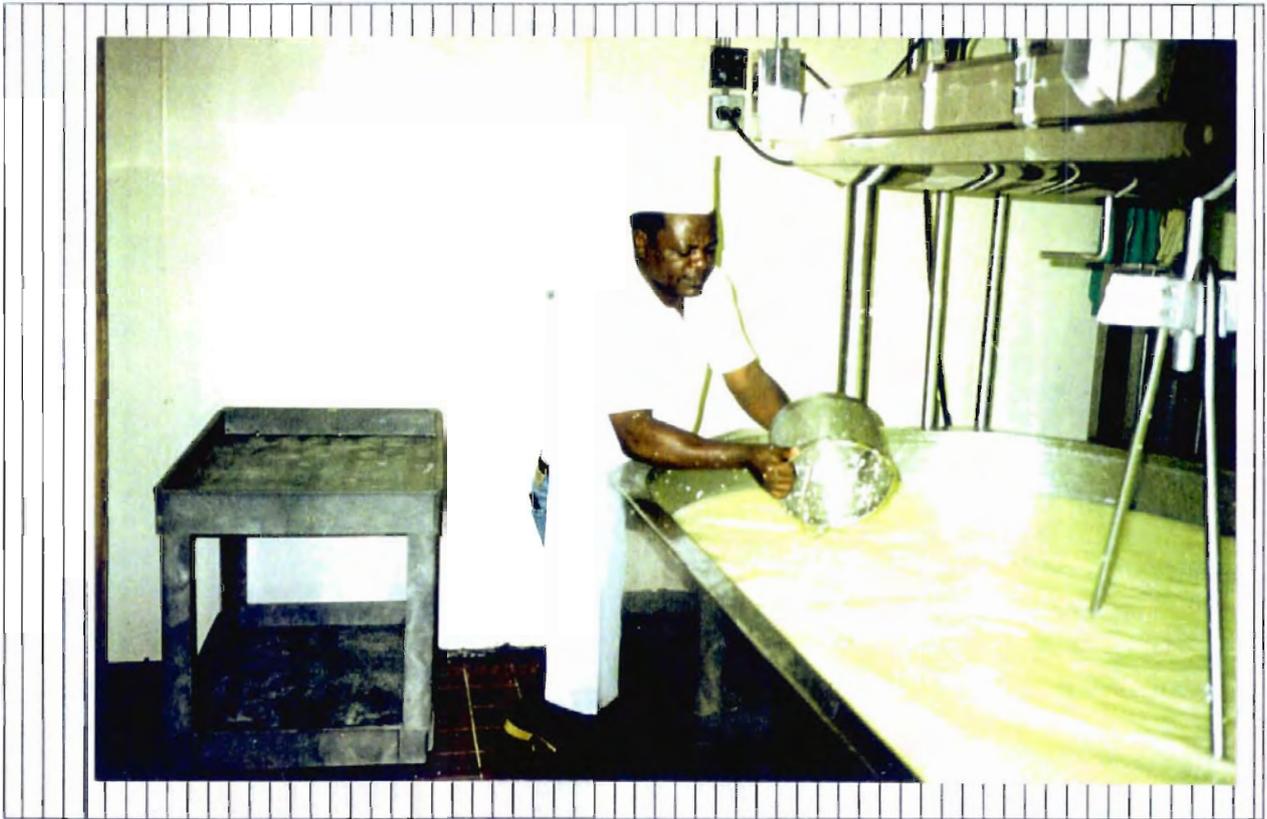
The Project Officer Land O Lakes, Mrs Kathy Horgans, assisted by Mr Richard Bakojja illustrating the proper way of cutting elephant grass during a visit to a dairy farmer. She advised farmers to avoid cutting big pieces which cows cannot easily chew. Photo by Sarah Muwanga.

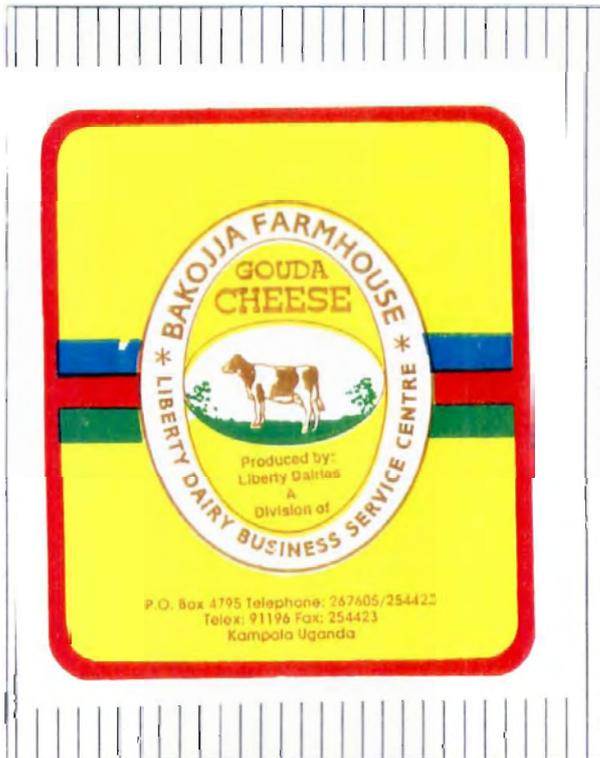
Initial "hands-on" training, with similar follow up on farm by participants and project staff, facilitates adoption/adaption of new practices.

DAIRY
PROCESSING

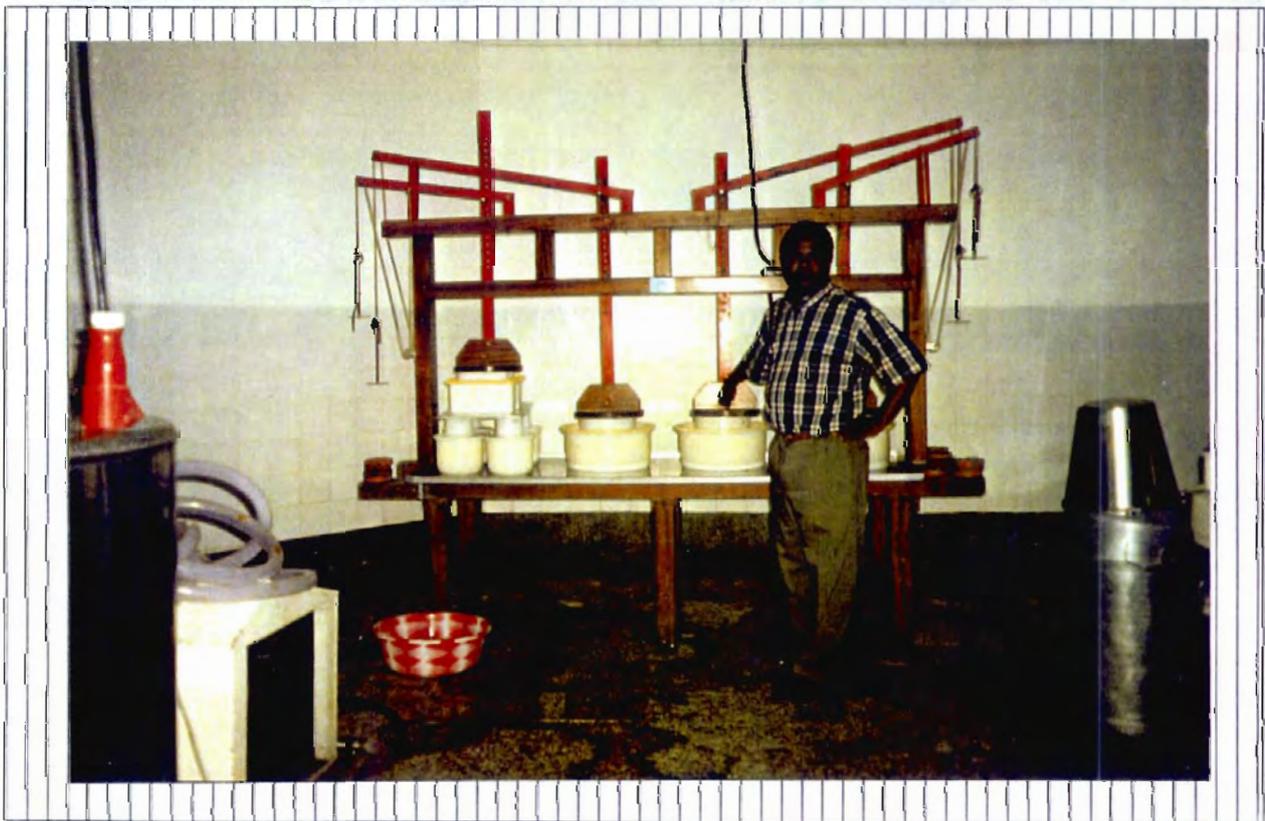
Richard Bakojja, the Land O'Lakes Private Sector Dairy Development Program In-Country Coordinator, learned improved cheese making during U.S. training.

As a result, he now produces a variety of flavors in his cheese including sun-dried tomato and caraway, basil, pepper and other varieties. His cheese is in high demand in Uganda and is of export quality.





Richard Bakojja cheese label.



Richard learned to increase the amount of whey pressed out of his product during his U.S. training at Eichten's Cheese and Bison Farm in Minnesota.

MILK



MITYANA - MWERA LIVESTOCK

**CO-OPERATIVE
SOCIETY LTD**

P. O. Box 203, MITYANA.

PHONE: 2054, MITYANA.

1 Litre

Mityana-Mwera Livestock Cooperative has benefited from Land O'Lakes courses and has begun to package its own milk. Land O'Lakes is assisting the group to procure a loan through the Cooperative Bank of Uganda to purchase a pasteurizer, transportation and increased refrigeration capability.

MILK



Fresh Dairy

STANDARDIZED
HOMOGENIZED
PASTEURIZED

MILK



Fresh Dairy

STANDARDIZED
HOMOGENIZED
PASTEURIZED

AD OFFICE · KAMPALA · 5th Street P.O. box 7078 DAIRY CORPORATION · HEAD OFFICE · KAMPALA · 5th Street P.O. box 7078 DAIRY CORPORATION · HEAD OFFICE · KAMPALA · 5th Street P.O. box 7078

The Uganda Dairy Corporation was advised by Land O'Lakes consultants to change their packaging--which they have now done with this new label. Previously, the Dairy Corporation had sold reconstituted milk powder and fresh milk using the same packaging--thus confusing consumers as they would not know if they had purchased fresh or powdered milk. A new label is meant to rebuild confidence to consumers that milk powder is no longer used.



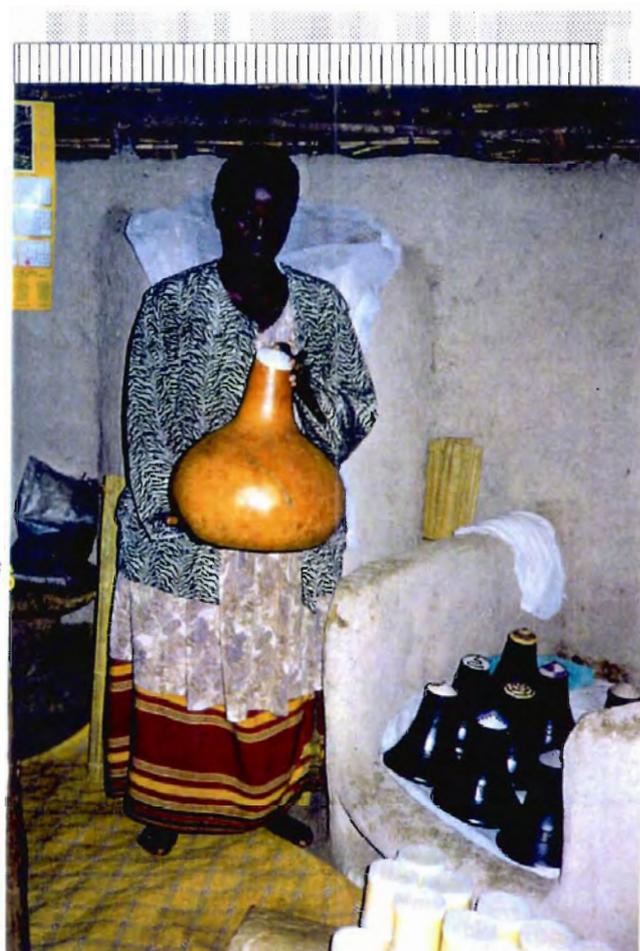
A training course in "Small-Scale Production of Ghee" was conducted by the Ugandan Food Technologist, Mohammed Serunjogi, in May, 1995. After the course the Maddu Women's Group began production and sale of ghee. They developed the label above. A second group began to add spices to their ghee product to increase sales.



Traditional ghee production.



Mohammed Serunjogi conducting baseline survey.



LUGANDA

TRAINING

BOOKS

**EKITUNDU EKYOKUNA
(UNIT FOUR)**

**OKUKUNGANYA AWAMU AMATA
(MILK ASSEMBLY)**

EKITUNDU EKYOKUNA

OKUKUNGANYA AWAMU AMATA

(milk assembly)

Okukunganya amata kukola kuki?

- Enkola eno yevunaanyizibwa okujja amata ku ddundiro n'okugatuusa ku kyuma ekigalongoosa.
- Enkola eno ekendeeza ku nsimbi omulimi kinnoomu zeyandisasaanyizza (gamba ng'ez'okupangisa mmotoka) kino ne kiyamba omulunzi okufuna ensimbi ennyingi okuva mu mataage.
- Okukuuma omutindo gw'amata nga tegukyuka *(maintain quality)*.
- Ku kusalawo okukkiriza oba okugaana amata.
- Ku kupima n'okujja sampulo ku mata *(weighs and sample)*.
- Ku kukuuma ebiwandiiko ebikwata ku mata *(maintains records)*.
- Ku kwawula amata ag'okunywa *(bottling milk)* n'ago ag'okukolamu ebintu ebirala *(manufacturing milk)* era buli kika nebakitereka kyokka mu mbeera ezikigyamu.
- Enkola eno ekola ng'olujegere lw'ebyentambula n'empuliziganya wakati w'ekibiina ky'obwegassi n'omulunzi *(serves as communication link between the cooperative and the farmer)*.

- Olumu (nga kino kya kyeyagalire) (*optional*): Enkola ey'okukunganya awamu amata eyinza okuyamba mu kufunira abalunzi ebintu ebyoza (*cleaners*), ebisengejja (*filters*) n'ebintu ebirala omulunzi byeyetaaga okusobola okufuna amata ag'omutindo ogwa waggulu.

ENDOWOOZA OKWESIGAMIZIBWA OKUJJA SAMPULO KU BULI MATA (*concept of universal sample*)

1. Sampulo egyibwa ku buli mata agava ku ddundiro (*sample taken from each farm delivery*).
2. Sampulo z'amata zifunibwa era ne zikwatibwa n'obwegendereza mu ngeri eri nti kiba kijja kusobozesa sampulo okwekebejjebwa okuzuula ebintu ebiri mu mata (ebigakola okugafuula ki kyegali (*components*), omutindo gwago (*quality*) oba n'okuzuula nti amata gaayongeddwamu/gatabikiddwamu ebintu ebirala oba nedda.
3. Okulondoola amata ppaka lwegatuuka ku kifo ekisooka mu kugalongoosa (*follows milk to the first point of processing*).
4. Engeri eno yelambika enkola okunesigamizibwa ensasula y'amata (*provides basis for payment*).

EBIROWOOZEBWAKO NGA BAKUNGAANYA AWAMU AMATA (*milk assembly issues*)

1. Engeri gyebasasulamu (*payment*)
 - Ekibiina ky'obwegassi kyekirina obuvunaanyizibwa bw'okusasulira okukunganya wamu amata abalunzi bo ne batasasula butereevu oba nedda?

- Abalunzi basasula butereevu oyo atambuza amata gaabwe olw'okugatambuza oba kibiina kyekimusasula?
2. Entegeka y'okukunganya amata (*organisation*)
- A. Okubeera nti engeri okungaanya n'okutambuza amata gyebikolebwako eri mu mikono gy'abantu abalala bekitakwatako, ng'omulimu gwabwe kutambuza mata kyokka (*assembly system owned and operated by third party*).
- E. Okubeera nti engeri okukungaanya n'okutambuza amata gyekukolebwako eri mu mikono gya kibiina ky'obwegassi era be banannyini mmotoka n'ebintu ebirala ebyeyambisibwa mu mulimu guno.
3. Okusalawo oba omuntu anasasula nga kino kikolebwa ku musingi gwa bwenkanya oba nga buli omu asasula kyenkanyi (*equitable vs equal*)
- Omusingi ogw'obwenkanya wano kitegeeza equitable
 - Buli omu kyenkanyi wano kitegeeza equal.

Eky'okulabirako (*example*)

Ekibiina ky'obwegassi kisazeewo okusasuzza omulunzi ensimbi ez'okutambuza amata okugajja ku ddundiro okutuuka ku kifo wegakungaanira.

- A. Okuyisibwa ekyenkanyi (*equal treatment*)
- Ensimbi ez'okutambuza amata ziri Shs. 3000/= buli liita 100 eky'obuzito bw'amata.

Omulunzi asooka afuna liita z'amata 70 buli lunaku

$$= \frac{70}{100} \times 1000 = 700/= \text{ buli lunaku}$$

Omulunzi owookubiri afuna liita z'amata 140 buli lunaku

$$= \frac{140 \times 1000}{100} = 1400 \text{ buli lunaku}$$

E. Endowooza eyesigamizibwa ku musingi ogw'obwenkanya.

Ensimbi ez'okutambuza amata ziri Shs. 100/= buli mmotoka
lw'eyimirira okwo kw'ogatta Shs. 500/= ku buli kilo 100 ez'amata

$$\text{Omulunzi asooka} = \frac{70 \times 500}{100} = 350$$

$$\text{Shs. } \frac{100}{450}$$

$$\text{Omulunzi owookubiri} = \frac{140 \times 500}{100} = 700$$

$$\text{Shs. } 100/=$$

$$\text{Shs. } 850/=$$

EBBANYI (MASTITIS)

1. Ebbanyi kye ki?

Okulwala kw'ekibeere nga kuleetebwa obuwuka obusirikitu (*microbes*). Enywanto emu yokka eyinza okulwala oba enywanto ezisukka mwemu zisobola okulwala.

2. Engeri ebbiri ez'ebbanyi.

- Ebbanyi ly'oyinza okulaba n'olizuula (*clinical mastitis*).
- Ebbanyi ery'olukonvuba (*chronic mastitis*).

3. Obubonero bw'ebbanyi ly'oyinza okulaba n'okuzuula (*symptoms of clinical mastitis*).

- Ekibeere okukaluba ku ludda okuli enywanto erwadde.
- Enywanto erwadde n'oludda kweri okuba nti bizimbye era nga byeyongeddeko obunene (*inflamed, distended quarter*).
- Ekitundu ekirwadde okubeera nga kitwakaavu/kimyuse, nga kyokya ng'ekirimu omusujja era ng'ente teyagala okikooneko oba okikwateko.
- Amata agatali ga bulijjo mu ndabika, mu mpunya etc. okuva mu zimu ku nywanto.
 - * amata okubeeramu omusaayi oba okubeera ne langi eya kyenvu (*bloody, amber coloured milk*).
 - * Amata okubeeramu obutole (*clots*), engeri y'ewuzi (*strings*), n'ebipapajjo (*flakes*).
 - Amata okubcera nga ga mazzi (*waterly milk*).

4. Ebbanyi ery'olukonvuba (*chronic mastitis*).

- Libeera lya lutentezi okumala ennaku - emyezi - oba emyaka (*persists for days - months - years*).
- Olumu likula ne lifuuka eryo ly'oyinza okulaba ate era liyinza n'okuddayo ne libeera nti terirabika.
- Amata agava mu nte erina ebbanyi ery'engeri eno gabeeramu obutofaali obuzimba omubiri gw'ente obwa bulijjo (*somatic cells*) bungi nnyo nnyo.

5. Engeri ebbanyi gyerikwatamu ente (*courses*)

- Bakiteriya eza bulijjo (*common bacteria*) buli kiseera zibeera ku nsolo, mu bifo ente mwezibeera (*environment*) ne mu ttaka.
- Bakiteriya ziyingira mu kibeere ky'ente nga ziyita mu biwundu oba mu katuli omuyita amata akali ku nywanto (*teat canal*).

Ente bwebamala okugikama, kiktwala eddakiika 30 ng'obutuli omuyita amata obuli ku nywanto tebunnaba kuziba. Singa ente ey'engeri eno yevulunga mu bintu ebicaafu ennyo, obuwuka obubeera mu bintu ebyo busobola okuyingira mu nywanto eba tennaziba ne huleeta ebbanyi.

- **Kanaluzaalwa w'ebbanyi (*Predisposing factors*)**

- Ente okulumizibwa ku/mu kibeere.
- Ente okusuzibwa ku kyaalire ekijama ennywanto zaayo ne zikooona era ne zisaabaana obucaafu obuli mu kifo ekyo.
- Ebyuma ebikama okuba nti tebyasibibwa bulungi (*improperly adjusted milking equipment*).

- Enkola enkyamu nga bakama ente gamba:-

- * Okusikambula enywanto z'ente ng'okama.
- * Obutanaaba mu ngalo ng'ogenda okukama.
- * Obutanaaba mu ngalo buli lw'omala okukama ente emu nga tonnaba kukama ndala.
- * Okukozesa tawulo emu okukaza ebibeere by'ente ezisukka mw'emu.
- * Okusiiga obusa ku nywanto z'ente ng'omaze okukama.

Ebintu ebirala ebikwata ku bbanyi

EDDAGALA LY'EBANYIKAMU ENYWANTO (*Teat dip*)

1. Eddagala lyebanyikamu enywanto z'ente nga bamaze okukama (*teat dip*) bulijjo kisaanidde libeere ku bbugumu eriri wansi w'eryo ery'ente i.e. 23°C oba obutawera. Kino kiyamba okusobozesa akatuli amata mwegayita akali ku kibeere okweggala kuba buli lw'oteeka ekintu mu kifo ekinyogoga, kyemiima. Mu ngeri y'emu bwebanyika enywanto z'ente mu ddagala erinyogoza, zemiima obutuli obuziriko ne bukendeera ne bukunira. Omubiri gw'ente gubeera ku bbugumu lya 38° - 39°.
2. Okunyika enywanto mu ddagala kisinga okuzifuuyira kuba kizibu okubunya enywanto zonna eddagala ng'ozifuuyira.
3. Kimu kyakubiri kyokka eky'enywanto kyekisaanidde okunnyikibwa mu ddagala.
4. Waliwo ebika by'eddagala bingi ebyeyambisibwa mu kunnyika enywanto z'ente naye nga yoda (*iodine*) y'asinga. Wabula, eddagala eririmu oyilo (*oil based*) terikola bulungi.
5. Bulijjo kozesa eddagala eryakakasibwa.

6. Eddagala ly'omaze okukozesa liyiwe.
7. Ente endwadde z'oba osembyayo okunyika era zinyikire mu kintu kyazo era zesisaanidde okusembayo nga zikamwa.
8. Wewale okukozesa eddagala lyebanyikamu enywanto nga lirimu kirola (*chlorine*) mungi. Eddagala ery'engeri eno likola bubi enywanto.

Okunnyonyola ebikwata ku ddagala lyebanyikamu enywanto (*teat dips*)

Okunnyika enywanto z'ente ng'omaze okukama, y'engeri yokka esinga okubeera ey'omugaso mu kuziyiza okusasaana kw'ebbanyi. N'olw'ensonga eno, eky'okunyika buli nywanto ya nte amangu ddala nga wakamala okukama y'enkola eragirwa okugobererwa. Eky'okunyika enywanto z'ente mu ddagala eririna obusobozi kiyamba okukendeeza ku bungi bwa bakiteriya kumpi butabulekerawo ddala n'akamu. Olwo ne kibeera nti eky'ente okuddangamu okulwala ebbanyi, kiba kikendeezebwa. Mu Amerika, okunoonyereza kulaze era ne kwoleka nti okunyika enywanto z'ente mu ddagala eririna obusobozi, kisobola okukendeeza ku kulwala ebbanyi mu nte ebitundu 75 ku buli 100 (75%) singa kino kiba nga kikoledwa wamu n'engeri endala ennungi ezeyambisibwa mu kulabirira ente gamba ng'eky'okuteeka eddagala mu kibeere ky'ente ekamizza oba eky'okulaba nti ente ebeera wayonjo.

Entereka n'enkwata y'eddagala lyebanyikamu enywanto

(storage and handling of teat dips)

Eddagala erinyikibwamu enywanto z'ente terisaanidde kuterekebwa mu bifo birimu bbugumu oba bunyogovu busukkiridde kuba mu ngeri ng'ezo, amaanyi n'obusobozi bw'eddagala lino okutta obuwuka, bikendeera. Wabula, osaanidde otereke eddagala lino mu bintu ebiyonjo. Kasita ofuka eddagala erinyikibwamu enywanto okuva mu kintu mw'eriira, teriteekwa ate kuzibwamu kuba kino kisobola okuliviirako okugendamu obuwuka.

Waliwo ebintu bingi by'oyinza okuteekamu eddagala n'onyikamu enywanto z'ente. Kisaanidde kibeere nti ekintu kyeweyambisizza kisobozesa ½ eky'enywanto okunyikibwa. Ebintu bino kisaanidde byozebwe buli lunaku. Wabula, ebintu ebitekebwanu eddagala ly'okunyikamu enywanto tebisaanidde kubeeramu ngoye oba mpapula etc. eziri ku mabbali gomunda waabyo kuba bakiteriya ziyinza okusikattira mu bintu bino ate nezireeta emitawaana.

Olwokuba nti amata ganywebwa abantu bangi n'ekyokuba nti gaagalibwa nnyo obuwuka obuleeta endwadde (*pathogens*), kisaanidde gakwatibwe era gakolebweko bulungi.

Yo mu Amerika, balina amateeka agafuga engula, entunda, entambuza n'enkozesa y'amata.

EKY'OKULABIRAKO KY'AMATEEKA AGAFUGA AMATA AMERIKA

(Example of United States State Regulations)

Ekigendererwa : Okukakasa abantu nti baja kufuna amata buli kiseera era
(Purpose) nga tegalina mutawaana gwonna eri obulamu bwabwe.

Engeri : Abantu abafulumya amata ag'eddaala A ne B babeera
eyeyambisibwa n'olusa *(permit)* olubakkiriza okutunda amata gaabwe.

Amateeka ageya- : Amata g'eddaala/guleedi A gakeberegwa emirundi ebiri
mbisibwa buli ddundiro era nga kikolebwa omukozi wa gavumenti
(regulatory means) ow'obuyonjo.

Amata g'eddaala/guleedi B: gano gakeberegwa omulundi gumu buli mwaka.

Kiba kyetaagisa:

- * Okubeera n'ekisenge awanabeera amata (*milk room*), okubeera n'amazzi agookya ne tanka ennene awanayolezebwa ebintu ebiteekebwamu amata (*vat to wash equipments*).
- * Okubeera nti tewali bintu birala byonna biyinza kugenda mu mata kugafuula ga mutindo gwa wansi (gamba ng'amalagala agajjanjaba, amalagala agatta ebiwuka) (*Absence of miscellaneous potential milk contaminants - medicines, pesticides*).
- * Okubeera n'ekyuma ekinyogoza nga kikola kinnawadda era nga kiri mu mbeera nnungi (*properly functioning cooling equipment*).
- * Okwekebejja n'okukebera ebifo mu butongole okwa buli mwezi kukolebwako b'ofiisa ba gavumenti mu ngeri eri bweti:
 - Bekebejja obungi bwa bakiteriya obuli mu mata nga beyambisa enkola ey'okumanya obungi bwa bakiteriya nga bakozeza ekintu ekiyinga essowaani eky'obunene obumanyiddwa (*bacteria, standard plate count (SPC)*).
 - Babala obungi bw'obutofaali obwa bulijjo obukola omubiri gw'ente (*somatic cells*) obuli mu mata nga kino bakikola butereevu nga beyambisa endabyo (*microscope*) (somatic cells, direct microscopic count (DMC) oba bayinza okukozeza engeri ya elektronika (*electronic*)).
 - Bekebejja obungi bw'omuzigo (*butter fat*) oguli mu mata.
 - Bekebejja ebintu ebiyinza okugaana/okuziyiza amata okuvaamu ebintu ebirala (*inhibitors*) (gamba ng'eddagala erijjanjaba erya antibayotika) (*antibiotic*).

- Bekebejja okuzuula nti oba amata gongeddwamu amazzi oba nedda (*water adulteration*).
- * Ekifo ekikolerwamu okubeera nga kiyonjo.
- * Ente ezikamwamu amata okubeera nga nnyonjo.
- * Amazzi ageyambisibwa okuba nti gava mu luzzi olwakakasibwa so si kumala gasena mu bitaba oba mu bidiba oli nga bw'abeera alabye.

EBIPIMO EBIRI MU MATEEKA EBYEYAMBISIBWA NGA BAKOLA KU MATA MU MINNESOTA - AMERIKA (*Minnesota USA Legal Standards for milk*)

Amata ag'omutindo ogusooka (guleedi A) (nga gateekebwa mu macupa) (*Grade A for bottling*) (nga ga kunywa)

- Ku ddundiro, amata g'omutindo ogusooka kisaanidde gabeere nti tegaweza bakiteriya 100,000 mu buli ml emu ey'amata nga beyambisa ekintu ekiringa essowaani ekimanyiddwa obunene era nga ky'ekigero ekyeyambisibwa nga babala bakiteriya (*at farm, less than 100,000 bacteria per ml standard plate count (SPC)*).
- Wegatuukira gasaanidde gabeere nti tegaweza bungi bwa bakiteriya buli 300,000 bwebabala nga beyambisa ekintu ekiringa essowaani ekimanyiddwa obunene era nga ky'ekigero ekyeyambisibwa bwe baba nga babala bacteria (*standard plate count*).

Amata ag'omutindo ogwokubiri (guleedi B) nga gakweyambisibwa kukolamu bintu birala

- Gaba tegaweza bakiteriya 500,000 nga zibaliddwa nga beyambisa ekintu ekiringa essowaani ekimanyiddwa obunene era nga ky'ekigero ekyeyambisibwa nga babala bakiteriya (*standard plate count (SPC)*), amata ag'engeri eno nga beyambisa enkola ya resazurini (*resazurin test*) etwala essaawa ezisukka mu 3 n'eddakiika 25 (3.25 hrs).

- Nga galimu obujja bwegaaya (*Trace of sediment*).
- Nga temuli lusu oba bintu biwunya.

Okutabiikiriza ebintu ebirala ebiri mu mata (*adulteration*)

- Eky'okubeera nti amata gaba gongeddwamu amazzi oba eddagala eriziyiza obulamu (*antibiotic*) kiteekwa okuloopebwa ku siteeti ye Minnesota (*water and antibiotic adulteration must be reported to the State of Minnesota*).
- * Omulundi ogusooka nga kino kibeerawo/eky'okugattiriza ebintu ebibi mu mata) mu bbanga ery'emyezi 12 (*first incident in 12 month period*):
 - Ebikolebwa okulongoosa embeera eno. Siteeti ye Minnesota eba eja kumanyisibwa abakozi b'ekyuma ekirongoosa amata abakola ku gw'okukunganya amata, ddi okulongoosa embeera eno we kulikomekerezewa.
- * Omulundi ogwokubiri nga kino kibeerawo (eky'okugattiriza ebintu ebibi mu mata) mu bbanga ery'emyezi 12
 - Omutango gwa dola 300.00 (\$300.00) = \$300.00 fine.
- * Omulundi ogwokusatu nga kino kibeerawo (eky'okugattiriza ebintu ebibi mu mata) mu bbanga ery'emyezi 12).
 - Omutango gwa dola 300.00 (\$300.00) n'eky'okujjibwako ebbaluwa ewa olukusa nakyo kisoboka (*\$300.00 fine and permit loss possible*).

GHEE
TRAINING
COURSE

**COURSE ON SMALL SCALE PRODUCTION OF
*MASHITA/GHEE***

Nyakahita - Uganda, May 7 - May 13, 1995.

Mohammed L. Serunjogi

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Acknowledgement.

I was assisted by Mr. Benon Sebbina in conducting this course. Thanks to him.

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Course on small scale production of *mashita*/ghee

1. Introduction

The main objective of the course was to train participants in profitable methods of producing *mashita* and ghee. The course was, therefore, aimed at imparting skills for improving the efficiency of producing *mashita* from milk, and the quality of *mashita* and ghee.

The course was designed to suit participants involved or interested in commercial production of *mashita* or processing it to ghee. A big majority of the participants (over 70%) were not involved in milk processing, and most of them did not know how to make or process *mashita* to ghee. Only the Nyakahita women's co-operative was actively involved in commercial production of *mashita* and ghee. After assessing the composition of the participants, the course outline was fine-tuned in order to compromise the different backgrounds, while still upholding the original and basic objectives.

Emphasis was placed on the method of producing *mashita* because it is the raw material from which ghee is locally produced. Besides, the quality of *mashita* is the single most important factor that influence the quality of ghee.

2. Course contents

Part I

- Introduction to Land O'Lakes, its objectives.
- *Mashita* defined and the difference between *mashita* and ghee explained.
- A review of *mashita* production in Uganda
- Discussion of the indigenous methods of making *mashita* and /or ghee.
- Importance of processing milk into *mashita* and/or ghee.

**Mashita* is an indigenous milk fat product produced by the churning of sour milk. The product differs from the conventional butter in its characteristic flavour. It is normally used for preparing hot dishes. If served with bread, its flavour is considered as rancid and undesirable.

Part II

- **Introduction to milk components**

Only major components such as water, carbohydrates (lactose), fat, protein, and minerals were mentioned. The importance of these components in the manufacture of various dairy products was also explained. For example:

Fat:- important in the manufacture of butter/*mashita*,

Protein:- important for the manufacture of cheese

Lactose:- its fermentation is important in the manufacture of various fermented milk products (gives flavour, modifies body and texture, and effects preservation)

- **Microbiological aspects**

The association of microorganisms, both positive and negative with milk was mentioned. The role of microorganisms in the production of flavour and texture of various fermented milk products, such as *mashita*, cheese and fermented milks was mentioned. The negative aspects of microorganism, i.e., the transmission of diseases and spoilage of milk and milk products was also mentioned. The importance of good hygienic practices was explained.

- **Description of methods for making mashita**

The various methods of making *mashita* were described. Through group participation, flow charts of the processes were drawn and the important processing parameters indicated.

Factors affecting the quality of *mashita* and ghee were discussed and, control points for quality assurance were indicated on the flow charts. The flow charts were displayed on the walls for constant referral throughout the course. Methods for making fermented milks were similarly described.

Methods of making products similar to *mashita* and ghee (Moroccan *Samna*, Ethiopian ghee, and Indian *desi* ghee) were described for purposes of comparison. Figures 1, 2 and 3, show the flow charts for the production of the Indian *desi* ghee, Ethiopian ghee and Moroccan *samna*, respectively. Figure 4 is the flow chart for the production of *mashita* and ghee in Uganda.

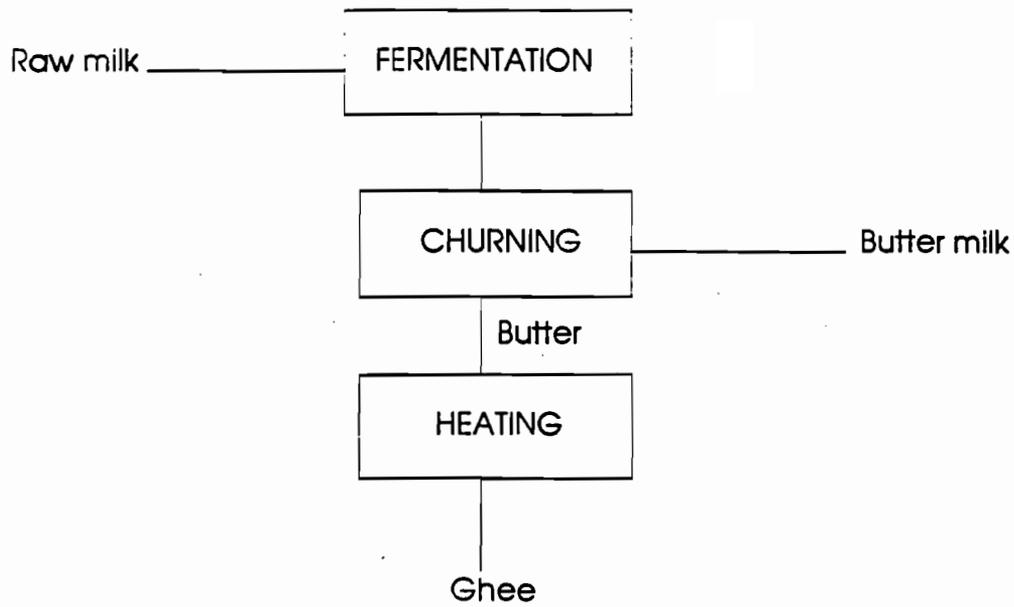


Figure 1: Flow chart for the production of Indian *desi* ghee

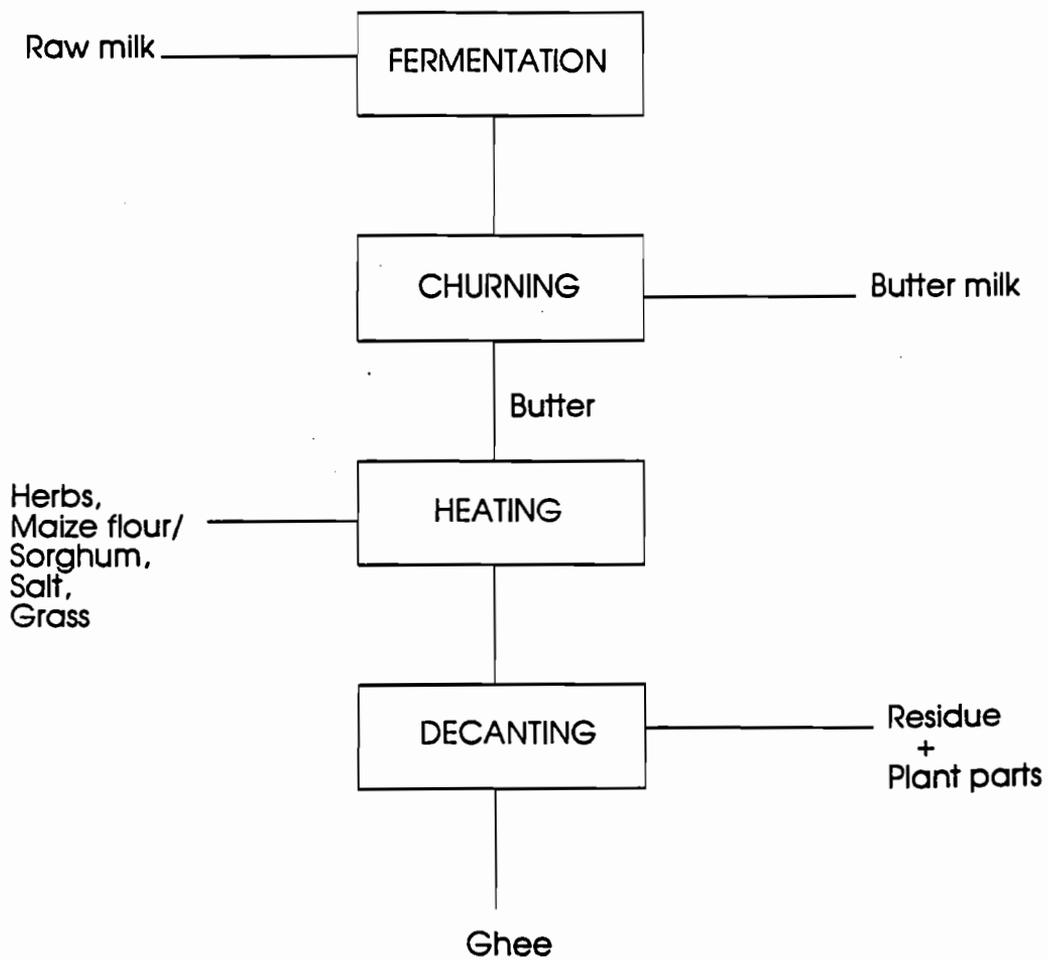


Figure 2: Flow chart for the production Ethiopian ghee

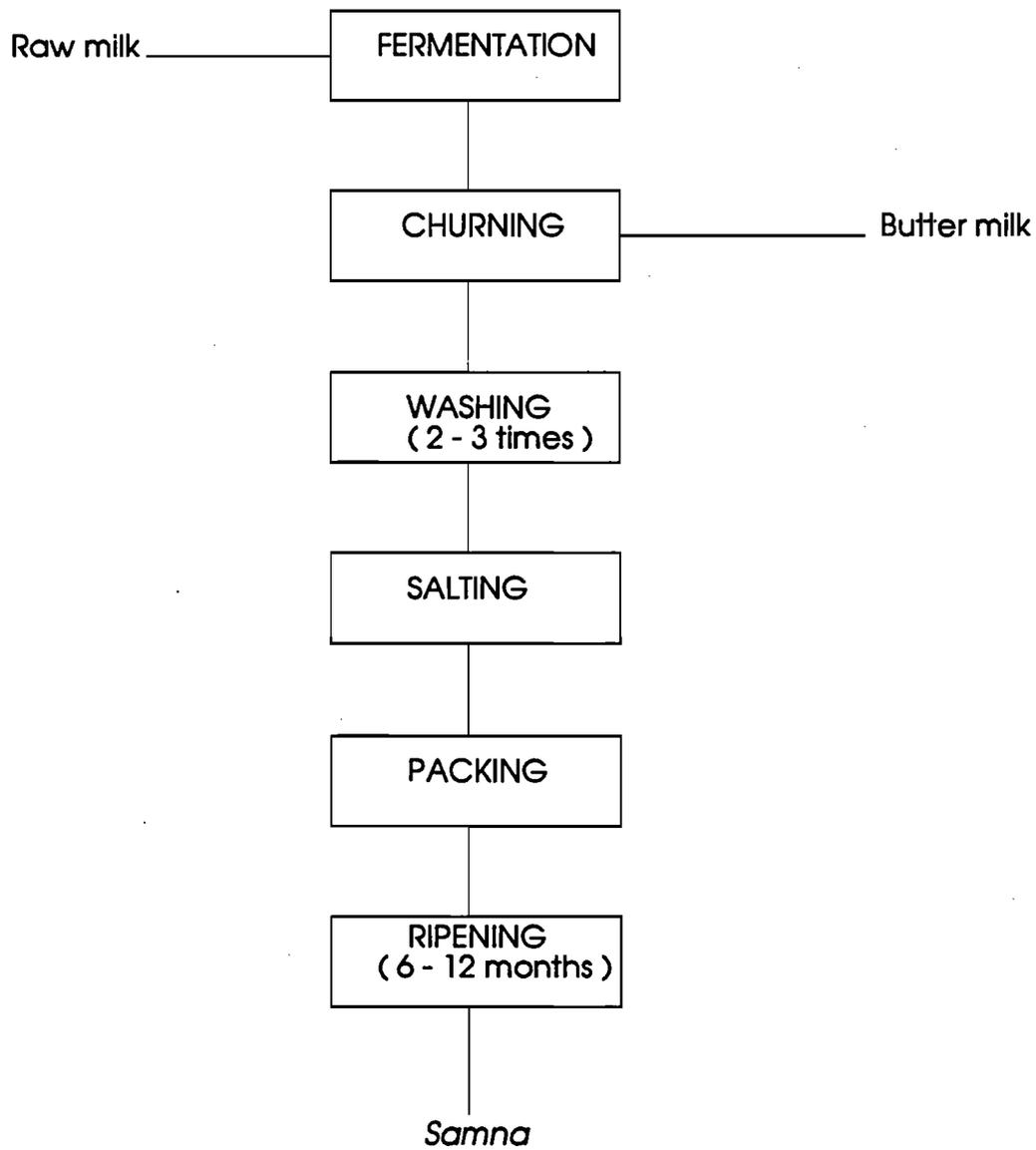


Figure 3: Flow chart for the production of Moroccan *samna*

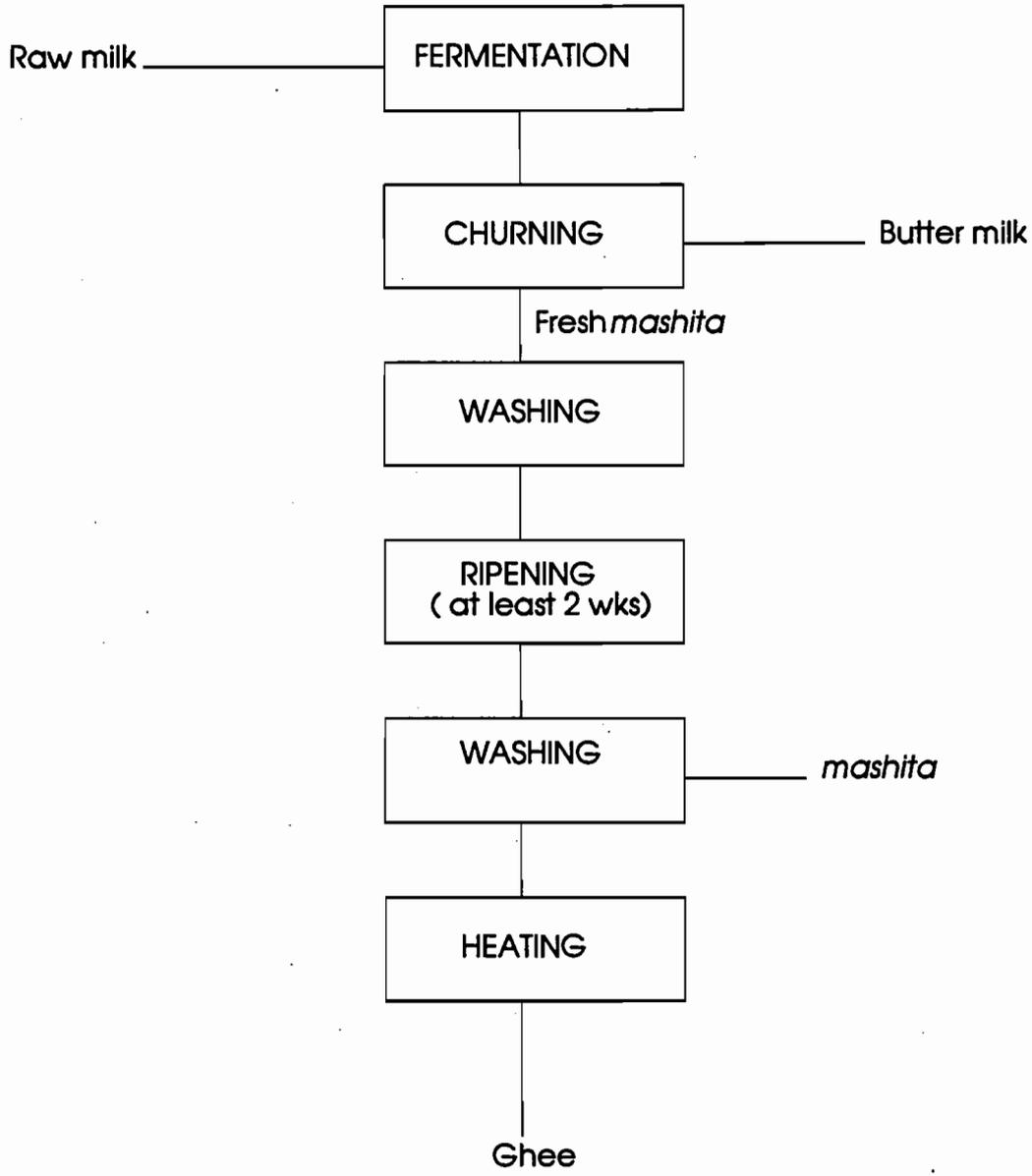


Figure 4: Flow chart for the production of ghee from *mashita* in Uganda

Part III

- *Hands on skills*

Making *mashita*:

In a practical session, participants prepared utensils and equipment for making *mashita*, separated cream from the milk (by gravity separation), inoculated it, and fermented it for 24 hours.

After the fermentation period, the milk was churned. The participants who were familiar with the traditional methods demonstrated the process to the rest. Figure 5a shows the utensils used for holding, fermenting and churning milk/cream to *Mashita*. Figure 5b, shows the participant not familiar with the churning process, trying it out after the demonstration.

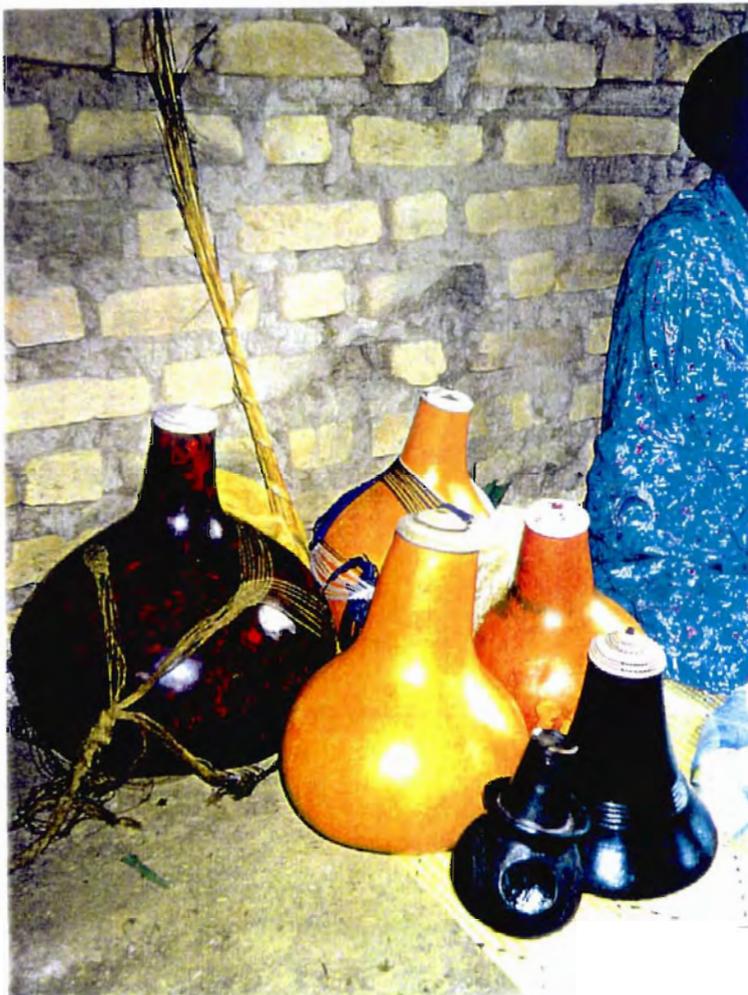


Fig. 5a: Utensils used for the holding, fermenting and churning milk/cream to *mashita*

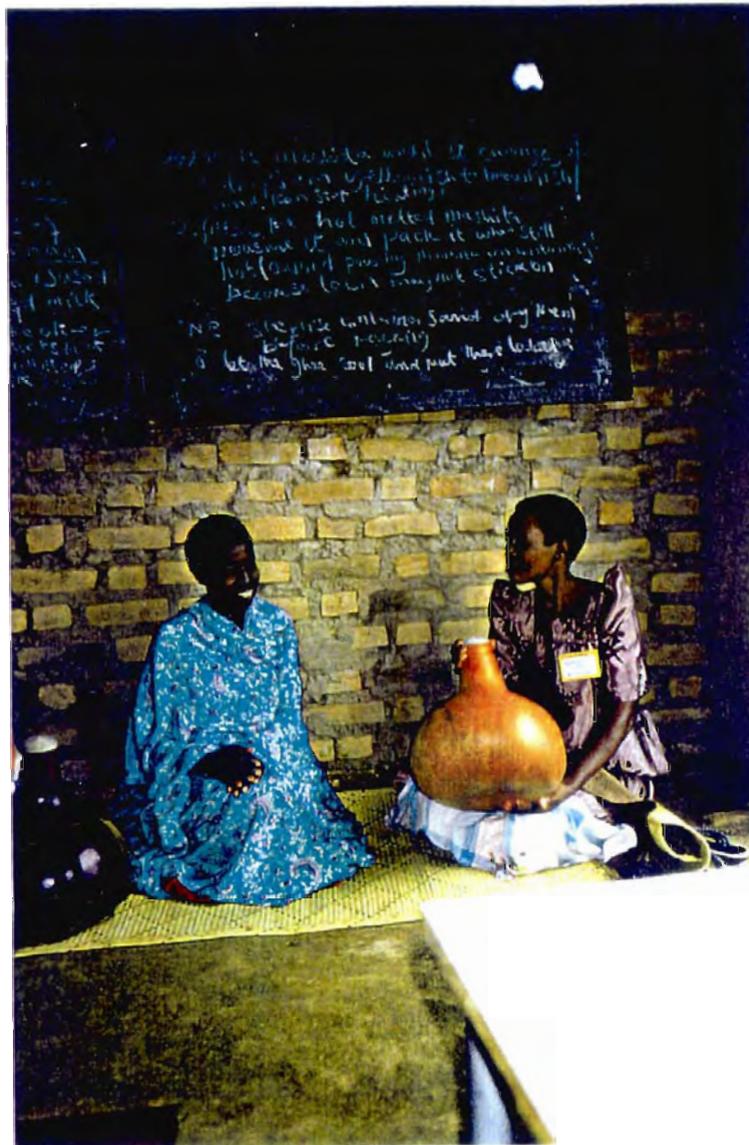


Fig. 5b: Participant who is not familiar with the churning process, tries it out after the demonstration

Since it was not possible to acquire the hand operated separator and churn, the process using such equipments was described with pictorial presentation. Figure 6 and 7. The possibilities of upgrading the indigenous method to use the more advanced tools such as the hand-operated milk separator and churn were mentioned.



Figure 6: An employee at the Kamuli farmers' co-operative dairy plant displaying a butter churn

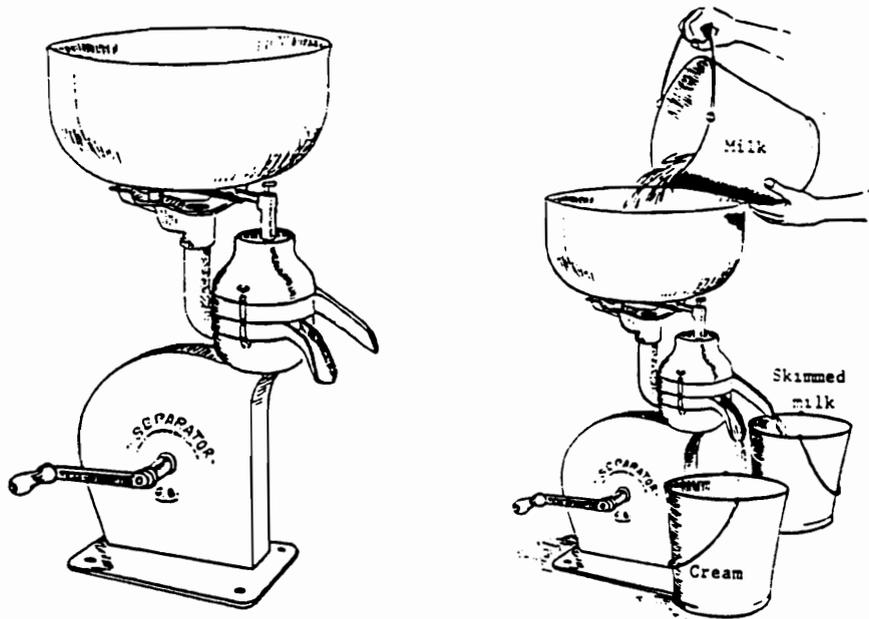


Figure 7: Milk separator*

* Adopted from FAO, Animal Production and Health Paper 69 (1988).

Making ghee:

The process of making ghee was demonstrated and factors affecting its quality explained. Figures 8a, b and c show some of the stages of processing *mashita* to ghee.

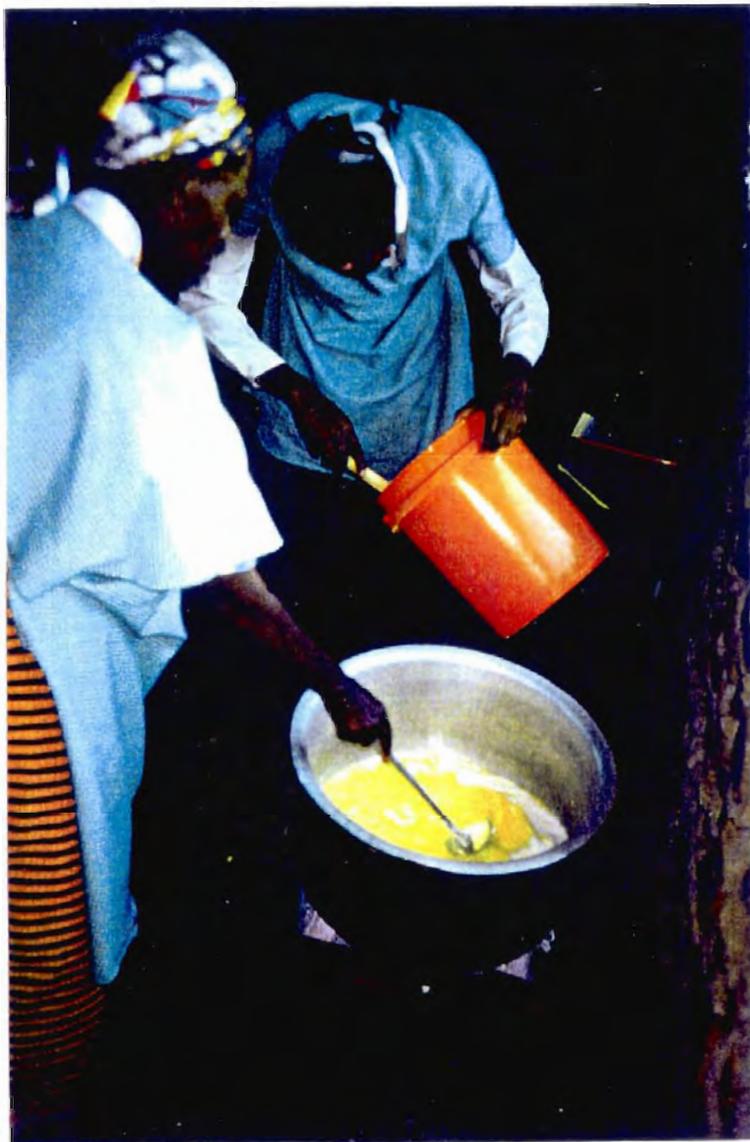


Figure 8a: Heat processing *mashita* to ghee.

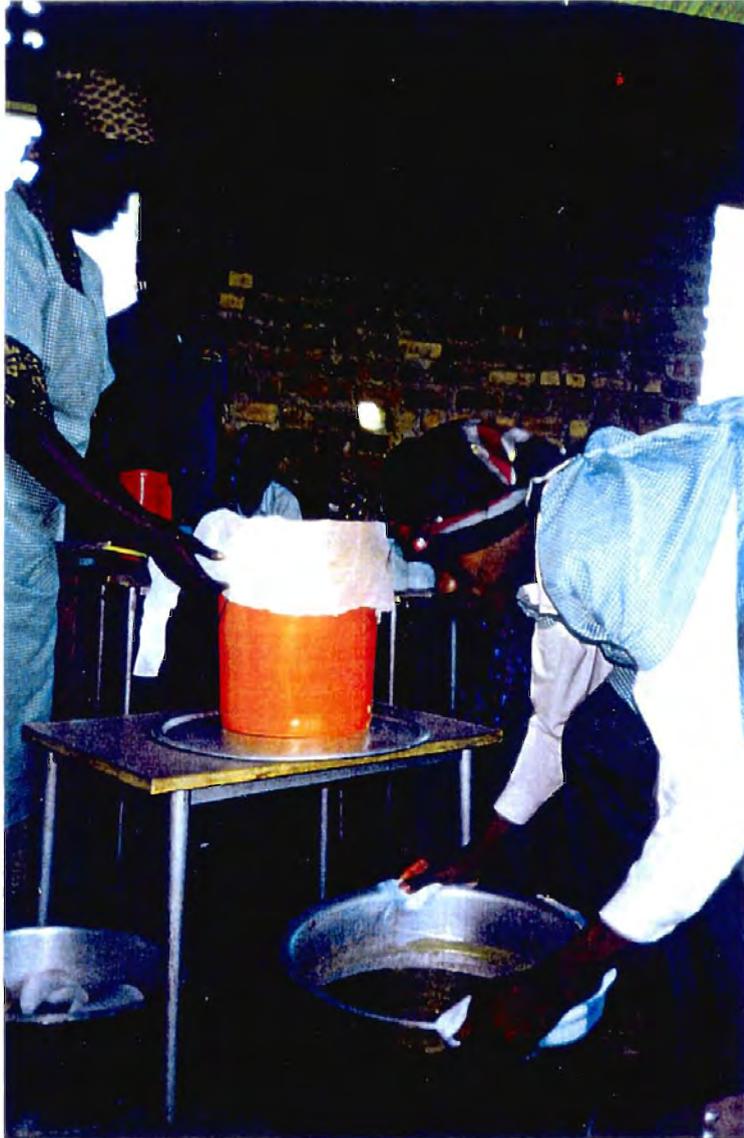


Figure 8b: Straining the ghee.

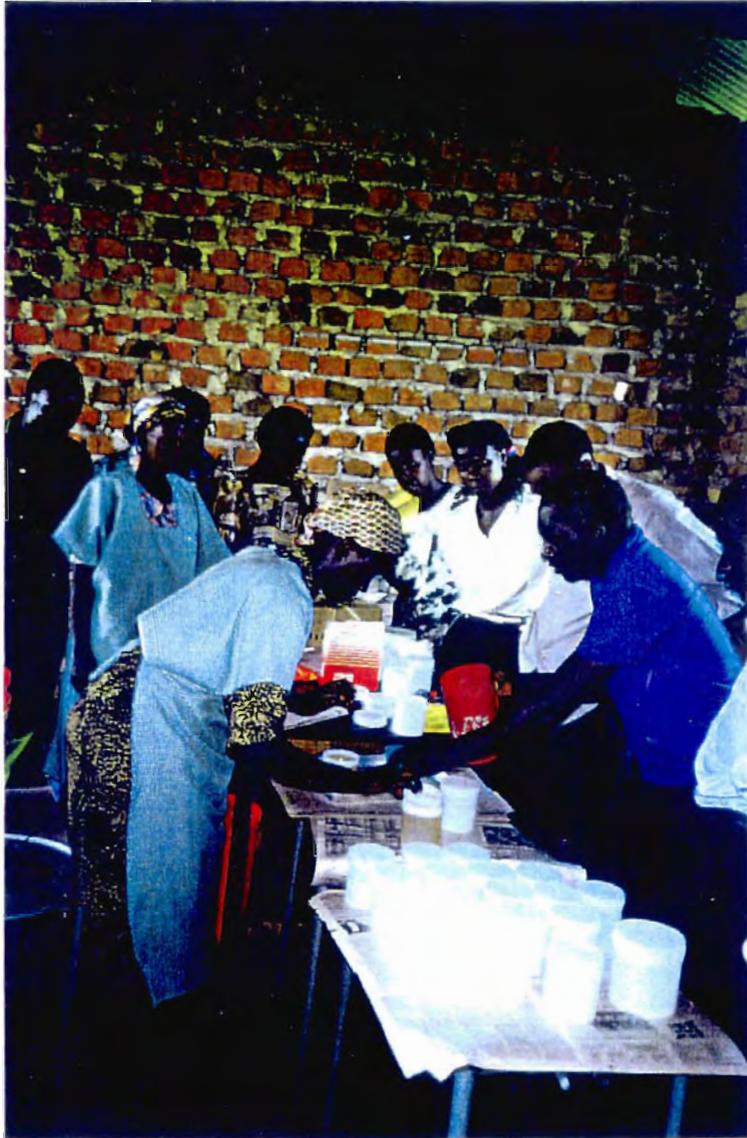


Figure 8c: Packaging the ghee.

4. Course evaluation

Participants were asked to evaluate the course by commenting on the seven aspects listed below: They were advised not to write down their names on the sheet of paper on which they made their comments.

1. Course contents
2. Relevance of the course
3. Training methods
4. Training materials (tools).
5. Trainer competency in handling the course
6. Adequacy of course duration
7. Language used.

The results of the evaluation were as follows:

Aspect of the course	Rating	Percentage of respondents
Course content	adequate	80
	fair	20
Relevance of the course	very relevant	80
	relevant	12
	not relevant	8
Training methods	excellent	40
	good	56
	poor	4
Training materials (tools)	excellent	28
	good	56
	fair	12
	no comment	4
Trainer competency	excellent	64
	good	32
	fair	4
Duration of course	just enough	88
	not enough	12
Language of instruction (preferred)	English	36
	Luganda	40
	Runyankole	8
	mixed vernacular	4

A good majority of participants rated the course as very relevant and the content as adequate. The training methods and tools were rated as good, while trainers' competency was rated as excellent, by the majority. Most of the participants thought that the duration of the course was just enough. English and Lunganda were almost equally rated as the preferred languages of instruction.

Some of the most notable remarks made by the participants, about the course, were the inclusion of more training tools, such as audio-visual aids and equipment for practical demonstrations. These items were conspicuously lacking and constrained the conduction of the course. Participants also recommended that more courses need to be offered in *mashita*/ghee processing.

5. The pasteurisation Unit

Kamuli Dairy Co-operative

We visited the Kamuli and Katikamu co-operatives to assess their needs for milk pasteurisation equipment.

At Kamuli we were received by a senior employee, responsible for production, and two executives of the co-operative society. We were shown around the factory after which we discussed the requirements for the pasteurisation equipment.

At the time of our visit, milk was pasteurised in cans immersed in a water bath heated directly by electric elements. This system was reported to consume a lot of electrical energy. The system was also quite old. Figure 9 shows one of such pasteurisers, and Figure 10 shows the troughs used for cooling the cans of pasteurised milk.

We proposed two alternatives for modifying the current pasteurisation process. The proposals were discussed with the engineer at his workshop.



Figure 9: Type of water bath used for pasteurising milk in cans at the Kamuli farmers' co-operative dairy plant.



Figure 10: Troughs used for cooling milk in cans.

Alternative 1: Jacketed pasteuriser.

We proposed a jacketed pasteuriser using water as the heating medium and electricity as the source of heat. The advantage of this system over the current one is that milk would be heated directly, held, and cooled in the same place. It would be possible to transfer the milk to the cooling tank using a pump connected to a suitable piping system. A simple construction of such a pasteuriser is shown in Figure 11. A tap is fitted to the pasteuriser to empty its contents, or a mechanism for tilting it is fitted in order to empty it.

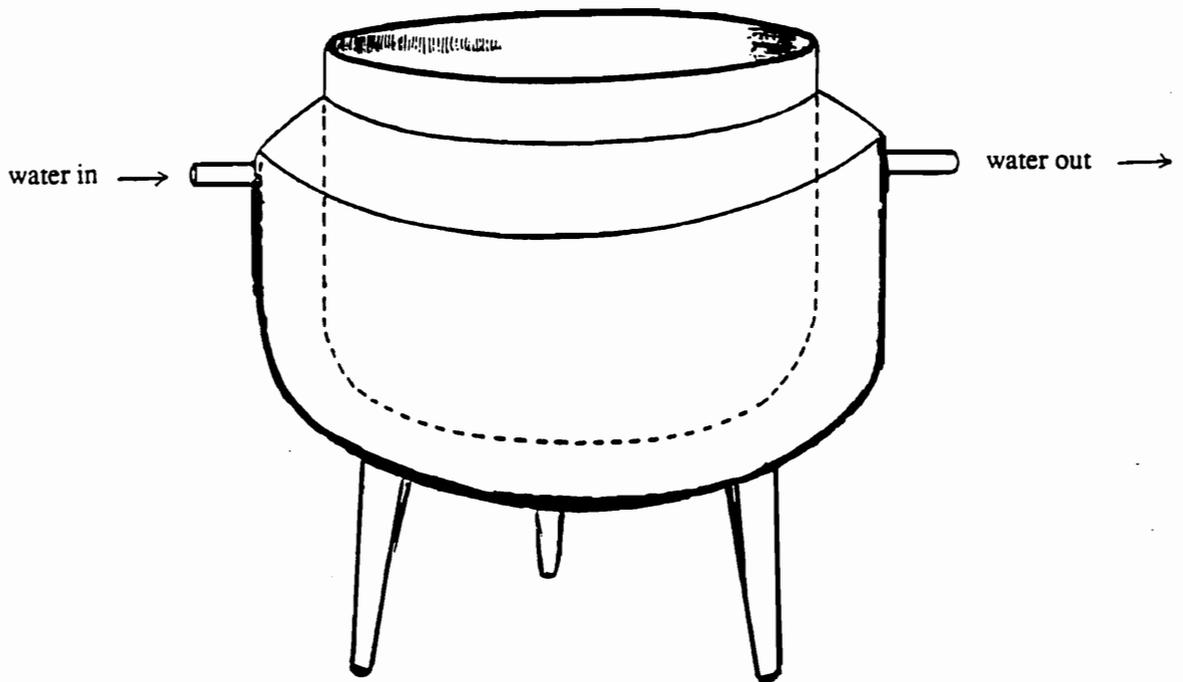


Figure 11: A jacketed pasteuriser

Alternative 2: Charcoal or fire wood stove.

This alternative was considered based on the fact that both charcoal and fire wood are readily available in the area, at least, in the short to medium term. It was also assumed that if this option is adapted, the co-operative will be able to generate enough capital to invest in the more permanent and environmentally friendly system in the medium term. It should be noted, however, that the proposed stove saves charcoal and firewood. This alternative was attractive to the executive of the co-operative because it was easily affordable. The stove could be built on the shade, which is already in existence, at the plant.

With this system, milk is heated in cans immersed in water baths. Forty litres of milk can heat to boiling within approximately 20 minutes. In the proposed system, up to four cans of milk (of 40 litres each) can be heated at ago. Cooling will still be done by immersing the cans in water baths. Figure 12 shows a fire wood/charcoal stove pasteurisation system for heating 4 cans of milk.

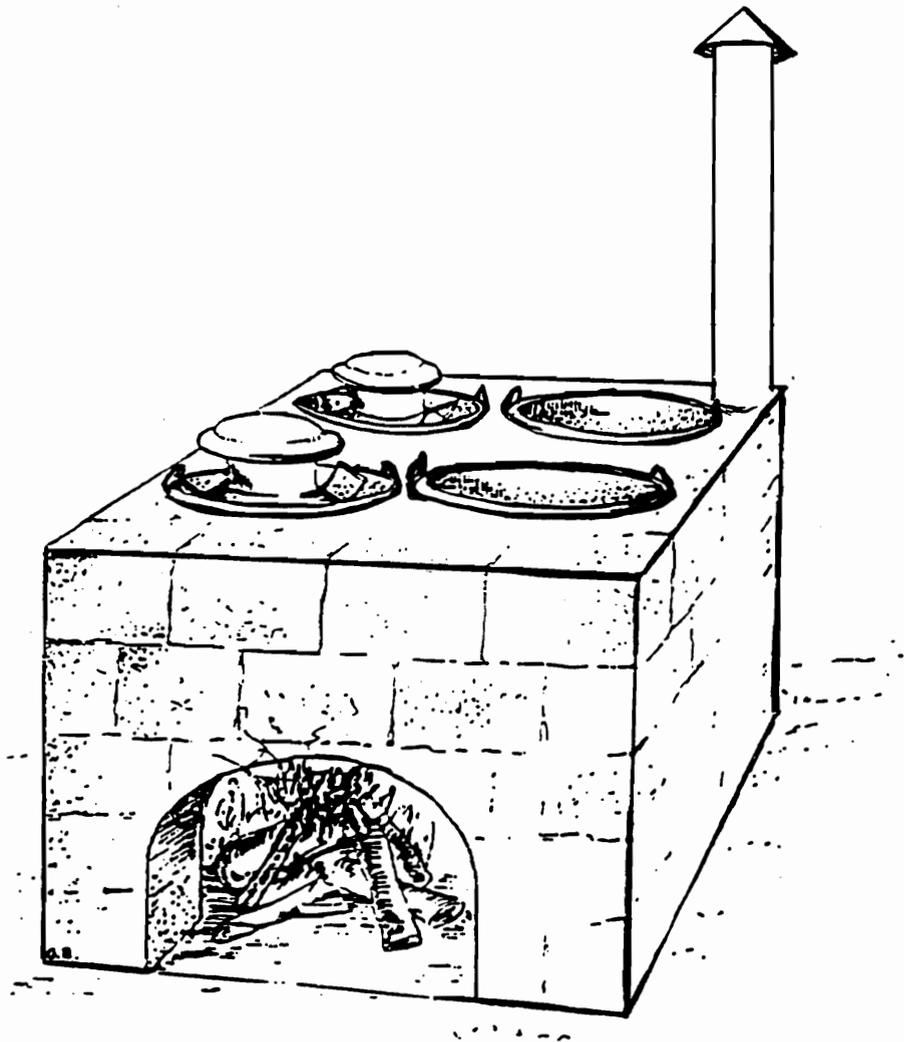


Figure 12: Firewood/charcoal stove for pasteurising milk

Katikamu Farmers' co-operative.

At the Katikamu farmers co-operative, in Luwero district, we visited the co-operative's milk shop. At the milk shop, milk is cooled in cans placed in a horizontal deep freezer. The temperature is controlled to avoid freezing the milk. The milk is sold in customer's own container or in plastic bags supplied at the shop. Currently, the milk is not pasteurised; it is just cooled and sold in the raw form.

The co-operative has a shell of a cooler, of which only the tank can be useful. The rest of the equipment was destroyed during the war. It is located in an unoccupied place away from the shop. It is not feasible to use this tank without further investment. The best alternative for this area, in the short term, is to use a fire wood or charcoal pasteurisation system until enough capital is generated to invest into a more advanced pasteurisation system. The system proposed under alternative 2 for Kamuli was proposed.

6. Comments on the choice of technology

It is important to recognise the kind of product demanded, and therefore the type and level of technology that should be developed to improve commercial ghee production in Uganda.

Two types of ghee are known in Uganda. The first type is made by processing ordinary butter. The second type is made by processing *mashita*, a milk fat product, whose production is based on indigenous methods. The particular techniques used for making *mashita* gives it the unique characteristics which distinguish it from the conventional butter. Its unique flavour and that of the ghee made from it, makes it a milk product in its own right. Whereas a hydrolytic rancidity is undesirable in the ordinary butter, at the right level, it is important for the full appreciation of the *mashita* flavour.

In Uganda consumers prefer *mashita* and/or the ghee made from it to the ghee made from ordinary butter. Unlike *mashita*, which is solely used for cooking, ordinary butter is preferably consumed on bread. Ordinary butter has been held as the standard against which the quality of *mashita* is judged. This is, certainly, a wrong approach because the two products are not the same and are not used in the same way.

The production of *mashita* is based on an indigenous starter culture (*enkamyo*) maintained and propagated through the culture enrichment technique. The kinds of microorganisms involved are not yet adequately known. It is for these reasons that it has been considered appropriate to report *mashita* as it is locally known.

In this course emphasis was laid on *mashita* production instead of ghee because the quality of ghee is, to a large extent, determined by the quality of *mashita* from which it is made. It is also true that many people prefer to consume the product as *mashita* but convert it to ghee to ensure safety, to effect preservation and to remove extraneous material and odours. Therefore improvement of the quality of *mashita* will not only improve that of the ghee that is made from it but also provide a more hygienic and shelf-stable *mashita*, ready for consumption.

We chose to go through the traditional method of making *mashita* pointing out the critical control points for product safety, and control points for process efficiency. The problem definitely arose due to the fact that the indigenous procedures are not standardised nor are the underlying factors affecting product quality clearly known. However, the solution round the problem was not to substitute *mashita* for ordinary butter for which the technology is known. It is possible to improve the efficiency of the indigenous method by substituting the purely mechanical processes such as cream separation and churning.

7. Recommendations

Judging from the participation in the course (see participant list), it is possible to note that the programme has been quite ambitious in reaching as many people as possible. This is a noble approach but there is a danger of thinly spreading resources which could limit the benefits accruing from the project and hence hamper its success.

In order to maximise benefits from the project, future training programmes should aim at establishing resource centres (centres of competency) where in country training could be conducted. The development of resource centres should target active co-operatives. The Nyakahita Women's Dairy could be developed as the centre for ghee/*mashita* processing while Liberty Dairy Co-operative could be developed for other dairy processes.

Nyakahita Women's Dairy should be facilitated by providing them with some hand-operated separators and churns. These equipment would be used for commercial production as well as for training other processors. It is important to recognise the fact that *mashita* production is a century old practice which has been passed over from generation to generation. The guardian of this art in Uganda are the Bahima people to whom the Nyakahita group belongs.

With such an arrangement, and with the Nyakahita group participating in training others, more regular courses could be held to benefit other co-operative groups.

To ensure sustainable development in commercial production of *mashita* and ghee, Land O'Lakes might find it useful to participate in the field experimentation of the developed starter cultures and optimised methods for the production of *mashita*. Work in this area is currently being done, jointly, between the departments of Food Science at, Makerere University and the Agricultural University of Norway.

Appendix 1: List of participants

The course in Ghee making was conducted between the May 7, 1995 and May 13, 1995 at Nyakahita subcounty in Nyabushozi county of Mbarara district. It attracted 30 participants from 9 co-operatives as follows:

1. Nabatanzi Harriet	-	Kashari Mutonto	F
2. Kyeyune Sam	-	Katikamu Dairy Coop.	M
3. Lwanga Harriet	-	'	F
4. Kato Ketu	-	MIHV	F
5. Bukanya Mary	-	MIHV	F
6. Sister Claudia	-	Kyabirikwa Convent	F
7. Jolly Kyomugisha	-	MIHV	F
8. Okum Baraza	-	Kyabirikwa Convent	M
9. Nakitende Gladys	-	Maddu Dairy Coop.	F
10. Serungaya Cissy	-	'	F
11. Musinguzi Francis	-	Nyakahita W. Dairy	M
12. Byentaro Esther	-	'	F
13. Mugume Ngoma	-	'	M
14. Kasigaho Winfred	-	'	F
15. Ahimbisibwe Miriam	-	Byanamira D. Coop.	F
16. Kyomusheraba Joy	-	Nyakahita W. Dairy	F
17. Bakayirwanda Joy	-	'	F
18. Kemiyanja Joy Enid	-	'	F
19. Kiconco Getu	-	'	F
20. Kadaga Madali	-	Kamuli Dairy Coop.	F
21. Alari Muhirwa	-	Maddu Dairy Coop.	M
22. Howard Bakkoja	-	Liberty Dairy Coop.	M
23. Alex Mukasa	-	'	M
24. Petronia Babirye	-	Kakooge Dairy Coop.	F
25. Wandera Mega	-	'	F
26. Harriet Kunya	-	Iganga W. Dairy	F
27. Lupanpa Nightngale	-	'	F
28. Ninsiima Sam	-	Maddu Dairy Coop.	M
29. Bakunda William	-	Kashari Mutonto	M
30. Kamadirisa Joy	-	Nyakahita W. Dairy	F

The Gender balance was Male (M) - 10, Female (F) - 20.

Appendix 2: Course objectives and outline

Course objectives

1. To impart skills for improving the recovery of fat from the milk.
2. To teach the participants how to profitably utilise the milk (for making *mashita*).
3. Impart skills for improving the quality of the *mashita*/ghee

The course will include the following topics.

1. Introduction to milk

Objectives:

- To introduce the components of milk (gross composition).
- To introduce the principles of milk hygiene, milk spoilage agents and factors affecting milk spoilage.
- To introduce principles of quality assurance

Instruction materials:

- Clip charts, transparencies for overhead projector (depending on availability of electricity), pictures, photographs, wall charts, e.t.c.

Methods of instruction:

The instructor will introduce the topic and lead the discussion. Theoretical facts will be given in the simplest form possible and, by making reference to known practical facts. Participants will be allowed to contribute by stating what they know about the subject. **The classroom-teacher-student approach will be avoided as much as possible. Group participation will be encouraged.**

2. Description of methods for the manufacture of *mashita*.

Objectives:

- To describe the method for making *mashita*.
 - . Make flow diagram.
 - . Determine control points (CPs) for quality assurance.
 - . Determine critical control points (CCPs) for assuring safety.
 - . Calculate theoretical yield.

- To describe the method for making fermented milk.
 - . Make flow diagram.
 - . Determine CPs and CPPs of the process.
 - . Compare the indigenous method with the controlled fermentation method.

Instruction materials:

Clip charts, transparencies for overhead projector, wall picture, photographs, pocket calculators, e.t.c.

Methods of instruction:

- Group participation in discussions, drawing of flow diagrams and, determining of CPs and CCPs of the processes.
- Trip to one of the participants' home to see the facilities for making *mashita*.
This trip will be used as the basis for discussing the indigenous household technology.

3. Hands on skills.

Objectives:

- Make *mashita*/ghee from sour milk and cream using different methods and compare economic efficiency and product acceptability.
- Make fermented skimmed milk

Instruction materials:

Clip charts, transparencies for overhead projector (depending on availability of electricity), indigenous household vessels and equipment for making *mashita*, hand-operated milk separator and butter churn, charcoal stove or electric plate heater, thermometers, e.t.c.

Methods of instruction:

- Group participation.
- Participants will divide, at least, into 3 groups to make 5 batches of *mashita* based on a predetermined scheme (but to be modified collectively by the instructor and the participants), and one batch of fermented milk.

4. Principles of starter culture control and management.

Instruction materials:

- Clip charts and transparencies for overhead projector.

Method of instruction:

- Group participation. The instructor will introduce the subject and lead the discussion.

End of course status:

At the end of the course, the participants will be expected:

1. To have gained skills in maximising fat recovery from milk using any of the methods covered in the course.
2. To have gained knowledge of the existing possibilities for profitably utilising the milk at the level of technology covered during the course.
3. To have gained knowledge about ways of improving the organoleptic quality and safety of *mashita* and fermented milk.
4. To make logical decisions about increasing the profitability of their businesses by adapting the appropriate manufacturing alternative(s).
5. To have gained a quality consciousness for hygienic handling of milk and milk products.

IMPACTS

15/7/95

KAMULI DAIRY COOPERATIVE

We visited Kamuli Dairy Cooperative on 15/7/95 to assess the management levels attained by farmers. Kamuli areas lies in the Eastern side of Uganda. The people of the area are subsistence farmers who have been keeping local animals with little input and output from them.

Farmers visited

a) Mrs. Dorothy Kamiro

Background

Before Land O' Lakes interventions, Mr. and Mrs. Kamiro were keeping local animals and were growing food crops in the following ways:-

- * They grazed their animals anywhere where there was pasture i.e. along the road side, in swamps etc. they hired a herdsman to do this.
- * Calves were tethered on their land by the husband. (Mr. Kamiro but not the wife or the children)
- * Sometimes, the local animal were tethered around the home. They could get loose and destroy crops.
- * Animals were rarely watered and were rarely given salt.
- * Spraying against ticks, treatment of sick animals, deworming etc were not done.
- * Animals had no shelter at all. They stayed in a small enclosure that became muddy during the rainy season.
- * The wife and children did not do anything concerning cattle because they considered cattle keeping to be a man's job.
- * Breeding of animal was not considered important since they could use any bull for breeding.
- * Supplementation of animals with agricultural wastes was rarely done and whenever it was done it was not effective since the supplements were just dumped in the small muddy filthy enclosure.
- * Record keeping and the use of artificial insemination as a breeding tool were not considered important.
- * The house wife Mrs. Kamiro owned nothing as it is the tradition of the area.
- * The integration of crops with animals was not at all considered i.e. the use of manure for increased crop yield was not at all considered.
- * Mr. & Mrs. Kamiro had no unifying or binding economic activity with other farmers in the area.

Improvements done

When participants of Land O' Lakes in Kamuli Dairy Farmers Coop.

started teaching and enlightening people the need to change Mr. Kamiro and family accepted to change from the uneconomical subsistence farming to some what economical paying dairy farming in an integrated way.

Changes have been observed in the following areas:-

1) Family's attitude towards farming

- * After Land O' Lakes training courses, Mr. Kamiro changed his traditional beliefs that a wife should not own any property by letting his wife own a cow. Now the cow belongs to Mrs. Dorothy Kamiro. Due to this, she (Mrs Kamiro) and all the members of the family look after the animal. They don't employ herdsmen and more.
- * The family now looks at their exotic animal with nutritional and commercial values i.e. they expect this animal to provide milk for the family and for selling while at the same time its manure has already made rapid improvement by increasing crop yield hence more food in the family.
- * Mrs. Kamiro told us that before Land O' Lakes interventions she did not know the need to feed well. But when she was taught that she had to feed the family well before considering other things. She has started to practice balanced diet as a priority.
- * Mrs. Kamiro's traditional attitude has also changed. She told us that before she attended courses at Kamuli, she did not consider financing or contributing school fees to her children. Now she says that sales from the milk will enable their children get more education.

2) Animal housing and related structures

After attending courses at Kamuli Farmers Dairy Coop, Mrs. Kamiro constructed a zero grazing unit for 3 cows, 2 calves, and a crush. She used locally available materials. Kamuli Cooperative staff who had attended Dairy production course, gave her the plans and the required technical assistance.

3) Calf feeding

Mrs. Kamiro's cow has not calved yet (it will calve at the end of next months) but she has the following plans for feeding her calf.

- * She will bucket feed the calf.
- * She will feed calves on fermented colostrum so that she saves some money.
- * She will call in a knowledgeable staff at Kamuli Dairy Coop to show her how to mix feeds for the calves.
- * She will always give the calf water.
- * She will give calves grass legume mixture and give them mineral salt supplements.

4) Family income

Mrs. Kamiro says that the income of her family will increase because of the following:-

- * Due to family involvement, the money that would have been used for paying for the herdsman's salary will be saved.
- * She hopes to start vegetable growing for her family and for sale. She will not be buying any more vegetable thereby saving some money and she will be at the same time selling some vegetables thus earning more money.
- * She hopes to increase the size of her matooke garden for sale now that she is sure that matooke can grow in Kamuli. Before Land O' Lakes courses, she was of the view that matooke cannot grow in this area. She had started with 20 stems of matooke and were doing well.

5) Breeding of animals

Mrs. Kamiro says that she will strictly use artificial insemination.

6) Disease and parasite control

Unlike in the past, Mrs. Kamiro is now observing strict disease control in the following ways:-

- * A veterinarian periodically visits the farm to check on the animals.
- * Tick control is very well observed by spraying the animals against ticks twice a week (during rainy season) and once a week during the dry season. Supona Extra acaricide is used.
- * Deworming of animals is periodically done.

7) Soil conservation

Mrs Kamiro has started practicing soil conservation methods. She mulches her matooke (banana) plantation and uses manure for crops. She hopes to use excess nappier grass for mulching. She will practice crop rotation.

8) Integration of crops with animals

Mrs. Kamiro has started looking at farming as an integrated activity. She has started to use manure for increased crop yield and fodder yield. She will use maize and soya bean from her garden to mix feeds for the animals and she will use manure for increased maize and soya bean yield.

9) Fodder growing and conservation

So far, Mrs. Kamiro has grown enough fodder for her animal. She has grown nappier grass (1½ acres) laba - lab, centrosema, sirato

and other legumes. However, she has not conserved fodder for use in dry season yet. She hopes to work with other farmers in the future to make silage.

10. Record keeping

Mrs. Kamiro keeps all records for her animals. However, she keeps them in ordinary exercise book which are likely to be lost, to wear out quickly or to get torn easily.

11. Practical cooperation with other farmers

Practically, Mrs. Kamiro is cooperating with other farmers in some activities e.g. at one time, her cow suffered from East Coast fever (*Theileria parva*) and had to get the medicine from her friend. When this friend of hers had no acaricide for her cows, Mrs. Kamiro helped her. Mrs. Kamiro greatly appreciated this spirit of cooperation and considers it as one of the achievements because before the courses she considered anybody doing a similar job as hers a competitor. She now considers her fellow farmers as facilitators.

12. Additional income generating activities

Mrs. Kamiro hopes to start commercial vegetable growing. She has started to grow matooke (banana) for home use and for sale.

13. Animal nutrition

- * Mrs. Kamiro feeds her animal on grass legume mixture.
- * She gives it water but the water trough is small.
- * She supplements her animal with sweet potatoes, vines and matooke peelings.
- * She gives mineral brick lick to her animal all the time.
- * She will start giving it dairy meal four weeks before it calves.

14. Short comings at Mrs. Kamiro's farm

- * She keeps dogs and goats but has not been spraying them and have been the source of ticks.
- * Records are very well written but are kept in books that can easily be torn or lost i.e. exercise books.
- * she has no drying tray where she can hang utensils for drying them.
- * Manure pit on the zero grazing unit is lacking.
- * Only part of the zero grazing unit has concrete.
- * The animal was not given intramammary tubes to lower mastitis incidence.

15. Advise given

- 1) Should spray, deworm and treat all the animals on the farm.
- 2) Should construct drying trays for her utensils.
- 3) Should make manure pits.
- 4) Should apply intramammary tube to the udder of her animal immediately i.e. one tube per quarter.
- 5) Should keep record in proper books i.e. black-hard-cover books.
- 6) Should complete the zero grazing unit.

16. Requests/complaints by Mrs. Kamiro

Mrs. Kamiro requests that more books in Luganda should be availed to them. She says that because these books are a few and on a high demand by almost everybody, they don't get them for enough time.

17. Condition of the animal

The incalf heifer is in good condition and shape.

B) Mr. Patrick Ndegeya and Mrs. Robinah Ndegeya's farm

This farm is located at Butende village in Kamuli district a few miles from Kamuli town in Kamuli district.

Before Land O' Lakes intervention, the owners kept 4 local cows and grew some food crops such as sweet potato, cassava, maize etc for home use and coffee as cash crop.

They used to do their activities in the following ways:-

- * A herdsman used to graze the animals wherever there was pasture. These animals were not getting enough to eat especially during the dry season.
- * Mortality rates in calves was high.
- * Treatment of animals was not done nor was spraying of animals against ticks done.
- * Animals had no shelter at all. They stayed in a small muddy filthy enclosure.
- * The family was not at all involved in animal rearing. It was the herdsman who opened for the animals in the morning and enclosed them during the animal. He could then milk them (if at all they had milk). Even Mr. Ndegeya admits that he spent little time to care for the animals.
- * Animals were only watered when the herdsman thought it fit or suitable.

- * Breeding was not controlled at all since all village animals grazed together, any bull could mate with any cow.
- * There were no equipments such as water and feed troughs for the animals on the farm.
- * No record was kept for the animals.
- * Very little milk was consumed by the family.
- * There was no link between animal crops and the land i.e manure was not used for increased crop yield. It was not considered valuable.
- * There was no cooperation between local cattle keepers of the area.
- * Mr. Ndegeya wanted to get many animals to gain more status among fellow men.

Improvements done so far

After attending seminars which were conducted by Kamuli Dairy Cooperative staffs that had attended Land O' Lakes Inc. courses, Mr. & Mrs. Ndegeya made the following improvements.

Family's attitude towards farming

- * Seminars and frequent visits by Kamuli Dairy cooperative staffs made Mr. & Mrs Ndegeya to realise the need to change from traditional and primitive outlook to some how acceptable position, they decided to work together.
- * They sold all the local animals and bought the exotic animal that produces more milk for sale. They are now benefiting by getting milk for home use and money from milk sales.
- * Mrs. Ndegeya informed us that one achievements so far is the fact that income from milk is known by both husband and wife and that they can now make a budget for the family. Before the course, it was the husbands who could decide what to do with the money.

2. Animal housing and related structures

Mr. & Mrs. Ndegeya have constructed a zero grazing unit for 3 cows, 2 calves and with a crush attached. The zero grazing unit has a manure pit attached on it. It has a cemented floor. Before, they had nothing.

- * One cow which has just calved a bull calf is kept in it.
- * Plans and technical assistance were got from members of Kamuli Dairy farmers Cooperative who attended Land O' Lakes course.

3. Calf feeding and management .

- * They are bucket feeding their calf. Before, they were letting calves to suckle their mothers.

- * They did not feed the calf on fermented colostrum but have plans to do it in the future.
- * A calf is given water and a clean comfortable bedding.
- * She hopes to give the calf, calf starter and salt supplements.
- * She intends to give her calf nappier grass and lab-lab grass mixture.

4. Family income

Already, the family income has increased from the sale of milk. Before they bought the high yielding animal which gives 12 litres in the morning and 7 in the evening, they were not selling milk at all. Currently, they are selling all morning milk and are using all the evening milk.

- * The money that was used for paying the herdsman is now saved.
- * Manure is being applied on matooke plants and the outcome is promising. This will lead to reduced expenditures on food in the future. Some matooke will be sold hence more income.
- * Manure will be used for growing vegetables for sale hence increased income for the family.

5. Breeding of animals

They will always use artificial insemination as a breeding tool.

6. Disease and parasite control

- * The animal received all the necessary vaccines as required. In the past, they were not vaccinating their animals.
- * A veterinarian checks on the animals periodically.
- * Tick control is done by applying spot on acaricide. Before, there was no spraying at all.
- * Deworming is periodically done.

7. Soil conservation

Mr. & Mrs. Ndegeya are carrying an intensive soil conservation activities. Manure from the zero grazing unit is put back in matooke and nappier grass gardens.

However, the method of application in matooke plantations is poorly done.

- * Some of the nappier grass is used for mulching.

8. Integration of crops with animals

Mr. & Mrs. Ndegeya's farm has attained a status of an integrated dairy farm.

- * Manure from the zero grazing unit is put back to the soil for

~~for~~ increased fodder and food crop yield.

9. Fodder growing and conservation

- * Mr. & Mrs. Ndegeya have grown 1½ acres of nappier grass and has some plots of lab-lab, sirato, centrosema.
- * They do not conserve pasture for dry season.
- * They are planning to make silage.

10. Record keeping

All records are very well kept in proper books.

11. Cooperation with other farmers

Mr. & Mrs. Ndegeya are working hand in hand with other dairy farmers in the area. They visit each other and exchange knowledge.

12. Additional income generating activities

- * Some of the matooke will be sold to bring more money in the family.

13. Animal nutrition

- * A mixture of legume and grass is given to animals daily but the legumes amounts are comparatively low.
- * Water was enough but it is put in a weak plastic trough.

14. Short coming on the farm

- * Poor application of manure in matooke garden.
- * Improper thinning of matooke plants.
- * Poor legume grass mixture.
- * Weak water troughs
- * Some nappier gardens were not properly manured
- * No fodder conservation is done to carter for the dry season

15. Advice given

- 1) Mr. Bakojja showed them practically how manure is applied in matooke.
- 2) Mr. Bakojja showed them how thinning of matooke plant is done and the reasons why.
- 3) They were advised to buy a 44 gallon empty oil drum and cut it into pieces, cement the two pieces and use them instead of the weak plastic basin.
- 4) They were advised to apply manure on nappier grass periodically.
- 5) Should make silage because this area is greatly affected by a drought.

16. Family involvement in the farm

Unlike the past where the cows were reared by the herdsmen, now it every family member's work and duty to look after the animals.

17. Conditions of the animal

The animal and its calf were in good conditions revealing the contributions of improved management.

18. Requests/comments/complaints

Mr and Mrs. Ndegeya requested for more books in Luganda. They appreciated the method of availing them information in a language they understand.

C) Babirye Mikenga Perusi's farm

Location - Butende - Kamuli

Background information

- * Nabirye's farm has fenced paddocks and natural pastures. Before Land O' Lakes Inc. courses, this lady was keeping her animals in paddocked area.
- * She owns 3 cows, 3 heifers calves and one bull calf. All these are crosses. She has been using artificial insemination all along.
- * Before the courses she was wasting all the colostrum.
- * She was not supplementing her animals with dairy meal.
- * All animals were in fenced paddock
- * Milk yield of the animals was very low
- * Animals had no shelter in the past
- * Natural pastures were used for grazing animals i.e. no planting of pasture was done.

Improvements so far

After Land O' Lakes Inc seminars, Mrs. Mikenga has made the following changes.

- * She has put one animal on zero grazing unit and observed that this animal does not fall sick as frequent as those in paddocked area.
- * She started using bucket feeding.
- * She had started using fermented colostrum
- * She is going to mix feeds for her animals
- * She has collected several grass seeds e.g. brachiria ssp, setaria ssp, chrolis ssp. which she is going to plant in her paddocks.
- * She has grown enough nappier and legumes for her animals.

- * She now grows vegetables for home use and for sale i.e. she grows garden egg (egg plants), tomatoes, amaranth~~thus~~ etc.

2. Animal housing and related structures

- * There is a building that was converted into a zero grazing unit.
- * There is a good calf pen
- * There is a crush

3. Calf feeding

- * By the time we arrived, one cow ^{hand} had calved
- * Mrs Mikenda has started to make fermented colostrum
- * she will bucket feed her calves
- * She will give ^{calves} ~~it~~ legume grass mixture. Formally she was giving ^{them} ~~it~~ grass alone.

4. Family income

- * The family income will definitely increase. There is an increase in milk production of zero grazed animals as compared to those on paddocked area.
- * Increased use of manure for vegetable growing will lead to more income to the family.

5. Family attitude and involvement

All members of Mikenga's family are involved in managing the farm. They take it to be a commercial undertaking.

6. Breeding of animal

All along Mrs. Mikenga has been using artificial insemination as a breeding tool and will continue to do so.

7. Disease and parasite control

- * She sprays her animals twice a week during the rainy season and once a week during the dry season. She uses Supona Extra Acaricide.
- * After attending Kamuli Dairy Cooperative courses Mrs. Mikenga changed her attitude towards disease control. Before, she was waiting until her animals could fall sick and then call a Veterinarian. When she was told the values of periodic checking of the animals, she changed and a veterinarian periodically checks on her animals.
- * She has improved the vaccination programme of his animal by vaccinating the animals at the right time.

8. Soil Conservation

- * Mrs. Mikenga carries out strict soil conservation activities. she has

developed a labour saving system whereby instead of piling up the cow dung and urine in one pit, she carries the materials to the site where she is going to apply them. Then she makes shallow pits and leaves manure to rot. This saves her labour. She developed this method after attending courses concerning soil conservation in Kamuli. Before, she hardly used manure on her crops.

- * She mulches her matooke garden.
- * She puts manure in nappier grass and vegetable gardens.

9. Integration of crops with animals

- * Before getting training, Mrs. Mikenga did not see the need to supplement her animals with mixed feeds. When she was taught proper feeding of animals, she grew maize and soya bean. She has just harvested them and will soon roast soya bean, grind it and will also grind maize which he will use to mix dairy meal and calf starter rations.
- * Manure from the cows is used for increased crop yield for feeding animals and people in the family.

10. Fodder growing and conservation

- * Mrs. Mikenga has grown a lot of nappier and lab-lab i.e. 2 acres of nappier and 1/4 acre of legumes. She has also grown fodder trees.
- * Mrs. Mikenga is collecting pasture seeds for planting in her paddock. She has collected the following seeds by the time we visited her.
 - Chloris (ssp) 3kg
 - Brachiaria (Spp) 3kg
 - Setaria (Spp) 2kg

She started doing this after attending courses conducted by Land O' Lakes participants of Kamuli Dairy Cooperative.

11. Additional income generating activities

- * Mrs. Mikenga has started growing vegetables for increased family income. She told us that she was told to use manure economically. So she has started to grow vegetable and matooke (banana) for sale and uses manure to increase their yield.

12. Record keeping

- * Mrs. Mikenga has an excellent record keeping system. Her records are neatly kept. She records all the activities and events that occur on her farm. She interprets them and acts accordingly.

13. Family involvement

- * After the course, Mrs. Mikenga changed her attitude towards labour. She was all along employing a herdsman. But after attending the courses, members of the family do all the work on the farm.

14. Cooperation with other farmers

- * Mrs. Mikenga is doing a good job. She has started to conduct seminars for members of her area and has changed some.

15. Animal nutrition

- * After attending courses, Mrs. Mikenga made the following improvements
 - She supplement her animals with mineral salt lick
 - She feeds her animal with nappier grass-legume mixture
 - She is making a protected shallow well so that she gets a reliable source of water for her animal. This area is severely affected by a drought.
 - She has learnt how to make hay and has plans to make some in the future.
 - She is soon mixing feeds for her animals to be used as a supplement.

16. Condition of the animals

The animals were in good shape and were healthy

17. Requests/comments/complaints

Mrs. Mikenga made the following requests:

- * She requested Land O' Lakes staff to visit them periodically
- * She requested Land O' Lakes staff to conduct seminars with farmers of Kamuli.
- * She complained that the number of women attending the courses at Kampala was low. But she was told that earlier women had not shown interest in the course.

18. Short comings

- * Has not been giving animals intramammary tubes during the dry season.
- * The manure pit is too near the house

19. Advice given

- * Should apply intramammary to animals at the end of the dry period.
- * Manure pit should be moved to an area which is a reasonable distance from the family house.

15.7.95

KATANGULA ASINANSI (WIDOW 70 YEARS OLD)

Location - Kiwolomera - Kamuli

1.00 Background

Widow Katungula Asinasi used to own 5 local cows which she was keeping in a traditional way. She carried her farming activities in the following ways.

- * A herdsman used to graze the local animals wherever there was pasture
- * Family members were not fully involved in looking after the animals
- * Spraying of animals against ticks was not done nor was deworming or medication done
- * Animals had no shelter and were kept in a small filthy enclosure that turned muddy during the rainy season
- * Manure from the animals was not at all used to recondition soils
- * Milk yield from these animals was disappointingly very low and unreliable.

2.00 Improvements so far

After attending the course, Mrs. Katangula made the following improvements.

- * She sold all her indiginous low yielding animals and got one high yielding first calver cow which is in calf. It is a friesian (Holstein)
- * She constructed a zero grazing unit for 3 cows, 2 calves and a crush.
- * She used locally available materials
- * She planted nappier grass and legumes
- * She bought water and feeding troughs for animals

3.00 Improvements in animal nutrition

Widow Kangula has made the following improvements as far as animal feeding is concerned.

- * She gives her animal mineral salt supplements. This was not done before.
- * She gives her animal nappier legume mixture daily. She has planted nappier and lab-lab for the animal.
- * She give the animal enough water all the time
- * She supplements her animal with dairy meal

4.00 Improvements concerning calf rearing

Katangula's cow has not yet calved but she hopes to make the following improvement.

- * She has constructed two calf-pens.
- * She has already learnt how to feed calves on fermented colostrum and on bucket. She will feed her calf fermented colostrum and on bucket.

- * She will give supplement of mineral salts and calf starter ration to calves.
- * She will feed her calves on grass - legume mixture
- * Will avail calves with water all the time

5.00 Family involvement

Katangula's family is now fully involved in management of their animals, pastures, gardens etc. They no longer employ on herdsman. The family comprise of 11 people, 6 adults and 5 children.

6.00 Breeding of animals

Katangula says she will use artificial insemination as a breeding tool.

7.00 Disease Control improvements

Before attending courses, widow Katangula was neither spraying her animals against ticks nor was she vaccinating or treating them.

- * She is now using spot-on (acaricide) for tick control
- * She has vaccinated her animal as scheduled by the veterinary department
- * A veterinary periodically checks on his animals
- * She deworms the animals periodically.
- * She disposes off manure frequently and emphasises hygiene as a tool for disease control.

8.00 Soil conservation

- * Soil conservation practices are observed by members of the family e.g. They apply manure on fodder crops and matooke.
- * They mulch matooke gardens

9.00 Integration of animals with crops

The family of Mrs. Katangula has integrated crops with animals by using manure from cows for increased crop yield. They are also going to use soya bean and maize to mix feed for better performance of their animals.

10.00 Fodder growing and conservation

Katangula and family have enough nappier and legume for animals but have not conserved pastures yet for use during the dry season.

11.00 Additional income generating activities

- * The family has started seriously on a matooke project both for home use and for sales.
- * They have plans to start vegetable growing
- * They are keeping 7 pigs and some local chickens.

12.00 Record keeping

Record keeping is fairly done.

13.00 Short coming

- * Zero grazing unit was constructed using weak materials.
- * Water trough was too small.
- * Family labour output was comparatively small.
- * Mrs. Katangula is doing most of the supervisory work yet she is very old.

14.00 Cooperation with other farmers

Many farmers within the area are now convinced that it is very easy to keep a zero grazing animal since the old lady has managed to do so. They frequently visit and consult her.

15.00 Conditions of the animal

The animal was in good healthy condition indicating good management and care.

16.00 Complaints/comments/requests

- * Widow Katangula requested more dairy management books in Luganda.

17.00 Advice given to Mrs. Katangula

- * She was advised to reinforce the zero grazing unit with strong posts.
- * Advised to get a big water trough for the animal
- * Young men and ladies were advised to participate more in family work

18.00 Farmers attitudes towards Land O' Lakes

Mrs. Katungula admitted that there was nothing as valuable as knowledge. She narrated how she had money in the past but could not progress at all due to lack of appropriate knowledge.

15/7/95 Mr. Guubi and family's farm

Location - Kiwolomera - Kamuli

1.00 Back ground information:

Mr. Ggubi is a peasant farmer who used to own 6 local animal which he was grazing locally anywhere where was pasture. These animals were not productive.

Before Land O' Lakes course, he used to carry out his farming activities in the following ways.

- * He employed a traditional herdsman who used to graze his animal wherever there was pasture i.e. by the roadside swamps etc
- * He neither practices tick control nor did he vaccinated or treated his animals.
- * Calves were suckling their mother
- * He was of the view that the more animals you have the more rich you become so he was always aiming at reaching this status.
- * He used to keep his animal in a small enclosure that had no shelter at all.
- * He had no breeding plan
- * Milk yeild from his animals was disappointingly very low and unreliable.
- * Family members were not involved in rearing animals
- * He did not apply manure to his crops

2.00 Improvements made so far

When he attended seminars that were conducted by participants who had attended courses conducted by Land O' Lakes in Kampala, Mr.Ggubi improved/changed in the following ways

- * He changed his attitude of believing in large numbers of unproductive animals. So he sold all the local cows and got one high yielding animals.
- * He constructed a zero grazing unit for 3 cows, 2 calves with a crush attached.
- members of Kamuli Dairy cooperative gave him the plan and technical assistance.
- * He planted pasture plants i.e. nappier grass, lab-lab and ~~centrosema~~ ^{centrosema} ~~centrosema~~.
- * He accepted to attend course and he allowed his wife also to fully participate in Kamuli Dairy Cooperative activities.
- * He stopped to employ the services of a herdsman and started to encourage and train members of his family to do the work.
- * The family embarked on growing of matooke using manure from the cow. Also manure was applied to coffee for the first time.
- * He provided his animal with enough food i.e. legume - nappier grass mixture and he sometimes supplements it with dairy meal. He also

- * provides mineral salt block to the animal. Before the course he was not doing anything like this.

3.00 Improvements in calf rearing and feeding

Before he attended the courses and seminars at Kamuli, Mr. & Mrs Ggubi did not see the need and the value of proper calf housing and feeding. ~~The~~ calves had no pens and they were not given supplementary ~~any~~ feeds and were rarely watered but after attending the course, they changed their attitudes towards calf rearing.

- * On their zero grazing unit plan they included a calf unit and constructed 2 (two) calf pens.
- * They are going to feed their calves on fermented colostrum.
- * They will bucket feed their calves
- * They will provide calves with water all the time and will give calf starter feeds and mineral salt supplements.

4.00 Breeding of animals

Before the seminars and courses at Kamuli, Mr. Ggubi had no plans for breeding his animals. His local cows could breed with any bull on range. But now, the family of Mr. Ggubi has decided to use artificial insemination as a breeding tool.

5.00 Disease and parasite control

- * Before attending courses and seminars, the family of Mr. & Mrs. Ggubi were not spraying their animals against ticks. They also were not vaccinating or treating animals. Mr. Ggubi admits that during his stay with the local animals, he only contacted a veterinarian when there was a compulsory and forced vaccination campaign.

After the course and seminars, Mr. Ggubi has changed greatly. He gives tick control a priority and sprays his animal twice a week during the rainy season and once a week during dry season.

- He has vaccinated the animals as scheduled
- He has contacted a veterinarian who periodically checks on the animals.
- The animals are now dewormed periodically. Before, he did not deworm them at all.

6.00 Soil conservation

Before the courses, Mr. Ggubi did not see the need to conserve soil. He says that due to over-cropping, soil lost its fertility and soil erosion carried away the good top soil.

After attending the course, he changed his attitude by doing the following.

- * He has started to grow matooke on his land and is using manure to improve the soil.
- * He has a plan of planting fodder and fruit trees to prevent soil erosion
- * He will mulch his matooke plantation.
- * He plans to practice crop rotation.

7.00 Intergration of animals with crops

Unlike in the past, Mr. Ggubi has started integrating his dairy farming with crop farming, by applying manure from the animal to crops.

- * He has grown maize and soya bean and will mix feeds for his animals.
- * He now feeds crop by-products to his animals.

8.00 Fodder conservation and growing

*Mr. Ggubi has already grown lab-lab, centrosema, and nappier grass and is feeding his animal with these fodder plants.

- * He manures the nappier grass gardens.
- * He has plans to make silage in the future to enable him feed his animals very well during the dry season.

9.00 Additional income generating activities

Before the seminars and course, coffee was the only source of income. The yield of coffee was disappointingly low.

- * After getting the knowledge of manure application, coffee yields and quality have increased and improved.
- * Amatooke garden for selling has been planned. Matooke will be sold to Kamuli^{town} for more money.
- * they have also planned a vegetable garden for sale.
- * Mr. Ggubi plans to grow more maize and soya bean to sell to other farmers who will use these ingredients to mix feeds for their animals.

10.00 Record keeping

Before the seminars and course, Mr. Ggubi did not keep any records.

- * He now keep records and his record keeping system is fair.

11.00 Short comings

- * The floor of the crush is not cement and is muddy. This may be a source of infection.
- * The size of nappier grass pieces is long and there is a lot of wastage during feeding.
- * Family labour output is low.

12.00 Cooperation with other farmers

Mr. Ggubi shares a bucket pump with some other farmers. When he has a problem (e.g. when he does not have enough drugs, feeds etc), his friend can assist him to overcome the crisis. He also does the same to his friends.

13.00 Condition of the animal

The animal (a friesian) was in good conditions revealing that it has been properly fed and well managed.

14.00 Complaints/comments/requests

Mr. Ggubi complained of having few Luganda text book in the area. He appreciated very much the efforts shown by Land O' Lakes to avail them books in Luganda and appeals for more copies i.e. may be at least one copy per village in Kamuli area.

- * He requested Land O' Lakes staff at Kampala to go to Kamuli and conduct a course there.

15.00 Advise given to Mr. Ggubi

- * To cut nappier grass into short pieces and give the animal a legume grass mixture.
- * He should see to it that his crash is not water lodged.
- * should thin matooke plants well
- * Should change the metallic feed trough to wooden one else it will be eroded by the salts in the feeds.

16.00 Farmers attitude towards Land O'Lakes

Mr. Ggubi has greatly appreciated Land O'Lakes for the wise decision of training people of the area to manage their own affairs. He revealed that most of his successes have been due to Kamuli Dairy Cooperative staffs. He was very pleased of Land O'Lakes method of encouraging farmers to do other activities besides dairy farming.

Mr. Muwaya Yekoyada

Location - Kamuli Buyomba

1.00 Mr. Muwaya's farm is located near Kamuli town. He used to keep both local cows and crosses. The crosses were grazing in a fenced paddock while the locals were grazed wherever there was pasture i.e by the roadside, in swamps etc. Local cows were not treated frequently and animals on the farm were frequently suffering from tick bone disease. Management was not critical and things were done anyhow.

- * Milk yield was low and the quantity was not measured.

- * calves were not bucket fed
- * Supplementation of the animals with mineral salt or dairy meal was unknown by then.
- * Treatments and vaccinations were rarely done.
- * Spraying animals against ticks was done only when ticks were many
- * The use of manure on crops was unknown
- * The farming activities were run more as a hobby than a business.
- * Family members were not involved in day-to-day management of animals.

2.00 Improvements so far

After attending courses and seminars at Kamuli Mr. Muwaya realised his mistakes.

- * He realised that, the local animals that were grazed on the roadside were the constant sources of ticks for animals and hence the sources of tick bone diseases. So he removed them to another farm.
- * He realised his mistake of not measuring milk. He now measures and records milk.
- * He selected two animals and put them on a zero grazing unit.
 - He has observed that, these animals on the zero grazing unit are giving more milk and are rarely falling sick when compared with those in his fenced farm. So, he is planning to put all animals on zero grazing.
- * He planted nappier grass, lab-lab, centrosema, siratro etc.
- * He constructed a zero grazing unit with a crush and has a calf pen.
- * He has started applying manure to matooke gardens, nappier grass gardens etc.

3.00 Nutritional status of animals

Mr. Muwaya has made the following improvements in terms of animal feeding:

- * He feeds his animals on nappier grass-legume mixture and supplements them with Dairy meal and mineral salt lick.
- * He gives his animals water all the time. Before the seminars, he was rationing them.
- * Animals are getting enough grass.
- * He plans to mix feeds for his animals.

4.00 Calf rearing improvement

- * After the courses, Mr. Muwaya started feeding calves on the bucket.
- * He is supplementing them with calf starter meal.
- * He has constructed a calf pen for calves.
- * He feeds his calves on grass-legume mixture. Before he was giving them only grasses.

- * He plans to feed the calves on fermented colostrum.
- * He gives calves water all the time. Before the course, he was rationing them.

5.00 Family involvement

Mr. Muwaya is steadily involving members of his family in the farm activities.

- * During holidays, his children work on the farm. Before the courses, farm work was in the hands of herdsmen.

6.00 Breeding of animals

Before attending seminars, Mr. Muwaya had no control on breeds. He is now using artificial insemination as a breeding tool.

7.00 Disease and parasite control

- * Mr. Muwaya is now spraying all his animals twice a weeks during the rainy seasons and once a week during the dry seasons. He uses Supona Extra acaricide.
- * He periodically deworms all his animals.
- * He treats his animals against trypanosomiasis.
- * A veterinarian periodically visits his farm to check on the animals.
- * Has vaccinated all his animals unlike in the past.

8.00 Soil conservation

- * Mr. Muwaya has started soil conservation practices e.g. he has started to put manure in his nappier grass gardens, matooke gardens and he is mulching the matooke gardens.

9.00 Integration of animals with crops

Mr. Muwaya plans to increase fodder and food crop yield by using manure from animals on these crops. He also plans to increase milk yield of the animals by growing maize and soya bean which will be used for feed mixing.

10.00 Fooder growing and conservation

- * After attending the courses, at Kamuli Mr. Muwaya planted nappier grass (3 acres), lab-lab 1/4 acre and is expanding on his siratro gardens.
- * He hopes to maximise production by giving a well balanced grass legume mixture.
- * He will grow maize in the future and make silage.

11.00 Additional income generating activities

- * The family sells coffee and oranges.
- * There are plans to expand and improve matooke gardens for sell.
- * They have started experimenting with pine apple growing for selling

12.00 Record keeping

Records are kept and it is fairly done.

13.00 Short coming

- * Crash not cemented
- * Owner of the farm does not supervise the work regularly
- * Water troughs are rusting

14.00 Cooperation with other farmers

The family of Mr. Muwaya cooperate with other farmers e.g. during his absence, the neighbours assist whenever need arises.

15.00 Condition of the animals

The animals were in good condition. One animal is producing 13 litres a day (cross-first calver) and another one 12 litres a day (cross-first-calver)

16.00 Complaints/comments/requests

- * Mr. Muwaya's son requested Land O' Lakes Uganda to avail them with equipments such as strip cups, tape measures, dewormers etc. Complained about expensive equipments.

17.00 Advice given

- * The floor of the crush should be cemented.
- * Owner of the farm should get more involved in farm activities.
- * Should cement the metallic water troughs.
- * Should buy equipments in bulk as a cooperative to reduce costs.

MRS. ABALIWANO

Location - Buyomba - Kamuli

1.00 Background

Mrs. Abaliwano had no cows. When Land O' Lakes courses started, she attended one of them. She also sent her farm manager to attend the dairy production and management course.

- * Mrs. Abaliwano's case is a special one i.e. her intentions and plans

have always been to first acquire knowledge and technical know-how before she brings in the animals.

- * Her plans are also that she must have all the materials before she begins the work.

2.00 Improvements

Perhaps one of the greatest achievements of Mrs. Abaliwano is fulfilling her plans as stated at the end of dairy production and management course she attended. She has even gone beyond his scheduled plans.

- * She has constructed a zero unit for 8 animals, 2 calves, with an area for cutting fodder, a calving area and a feed store. The unit has a manure pit.
- * She has grown 5 acres of soya bean and 7 acres of maize. These will be used for mixing dairy meal for cattle and chicken feeds.
- * She has planted lab-lab about $\frac{1}{2}$ acre.
- * She has planted silver leaf desmodium.
- * she has already made 20 tons of silage. She made silage on 28.5.95.
- * She has already planted matooke where she will put manure.
- * She has 5 acres of elephant grass planted.
- * She has prepared 3 acres of lab lab. She will plant it next season.
- * She is bringing 3 cows next week.
- * She has already constructed a poultry unit for 600 layers.

3.00 Nutrition status of the animals

The nutritional status of these animals will be good since silage will carter for dry season. The legumes will supplement - nappier and the home made ration will balance nutritional deficits. (she is at present harvesting soya bean and maize to be used for feed mixing).

4.00 Calf rearing improvement

According to Mrs Abaliwano's plans, calves will be reared as follows:-

- * They will be fed on fermented colostrum. Something unknown before.
- * Bucket feeding will be the routine.
- * Calves will be weaned earlier and then given calf starter rations.
- * Calves will be fed on legume hay for better growth.
- * Calves will be given water all the time.
- * Periodic weighing of calves will be done to monitor growth rate and development.
- * Straw will be used as pedding.

5.00 Family involvement

Mrs. Abaliwano is solely a Dairy farmer. During holidays, children

will assist her in farm activities.

6.00 Breeding of animals

Breeding will be by artificial insemination.

7.00 Disease and parasite control

Mrs. Abaliwano plans to put what she learnt in Land O'Lakes course in practice in the following ways:-

- * She will use strip cups, teat dips and california mastitis tests to check mastitis.
- * She will vaccinate his animal as scheduled.
- * Tick control will be a routine.
- * Hygiene will be the basis of disease control.
- * She will periodically deworm the animals and will employ a veterinarian who will periodically check on the animal.

8.00 soil conservation

- * Mr. Abaliwano is carrying soil conservation in the following ways.
 - She is practicing crop rotation
 - She ^{will} apply manure on her crops
 - She mulches matooke gardens

9.00 Integration of animals with crops

The integration of animals with crops at Mrs. Abaliwano's farm will be as follows:-

- * Manure from chicken house will fertilize the elephant grass gardens. while that from cattle will fertilize gardens for chicken green feeds and vegetables to prevent disease spread on the farm.
- * Soya bean and maize grown on the farm will be used for mixing feeds and will lead to some saving and increased egg and milk yields.
- * Plant ^{and} animal products, will give a balanced diet to the family leading to better health.

10.00 Fodder growing and conservation

- * Mrs. Abaliwano has already made silage before bringing in the animals. As soon as animals arrive, she will make another 20 tons of silage so that she is not affected by a draught.
- * Mrs. Abaliwano has planted enough pastures for feeding animals for silage making and for mulching purposes.
- * Mrs. Abaliwano is going to store maize stovers for use during the dry season.

11.00 Additional income generating activities

- * Mrs. Abaliwano grows vegetables for sale.
She grows tomatoes, cabbages, egg plants etc.
She has started planting matooke for selling.

12.00 Record keeping

Already, Mrs. Abaliwano is keeping records of what she is doing.

13.00 Short coming on the farm

- * The structures of the zero grazing unit especially the horizontal bars are weak.

14.00 Cooperation with other farmers

Mrs. Abaliwano is giving nappier grass planting materials to whoever wants. She has plenty of them.

15.00 Conditions of the animals

Animals are not yet on the farm.

16.00 Complaints/comments/requests

Mrs. Abaliwano greatly appreciated Land O' Lakes vision of availing technical assistance to Ugandans in a language they understand.

17.00 Advice given

- * To strengthen the zero grazing unit.

CONCLUSION FOR KAMULI FARMERS COOPERATIVES

Kamuli farmers cooperatives was a ring leader of those cooperatives that believed in handouts i.e. they were believing to be always given. However, what has been seen in the field has revealed that their attitude has already changed through seminars constant interactions with members from other cooperatives and constant teaching by Land O' Lakes staff.

WOMEN'S DAIRY PROJECT - IGANGA

17/7/95

Women's Dairy Project - Iganga is located in Iganga town. Its members have all along been peasant crop farmers with some keeping few local cows. The main problem has always been how to raise money and finance their projects. However, some members have started on dairy farming activities.

A) Mr. Musumba F. Sembera

Location Walukuba - Iganga

Mr. Musumba has been keeping animals in fenced paddocks. He started with local animals and has been crossing using artificial ^{insemination} ~~animals~~. But he has not been ^{looking} ~~looking~~ after his farm in meaningful ways.

- * Tick and disease control although were done, were not routinely done.
- * Manure use was unknown
- * Calf bucket feeding was not practiced.
- * Fermented colostrum was not used
- * Pasture improvement was not done
- * Animals had no milking area

2.00 Improvements so far

- * They have started to consult a zero grazing unit for 3 animals
- * They have constructed a calf pen
- * They have started growing nappier grass
- * They have started collecting manure
- * They have started removing dangerous weeds from the paddock i.e. ~~lanatana~~, phytolacca spp etc
- * Plans to grow matooke for selling

3.00 Improvements in calf rearing and feeding

- * They have constructed calf pens for calves
- * They have started feeding calves on fermented colostrum and are feeding cows on bucket.
- * They provide calves with water all the time

4.00 Breeding of animals

Mr. Musumba solely uses artificial insemination.

5.00 Disease and parasite control

Mr. Musumba and family have improved disease and parasite control in the following ways:

- * They periodically deworm their animals
- * Tick control is routinely done i.e. spraying is done every week.

- * They have vaccinate the animals as scheduled.

6.00 Soil Conservation

- * Mr. Musumba has started manure application on his crops.
- * He plans to mulch matooke gardens.

7.00 Integration of animals with crops

Plans are underway for Mr. Musumba to start an integrated dairy farming systems.

- * He is planning to grow maize and Soya bean and will mix feeds for his animals.

8.00 Fodder conservation and growing

Mr. Musumba has started growing nappier grass. He is also preparing land where he will grow lab-lab.

- * He plans to make silage in the future.

9.00 Additional income generating activities

Mr. Musumba has been selling coffee for additional income. He plans to grow vegetables and matooke for sell in the near future.

10.00 Record keeping

- * Mr. Musumba keeps all records but the records are mixed up and are in one book.

11.00 Short comings

- * Records are not kept separately.
- * Dangerous weeds such as triamfeta ssp (lovegrass), phytolacca ssp and Lantana ssp are still abundant on the farm.

12.00 Cooperation with other farmers

Mr. Musumba is assisting some other farmers in the area to start zero grazing system.

13.00 Condition of the animal

Mr. Musumba keep crosses some of which show photosynthesisation due to eating poisonous weeds.

14.00 Complaints/comments/requests

Mr. Musumba was very appreciate for Land O' Lakes Inc. course. He revealed that all along they could not make any progress because they had no appropriate source of information. All the achievements on the farm so far are due to Land O' Lakes interaction.

15.00 Advice given to Mr. Musumba

- * Should keep record separately
- * Should remove dangerous weeds
- * Should work quickly on his zero grazing unit
- * Should intensify on manure usage

16.00 Farmers attitude towards Land O' Lakes

Mr. Musumba greatly appreciate Land O' Lakes interventions. Before Land O' Lakes he had tried very much to change but in vain. He very much liked the ideas of training farmers in artificial insemination and ^{herd} healthy. He requests for more books in Luganda to be availed to farmers.

B. Buwolomera Ababiri Bantu Development Association (BABDA)

1.00 Background

Buwolomera Ababiri Bantu Dev. Association (BABDA) is a cooperative that was developed from the need to utilise resources in Iganga Districts. However, this organisation lacked technical know-how though it had the plans. So it joined Iganga Women's Dairy Project. Before interaction with Iganga Women's Dairy's Buwolomera was managing its demonstration activities in the following ways.

- * It was keeping animals entirely on fenced paddocked areas.
- * It did not know the use of fermented colostrum.
- * Bucket feeding of calves was not done
- * Application of manure on matooke was not done
- * Pastures were not improved
- * Pest Control was not done
- * Strip cultivation (banding was done using pasperum grass
- * There were very few fodder crops

2.00 Improvements so far

After interaction with Women's Dairy Project Iganga, BABDA made the following progress.

- * They improved their fenced farms by sowing legumes in grass pasture.
- * They demarcated plots and applied manure in them and then grew crops in them but left others without manure for comparison.
- * They are carrying out semi-zero grazing system with a view of turning completely to zero grazing system.
- * Have started to carry out organic farming and make pesticides locally using herbs cow's urine etc.

- * After making manure, they now apply it in an organised way in well demarcated plots.
- * Tick control is very well observed now.
- * Members are to use fermented colostrum and bucket feeding in the future.
- * Mr. Tulibagenyi James the Project Co-ordinator mixes feeds for the animals and the local chicken "He says that he is saving a lot.
- * They are now using improved cooking stove.

3.00 Disease control

- * Periodically a veterinarian visits the farm to check on the animal.
- * Spraying is done regularly now. i.e. twice a week
- * Deworming is done routinely now.

4.00 Soil conservation

BABDA is doing excellent work in soil conservation.

- * They are using strip cultivation on the banded areas. They grow pine-apples on them.
- * They mulch matooke garden.
- * They apply manure on matooke plants
- * They rotate crops
- * They use organic pesticide (home made) that are degradable.

5.00 Integration of crops with animals

There is a well established link between the land, animals, soil and the people at BABDA farm unit. Manure from the cows is used for improving crops. Crops that are grown are used for mixing feeds for animals. People from the area come and study new skills.

6.00 Fodder conservation and growing

BABDA has grown a lot of elephant grass and some legumes but is carrying out semi-zero grazing system.

- * BABDA hopes to make hay in the near future.
- * Have plans to make silage when they go zero grazing.

7.00 Income generating activities

- * BABDA has started experimenting on matooke and rice for additional income besides cattle. The two crops are promising.
- * They have also started growing vegetables for sale.

8.00 Record keeping

Records are very well kept at BABDA farm unit.

9.00 Short comings

- * Has not gone fully zero grazing this affects milk yield.
- * Due to ranging of animals, they suffer frequently from tick bone diseases.

10.00 Inovations

BABDA has developed and improved in a locally made nappier grass cutter which is more efficient than the ordinary panga.

11.00 Cooperation with farmers

BABDA is a farmers centre where farmers periodically meet to exchange experience and get new ideas and skills.

12.00 Condition of the animal

- * One animal was sick suffering from tick borne diseases. This was due to letting the animals graze on pastures.
- * One exotic animal was okay but produced only 18 litres of milk though it appeared to have a very high potential.
- * A cross yields 10 litres a day

13.00 Structures on the farm

- * There are calf pens on the farm
- * There is a crush on the farm

14.00 Complaints/comments/requests

Mr. Tulibagenyi James says that he would have gone zero grazing but due to unreliable water supply from his shallow well, he is waiting until he constructs an underground tank.

15.00 Advice given to BABDA

- * Should remove dangerous weeds from his pastures i.e. has plenty of lantana camara.
- * should start making hay
- * Should expand on his matooke and rice garden

16.00 Farmers attitude towards Land O' Lakes Inc.

Mr. Tulibagenyi admitted that before he got in contact with Iganga Women's Dairy project, they had problems of getting reliable good information concerning dairy management, cooperative formation and farming as an integrated undertaking.

They appreciated Land O' Lakes vision of availing them technical knowledge in Luganda which enabled even those who did not reach very

far academically to participate fully in dairy activities and developments.

C. NABIRYE KAYIMA MARTHA

Location - Iganga

1.00 Back ground information

Nabirye Kayima Martha is one of the low income farmers in Iganga who would like to go dairy farming through a step by step system. They have planned to use their resources to buy dairy cows in the future. They plan to it this way.

- * They will grow soya bean and maize to be used for mixing feeds for cockerels. Experiment with cockerel rearing has proved that cockerels do better here.
- * Then they will sell cockerels and buy cows.
- * They may sell some of the soya beans and maize to buy local cows to consolidate capital and will later sell them to buy high yielding exotic animals.
- * Already, experimentation with cockerel in the area has proved a success. Of the 106 cockerels, one died and the others are still doing well. They will be sold in August.

2.00 Improvements so far

Before Land O' Lakes Inc interaction, Nabirye was growing only food crops for her family. But after attending seminars conducted Iganga Women's Dairy Project she made the following changes.

- * She began to have plans to whatever she was doing. i.e. she planned to work hard by growing more crops (maize, sweet potatoes, soya bean and ground nuts) for sale and then buy local cows as a capital consolidation undertaking. Already she has 4 cows and 2 calves though she is still keeping them traditionally.
- * She has grown a lot of maize 4 acres soya bean (3 acres) and sweet potatoes 2 acres, she will use maize and soya bean to mix feeds for her cockerels and sell some of the sweet potatoes.
- * She hopes to bring in cockerels by the end of August.
- * After selling the cockerels, she will buy more local cows which she will later sell to buy one high yield animal.
- * She has plans to construct a zero grazing unit in the future.
- * She has planned to grow vegetables and hopes to grow onions next season.

3.00 Improvements in calf rearing and feeding

Nabirye's local cattle rearing is an asset consolidation undertaking. So, her main concern is to have a number of animals first and later improve their status. She plans that after getting calves from high

yielding animals she will:

- * Bucket feed the calves
- * Use fermented colostrum
- * Mix feeds for the animals

4.00 Disease and parasite control

Nabirye has not yet done any disease and parasite control activities. By the time we visited her, she had not dewormed the animal, the animal had ticks and had not been vaccinated. She told us that due to changes in season patterns, rainfall delayed. So, she planted late and her soya bean and maize matured late and its sales have not coincided with the bringing of the local animals. She says that after selling some of maize, soya bean and sweet potatoes, she will buy acaricide, and anthelmintics to spray and deworm the animals.

- * she will vaccinate her animals

5.00 Breeding of animals

Mrs. Kayima has no breeding policy yet but has the following plans.

- * She plans to put 2 local animals on zero grazing system and then use artificial insemination as a breeding tool.

6.00 Soil conservation

Before Land O' Lakes Inc Mr. Kayima did not practice soil conservation methods. After attending courses at Women's dairy she made some improvements.

- * She started to practice crop rotation.
- * She has started collecting manure from her animals. She will put this to where she will grow crops.

7.00 Integration of animal with crops

Mrs. Kayima will use manure from her chicken unit and from her local animals to recondition soils on which she will grow matooke and vegetables for sell and home use.

8.00 Fodder conservation and growing

Mrs. Kayima hopes to grow nappier and legumes to feed local animals at night.

9.00 Additional income generating activities

Mrs. Kayima plans to ^{keep} ~~do~~ poultry as a side income business.

10.00 Record keeping

Mrs. Kayima does record some information concerning her activities

but her recording system and methods are not satisfactory.

11.00 Short comings

- * ~~Essa~~ lack of disease and parasite programme for local animals
- * Poor record keeping system
- * Poor breeding plan
- * Unsatisfactory soil conservation programme
- * Lack of house for the animal
- * Lack of crush for the animal

12.00 Cooperation with other farmers

Mrs. Kayima cooperates with other farmers.

Through cooperation, they came up with a plan of growing maize and soya bean for raising cockerels and after selling them, they may then buy layers and save money and later buy high yielding cows.

13.00 Conditions of the animals

The animals (locals) were not in bad conditions except that they have a lot of ticks.

14.00 Complaints/comments/requests

Nabirye Kayima was very appreciative to Land O' Lakes training programme which enables a person to think and plan for herself. She hopes to have one high yielding animal in the future and this is due to Land O' Lakes training programmes.

- * She complained that there were many rats eating her sweet potatoes.

15.00 Advice given to Nabirye

- * Should use poison to kill the rats. Should put it in their burrows.
- * Should vaccinate, deworm and spray animals
- * Should construct a shelter for the animals
- * Should organise record keeping system on her farm
- * Should practice artificial insemination
- * Should construct a crush
- * Should construct a chicken house
- * Should use more manure
- * Should visit BABDA ^{farm} ~~centre~~ to learn how manure is used and how local pesticides are made and used.

16.00 Farmers attitude towards Land O' Lakes

Nabirye Kayima appreciates Land O' Lakes effort to teach people how to change. She was very happy with the incorporation the roles of the family in the training programme. she admitted that before Land

O' Lakes programmes, she and her husband were working separately. She could not own cows by then but after seminars and courses, her husband allowed her to own property and she has 4 local animals.

D. WOMEN DAIRY PROJECT -IGANGA (MRS LUPAMPA)

1.00 Background

Women's Dairy project Iganga has a demonstration unit where it keeps one high yielding animal. Before Land O' Lakes interactions, they were carrying out their farming activities in the following ways.

- * The animal (though high yielding) was just tethered around.
- * Record keeping was not practiced.
- * The cow was given water, irregularly
- * Tick control was not well done
- * They had no shelter for the animal
- * There was not pasture planted for the animal
- * Mrs. Lupampa was of the view that matooke does not grow in Iganga
- * The use of manure to improve on the soil was not know
- * Tree planting was not practiced. Trees could grow naturally
- * There was no integration of dairy farming with other economic activities

2.00 Improvements

After Land O' Lakes Inc interactions, Women's Dairy Project made the following improvements.

- * Mrs. Lupampa started keeping records for the animal and for the project.
- * She constructed a zero grazing unit for the animal
- * She grew nappier grass for the animal
- * She started deworming and vaccinating the animals
- * She developed a plan to enable low income group also develop financially by using their own resources. i.e. she initiated the cockerel project for low income group in the cooperative.
- * She has grown some matooke plants and is applying manure to it
- * She has planted nappier grass and is preparing an area for legumes
- * She has grown soya bean and maize which she is going to use mixing feeds for the cockerels. She will use her centre as a control for other people.
- * She plans to bucket feed the animals
- * she plans to use fermented colostrum
- * She now mulches her gardens
- * She has planted some mango trees but have been affected by a drought.

3.00 Soil Conservation

- * Mrs. Lupampa applies manure in his matooke garden and mulches them. She learnt the techniques in Mbarara during Land O' Lakes interactions.
- * She has nitrogen fixing trees in her gardens.

4.00 Improvements in calf feeding and rearing

- * Mrs. Lupampa plans to rear and feed her calves by following the methods
- * She plans to bucket feed the calves and to use fermented colostrum.
- * She plans to feed them with legume hay
- * She plans to construct a calf pen ~~for them~~
- * She plans to feed them on mixed feeds
- * She will vaccinate the calves
- * She will give water to calves all the time

5.00 Disease and parasite control

- * Mrs. Lupampa vaccinated the animal as scheduled
- * She has not taken tick control seriously. The animal had some ticks by the time we arrived.
- * She deworms the animal periodically

6.00 Breeding of the animal

Mrs. Lumpampa uses artificial insemination as a breeding tool.

7.00 Integration of animals with crops

Mrs. Lupampa has started to integrate animals with crops. Manure from the cows and poultry unit will be used for improving the soils for increased crop while crops such as maize and soya bean will be mixed together to make feeds for increased yield from animals.

8.00 Fodder growing and conservation

- * Unlike in the past, Mr. Lupampa has now grown nappier grass and legumes for the animal.
- * She plans to make silage in the future

9.00 Additional income generating activities

- * She will keep chickens, grow matooke and vegetables as an additional income generating activity.

10.00 Recording

The record keeping system of Mrs. Lupampa is fair.

11.00 Shortcomings

- * Has not taken tick control as a priority.

- * Has no crush
- * Has no calf pen
- * She sometimes tethers the animal around which leads to the animal getting ticks

12.00 Cooperation with other farmers

Mrs. Lupampa is the chairperson of Iganga women dairy project and members meet at his place every Wednesday for discussions. She plans for other members.

13.00 Conditions of the animals

The animal was in good condition and shape but had ticks.

14.00 Complaints/comments/requests

Mrs. Lupampa was very pleased with Land O' Lakes course and requested for a seminar to be conducted in Iganga by Land O' Lakes Inc. staff (Kampala Office).

15.00 Advice given to Lupampa

- * Should consider tick control a first and foremost priority.
- * Should not tether her animal any more
- * Should construct a calf pen and a crush

16.00 Farmers attitude towards Land O' Lakes

- * She says that she has already benefitted from Land O' Lakes Inc interactions.