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Burundi Agribusiness Program: PY 5 First Quarter Report 1 oct – 31 December 2011

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Acronyms and Abbreviations

ADC	Agent de Développement Communautaire
AFAB	The Burundi Association of Women Entrepreneurs
ARFIC	Agence Régulateur de la Filière Café
ASBL	Association sans but Lucratif
AVEDEC	L'Association Villageoise d'Entraide et de Développement Communautaire
BAP	Burundi Agribusiness Program
BBIN	Burundi Business Incubator
BCC	Business Concept Course
BBN	Burundi Bureau of Normalization
CAPAD	The Confederation of Agricultural Producer Associations for Development
CECM	Caisse d'Epargne et Crédit Mutuelle
CERADER	Centre de Recherche Agronomique et du Développement Rurale (U Ngozi)
CNAC	Confédération National des Caféculteurs
CNTA	Centre Nationale de Technologie Agro-Alimentaire
COGS	Cost of Goods Sold
COP	Chief of Party
COTR	Contracting Officer's Technical Representative
CQI	Coffee Quality Institute
CTO	Cognizant Technical Officer
CURDES	Centre Universitaire de Recherche sur le Développement Socio-économique
CWS	Coffee Washing Station
DCA	Development Credit Authority
DCOP	Deputy Chief of Party
DG	Directeur Général (Managing Director)
DPAE	Direction Préfectorale de l'Agriculture et Elevage
EAFCA	East African Fine Coffee Association
EAWEEExN	East African Women Entrepreneurs Exchange Network
ESF	Economic Support Funds
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
FBU	Francs Burundais
GAP	Good Agronomic Practices
GDP	Gross Domestic Product
GMP	Good Management Practices
GOB	Government of Burundi
HACCP	Hazard Analysis and Critical Control Point
HVC	Horticultural Value Chain
IAB	Industrie Agro-alimentaire de Buterere (dairy)
IFAD	International Fund for Agricultural Development
IMF	International Monetary Fund
INADES	Institut Africain du Développement Economique et Sociale
IQC	Indefinite Quantity Contract
IRAZ	Institut de la Recherche Agronomique en Zootechnie
ISABU	Institut de Recherche Agronomique du Burundi
KIST	Kigali Institute of Science and Technology

KTBH	Kenyan Top Bar Hive
LF/CV	Lead Farmer/Community Veterinarian
LOE	Level of Effort
LOL	Land O'Lakes
MFI	Micro-Finance Institution
MINAGRIE	Ministère de l'Agriculture
MCC	Milk Collection Center
MOU	Memorandum of Understanding
MSU	Michigan State University
NGO	Non-Governmental Organization
OTF	On the Frontier
OCIBU	Office du Café de Burundi (Coffee Board)
PAGE	Projet d'Appui à la Gestion Economique
PHAST	Participatory Hygiene and Sanitation Transformation
PNIA	Plan Nationale d'Investissement Agricole
PRASAB	World Bank Funded Development Program in Burundi
PO	Producer Organization
PP/S	Participants per Session
SCAA	Specialty Coffee Association of America
SCAE	Specialty Coffee Association of Europe
SCEP	Service Conseil aux Efforts de Privatisation
SCP	Soil Conservation Practices
SIVCA	Société pour la Valorisation Industrielle du Café
SODECO	Société de déparchage du Café
SOGESTAL	Société de Gestion des Stations de Lavage
STTA	Short Term Technical Assistance
UHT	Ultra-High Temperature
USD	US Dollar
USG	US Government
VC	Value Chain
WB	World Bank

Executive Summary

The first quarter of BAP's final project year saw a number of previously started initiatives come to fruition. Of particular note was the opening of Burundi's first operational milk collection center in Bukéyé Commune of Muramvya Province during the month of November and the change in our strategic approach to small grants which freed the accumulated logjam and permitted disbursement of funding for 51 associations during Q1. Principal realizations this quarter by component are as follows:

In Coffee Burundi benefitted from favorable climactic conditions during the reporting period which should translate to an early and robust harvest. During this reporting period we monitored reforms to the coffee sector and witnessed the second tender of operational infrastructure by the GOB. Twenty four enterprises- principally national but with a scattering of international joint ventures, bid on a total of 19 lots of coffee washing stations, with 6 others bidding on the two SODECO dry mills being tendered. Further, we used the down time between production seasons to "tell the story" of the results from our soil amendment demonstrations to 180 farmers, 19 extension workers, 8 public officials, and 30 coffee sector actors. Baseline household data was collected and analyzed for farmers participating in the research study on the relation between agronomic vigor, productivity and prevalence of potato taste defect, a report on these findings will be available during Q2. Soil samples and samples of compost made using pulp as a substrate were analyzed in collaboration with ISABU. 83 technical training sessions on best agronomic practices for coffee were facilitated by ADC with 2039 lead farmer participants, 28% of whom were women, and an additional 139 sessions were held by lead farmers on 119 hillsides, extending the outreach of the message to an additional 3934 participants, of whom 36.5% were women. BAP finalized the business plans with four cooperatives wishing to invest in mini-washing stations. These cooperatives are located in Kayanza, Gitega and Bubanza provinces. Finally, BAP collaborated with key coffee sector actors to ensure the milling and expedition of Prestige Cup competition winning lots purchased through Auction in August to their destinations in the US, Europe, Asia and Australia.

In Dairy staff of the Bukeye milk collection center was trained during October, and the center opened for business during November and December. This MCC, the first to be operational in Burundi, collected a total of 11,586 liters of milk from 58 dairy farmers in the draw zone, including 16 women during its first two months of operation with only a 1.3% rejection rate. This activity has already resulted in the injection of 6.28 million FBU into the rural communities. BAP trained lead farmers facilitated 40 training sessions on 9 different hillsides. In total 516 people participated, 27.7% of whom were women. In addition ADC facilitated 30 sessions on 6 different technical themes with 328 dairy farmers, 64% of whom were women. Lead Farmer/Community Veterinarians treated a total of 830 cases on their hillsides resulting in a significant decrease in animal mortality. In Ngozi province where information is available, 19 farmers from 6 different hillsides produced 12.67 mT of improved forage and distributed 580 stalks of Pennisetum (equal to 8700 cuttings) to their neighbors. Artificial insemination of 42 cows resulted in 31 pregnancies, a 73.8% success rate. At the request of the DNE, BAP trained 22 community veterinary technicians from underserved areas in ruminant health care. At the request of the National Veterinary Lab, BAP offered capacity reinforcement to the laboratory and its technicians. Finally, BAP offered a one day workshop for dairy processors in quality control and hygiene.

In Horticulture BAP analyzed and reported on production from 24 demonstration plots established in 7 of 12 provinces in our project zone, identified and assisted in the preparation of horticulturally based income generating activities with 28 associations in the project zone. During this reporting period 1339 farmers, 59% of whom were women were trained in Best Agronomic practices, while 353 farmers were trained in GAP and GMP, four new technologies were replicated with lead farmers and 5 students from the University of Ngozi were trained in entrepreneurship. Extension brochures for 6 horticultural crops were finalized in French and Kirundi and 15 associations reinvested their earnings from demonstration plots accomplished during 2011-C in production during the 2012-A agricultural season.

In Gender and Micro-Enterprise 20 small grants for women's associations to assist in income generating activities were developed, local organizations capable of providing literacy services to associations throughout the project zone were identified and 1232 association leaders of whom 848 (68.8%) were women received capacity reinforcement from ADC in organization and management of their producer associations and transparent management of their financial and property resources.

In Grants and Financial Intermediation 65 new grants were developed and approved during Q1 for a value of \$166,610. BAP received a monitoring visit from the DCA backstop Joseph Obi coupled with visits to the cooperating financial institution and two DCA recipient partners. The DCA is currently 41% disbursed and has led to a portfolio diversification at the host financial institution.

In the area of Clean and Productive Environment BAP's CPE team coordinated with the Coffee and Grants Management teams to conduct field visits to 6* new coffee washing stations interested in installing the BAP promoted model for waste water effluent control infrastructure and ventilated block latrines with hand washing facilities. Washing station operators received technical assistance in designing schematics for system lay-out, estimating construction costs and developing associated budgets. The Kigoganya water system is 75% accomplished and ADC are providing capacity reinforcement to Community Water Management Committees to assist them in resource mobilization, structuring and operations.

At the BBIN emphasis was placed on the assistance to competitors for the Shika Business Plan Competition, on training activities, and on the continued reinforcement of the Center Staffs management capability. A retreat with the executive committee resulted in the determination of strategic focus points for 2012 workplanning. The work plan and annual operating budget were approved by the founding members and an external audit was contracted. During this quarter BBIN registered 50.27 million FBU in revenues from the sales of services, but operating expenses surpassed revenues by 15%, suggesting some belt tightening is necessary as well as a greater effort by the BBIN management team to recover outstanding debt for services rendered but not yet paid.

Value Chains

Coffee

Introduction

The first quarter of the project year is usually a down time for coffee sector activities as we are between campaigns, the dry milling and sales are mostly accomplished and the time has not yet arrived to begin the physical preparations for the 2012 harvest season. BAP used this period to facilitate a number of workshops related to our productivity demonstrations in order to explain to MINAGRIE personnel, communal and provincial level administrators, coffee federation representatives and farmers themselves the results obtained during the first year of demonstrations with an eye toward motivating people to adopt and replicate the techniques and technologies. The fall application of soil amendments to demonstration plots was accomplished and BAP distributed a number of tools to farmers cooperating in the demonstrations to enable them to implement Best Agronomic Practices on their plantations. Coupled with this activity we undertook the analysis of samples of compost produced using coffee pulp as a substrate and found that the compost is comparable to international norms and standards for providing plant nutrients, but also that the pulp compost has a basic pH which is of great advantage in promoting nutrient uptake in the plantation given that Burundian soils are acidic. In collaboration with the University of Ngozi and ISABU, the research study on links between agronomic vigor, productivity and potato taste completed a preliminary report on households in the study and the initial soil analysis from the coffee plantations of these households. Capacity building of farmers by ADC and the cascading training offered on hillsides by lead farmers continued. BAP assisted four cooperatives in developing business plans for the installation on mini washing stations and we closely monitored the dry milling and export of the lots sold during the Prestige Cup competition. With the Coffee Sector actors BAP facilitated a lessons learned/evaluation session of the Prestige Cup which resulted in a series of recommendations for the Cup of Excellence, scheduled in August 2012. At the request of InterCafe BAP participated in an exploratory trip to the Korea Coffee Fair in Seoul and continued our assistance to the Burundi Chapter of the International Women's Coffee Alliance (IWCA).

Deliverables matrix for Coffee

Indicators	Results accomplished Q1 PY 5	Cumulative
Initiate a demonstration plot-based extension program to diffuse knowledge of improved production practices		
120 demonstration plots established with BAP Lead Farmers from years 1-3 with a minimum of two techniques implemented in each demonstration plot.	45 demonstration plots established	134 demonstration plots established
10 InterCafé agronomic technicians trained	19 agronomics technicians trained (13 from DPAAE and 6 from federations)	19 agronomics technicians trained (13 from DPAAE and 6 from federations)
6 training workshops organized with InterCafé for DPAAE personnel and Communal Agronomists in Best agronomic practices for Coffee	5 workshops organized (2 in Kayanza, 1 in Ngozi, 1 in Muyinga, 1 in Kirundo)	6 workshops organized (2 in Kayanza, 2 in Ngozi, 1 in Muyinga, 1 in Kirundo)
At least 4 Fiches in Kirundi and French produced for use by BAP and InterCafé on each of following techniques: organic fertilizer application; mixing organic and chemical fertilizer use; composting; water management & harvesting; sequencing the renewal of	3 fiches produced on organic fertilizer application, on composting and on coffee diseases	3 fiches produced on organic fertilizer application, on composting and on coffee diseases
Initiate an applied research program to capture demonstration plot results to identify most effective measures for reducing cyclicity		
Research Program study protocol and filed instruments produced	The protocol produced	The protocol produced
Data collected from BAP demonstration plots and U.Ngozi/ISABU research plots	Data collected	Data collected
Preliminary results report for 2011 season	The report produced	The report produced
Final report for 2012 season	Not yet	Not yet
Conduct a demand-driven training program for new CWSs not yet practicing improved processing techniques introduced by BAP in prior years		
30-40 representatives from new Pilot CWSs trained in quality enhancing techniques	Not yet	Not yet
At least 5 training workshops held in new pilot washing stations prior to the 2012 season	Not yet	Not yet
InterCafé staff trained on improved processing techniques	Not yet	Not yet
Work with InterCafé to set up and equip a Coffee Quality Center (CQC)		
MOU signed with InterCafé to launch CQC	Not yet	Not yet
CQC Business Plan developed	Not yet	Not yet
CQC equipped with cupping equipment and furnishings	Not yet	Not yet
Expand the corps of professional cuppers		
Training sessions are held to identify a new group of highly leveled cuppers, integrating younger university and Technical school graduates	Done	Done
At least 5 new lead coffee cuppers are selected	Done	Done
Newly trained Burundian Cuppers undertake exchange visits and are invited to cup at regional coffee events in East Africa	Not yet	Not yet
At least 2 Burundian cuppers receive internships with International Roasters to improve their capacities	Not yet	Not yet
A Cup of excellence completion is held to identify the highest quality lots in Burundi	Not yet	Not yet
A Cup of Excellence is held in Burundi	Not yet	Not yet
Put in place systems for controlling coffee washing station effluent run-off		
Pre-season, mid season and post season water analyses are completed and analyzed at 9 CWS with effluent control and 9 without effluent control systems	Done on 12 CWS with effluent control and on 5 without effluent control systems	Done on 12 CWS with effluent control and on 5 without effluent control systems
6 new CWS are equipped with effluent control systems	Not yet	Not yet
3 influent treatment systems are piloted at CWS equipped with effluent control systems and at least 1 water recycling system implemented with industry support	Not yet	Not yet
Support InterCafé to develop its capacity to promote and market Burundian coffee		
InterCafé participates with BAP training support to deliver presentations for one overseas trade mission, two international trade shows and at least one inward buyer mission.	One mission organized in Korea	One mission organized in Korea
InterCafé procedures manual developed for sending of overseas samples with attributed responsibilities	Not yet	Not yet
Data base of Burundian buyers created and used at InterCafé	Not yet	Not yet
Expand the core of CWS certified by the UTZ Kappah program		
MOUs with FLO and/or UTZ, InterCafé and relevant farmer Cooperative Federations to develop certification	Not yet	Not yet
At least 2 new CWS receive some form of certification	Not yet	Not yet
InterCafé begins to promote certification	Not yet	Not yet
Develop a coffee quality data base		
Data base created and provided to InterCafé	Not yet	Not yet
Sensory data classification scheme devised and systems set up for inputting cupping data	Not yet	Not yet
Internet accessibility initiated	Done, a internet site functioning	Done, a internet site functioning
Initial maps of taste profiles developed	Not yet	Not yet
Construct 3 new Mini Washing Stations and build capacity of farmer cooperatives to run them with production trials in 2012 season		
3 Mini Washing Stations are built with support from BAP	4 Mini washing stations built: dusangirjambo of Bwayi, Mboneramiryangoof Korane, Dusangirjambo of Karinzi, Kanovera of Ntamba	4 Mini washing stations built: dusangirjambo of Bwayi, Mboneramiryangoof Korane, Dusangirjambo of Karinzi, Kanovera of Ntamba
3 Farmer Cooperatives are strengthened with institutional, managerial and technical training. All will produce Business plan.	Not yet	Not yet
Help coffee producer associations implement income generating and agricultural diversification projects		
20 BAP activity grants given to coffee cooperatives to support income generating projects	10 coffee associations received grants in horticulture sector	10 coffee associations received grants in horticulture sector
At least 200 households benefit	334 households benefited	334 households benefited
Contribute to the on-going policy dialogue on the evolution of coffee sector regulation and disseminate information about reforms		
26 new radio broadcasts per year on coffee reforms	5 new radio broadcasts produced	5 new radio broadcasts produced
2 coffee reform panel discussions	Not yet	Not yet
5 Workshops organized with Provincial Governments on coffee reforms	6 workshops organized in Kayanza, Ngozi, Muyinga, Gitega, Kirundo and Bubanza	6 workshops organized in Kayanza, Ngozi, Muyinga, Gitega, Kirundo and Bubanza
1 radio publicity announcement per month	Not yet	Not yet
At least 1 white paper on coffee sector reforms	Not yet	Not yet

Activities undertaken during this Reporting Period

Improving Coffee Productivity and Stabilizing Cyclicality

During this quarter four principle activities were undertaken in this area.

First, the program organized a series of meetings with producers to evaluate the realizations of the first year and prepare the activities of the coming season.

Second, BAP hosted a workshop for communal and provincial administrators and cadre from the DPAE to inform them of the results of our efforts to improve coffee productivity.

Third, BAP agents monitored the pest management of demonstration fields, the application of chemical and organic fertilizers and we had a series of sample composts analyzed to determine their exact nutritive value

Fourth, BAP continued its partnership with the University of Ngozi researching the impact of improved fertilization on agronomic stress of coffee plantations and the link between agronomic plant vigor and the potato taste defect.

Meetings facilitated with producers to discuss the results of coffee productivity demonstrations

These meetings, held in the provinces of Kayanza, Ngozi, Kirundo and Muyinga were facilitated by BAP's Coffee component leader assisted by our field agronomists and coffee sector intern. In addition to lead farmers participating in the demonstrations, BAP invited ARFIC representatives, DPAE personnel and Farmer Federation representatives to attend the sessions.

A total of 144 participants attended these sessions, not counting BAP staff

Province	Producers	ARFIC	DPAE agronomists	Coffee Federation Representatives	DAI/PAIR	TOTAL
KAYANZA	48	1	2	0	4	55
NGOZI	46		0	1	5	52
MUYINGA	28	1	2	2	4	37
KIRUNDO	11	1	0	1	4	17
TOTAL	133	3	4	4	17	161

These workshops were an important method of informing the DPAE and Federation representatives of the first year's results from the demonstration fields.

Using data registered by the lead farmers themselves with assistance from the ADC and monitoring by BAP provincial coffee agronomists, individual results were presented, compared and contrasted with other from the province and the aggregated results of each province were compared with those of the other provinces. Farmers were thus able to see the impact different methods of fertilization could have on their productivity. We note that certain lead farmers, noting the non-performance of their traditional cultivation practices have proven reticent to repeat the control treatment of the demonstration in a second year, given that the

demonstrations convinced them that without fertilization the effort they invest in producing the coffee is in vain and they perceive no added value in losing potential production for a second season.

Workshop facilitated for communal and provincial level administrators and the DPAE

At the request of the governor of Kayanza, and in collaboration with WebCor, a workshop was held for 35 participants to sensitize them to our work on coffee productivity and motivate them to assure an intensified extension coverage of their zones in order to promote best agronomic practices for coffee production in order to improve year on year productivity of existing plantations. Participants included :

- 8 communal and provincial administrators
- 9 cadre from the DPAE
- 2 agronomists from the Kayanza farmer's federation
- 14 representatives from different coffee washing stations including those of WebCor, Codemu, Coprotra, SEGEC and the SOGESTAL; as well as
- 4 journalists

The discussions were accompanied by a field visit to demonstration sites in Mparamirundi. The DPAE informed participants that they have identified 11 lead farmers by hillside for to participate in intensified extension/demonstration activities during 2012 and requested that BAP assist them by training the communal agronomists and select agronomic monitors in these improved production practices.

The principal advisor to the governor of Kayanza who presided over this workshop made the following recommendations to participants:

- 1) Agencies concerned by the development of the coffee sector should ensure that the proper fertilizers are available in sufficient quantities to respond to farmer's demand and should monitor and document the distribution and application of the fertilizers
- 2) Communal administrators need to ensure that the communal agronomists and hillside monitors are aware of this new initiative and reestablish the lost practice of reserving Thursday's uniquely for extension activities on coffee; further the administrators need to develop and distribute a PV of the workshop to extension agents in their communities
- 3) The agronomists need to increase the number of meetings with sector actors to explain the results achieved to date and promote the adoption of the technologies and agronomic practices that have led to these results; and
- 4) The province requests that DAI/PAIR reinforce the competency of the agronomists and extension personnel intervening in the coffee sector within the province of Kayanza

Impact of these meetings on neighboring coffee farmers in proximity to lead farmers with demonstration fields

In Kirundo, follow on meetings were held by the BAP agronomist assisted by the ADC and lead farmers with farmers adjacent to the washing stations of Gasura, Rugerero and Ngogomo.

In Ngozi, 1 meeting was facilitated for farmers in the Rutanga washing station draw zone. Lead farmers trained 27 other farmers, using their demonstration plots as examples. Eighteen of the 27 farmers have already

replicated what they've learned, fertilizing 1775 coffee trees using organic manure. Nine of the 18 (50%) have instituted compost pits to provide organic fertilizer for their plantations during the month of February 2012.

One farmer Emmanuel KAYOBERA of the Butaha hillside in Gashikanwa commune began adopting the technologies after seeing the results on his neighbor Simeon Batakanwa's demonstration plots. Simeon explained to Emmanuel the demonstration protocol after which Emmanuel fertilized 50 of his coffee trees with manure. Already he notes that the physiological characteristics of the fertilized trees differ from the others in his plantation, being darker green and presenting fuller foliage.

In Kayanza, six meetings were facilitated in draw zones around the coffee washing stations of Buziraguihindwa (CPC), Butegana, Ruhororo, Karinzi, Mpanga (SEGEC), and COPROTRA. A total of 267 participants attended these sessions of whom 89 (33%) were women.

According to the report of our agronomist, no farmers in the Mpanga draw zone have ever used NPK fertilizer on their coffee plantations reverting uniquely to urea. Following training on the new production techniques these farmers are developing compost pits to produce organic fertilizer for application to their coffee plantations. This same dynamic is also being noted in the Buziraguihindwa draw zone.

Of the 49 initial farmers involved in the fertilization demonstrations, 32 have already extended fertilization to other coffee trees in their plantations and have trained an additional 13 farmers from surrounding hillsides in the techniques by inviting them to visit their demonstration fields.

Members of the new farmer's cooperative Kazoza N'lkawa of Mpemba in Matongo commune are motivated to produce and apply organic manures (compost and manure) to their coffee plantations. In total 503 farmers on four hillsides-Mpemba, Nyakibingo, Nyarurimbi and Matongo have applied compost to 13% (15,473 trees) of their total plantation of 117, 469 coffee trees.

We note that fertilizer purchases of NPK by farmers in Kayanza have increased from 100 mT in 2010/2011 to 240 mT by the end of this reporting period, according to data furnished by the farmer's Federation Bonakure.

Lead farmers in all provinces are converts to fertilization, be it mineral fertilization or organic. They are undertaking efforts to expand the fertilization from the small demonstration plots to their entire plantation. The farmers continue to complain about the high cost of mineral fertilizer, but also are concerned about the fact that fertilizer is not available in a timely fashion for those wishing to procure it. The recommendation is that InterCafe and the farmer's federations begin warehousing fertilizer at the washing stations in proximity to the farmers rather than in centralized warehouses in the provincial capitals.

Pesticide application was facilitated this year because the products arrived on time and were distributed efficiently to the communes.

Fertilizer Application to Demonstration plots

During the month of November, 134 producers in the provinces of Kayanza, Kirundo/Muyinga and Ngozi applied soil amendments to their coffee plantations. A total of 17,992 coffee trees received a fertility treatment. Twenty-three point three percent of trees received NPK, 21.7% received organic compost; 34.9% received both

compost and NPK and 19.8% received no treatment, remaining as traditional practice controls. In total 483.95 kg of NPK fertilizer and 102.11mT of compost was applied.

Province	Farmers	# of Trees	NPK	Compost/ Manure	NPK + Compost	Control	Kg of NPK used	Kg of compost or manure applied
Kayanza	49	5690	1422	1423	1422	1423	142,25	28450
Ngozi	50	8182	1641	1453	3833	1255	238,7	52860
Kirundo- Muyinga	40	4120	1140	1040	1040	900	103	20800
TOTAL	139	17992	4203	3916	6295	3578	483,95 kg	102110 kg

We note that 4 farmers with demonstration fields have refused to continue with their traditional practice controls. One of the farmers Madame Julienne Ntakarutima from the Gihororo commune of Kayanza who manages a demonstration plot with 125 trees explained her decision in the following way:

How can we continue to reserve a portion of our plantations with no application of fertilizer or manure when the figures in your reports show that unfertilized plants produce little coffee and that the coffee produced is of very poor quality with a high percentage of cherry that float and thus are rejected by the washing stations. Those who learn will succeed and we have learned so why should I continue an activity which requires great effort and loses me money?

To support the hypothesis that this decision is not due to reticence on the part of the farmers, we note that the 4 have purchased sufficient NPK fertilizer to apply to their control plantations while they augment the number and size of their compost pits.

Distribution of Equipment to Farmers managing demonstration plots

In order to facilitate the application of agronomic best practices for coffee by lead farmers managing demonstration plots in partnership with BAP, they were equipped with a selection of small equipment during this reporting period, notably a pruning saw, a shovel, a face mask, and a limited number of scales to weigh the harvest from the different treatment plots.

Item	QUANTITY				Total
	Ngozi	Kayanza	Kirundo	Muyinga	
Pruning saw	45	48	16	25	134
Dust mask	45	48	16	25	134
Shovel	45	48	16	25	134
Marking Pens	4	4	4		12
Scale	6	7	4	9	26

Analysis of Compost produced using coffee pulp as a substrate

Samples were taken from compost pits of demonstration farmers at the washing stations of Butegana and Kinyovu in Kayanza, Murambi and Rutegana in Ngozi and Muyinga during the month of October 2011. These were analyzed at the ISABU labs during the period of November and early December.

Physical Description of the Compost Samples

- 1) **Samples from Butegana and Kinyovu-** These compost pits were established 22 and 12 July respectively and samples were taken on 20 October 2011. The compost is principally composed of coffee pulp with Eragrostis straw and a small quantity of cow manure as ferment.
- 2) **Samples from Murambi and Rutegana-** The compost in Murambi began in early July, in Rutegana as of 18 July and samples were taken 13 October 2011. The principle substrate is coffee pulp. The straw used is derived from Eragrostis and Hyparrhenia with a small amount of cow manure to assist in fermenting.
- 3) **Sample from Muyinga-** This compost came from a pit that was established in 2010 and that had been sitting almost a year. The principle substrate was banana leaves.

The results obtained are:

Locality	Sample #	pH water	% C	% N total	% NH ₄ (Ammonium)	% NO ₃ (Nitrate)	P total %	K total %	Ca total %	Mg total %
Butegana	A 445	9,19	13,22	1,36	0,0038	0,0003	0,13	1,26	0,43	0,25
Kinyovu	A 449	9,4	13,39	1	0,0038	0,006	0,1	0,8	0,48	0,65
Murambi II	A 447	7,76	5,18	0,45	0,0046	0,0053	0,09	0,35	0,31	0,11
Murambi I	A 448	7,75	7,73	0,44	0,0046	0,005	0,05	0,55	0,26	0,13
Rutanga II	A 446	8,05	8,24	0,51	0,0078	0,0039	0,05	0,67	0,31	0,14
Rutanga I	A 451	8,4	8,43	0,47	0,00028	0,0098	0,08	0,43	0,53	0,13
Muyinga II	A 450	7,3	5,02	0,58	0,0053	0,049	0,08	0,63	0,39	0,17
Muyinga I	A 452	9,05	20,41	0,45	0,0015	0,011	0,19	4,38	1,22	0,51

The pH is basic which is an advantage for the acidic Burundian soils. The phosphorus and potassium are readily available for plant uptake, though P will attach to free radicals of aluminum in the soil and also has a secondary carry over effect in subsequent seasons. The nitrogen counts are a bit lower than expected but this may be due to delay between sampling and analysis. In general however, the compost compares favorably with internationally accepted norms and standards and recommendations made for organics of this nature are applicable for Burundi.

Initial Results of Research Activity under contract with the University of Ngozi

The University has finished its preliminary household study of the 72 households that will serve as hosts for the research initiative on links between agronomic vigor, productivity and potato taste defect. The final report should be available during Q2. At the same time initial analyses of soil samples from these farmers coffee plantations were received from ISABU.

Province	pH	% Total N	P in mg/kg	K in mg/Kg
Kayanza	5.41	0.1	15.62	6.54
Kirundo	5.78	0.17	19.13	8.84
Ngozi	5.43	0.18	31.22	7.2
Mean	5.54	0.15	21.99	7.52

The pH of the soil is acid but generally remains in the productive range for coffee, but a more detailed analysis of the results shows that fully 37.5% of the soils in Ngozi have a pH lower than 5.3. In Kayanza the percentage is 20.8, while in Kirundo only 16.7% of plantations were below this lower threshold. These results suggest that nitrogen will be less available to the coffee trees and that soil micro-organisms are less likely to be present. In order to increase adsorption of N it is suggested that the pH of the soils be elevated. One manner to do this would be through a liberal use of compost, which we have seen has a basic pH. A second possibility is to encourage liming of the plots.

The N(itrogen) content of the soils is below threshold in all cases, meaning these soils are poor in nitrogen and thus restrict the productivity potential of the plantations. The P(hosphorus) levels found are at the lower limit of the productive range, with only Ngozi province falling within standard (20-40mg/kg). Once again, the absence of sufficient phosphorus is likely to limit crop productivity. The mean potassium (K) levels of the soils are sufficient for optimal plant growth. Given that the potassium is generally a by-product of mulch decomposition, there is an indication that farmers are adopting this agronomic practice, though the quality, quantity and timing of the mulching still need to be improved upon. Detailed analysis however, relates a somewhat different story. An average of 37.5% of all households showed plantations deficient in potassium. In Ngozi this percentage rose to 50%. The high population densities found in Kayanza and Ngozi, limit the land area that can be dedicated to fallow, thus restricting supply of hay and other organic matter as mulch. This reinforces the argument that coffee farmers should be focusing on composting and on the application of this compost to their coffee plantations. Potassium is highly water soluble can quickly leave the rooting zone when applied as chemical fertilizer, but the nutrient is extremely important to plant woodiness and necessary for the production of fruit.

2) Capacity Reinforcement to Coffee Producers and their Organizations by ADC

During this reporting period ADC provided training to lead farmers from the draw zones of 32 washing stations in seven different provinces. Seven different themes were facilitated, one of which was related to the privatization process. A total of 2039 farmers participated in these sessions 28% of whom were women. Mean participation was 24.6 pp/session. ADC facilitated a total of 83 sessions during the reporting period. The most popular themes (# of pp x # sessions) were fertilization followed by discussion on coffee productivity results from the demonstration plots, composting and agronomic maintenance of coffee plantations. The greatest number of participants 171 was registered at the discussion on privatization of the coffee sector. Women's participation as a percent of total participants was greatest at sessions on composting, coffee productivity, agronomic maintenance of coffee plantations and privatization of the coffee sector. Women's participation was lowest at sessions on nursery production of coffee.

Training sessions facilitated by ADC for Lead Farmers at CWS during Q1

Module	M	W	%W	Total pp	#s	#pp/s
Agronomic Maintenance of Coffee Plantations	154	63	29.0	217	17	12.8
Fertilization	410	139	25.3	549	23	23.9
Composting	207	122	37.1	329	12	27.4
Pest Management	169	35	17.2	204	15	13.6
Coffee Productivity (discussion of results from demonstration fields)	278	124	30.8	402	6	67
Privatization of the coffee sector	124	47	27.5	171	1	171
Nursery production of new coffee plants	126	41	24.6	167	9	18.6
Total	1468	571	28.0	2039	83	24.6

Capacity Reinforcement to Coffee Producers and their Organizations by Lead Farmers

During this reporting period lead farmers facilitated a total of 139 training sessions on 119 sub-hillsides in the project zone. A total of 3934 farmers of whom 1436 (36.5%) were women attended these sessions. Effective participation (# sub hillsides x average pp/s) was 3368 of whom 1229 were women. In total six technical modules were developed. Of these the most popular judging by the number of sessions facilitated and the average pp/s were: Pest Management (46 sessions with an average participation of 40.1 pp/s) followed by Agronomic maintenance of coffee plantations (51 sessions with an average participation of 23.2 pp/s) and Fertilization 28 sessions with an average participation per session of 18.9 pp). Women's participation was greatest at sessions on composting (39.6%), agronomic management of coffee plantations (38.9%) and improved processing techniques for coffee (37.5%).

Module	PARTICIPANTS						
	M	W	% W	Tot	#sc	#s	#pp/s
Agronomic Maintenance of Coffee Plantations	723	462	38,9	1185	46	51	23.2
Fertilization	338	191	36,1	529	25	28	18.9
Pest Management	1198	648	35,1	1846	34	46	40.1
Composting	122	80	39,6	202	7	7	28.9
Improved processing methods for coffee	10	6	37,5	16	1	1	16.0
Nursery production of new coffee trees	107	49	31,4	156	6	6	26.0
Total	2498	1436	36,5	3934	119	139	28.3

Assistance to cooperatives for the development of business plans for mini-washing stations

A workshop was held in Banga for representatives of the three cooperatives (Kazoza N'lkawa of Bwayi, Dusangirijambo of Karinzi and Mboneramiryango of Korane) requesting BAP grant assistance for the installation of mini-washing stations with ecopulper technology. Present at the meeting were 15 cooperative representatives, 2 technical advisors, one each from the Federations of Kayanza and Gitega, 3 BAP ADC, and members of our coffee team. The workshop was facilitated by Stephan Jean Pierre, a consultant to BAP's coffee program. In addition to responding to technical questions necessary to complete the cooperative business plans, the consultant insisted that a separate "activity" committee be elected to manage the washing station and that this committee be composed of people who are not currently serving on the executive committees of the respective cooperatives. Throughout the day the participants impressed the facilitators with their knowledge of the projects, their production history, as well as their motivation to see the projects brought to fruition. The farmers for their part expressed concern about:

- Lighting at the washing stations
- Mobilization of funds in a timely fashion for the start of the activity in the 2012 coffee campaign
- Access to markets and market information and
- Access to credit from commercial lending institutions for operations at each mini washing station

The three business plans were completed during the month of December 2011 and submitted to USAID for approval early in the month of January 2012.

In addition to the initial three cooperatives, two others, one in Mugina, Province of Cibatoke and the other in Ntamba in the province of Bubanza approached the program for assistance in developing mini-washing stations.

The cooperative of Mugina, approached BAP for assistance in improving the water inflow to their proposed station, for funds to construct latrines, and for training in the setting up and managing of a coffee processing plant. This cooperative is already assisted by a NGO, ADISCO, that has set up a parallel multi-purpose cooperative (health mutual and mini washing station) structure in parallel with the coffee farmer's cooperative that already existed. This newer cooperative has as members, certain persons derived from the coffee cooperative, but also a number of people not associated with the original coffee cooperative. There has been no fusion of the two structures to date, leaving a confused situation in the field that is ripe for conflict. After a field visit to Mugina it was our technical staff's assessment that this activity could not be ready for the beginning of the coffee processing season. This was communicated both to the cooperative in Mugina and to Adisco. The ADC will continue to monitor the evolution of activities to see if assistance may be offered either for effluent treatment or for the construction of latrines and training in proper hygiene protocols.

The Cooperative Kanovera in Ntamba- This cooperative began activities in 2007 with 175 members. By the end of this reporting period that number had increased to 354. The cooperative's stated objective is to build and manage a mini-washing station for coffee and sell the processed coffee to the international specialty coffee market. The cooperative has already used its own funds to purchase 0.75 ares on the Buhoro hillside. The price paid was 4.285.000 FBU. Further, they have constructed on the site an office/warehouse complex that is 11m x 9 m valued at 12.975.000 FBU. The cooperative has submitted a business plan and grant request to BAP to supply them with an ecopulper and drying table equipment, as well as assisting in improving the inflow of water and control of coffee pulp and effluents and the construction of a bloc latrine. The value of the grant request is

50.200.000 FBU (64%) for a project valued at 78.098.900 FBU. Our technical assessment is that given the motivation of the members, the mobilization already accomplished and the infrastructure already completed, this project merits BAP assistance to see it through.

3) Promotion and Marketing Activities

During this reporting period, the following activities were undertaken in this domain.

- Monitoring the dry milling and expedition of lots purchased at the Burundi Prestige Cup Auction
- Participation in the Burundi delegation at the Seoul Coffee Show
- Validation with coffee sector actors of the principles for distributing the Prestige Cup premium to the winning farmers
- Evaluation of the Burundi Prestige Cup to draw lessons and make recommendations for the 2012 Cup of Excellence (COE)
- Establishment of the COE 2012 coordination committee and development of the calendar of activities for COE 2012
- Assistance to the Burundi Chapter of the International Women's Coffee Alliance (IWCA) for the planning of their activities

Monitoring the dry milling and expedition of the Burundi Prestige Cup lots

BAP's marketing and promotion specialist Lyse Kaneza, assisted by BAP quality control specialist Tharcisse Niyungeko stayed in permanent communication with BPC buyers for their milling instructions and played the role of liaison with SIVCA, the washing stations and the coffee exporters to assure priority dry milling, packaging of the coffee in grain pro bags and priority expedition from Burundi. BAP is pleased to note there was much enthusiasm on the part of different coffee sector actors- the SODECO, SIVCA, the SOGESTALS to ensure the final stages of the Burundi Prestige Cup went as smoothly as the competition. By the end of the reporting period all the purchased lots had been milled, one half had already arrived at their destinations and been paid for.

One slight problem developed with coffees shipped to Australia as the sacs arrived in less than pristine condition smelling of oil and diesel fuel. Luckily the grain pro inner liners protected the integrity of the coffee. A followup to find where the contamination occurred proved that it happened after chain of custody had been turned over from the dry mill to the exporter's agent. To wit the exporter's agent decided to transport the coffee in common carrier taxis from Ngozi to the airport, instead of using dedicated transport. During loading the sacs were placed beneath other commercial goods and a couple of jerry cans filled with diesel fuel. These spilled in transit causing the contamination. BAP informed the exporter's representative of the problem and made necessary recommendations to ensure an incident of this type does not recur.

Validation of the principles for the distribution of the quality premium to winning farmers

A meeting was held with the washing station managers of the washing stations that produced the 22 winning lots. All the owners signed a note of engagement to pay the producing farmers their quality premium once the buyer's money has been received. Further this event will benefit from media coverage to encourage farmers and others to participate in COE 2012. BAP expects payment to be effected during the first half of February 2012.

Participation with ARFIC and InterCafe at the Seoul Coffee Fair

InterCafe approached BAP about the possibility of sending its coffee value chain leader Emile Kamwenubusa to Seoul to participate in the Korean Coffee Fair from 24-27 November, 2011 and thus to explore the [potential of this Asian market. BAP accepted InterCafe's solicitation and our value chain leader travelled at InterCafe expense with the Burundian Delegation. In Korea a meeting was organized with more than 30 local roasters with assistance from TerraNova Coffee and the Trade Show organizers. The participants appreciated the presentation, the publicity materials presented and the quality of the Burundian Coffee that was prepared and served. The Korean market is quite upscale and there is great interest among the Koreans for Burundian coffee. Upon returning to Burundi, the delegation made a presentation to Burundi Coffee sector actors with recommendations and was asked to draw up an action plan to facilitate penetration of the Korean Market.

Evaluation of the Burundi Prestige Cup

A synthetic report on the Burundi Prestige Cup was written and submitted for validation to the organizing committee for validation. Once validated, ARFIC and InterCafe took responsibility for transmitting the final report to the Burundian authorities. On the 28th of December, the organizing committee for the 2012 Cup of Excellence was elected and their designation was formalized by a note jointly signed by ARFIC and InterCafe. In the new configuration the DG of SIVCA becomes a member, and new representatives of SODECO and CNAC have been elected. The calendar of events for the Burundi Cup of Excellence 2012 is:

16-20 July- Pre-selection of Samples and selection of National Jury Cuppers

13-17 August- Selection by the National Jury Members

20-24 August- Competition with International Jury members

17 October 2012- Internet Auction of winning COE lots from Burundi

Assistance to the Burundi Chapter of IWCA

Burundi is the first African Country to have an official chapter affiliation with the International Women's Coffee Alliance. Since beginning activities in March 2010, the chapter membership has increased from 40 to 70 women. Understanding that there is a niche market among specialty buyers for coffee produced by women, IWCA Burundi set as its objective for 2012 to present coffees for evaluation at the Cup of Excellence. To this end IWCA will organize training sessions in best practices for coffee targeted for women coffee producers. IWCA will continue to increase its membership and begin mobilizing resources through the sale of artisanal goods, eventually diversifying into livestock raising and crop production with a percentage of sales dedicated to IWCA. IWCA anticipates signing agreements with washing stations willing to process women farmer's coffee separately from that of men. Two stations in Kayanza are considered to be low hanging fruit for this initiative. Lots will be cupped and the best lots presented for COE competition with a special IWCA label. Challenges remaining are to find the necessary monetary resources to start their program; receive permission to use the IWCA label; find a mechanism to sell the coffee; find suitable buyers; receive authorization from Burundian authorities to market their coffee even though IWCA is a NGO and this cannot make a profit.

In the medium term IWCA wants training in water harvesting/water storage, composting, and the production of mushrooms to generate sufficient revenues to purchase land and build their own mini-washing stations.

Principle Coffee Sector Activities for Q2

- Assist farmers in the application of best agronomic practices for coffee
- Train DPAE agents at the commune level in these best practices to extend outreach of program efforts
- Prepare farmers from 3 cooperatives to receive Fair Trade Certification during 2012
- Collaborate with InterCafe for the installation of a Coffee Quality Center
- Reinforcement of Best Processing practices with the managers of partner washing stations
- Training cooperative members in the use of eco-pulping technology
- Training by ACE in roasting and intermediate cupping
- Vacuum packing of competition samples
- Assist with the organization and participation in key promotional events- EAFCA and SCAA
- Continue to assist with the organization of partners for activities related to the COE 2012

Dairy

Introduction

This reporting period was marked by two major events, the start of milk collection activities in Bukeye and electrical brown outs throughout the country that caused distribution for processed fresh milk products to the consumer level because cold chain integrity could not be guaranteed. In addition to these events we note that during this reporting period, the program facilitated the training of community veterinary agents, continued to monitor forage production and distribution as well as facilitating contact between major dairy processors in Burundi and a supplier of quality milk processing equipment in Europe.

Dairy Deliverables Matrix

Indicators	Results accomplished Q1, PY 5	Cumulative
Start improved fodder cultivation/enclosed production training activities to build capacity of new livestock groups		
MOUs signed between BAP and 6 new livestock groups with approval from Provincial DPAs covering 140 new farmers	Not yet	Not yet
20 new Lead Farmer training agents trained	Not yet	Not yet
3 new Communal Agro-Technicians Trained in improved livestock techniques	22 new communal agro-technicians trained (9 in Ngozi, 6 in Makamba, 7 in Muyinga)	22 new communal agro-technicians trained (9 in Ngozi, 6 in Makamba, 7 in Muyinga)
3 of the 6 Groups have enacted Livestock Development Plans initiated by the end of the year for improved production and associated economic activities	Not yet	Not yet
4 of the 6 groups operating with appropriate statutes and governance mechanisms		8 group operate with statutes and governance mechanisms
12 PO leaders/members participating in study tour to Kenya	Not yet	Not yet
Sign agreements with new groups to support improved productive practices		
6 agreements with POs signed	Not yet	Not yet
6 improved fodder trial plots/nurseries established 20 enclosed stables constructed with participation of groups membres	6 fodder trials plots established	6 fodder trials plots established
At least 20 Kg of improved fodder seed and 10,000 cuttings of penisetum grass are produced by farmer multipliers in each of the 6 Groups/Group members in year 3. At least 10 chop boxes and a similar number of manual hay balers disseminated	Improved fodder seed and cuttings of penisetum have been distributed to farmer multipliers and the production will be available in quarter 2. 5 chopping box and 5 bailing cases disseminated	Improved fodder seed and cuttings of penisetum have been distributed to farmer multipliers and the production will be available in quarter 2. 5 chopping box and 5 bailing cases disseminated
Build on past progress with groups assisted in years 2 and 3 to increase production volumes and introduce key new fodder crops		
30 Kg of fodder seed and 20,000 cuttings of hybrid Napier grass from ISABU are produced by farmer multipliers and distributed to group members in Bukéyé and Rutegama	Not yet	Not yet
At least 4 agreements made to begin transitioning dairy ADCs extension agents/communal agro-technicians to Pos	Not yet	Not yet
Implement a small farmer dairy productivity system		
500 "fiches de production" with milk production figures are distributed and being filled in by members in BAP assisted Pos	500 "fiches de production" with milk production figures distributed and filled in by members	500 "fiches de production" with milk production figures distributed and filled in by members
Begin a program of Artificial Insemination (AI) to improve the genetic characteristic of small farmer dairy herd		
10 of Communal Agro-Technicians trained and equipped with AI Kits	15 communal Agro-Technicians trained but not yet equipped	15 communal Agro-Technicians trained but not yet equipped
300 farmers in milk draw zones adjacent to MCC receiving 500 AIs during year	40 farmers received AI	42 farmers received AI
A target rate of success of 45% is achieved	A rate of success of 72.5% achieved	A rate of success of 72.5% achieved
Implement a vaccination plan on a cost-share basis with POs around Milk Collection Centers		
A minimum of 2 agreements signed with Pos in Bukeye to set up a system of veterinary services	Not yet	Not yet
At least 2,000 animals receive vaccinations	Not yet	Not yet
Undertake a training program directed at Communal Agro-Technicians		
50 communal agrotechnicians trained in bovine health and dairy hygiene and equipped with basic veterinary kits	22 communal agrotechnicians trained	22 communal agrotechnicians trained
Construct Milk Collection Centers (MCCs) for BAP grantees in Bukéyé and Rutegama. Bukéyé		
2 Grants for MCCs approved	Already done (MCC Bukeye and MCC Rutegama)	Already done (MCC Bukeye and MCC Rutegama)
2 MCCs equipped and ready to receive milk deliveries	Only MCC Bukeye is equipped and begun to receive milk	Only MCC Bukeye is equipped and begun to receive milk
Support the establishment of other MCCs by farmer groups and private investors		
Assessment for 2 new MCCs	Not yet	Not yet
Milk supply projections, animal census for 2 new MCCs	Not yet	Not yet
2 new MCCs enter operations	Not yet	Not yet
MCC Grantees receive capacity building in both technical and managerial requirements for operating MCCs		
Farmer households trained in hygienic milk handling and transport	Done	Done
Required staff/personnel hired and trained in MCCs operations (Bukeye and Rutegama)	Already done at MCC of Bukeye	Already done at MCC of Bukeye
MCC personnel study visit to Rwanda	Not yet	Not yet
MCCs receive help in establishing linkages to dairy buyers		
Model contract completed		Done

Supply contract(s) negotiated with processors /retailers		MCC Rutegama is linked to IAB processor and Ngozi farmer groups to Nyabisabo processor
Contract performance monitored /disputes arbitrated		Done
Development of training program for Burundian processors		
Workshop on cold chain management and EAC hygiene standards for processors		Workshop held and 20 persons participated
Development of Dairy specific training modules in French on proper hygiene principles and sampling/monitoring for EAC health standards	Not yet	Not yet
Individualized training based on needs assessment for each operational dairy processor and their staff	Not yet	Not yet
Help the national veterinary laboratory initiate a program of milk quality testing		
Study tour to RARDA (Rwandan Animal Resources Development Authority)	Not yet	Not yet
Assistance in Standard laboratory procedure development, use of milk testing equipment and interpretation of results		Training already organized, the equipment not delivered
A workshop will be facilitated with dairy processors, NVL staff and BBN personnel to discuss EAC health and hygiene requirements for fresh milk products, roles and responsibilities of each entity and the challenges to achieving compliance		Done
Support artisanal cheese production		
At least 1 BAP Activity Grant for improved cheese production	Not yet	Not yet
1 business plans produced	Not yet	Not yet
2 new cheese products are developed and test marketed	Not yet	Not yet
Packaging and branding are improved	Not yet	Not yet

Activities accomplished during Q1

Improving productivity and organizational capacity at the dairy farm and association levels

Capacity Reinforcement for dairy associations

During this reporting period BAP trained lead farmer/community veterinary agents facilitated 40 training sessions on 9 different hillsides in the communes of Rutegama and Ryarusera in the province of Muramvya. In total 2.303 participants of whom 27.7% were women participated in these sessions. Effective participation (# hillsides x mean participation/session) equals 516. A total of eight different modules were offered during this quarter. The most widely facilitated sessions were castration, dehorning and hoof care (7 sessions) followed by Filaria, worms and their treatment (6 sessions). Four themes were facilitated on 5 times on different hillsides, these are: Theileriosis, Birthing, Advantages of permanent stabling and Milk Hygiene. The most popular modules, judged by the number of mean participants per session were Theileriosis (120.2 pp/s), Advantages of permanent stabling (99 pp/s) and milk hygiene (82.4 pp/s). Women's interest was greatest for the modules on Theileriosis (35.8 pp/s), milk hygiene (26 pp/s), advantages of permanent stabling (24.2 pp/s) and filarial, worms and their treatment (15.33 pp/s).

	Module	Sessions	Participants			Xpp/S	X W/S
			M	W	Total		
1	Signs of a sick animal; stable hygiene	4	62	22	84	21.00	5.50
2	Tick transmitted diseases	3	57	16	73	24.33	5.33
3	Filaria, Worms and their treatment	6	212	92	304	50.67	15.33
4	Castration, dehorning and care of hooves	7	82	21	103	14.71	3.00
5	Theileriosis	5	422	179	601	120.20	35.80
6	Birthing	5	175	56	231	46.20	11.20
7	Advantages of permanent stabling	5	374	121	495	99.00	24.20
8	Milk Hygiene	5	282	130	412	82.40	26.00
	Total	40	1666	637	2303	57.31	15.80

Training sessions assured by the ADC

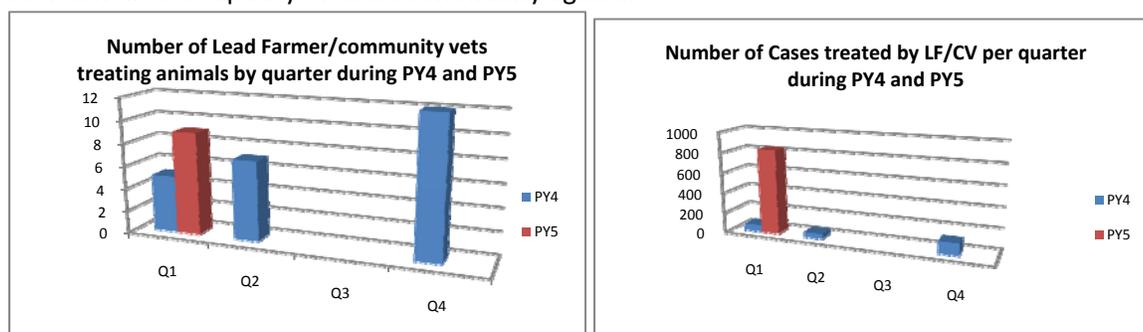
During the present reporting period ADC from two provinces (Muramvya and Ngozi) facilitated training sessions for dairy farmers in their respective provinces. In total 30 sessions were held with a total of 328 farmers of which 209 (64%) were women. Six themes were treated as may be seen in the table below. Mean participation per session was 10.9. The themes receiving the most attention during this quarter were forage multiplication (10 sessions), monitoring of forage production (8 sessions), hygiene and milk quality (6 sessions), followed by improved cattle rations (4 sessions). Wmen's participation was greatest at sessions on improved cattle rations (95.5% of pp), followed by forage multiplication (65.1% of pp) and Hygiene and milk quality (64.2% of pp).

Themes facilitated for dairy farmers	# provinces	Province	# Ass.	Participants			# s	Moy/s	% W
				M	W	T			
Improved cattle rations	1	Muramvya	4	2	42	44	4	11.0	95.5
Hygiene and milk quality	1	Muramvya	15	43	77	120	6	20	64.2
Using the milk production management tool	1	Muramvya	1	4	1	5	1	5.0	20.0
Multiplying forage crops	1	Muramvya	12	38	71	109	10	10.9	65.1
Monitoring forage production	2	Muramvya	1	6	4	10	1	10.0	40
		Ngozi	4	20	12	32	7	4.6	37.5
Composting	1	Ngozi	2	6	2	8	1	8.0	25
Total	2			119	209	328	30	10.9	63.7

Treatment of animals by Lead Farmer/Community Veterinarians

Compared to the first quarter of PY 4 when only five of the LF/CV were treating animals in their zones, this reporting period 9 were providing services to farmers on their hillsides. The number of cases treated has risen from 64 in Q1 of last year to 830 during this reporting period, suggesting that dairy farmers are increasingly

confident in the capacity of these community agents.



The table on the following page shows that these LF/CV treated 13 different types of conditions during this reporting period. A total of 7 hillsides provided information. The conditions most frequently treated are theileriosis, filarial, and internal parasites (worms). On four hillsides the agents assisted in the birthing of new calves.

	Condition Treated	# hillsides	# of Cases treated
1	Theileriosis	6	401
2	Filaria	3	250
3	Foot and Mouth Fever	3	10
4	3 Day Fever	1	1
5	Worms	6	79
6	Deticking	1	25
7	Mamitis	1	2
8	Cuts and bruises	1	8
9	Diarreah	1	3
10	Dehorning	5	20
11	Galls	1	2
12	Synchronizing cows in heat	1	1
13	Assistance in Birthing	4	28
	Total	7	830

Improvement, diversification, production and re-distribution of forage crops

The ADC of Muramvya facilitated training sessions in forage nursery production for farmers on four hillsides as well as for cadre of the DPAE. In total 48 persons participated in this training including 11 agricultural monitors of the DPAE. Women represented 29.2% of all participants.

In Ngozi the re-distribution of Pennisetum cuttings has started to occur. To date 19 farmers from 6 hillsides have produced 12.67 mT of forage and distributed 580 stalks of Pennisetum, equal to 8700 cuttings. The 12.67 mT of forage is enough to provide 422 days of supplemental feed rations to one improved race cow weighing 400 kg.

Genetic Improvement of cattle in the Milk Collection Center Draw Zones

Last quarter we reported on the training of the veterinary technicians for artificial insemination. In Bukéyé of the 42 cows who were inseminated, 31 are pregnant and 11 have returned to heat. The success rate from the AI is

73.8% which is quite high. To assist in genetic improvement of animal stock while waiting for the AI technicians to be equipped, the farm in Bukéyé has accepted to have one of its young improved race bulls provide stud service to interested dairy farmers for 10.000 FBU/opportunity when the going rate for this type of service is 15.000 FBU/opportunity.

Training of Communal Veterinary Technicians

At the request of the General Livestock Directorate of the Ministry of Agriculture, BAP trained 22 communal veterinary technicians from zones that are not currently covered by development project assistance in the provinces of Ngozi, Makamba and Muyinga. The curriculum covered:

- Bovine pathology
- Reproduction
- Feeding of ruminants under zero grazing schemes
- Critical surgical interventions linked to ruminant birthing
- Surgical interventions for large and small ruminants
- Common toxicological issues with domestic animals
- Production and proper storage of milk and milk products
- Managing a veterinary pharmacy
- Managing a boutique selling veterinary supplies and feed supplements
- Providing technical expertise for meat quality control

The trainees found the material interesting and useful, but solicited the project to provide them with the basic equipment necessary to practice the techniques they had learned.

Milk Collection Operations (Bukéyé)

The MCC in Bukéyé opened for operations 1 November 2011. In two months of operations they have collected a total of 11,586.5 liters of milk from dairy farmers in the draw zone, an average of 186.88 liters/day. During this time, only 153 liters of milk (1.3%) have been rejected for quality issues. With a purchase price of 550 FBU/liter, this means that in two months of operations the MCC has injected 6.288.425 FBU back into the community. By the end of December 58 farmers, including 16 women from 8 different hillsides were regularly providing the MCC with milk. Members of six dairy associations were participating in the activity.

Dairy Farmers serving the Bukéyé MCC during Q1

Hillside	Men	Women	Total
Banga (Kayanza Prov)	4	0	4
Gahaga	6	0	6
Gaharo	1	0	1
Kibogoye	0	1	1
Kiziguru	16	10	26
Musumba	2	2	4
Nyamirambo	4	0	4
Rweteto	9	3	12
Total	42	16	58

MCC Rutegama

Construction of the MCC in Rutegama began in June 2011. By the end of this reporting period the major portion of the construction had been completed but outstanding issues included hooking up water and electric utilities, finish work for the building including windows, doors and locks and the completion of a septic system. Most of the equipment needed to render the MCC operational are already in place but some smaller equipment – graduated milk buckets, milk cans, and alcohol guns are on backorder with the supplier. Electric hookup will cost the association 5.4 million francs, but they have negotiated to pay this in installments and have already deposited 2.726 million FBU with REGIDESO.

Technical Assistance to the National Veterinary Lab

For six days during November Irwin Foreman assisted the Burundi National Veterinary Lab with training in the following areas:

- The preparation of Standard Operating Procedures (SOP) for the laboratory
- Guaranteeing quality of service in analysis
- Articulation of roles and responsibilities between the NVL, meat inspection service, the milk collection centers and dairy processors
- Measurement methods for health norms and standards
- Laboratory organization
- Organizing human resources inside a laboratory
- Analytical quality control
- Monitoring sample collection
- Calibration testing and registering data at the laboratory
- East African Dairy Quality norms and standards
- Assuring the quality of milk during the pasteurization process
- Future training needs

His STTA report is furnished as annex 1 of this report.

Training of Dairy Processing Technicians

A one day workshop was organized during November 2011 for quality control and production personnel from the principle operating dairies in Bujumbura. Six participants representing three dairies, the national veterinary lab and the Managing Director for Livestock at MINAGRIE, participated in this workshop. Topics covered included: quality control and assuring sanitary conditions during processing, maintaining cold chain integrity, hygiene and the milk processing line. Principle constraints include: limited participant access to technical information and lists of potential equipment suppliers; lack of mastery in the processing steps for different milk products; little knowledge of the structure and functioning of the installed milk processing equipment; and little application of basic sanitary measures and/or cleaning of equipment leading to shortened shelf life for dairy products. Given the current situation of generalized electrical brownouts in Burundi, participants expressed strong interest in developing extended shelf like products- yoghurts and cheeses, sterilized and Ultra High Temperature (UHT) milk.

With a growing market for dairy equipment for collection and processing and interest expressed by the sector for direct contacts with suppliers, BAP arranged for the commercial representative of NIKOS to visit Burundi

during his East African prospection tour to meet with interested parties. Three current processors and two potential clients met with the Nikos representative during his stay and are currently in price negotiations to source their needed equipment.

Principle Activities planned for Q2

- Training of MCC personnel in Rutegama
- Training of lead farmers in milk hygiene, hygienic storage and transport of milk to maintain quality
- Opening of the Rutegama MCC
- Acquisition of Artificial Insemination equipment and improved race semen
- Effective start up of AI activities by BAP trained technicians
- Training Dairy processing personnel in the production of extended shelf life yoghurt
- Continued training of NVL staff

Horticulture

Introduction

One of the most important seasons for BAP's horticulture efforts was 2011C in 7 of Burundi's 12 regions. This season was characterized by a fast pace in achieving field activities, particularly around the identification, implementation and monitoring of horticultural demonstration plots (demoplots). The data presented as evidence for the results reached during this quarter have been collected and cross-checked by the horticulture team in Bujumbura in close coordination with the ADCs.

In many cases, the activities reported were conducted at a small scale to teach farmers improved practices and better crop management alternatives, but the results of some plots resulted in significant economic impact for the participating farmers. This underlines the importance demonstration plot implementation has had on targeted communities. Quick results at the farmer group level motivate other individuals and organized groups to follow the same practices in search for higher revenues. Additionally, in most cases, such increased revenues have led to more jobs and better environmental stewardship of the limited resources farmer groups own. This is exemplified by several success stories as discussed further in this report.

This section presents tables and summaries on achievements and activities carried out during the present quarter. It closes with a brief review of success stories where, with the help of the newly-acquired knowledge and facilitated inputs by BAP, farmers have been able to achieve in one season the income, livestock and land they could not afford in many years of hard work.

Summary of Horticulture Deliverables Q1

Indicators (Target for 30 Sept 2012)	Results Accomplished this quarter	Cumulative Results vs Workplan Targets
Increasing productivity through improved agronomic practices		
Number of grants signed (30 small grants)	28 in horticulture	29
Number of demonstration plots (demoplots) established (45)	10 among which 9 were established in 3 new provinces (Ngozi, Kirundo and Muyinga)	34
New farmers trained in modern agronomic techniques. (1000)	1339 farmers trained of whom 789 (58.9%) were women	2689
Volume of vegetables produced increase (demoplots)	23 T	53.79 mT
Revenue from vegetables increase	4.76 million FBU	11.84 million FBU
Reinvestment increase by 2011C demoplots owners (20 Assns)	15 associations and 9 individuals	22 associations and 9 individual farmers
Improving Marketability of Products Introducing Best Practices		
Farmer groups/individuals trained on the use of the wooden box to protect their products (50)	1 group and 1 individual	13 farmers in 6 associations
Farmers trained on post harvest handling (storage of onions) (400)	168 farmers trained on harvest and storage of onion of whom 106 (63.1%) were women	
Farmers trained on GAPs and GMPs. (600)	353 farmers in total were trained of these 224 or 69.1% were women	565 farmers trained
Nursery Business Plans Developed (30)		24
Simple irrigation systems are established using models of treadle technology developed by KickStart in Kenya (3)		20 treadle pumps and one hand pump are installed and operational
Link with Other Institutions and DPAEs to Support Horticultural Expansion		
DPAE rural monitors taking responsibility for horticulture demo plots. (10)	19 DPAE attended nursery on farm training	31 cadre of the DPAE, including 6 Rural monitors have participated in this activity
Best agronomic practices replicated with lead farmers	Nursery and raised beds replicated in granted projects(47 times), trellising replicated 2 times	
Field Days facilitated for farmers with media coverage		6 field days in 5 provinces but only 1 radio broadcast total participation 331 of whom 177 (53.5%) are women
Number of students trained on entrepreneurship (10)	5	12 (7 from Fac Agro and 5 from Fac Econ at the U Ngozi)
Number of Extension bulletins in Kirundi and French produced and distributed	Extension brochures for production of green pepper, tomatoes, onions, cabbage, amaranth and eggplant finalized	176 demonstration field guides distributed in 17 provinces.
Number of exhibitions attended	World food day exhibition attended	

Activities undertaken during Q1

Season 2011- C Demo Plots

In 20 of 24 demonstration plots established in seven provinces the improved practices demonstrations produced better than the traditional controls. In Matongo province of Kayanza province the traditional controls for cabbage and green pepper produced better than the best practices fields. We note too that the demonstration field for tomatoes in Muruta Commune of Kayanza Province, did not produce, as the field was destroyed by a hailstorm.

In Gitega the control plot for onions and the improved production plots established in the commune of Gitega showed no significant difference from each other. Data from the onion demonstration in Giheta commune, however, had improved practices producing better than traditional controls by 57.5%.

Mean sales prices for tomatoes averaged 250.09 FBU/kg, but were highly variable with a high of 472.78 FBU/kg for tomatoes produced in the commune of Gihanga, Province of Bubanza to a low of 88.02 FBU/kg for tomatoes produced in the Mutaho commune of Gitega Province. Certainly the Bubanza tomatoes benefitted from the proximity of the Bujumbura market while those in the province of Gitega were discounted both for the poor quality of the traditionally grown tomatoes and the softer, upcountry market.

There was no significant difference in the average sales price of tomatoes from the control plots vs the improved practice plots- in fact the control plot tomatoes sold for slightly higher prices per kg (228.51 FBU/kg vs 224.36 FBU/kg).

With an average sales price of 250.09 FBU/kg and seasonal input costs for tomatoes averaging 453,077 FBU a farmer needs to produce 1811,66 kg per 10 ares (18.12 mT/ha) to break even in season C. To cover costs of replanting in a successive season the farmer would need to produce double this (36.24 mT/ha) before any off take of profit was realized. While improved practices are shown capable of attaining these yields, it is clear that market timing of production is vital and market price differentiation based on quality of product delivered are key to farmer success as the margins are razor thin.

Average sales price for onions was 513.1 FBU/kg, with a high of 1000 FBU/kg for onions from Makamba marketed during January 2012 and a low (288.3 FBU/kg) for onions from Giheta commune of Gitega province. Early harvest onions were placed in direct competition with onions coming from Tanzania, but an OBR crackdown on these importations in late December restricted supply and rendered Burundian onions more competitive in the market.

Where differentiated information is available, we found that onions produced using improved production practices garnered higher average market prices than those grown under traditional cropping practices (359.4 FBU/kg vs 252.5 FBU/kg), a positive price differential of 42.3%.

With the average sales price of 513.1 FBU/kg a farmer needs to produce 5.94 mT/ha of onions to break even under an improved production scheme or double this (11.88 mT/ha) if they plan to reinvest in a 2nd season.

Given that our improved practices demonstration fields yielded only 9.18 mT/ha on average, farmers adopting this technique will need prices to rise to 29.4% to an average of 664 FBU/kg to break even if they expect to plant in a second successive season.

Cabbage pricing followed the trend for onions with improved practice cabbage garnering an average of 54.84 FBU/kg vs 48.82 FBU/kg for cabbage grown under traditional conditions (an increase of 12.3%). We note, however, that cabbage is rarely sold on a per kg basis, more often it is sold by head or by sac. The improved practice cabbages were larger than those produced traditionally, meaning production sales stretched further when the cabbage was wholesaled by the sac and that there is retail market differentiation for pricing based on the size of head produced, with head sized correlating with improved quality at the consumer level.

14 of 24 demonstration plots generated more revenue than it cost for consumable inputs to produce them; however only 3 of 13 demonstration plots generated sufficient revenue to cover the cost of consumable inputs for producing in a second successive season. All three plots grew tomatoes. Two of the three are located in Gihanga Commune of Bubanza Province, one is located in Mutimbuzi Commune of Bujumbura Rural. Gihanga being located in the Imbo plain at low altitude and with high temperatures means that tomatoes have a shorter growing cycle (quicker maturation time once fruiting begins) than those grown at altitude and are less susceptible to fungal attacks due to lower humidity. The demonstration plot in Mutimbuzi has similar environmental conditions to Gihanga, though it is at a slightly greater altitude (839 m vs 810 m). The soil in Mutimbuzi is poorer than that of Gihanga, with high permeability, thus retaining less water in the rooting zone which is one reason why yields suffered on this demonstration field. This site could benefit from reverting to organic soil amendments (compost or manure) rather than using 100% chemical inputs. The organics would permit better soil water retention and improve soil structure as well as rendering needed plant nutrients in a time release fashion. The Association in Mutimbuzi compensated for lower yields by timing their production effectively to benefit from higher sales prices for their tomatoes because they produced before the market was saturated with product. A second demonstration field in Bujumbura Rural actually out produced the fields in Mutimbuzi but the product was sold at a discounted price 44.9% lower than that of the association in Mutimbuzi due to the fact that his harvest coincided with a period of overabundance in supply. This exhibits just how thin the margins are for these perishable crops and how important it will be to time production going forward.

Tomatoes in the flatlands of Bubanza and lower altitudes of Bujumbura Rural performed well in these demonstrations. Of particular importance to improved productivity was the vertical trellising as well as the improved plant vigor resulting from improved nursery practices. The trellising should be able to be recycled through two growing seasons, but prices and market timing remain important factors in rendering this activity profitable without project support. To further reduce costs the farmers should explore planting *Leucaena*, *Calliandra* or *Grevillea robusta* as windbreaks delimiting their land. These multipurpose trees can provide animal fodder and trellising materials.

Two additional demonstration fields, both in Matongo Commune of Kayanza Province, exhibit potential to cover costs of inputs in a second season, for cabbage and green pepper, as the amount of money needing to be injected from outside, in addition to revenues generated in order to plant a second season is 30.000 FBU or less.

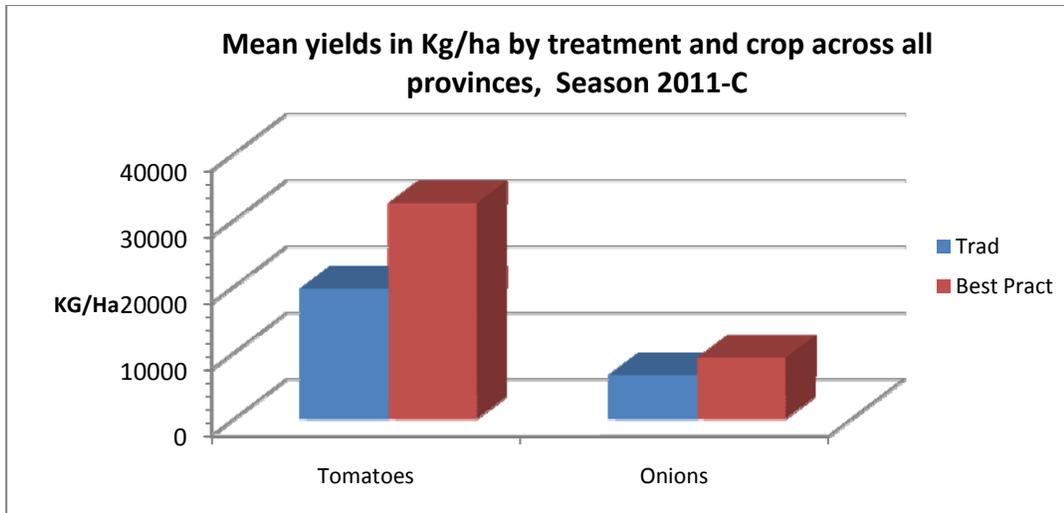
These two trials underperformed. First with land at a premium due to high population pressure the control and demonstration plots needed to be separated. In the case of the cabbage demonstration, the control plot was a)

larger than the improved technology plot, b) the control plot was set up nearer the water source and c) it was begun earlier than the improved technology plot. In one of the cabbage demonstration fields the treadle pump hosing broke down and the association reverted to hand irrigation of only the control parcel, thus production on the improved technology plot was compromised due to hydric stress. We note that the soils in the Matongo low lying areas are quick drying and do not retain moisture well and thus require frequent irrigation and close monitoring. The variety of cabbage used in the demonstration (oxylus) is preferable to other varieties because it is resistant to fungal attack and therefore pest control is limited to aphids and caterpillars, reducing the amount, frequency, and cost of pesticide applications. The green pepper trial in Matongo, in addition to suffering from differential placement and size of the fields was compromised when the farmer sold his field to a local retailer before harvest was completed so only partial results of the harvest are available for interpretation. It is interesting to note that green pepper, if provided with NPK fertilizer and regular foliar applications of nitrogen can produce for up to 5 months after harvest begins. The farmer who sold his field started up a separate business selling horticultural seedlings to his neighbors. This netted him 140.000 FBU in supplemental income.

Of the other 9 demonstration plots, three associations have converted their revenue assets from crops to livestock, one association bought land, one association rented land, no information is currently available on how two of the associations plan to use the revenue, one association plans on using the revenue generated from the demonstration plot as the community contribution toward leveraging a BAP small grant and the final beneficiary purchased acreage and improved his own personal living conditions by renovating and expanding his house.

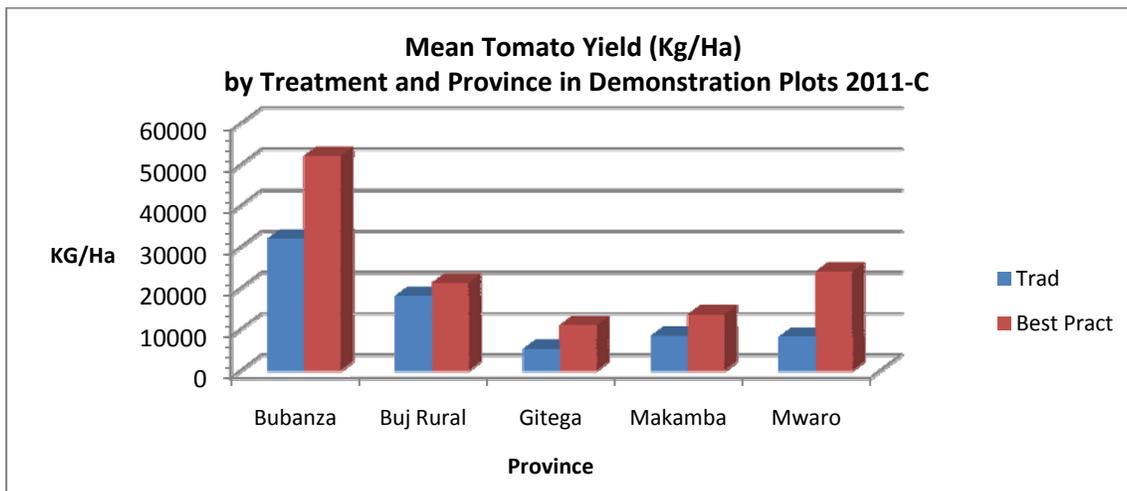
10 of 24 demonstration plots were unable to cover input costs and therefore lost money. For six of these we have no information available how the revenues were used. One association will use the money earned from the demonstration plot as its contribution toward leveraging a BAP grant, one has used the money to purchase a cow, and the remaining two have invested in seeds for the next growing season.

Sixty percent of these plots produced tomatoes. In Makamba province, the tomatoes produced with the improved treatment out yielding the control by 95.1%, however low market prices render this crop unviable commercially at the current time in the province. First the associations need to work on timing their production so they either produce at the beginning or the tail end of the market cycle when demand outstrips supply. Further, the farmers believe that the vertical trellising led to increased crop failure as the birds used the trellis as a perch to feast on the tomatoes. In Makamba the ideal time to produce would be for sale in July (meaning nursery set up in late March). In Mwaro the improved production practice treatment out yielded traditional controls by greater than 170%, but production was economically unviable because harvest occurred at peak season in late September/early October when the per kg price of tomatoes had dropped to 100 FBU/kg. Had production been timed for an August harvest, the profitability equation might have been different.



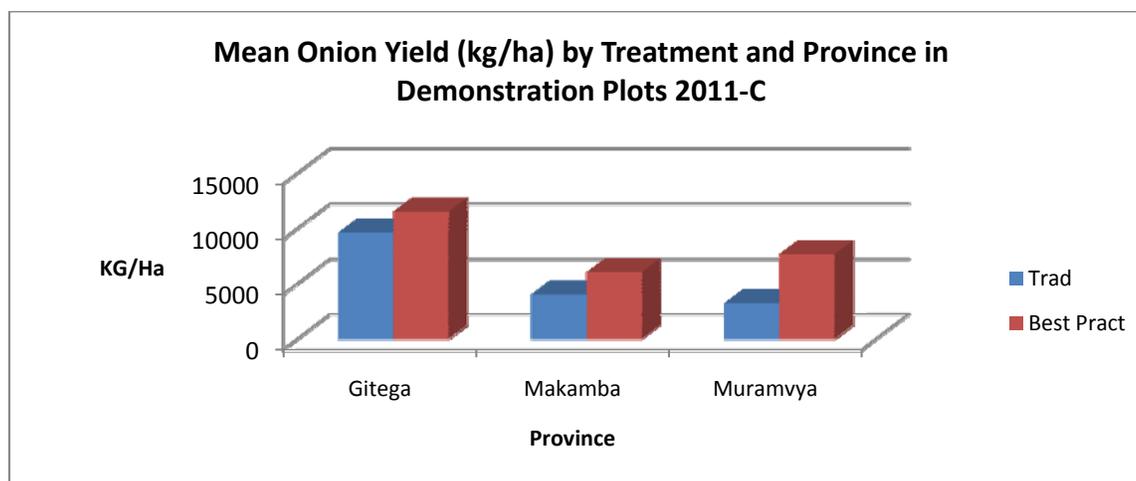
Demonstration plots showed that farmers could increase yields of tomatoes by 88.4% (from 19.6 mT/ha to 32.5 mT/ha) through the adoption of improved practices and yields of onions could be improved by 38.8% (from 6.6 mT/ha to 9.18 mT/ha) under best practices when compared with traditional production methods.

The following figure shows that improved practices gave better yields than traditional ones when growing tomatoes in every province where these trials were run. Greatest improvement in productivity vs controls was noticed in Mwaro and Bubanza provinces. The least difference was noted in demonstration fields of Bujumbura Rural. Even where differences were less noticeable, adoption of improved practices resulted in yield increases of 26%, while in Mwaro improved technologies out yielded traditional practices by 189%.



As the Figure on the next page illustrates, demonstration fields of best practices for onions in Gitega, Makamba and Muramvya provinces out yielded traditional practices. Greatest yield increases due to improved technology was noted in Muramvya province 139% improvement; while in Makamba increases due to improved technologies yielded 50% more than the control plot. Meanwhile in Gitega improved practices improved yields by only 19.8%. This said, it is true that yields of onions were higher in Gitega province than in any other,

regardless of the treatment. Even traditional practices for onions in Gitega out yielded improved practices in Muramvya province by 25.7%, suggesting that environmental conditions for the production of onions in Gitega are more ideal than those found in other provinces where demonstrations occurred.



2012 –A Season Demonstration plots

Nine new demonstration plots have been initiated in the provinces of Ngozi, Kirundo and Muyinga during this reporting period. Site placement for the plots and crop choice has been finalized. GPS coordinates have been noted. Memoranda of Understanding in both Kirundi and French have been negotiated and signed. The first training for the establishment of the improved nurseries has been completed and the required inputs and non-expendable equipment –excepting mineral fertilizers and pesticides have been provided by the Program.

Coordinates of the 2012A season demonstration plots

#	Farmer group	Province	Commune	Hillside	Crop	Latitude	Longitude	Alt (m)	Surface (ha)
1	Duhuze	Ngozi	Ngozi	Gakeceri	Onion	S02°53.434	E029°46.461	1674	0,088
2	Remesha amahoro	Ngozi	Gashikanwa	Kivumu	Tomatoes	S02°54.334	E029°53.740	1735	0,084
3	Dufashanye	Ngozi	Kiremba	Gitanga	Cabbage	S02°50.872'	E029°56.876'	1465	0,095
4	Twijukire ibikorwa	Kirundo	Kirundo	Runyonza	Green Pepper	N/A	N/A	N/A	0,10
5	Abasangirakivi	Kirundo	Kirundo	Runanira III	Green Pepper	S02°53.434'	E029°46.464'	1308	0,10
6	Kameniyobweze	Kirundo	Busoni	Nyagisozi	Green Pepper	S02°27.512'	E030°17.584'	1328	0,10
7	Mudahemuka	Muyinga	Gasorwe	Karimbi	Cabbage	S02°49.941	E030°16.179'	1692	0,10
8	Abagwizanyanya	Muyinga	Butihinda	Buhorana	Tomatoes	S02°38.108	E030°21.545'	1598	0,10
9	Tugirisuku	Muyinga	Muyinga	Nyamaso	Tomatoes	S02°49.765	E030°19.923'	1650	0,10

Best cropping practices that will be highlighted in these fields include- improved nursery seedling production, fertilization schemes, planting density, weeding and safe pesticide application.

In addition to these 9 new demonstration plots, 18 of the previous season's demonstration plot managers (associations or individuals) have reinvested the revenues generated from the 2011 C season into production during the 2012 A season (see Annexe 2). Of these 18, sixteen have reinvested in horticultural crops and 2 have invested in rice production. Of the 12.658.740 FBU generated in revenue from the 2011 C horticultural season 3.813.300 (30.1%) has been reinvested in agricultural production, 81.1% of this amount was re-injected in horticultural production. Further the 18 associations have increased their land area under production 168% from 1.8 ha in 2011 C (demonstrations) to 4.83 ha in 2012 A with their reinvested funds. Horticultural crops being

produced include cabbage (4), green pepper (3), beans (2), leeks (1), passion fruit (1), tomatoes (6), eggplant (1), and onions (2). In addition to rice, small land areas have been dedicated to maize, sorghum and groundnuts. Different than rice, these latter crops have been intercropped with the horticultural production rather than being monocropped.

Best practices adopted by these farmers following the demonstration of techniques in the 2011 C season include use of improved nursery (16) , planting on raised beds (3), and trellising (2) of tomatoes. Eleven farmers adopted one new technology while five adopted two of the horticultural best practices being demonstrated.

Small Grants in Horticulture

During this reporting period the program completed achievement of the first milestone for the 60 small grants signed to support production and marketing of horticultural crops by associations in all 12 provinces of the project zone. This number includes 20 women's groups and 11 typically "coffee associations" who are diversifying their income streams to include horticultural activities.

This activity benefitted substantially from the groundwork laid by demonstration activities undertaken during the 2011 C agricultural season. Detailing the steps and developing a project planning calendar was facilitated. The ADC had been trained in best horticultural practices were experienced in the improved technologies and thus able to participate in training activities. Experience monitoring the execution of the different steps in the cropping calendar has been brought into play, all of which contributed to our being able to quickly achieve the setting up and training in improved nursery practices which was the first deliverable.

During this reporting period ADC received training of trainers in the setting up of improved nurseries facilitating the replication of this knowledge to our 60 small grantees. Input and equipment distribution to grantees occurred in a timely fashion. Training modules covered during this reporting period are given in the table below.

Topic	Farmer group #	Prov. #	# attendees			# of sessions	Attendee/ session	% of Women
			Men	Women	Total			
Nurseries	55	11	443	536	979	59	16.6	54.7
Composting	29	4	23	86	109	10	10.9	78.9
Planting density	1	1	2	12	14	1	14	85.9
Irrigation	1	1	1	8	9	1	9	88.8
Spraying	3	3	13	9	22	3	7.3	40.9
Trellising	1	1	6	0	6	1	6	0
Assessment of demoplots activities	1	2	0	32	32	3	10.67	100
Harvest	8	3	62	106	168	16	10.5	63.0
TOTAL			550	789	1339	94	14.2	58.9

In total 1339 farmers participated in these sessions, including 789 women (58.9%). A total of eight modules were offered in 94 different sessions. The most popular sessions were: improved nurseries (59 sessions) followed by harvesting (16 sessions) and composting (10 sessions) , the assessment of demonstration plot activities and how

to properly apply pesticides (3 sessions each). Women's participation was highest at sessions on assessing demonstration plot activities composting.

Training in Best Agronomic Practices for Horticulture

A total of 353 farmers 69 % of whom were women assisted at trainings in this domain during Q1. Eight different modules were offered in 43 different sessions across the project zone. The most popular sessions were: monitoring demonstration fields and cultivating vegetables (11 sessions each) followed by record keeping (9 sessions) and monitoring harvest results. Woman's participation was greatest at sessions on hygiene/water (100%), vegetable cultivation (85.9%), and monitoring harvest results (72.2%).

Sub-theme	# provinces	# Associations	# of attendees			# of sessions	# of attend/session	F%
			M	F	T			
Hygiene, water	1	1	0	2	2	1	2	100
Demo fields record keeping	3	5+1 ind	26	31	57	9	6.3	54.39
Harvest follow up	1	3	10	26	36	4	9	72.22
Environment preservation	2	2	9	5	14	2	7	35.7
Farmer groups activities assessment	1	2	10	10	20	2	10	50
Fields follow up	5	6	25	46	71	11	6.45	64.79
Vegetables cultivation	3	16	19	116	135	11	12.27	85.93
Crops maintenance	2	2	10	8	18	3	6	44.44
TOTAL			109	244	353	43	8.2	69.1

Partnership with other Institutions

- a) **University of Ngozi** During this reporting period five students from the economics department participated in three modules of Entrepreneurship training facilitated by the Burundi Business Incubator under contract from BAP. These modules were: First Steps to becoming an Entrepreneur; Business Concepts; and Business Planning. Further BAP sourced improved horticultural seed for eggplant and amaranth from the University to be used in demonstrations with farmers at multiple locations during the 2012 B agricultural season.
- b) **CNTA-** The MOU was signed, the grant agreement was approved for a joint effort promoting canning of fruits/vegetables and solar drying in partner communities. The equipment necessary to build the prototypes has been procured and they are in process of being built at CNTA for use in the field during Q2

c) **DPAE**-As part of BAP's disengagement/sustainability strategy we have sought to forge closer ties with DPAE and their staff in the provinces where horticultural demonstrations are on-going. Extension staff has been invited to attend technical training sessions and to participate in the implementation/monitoring of the activities. During this reporting period the horticulture team registered the following participation at its hosted events. In sum 8 ADC in six different provinces mobilized 19 members of the DPAE for training and implementation activities. We note that in only one of these provinces (Muramvya) does BAP have a formal collaboration agreement signed with the DPAE, supplemental to the technical convention we have negotiated with the Ministry of Agriculture. From the results obtained it appears that the interpersonal relations between BAP's field agents and the DPAE is more important to field collaboration than formal signed agreements. Where confidence has been built and activities are producing tangible results, the extension service agents appear ready and willing to improve their capacities.

ADC	Province	# DPAE attendees		Comments
		Training on improved nursery set up	Nursery implementation	
Philippe	Kayanza	1	1	Both were field extension agents (MINAGRIE)
Ernest	Ngozi	4		2 assistants de zones and 2 MInagri agents
Romuald	Muramvya	1	1	The same person (MINAGRIE)
Jacqueline	Muramvya	2		2 MINAGRIE for training
Fiston		2	3	1 communal agronomist and 1 MINAGRIE extension agent for training 1 communal agronomist and 2 MINAGRIE extension agents for implementation
Desire	Mwaro	2	1	2 MINAGRIE extension agents for training, 1 for implementation
Oscar	Bururi	0	1	1 MINAGRIE extension agent
Romaine	Kayanza	1	1	The same person (a communal agronomist) for training and implementation
8	6	13	6	
Total DPAE attendees		19		

Lessons Learned

- 1) Farmers are from the "Show me" State-** Farmers believe what they can see with their own eyes. This is one reason why demonstration plots with proven technological packets being grown side by side with traditional practices can lead to accelerated changes in farmer's methods. This approach does, however, require in trained extension personnel, in proximity, to accompany the demonstrations and facilitate discussions of the dynamics being observed. Once farmers see the difference a technology like vertical trellising can make in improving the productivity and quality of their harvest, voluntary adoption and replication of the technology quickly occurs. Technologies being promoted should be efficient, productive, proven, and cost effective. Where improved inputs are used, their quality and agronomic vigor need to be assured. In sum all precautions necessary need to be taken to ensure that the technology being highlighted, succeeds need to be taken. Farmers need to be encouraged to visit the demonstrations and ask questions and documentation on the protocols being promoted should be readily available in local language, with simple diagrams, graphics and pictures, in color, if at all possible.

- 2) **Timing of Production and Sales Price are key factors determining profitability for horticultural production-** Farmers who timed their production so harvest occurred at the beginning or end of a cropping cycle had more market opportunities than those whose production fell at peak. Placing product in markets with higher demand than supply empowered farmers during price negotiations. Price thresholds at peak are below production costs when using improved technology. In the future farmers will need to disaggregate their product sales based on quality and will need to be educated in the components of their cost structure so they may better price their product to maximize potential for profitability
- 3) **Horticultural crops are very weather sensitive and meteorological forecasts in Burundi are often unreliable-**Hailstorms , high temperatures and winds coupled with torrential rains all negatively impact the highly sensitive horticultural plants and soft skinned fruits and vegetables. While raised beds can improve soil rooting structure and drainage and ultraviolet sheeting can shade seedlings and protect them from the heaviest rains, transplanted plants are highly susceptible to environmental stress in the 10 day period following replanting in the field from the nursery. Knowing when inclement weather is likely to strike with a degree of certainty allows farmers to take precautions to protect their crop. Without this certainty, it seems useful to recommend that horticultural farmers invest in plastic tunnels and greenhouse structures.
- 4) **Improved Market information and linkages are important –** Farmer knowledge of prices at different market in Burundi, tied to an assessment of differential crop demand and transporter capacity are decisional tools that can assist in determining when and where to sell produce. Publishing this information through local language radio broadcasts is recommended
- 5) **Post Harvest losses remain high-**Horticultural products are highly perishable care needs to be taken to minimize postharvest loss and quality reduction due to issues related to drying, storage or transport. Technologies like the cageot and solar driers can help and should be widely promoted as should post harvest conditioning of product, drying under proper sanitary conditions and differentiation of markets based on quality parameters.

Planned Activities for Q2

- Document results from 2012 A demonstration plots
- Documentation of results and impact from demonstrations and small grants
- Implementation of new demonstration plots for 2012 B season
- Training of DPAE staff in Best Practices for Horticulture
- Technical training materials are replicated and disseminated in French and Local language to clients and partners, including the DPAE agents, in the project zone
- CNTA will offer training in solar drying and canning

Success Story-Improving Women's Welfare by reducing irrigation costs and time invested in seeking water



Figure 1-Women using an India Mark II pump for irrigation

Dufatanemunda II is a woman's association composed of 18 members, 2 of whom are men. It was created in 2002 in Gihanga Center in Bubanza Province. Initially an organization promoting social assistance and reconciliation in the community, the group started by growing rice together and using the revenues from the rice to improve member's lives and to provide financial support in case of emergencies. Half of their members were illiterate and none of the members had access to sufficient capital to access improved agricultural technologies.

BAP assistance began in 2009 with the ADC providing capacity reinforcement in organizational and institutional management of a producer organization. Further literacy training offered through BAP trained two of the members as trainers of others and they, in turn trained the eight illiterate members of

the association in reading, writing and basic math in Kirundi. The group received technical training in Good Agronomic Practices and Best Management Practices for Horticulture.

During the 2010-C and 2011-A seasons the group faced water shortages due to renovations being performed on the irrigation canals in the rice perimeter where they usually rented land and grew horticultural crops between rice seasons. The association reverted to hauling in water by bicycle from 1 km away at a cost of 150 FBU per plastic container. To water 10 ares cost the association 175.800 FBU.

With water procurement becoming an expensive and time consuming chore, the association accepted to partner with BAP in irrigating from a hand dug well. The digging and construction, carried out by Association members supervised by BAP resulted in a well 11.5 meters deep. Labor contributed by the association to this effort was valued at 452.800 FBU. In the first season, the association grew tomatoes, green pepper, amaranth and eggplant and earned 1.102.700 FBU. BAP's initial efforts to source a treadle pump capable of providing 12 meters of suction head failed. In the first season after the well was dug, the association resorted to hand pulling water from the well using a rope and plastic cans. This was a heavy and costly task resulting in expenses of 225.000 FBU for irrigating 10 ares during a 90 day growing season. Time savings were considerable vs the previous system and the risk of non-production due to drought was reduced. In Sept 2011 an India Mark 2 hand pump was sourced and installed. Labor cost for irrigation decreased to 90.0000 FBU over the 90 day growing season.

Once water was assured BAP assisted the association in setting up a demonstration plot for tomatoes using Best Horticultural Agronomic practices including an improved nursery, raised beds and trellising. The results of this demonstration plot were encouraging as the association deposited 636,700 FBU from earnings into their account at the CECM microfinance bank. Some of this money has since been reinvested in growing tomatoes, green pepper, eggplant, onions and peanuts during the 2012- A season. The Association has increased their land area under horticultural production from 10 to 18 ares.

Success Story-A successful demonstration field leads to emulation in Bubanza



Canut Harerimana is a farmer on the Kizina hillside in Mpanda Commune of Bubanza Province. He has grown vegetables since 1982 using only traditional agronomic practices. One year he planted a hectare of tomatoes and the majority of them rotted in the field before they could be sold.

In June 2011 he accepted to partner with BAP to develop a demonstration field to showcase best practices for tomato production on 45 ares of his land. Three principle techniques were showcased- planting density, proper fertilization and the use of trellising.

When his harvest was completed and sold at the end

of September he had earned appx 2.3 million FBU. Part of his earnings was re-invested in the production of tomatoes during the 2012-A season, part went for household needs, and a remaining amount was deposited to savings.

Witnessing the success of the demonstration plot, a number of neighboring farmers on Canut's hillside have begun to replicate the practices during the 2012-A season. M. Juvenal Ndarihonye is one such farmer. Juvenal is 36 years old and the father of four. During November he planted a field of tomatoes in proximity to Canut and has applied the best practices, particularly the trellising on his land in the hopes of attaining a good harvest. With the revenue he expects to earn, Juvenal expects to a) increase his land area under production and b) diversify into other economic activities particularly commerce.



Juvénal NDARIHONYOYE applique les techniques agricoles apprises sur le champ de démonstration de Monsieur Canut HARERIMANA

Cross-cutting Components

Gender and Micro-Enterprise

Introduction

Principle activities for the reporting period in this technical area included:

- Preparation of 20 small grant dossiers for women's groups from seven different provinces
- Identification of local organizations capable of coordinating a second round of literacy activities for our clients and
- Continued capacity reinforcement of producer organizations in institutional and organizational management and business skills

Activities undertaken during Q1

Small Grants

Twenty small grant dossiers were developed with women's associations in seven provinces during this reporting period. An additional two dossiers in beekeeping were edited and should be financed during Q2.

Province	# of Women's associations	Activity	Total Grant amount in FBU
Bururi	3	Cabbage, Onions	13.740.980
Bubanza	3	Onions, Green Pepper	5.906.350
Bujumbura rural	1	Onions	1.204.990
Cibitoke	1	Soap making	2.915.000
Gitega	1	Cabbage	898.480
Kayanza	1	Onions	1.044.710
Kirundo	1	Cabbage	1.953.810
Makamba	1	Amaranthe, cabbage	1.691.705
Muyinga	1	Onions	1.456.560
Mwaro	5	Cabbage, tomatoes, onions and carrots	5.582.100
	1	Beekeeping	7.000.000
Ngozi	1	Cabbage	657.210
TOTAL	20		34.051.895

Capacity Reinforcement of Producer Associations

During this reporting period 1232 leaders of farmers associations, including 848 women (68.83%) benefitted from capacity reinforcement in organizational and institutional management, as well as business development skills.

Organization and management of producer associations

Module	# provinces	Provinces	# Associations.	Participation			# sessions	Eff/S	%W
				M	W	T			
Producer Organizations	3	Ngozi, Muramvya, Kayanza	9	13	51	64	7	9.1	79.6
Miutes of Meetings	1	Cibitoke	2	1	6	7	2	3.5	85.7
Association Executive Boards	2	Makamba, Bubanza	3	5	18	23	3	7.6	78.2
Conflict Management in an association	2	Bujumbura, Cibitoke	3	9	16	25	3	8.3	64.0
Activities planning	5	Kirundo, Ngozi, Bubanza, Bururi, Bujumbura	36	39	116	155	15	10.3	74.8
Documentation of activities	1	Gitega	1	4	2	6	1	6.0	33.3
Rights, roles and responsibilities of association members	1	Gitega	1	5	4	9	1	9.0	44.4
Income generating activities	2	Bujumbura, Gitega	4	2	34	36	4	9.0	94.4
Evaluation of Literacy activities	1	Kayanza	1	0	9	9	1	9.0	100.0
Evaluating the pertinence of training themes	1	Kayanza	5	0	21	21	1	21.0	100.0
Defining an income generating activity	1	Bujumbura	1	2	10	12	1	12.0	83.3
Developing vision	1	Kayanza	1	4	14	18	1	18.0	77.7
Total			67	84	301	385	40	9.6	78.0

A total of 67 associations participated in capacity reinforcement in this area during the current reporting period. Twelve different themes were offered to associations in 10 different provinces within our project zone. The most popular theme proved to be activities planning, offered to 36 associations in 5 provinces in 15 separate training sessions. This was followed by the theme creation of producer associations (9 associations in 3 provinces offered in a total of seven sessions. Not surprisingly, given the emphasis this quarter on small grants, the theme income generating activities was the third most popular theme with four associations in two provinces benefitting from 4 training sessions. Effective participation (# of sessions x mean # of participants/session) was 384. Women represented 78% of participants.

Management of an Association's finances and Inventory

Sixty eight associations in seven different provinces benefitted from a total of 28 sessions in this technical area covering a total of 10 different technical modules. In total 336 clients participated of whom 233 (69.3%) were women. The most popular sessions this reporting period were: Managing association inventory (11 sessions) followed by Financial management of producer associations (4 sessions) and Annual profit and loss statements (only 3 sessions but grouping 24 associations) followed by using receipts, purchase orders and inventory control sheets (3 sessions with a total of 22 associations).

Theme	# Provinces	Province	# associations.	Participation			# sessions	X pp/s	%ge W
				M	W	T			
Marketing: Who are the clients ? How can we meet their demand ? Pricing of products	1	Bujumbura	1	4	6	10	1	10.0	60.0
Financial management of Producer Assns.	3	Cibitoke, Bujumbura, Makamba	4	9	16	25	4	6.2	64.0
Managing Association inventory	6	Bujumbura, Muramvya, Kayanza, Gitega, Cibitoke, Ngozi	11	25	78	103	11	9.3	75.7
Maximizing productivity while minimizing cost	2	Gitega, Kirundo	2	9	15	24	2	12.0	62.5
Profit and Loss Statements	2	Ngozi, Cibitoke	24	29	40	69	3	23.0	58.0
Petty Cash Register	1	Kayanza	1	0	24	24	1	24.0	100.0
Using receipts, purchase orders and inventory control sheets	2	Bujumbura, Ngozi	22	16	41	57	3	19.0	71.9
Marketing plans, cash flow analyses, costing		Bujumbura	1	6	4	10	1	10.0	40.0
Profit distribution /allocation in producer associations		Bujumbura	1	5	5	10	1	10.0	50.0
Calculating profitability of an Income Generating Activity		Cibitoke	1	0	4	4	1	4.0	100.0
TOTAL			68	103	233	336	28	12.0	69.3

Development of Income Generating Activities

Thirty eight associations in 10 different promises participated in 64 sessions of capacity reinforcement in this area during the current reporting period. A total of 461 persons participated of whom 314 (68.1%) were women. More associations in Muramvya province benefitted from this sequence of training sessions than any other province. However, one fourth of all participants attended sessions in Bururi province, followed by Bujumbura Rural and Muramvya provinces. This suggests that in Bururi the activity was divided into sub-themes, while in Muramvya the ADC grouped associations for capacity reinforcement in this area.

Province	# of associations	Participation			# sessions	X pp/s	%W
		M	W	T			
Bujumbura	3	30	46	76	10	7.6	60.5
Bubanza	4	4	52	56	9	6.2	92.8
Cibitoke	1	0	2	2	1	2	100
Makamba	3	9	12	21	7	3	57.1
Mwaro	1	0	7	7	1	7	100
Kayanza	3	39	10	49	5	9.8	20.4
Gitega	6	16	40	56	8	7	71.4
Bururi	3	24	81	105	16	6.5	77.1
Muramvya	13	20	44	64	6	10.6	68.7
Kirundo	1	5	20	25	1	25	80
Total	38	147	314	461	64	7.2	68.1

Identification of a local organization for Literacy Training

During Q1 the TDR for recruitment of a local organization capable of offering proximity literacy services under contract with BAP for women leaders in our project zone was developed.

The RFP was published in December and offers will be analyzed and contracted during January 2012.

Radio Emissions AKEZAKARIGURA with Radio Isanganiro

Two emissions dedicated to this component were organized during Q1. One, in October, with the Association Kazozakeza of Mubinga and Bizoza of Bukirasazi in Gitega province, and one in December with six women's associations in Kayanza province.

The emission from Gitega recorded on October 14th. The Association Kazozakeza spoke of how literacy training offered by BAP assisted them in becoming better organized and more financially transparent. The improved management of their association's budget and equipment has translated to better management of household finances by the women members of the association. The Association Bizoza's principle activity is sewing. Literacy has assisted in diminishing the number of conflicts between members. The association's books are open to all members and so everyone can see how much money has been spent and how much has been earned through their activities. The increased revenue has assisted in improving the economic well being of the members and their families.

During the second emission, recorded in Kayanza province 8 and 9 December 2011, the women insisted that literacy training had improved their capacity in management and, as a result of better management, the associations are better organized, and they have been able to institute savings and loan programs for their members using association resources. For the women of Kayanza, what they have learned through the literacy program is more valuable than any financial grant they might have received as it is a durable resource that they may use for years to come.

Participation in the East African Women's Entrepreneur Exchange Network (EAWEEEXN)

For this conference hosted by AFAB from 3-5 October 2011, BAP sponsored the participation of 30 rural women as well as the participation of 3 artisans at the trade show associated with the conference. Burundi has been chosen as the headquarter's country for this network and the women artisans found that their goods were of comparable quality with those from other countries, sold some merchandise but found the networking opportunities to be of greatest importance.

Assistance to IWCA/Burundi in developing its Strategic Plan

BAP co-financed a workshop on 9 and 10 December 2011 for 32 women members of IWCA from across the interior of the country to develop an action plan for 2011-2012 and to develop income generating activities to assure the long term sustainability of the organization. The women members wish to improve their mastery of improved agronomic production practices for coffee. Further they wish to produce organic manure, create handicrafts for sale and invest their earnings in livestock particularly cattle, goats and chickens, as well as in the production of mushrooms.

Constraints encountered during Q1

- Women members of associations are time constrained. If they are able to find one day per week for association activities, it is not evident that they are able to find 1 to 2 supplemental days for capacity reinforcement activities.
- Certain associations and their members resist change, innovation and the introduction of new technologies. Most of these groups were established during the crisis to receive and manage hand outs from Humanitarian and Refugee Relief Organizations. Instead of seeking to transform themselves through the running of income generating activities, these associations wait for direct aid and thus retain an attitude of entitlement and dependence.
- Women need the introduction of time and labor saving technologies as they are oversubscribed in terms of responsibilities. One of the biggest time wasters is the daily research for fuel wood. Introduction of fuel efficient stoves would reduce the time invested in collecting fuel wood and free the women up to partake in other activities.

Recommendations

- It is necessary to closely monitor the use of grant funds in the execution of income generating activities to ensure the activities are well managed and to document the results and impacts
- Development of Management tools should be integrally tied to the development and implementation of income generating activities to add tangible real world experience to the theory. When our clients see firsthand how the tools and record keeping can impact governance, transparency and profitability of an activity in which they have invested then they are more likely to adopt the tools for the long term. Further, once the value of the tools have been demonstrated tangibly, the women quickly adapt the lessons to other parts of their lives.
- It is important to start the second phase of literacy activities in order to complete the cycle and measure impacts before anticipated PACD on 30 Sept 2012.

Principle Activities to be undertaken during Q2

- Start second phase literacy activities with client associations in the project zone
- Monitor the evolution of grant agreements with client associations
- Continue Capacity Reinforcement for themes related to Institutional Development, Organization and Management
- Identify a partner to facilitate outreach of kitchen garden and improved wood stoves
- Facilitate organization of business language classes for 20 women from AFAB
- Introduce a system of grouped savings and credit with client women's associations

Grants and Financial Intermediation

Introduction

BAP small grants program moved into a positive new phase during the first quarter of PY5. 65 new grants were developed and approved between October and December 2011 as BAP ramped up grants activity to meet its ambitious work plan deliverable of approving 83 new grants while bringing prior year's grant commitments to conclusion within the next 14 months.

60 of the 65 new grants were generated as BAP Activity Grants which targeted BAP partner producer organizations and women's associations who are ready to leverage capacity reinforcement assistance received during the first three project years to initiate sustainable income generating activities. PTL Tom Lenaghan and consultant Damian Guillemineault, provided technical assistance and training on the development of income generating activity models with budgets and cash-flow estimates which allowed BAP grants staff, component leaders and field agents to work together to select and quickly assess various activities with profit potential.

Grant assistance requests from Sogestal Kirimiro, Sogestal Kayanza and the coffee Cooperative NKAMWAYACU of Muyinga province, were approved to construct waste water treatment and sanitation facilities at 4 new coffee washing stations.

In October, BAP submitted and received approval for the grant application from the *Centre National de Technologie Alimentaire (CNTA)* to promote and diffuse new technologies for preserving fruit and vegetables and reducing post-harvest losses. CNTA was awarded \$49,342 to produce and distribute, with BAP technical assistance, jointly-built solar dryer prototypes and canning material to 40 test groups in 4 provinces (Cibitoké, Bubanza, Makamba and Kirundo). The test groups will receive hands on training in canning and solar drying, the technical plans for the solar dryer models, and follow-on assistance to ensure proper adoption as well as support groups interested in building the solar dryers or implement canning activities on their own.

Activities undertaken during Q1

The table below summarizes results to date of BAP Q1 PY5 new grant activities.

Table 1: New Activity Grant Approvals

Sector	Target (#)*	Results to date (#)	% Complete	Target (\$)*	Result to Date (\$)	% Complete
Coffee – income generation	20	11	55%	\$60,000	\$16,919	28%
Coffee/environment – effluent control	6	4	67%	\$60,000	\$36,372	52%
Horticulture – production	30	29	97%	\$30,000	\$37,783	126%
Horticulture – institutional capacity strengthening	1	1	100%	\$50,000	\$49,342	98.7%
Gender	20	20	100%	\$60,000	\$26,194	44%
Dairy	6	0	0%	\$16,000	\$ -	0%
Total	83	65	78%	\$276,000	\$166,610	60%

*BAP 14 month work plan deliverables

13 grants were pending last quarter including 5 from the coffee sector, 3 dairy, 4 enterprise development grants and 1 grant for waste water effluent control¹. 5 grants were rejected including 4 horticulture and 1 effluent control grant. A detailed list of BAP approved, in process and rejected grants are included in an annex to this report.

The BAP grants management team received a boost in efficiency in its grants management process with the completed installation of a new grant management component on its *Technical and Administrative Management Information System (TAMIS)*. As its name communicates, TAMIS is an information management system developed by DAI that facilitates communication, information sharing and project management compliance coordination between DAI field offices and the home office in Bethesda. The new grant management component houses agreement templates, annexes, sample reporting formats, USG, USAID and DAI policies and procedures governing grants under contracts (GuC) in a centralized, automated and easily accessible database. 87 grants from PY3, 4 and 5 are now uploaded onto BAP's TAMIS system.

New Grant Activity Model

Consultant Damian Guillemineault, with assistance from BAP's Grants Manager Ladislav Habonimana, designed three income/cashflow models: one for horticulture, one for beekeeping (which was slightly modified for use for soap making), and one for small livestock projects (yet to be field tested). The idea behind these models was to be able to answer two questions:

1. Is the activity profitable (Revenue > Expenses) for two seasons?
2. Will farmers have sufficient income at the end of season 1 to finance season 2

With the help of Tom Lenaghan and Allison Williams, the technical terms and conditions for the grant agreement were devised and field tested with groups in Mwaro for horticulture and beekeeping activities. It should be noted that BAP attempted to take into account USAID guidance whenever possible. As such, the Horticulture grants are FOG/in-kind grants. Multiple attempts were made to structure these FOG grants with a cash disbursement mechanism but the combination of time constraints and lack of financial sophistication by grant applicants and recipients made this ultimately impossible. BAP did, however, incorporate the following clear requirements in the FOG/In-Kind model:

- 1) All grant recipients accompany local BAP ADCs to purchase improved seeds, and when possible, chemical fertilizer and pesticides (paid by the association as their contribution). BAP selected the local inputs supplier AVET as a sole source provider due to the fact that they are a trusted supplier of quality products and the only one located in five regions of Burundi. Linking farmers with a reliable supplier of quality inputs in-proximity reduces a key obstacle in promoting production under improved agricultural practices.
- 2) Associations receiving grant assistance for beekeeping activities must oversee the construction of modern hives. BAP provided each association with a construction diagram of a modern hive and

¹ Under the current funding cycle, effluent control and sanitation grants are budgeted under the Clean and Productive Environment earmark.

instructions to identify two or three local carpenters to build them. At the end of the project period, the associations will evaluate the quality of the hives made by each carpenter. The expected result is the creation of a local source of modern bee hives, as well as a new income stream for local carpenters. It also reduces beekeeping association's dependence on a sole supplier and encourages local competition. These measures will ultimately strengthen and Improving the honey value chain.

- 3) Improving use of savings accounts. One thing discovered during this activity was that the majority of grant recipients preferred to keep their money in an association cash box instead of with a financial institution. This is because many local FI's only offer draw or current accounts which charge monthly fees and have restrictions unattractive to the association members. Many farmers and association members expressed their perception of financial institutions as places that take their money for very little in return. Several associations had even closed their accounts. BAP decided, however, that ADCs will encourage these associations to open savings accounts in order to benefit from interest earned on such holdings.

All 17 BAP ADCs were trained in the field on thinking through and completing the model then challenged with friendly competition to identify and evaluate 3 activities with three different associations. Within two weeks – and after another round of follow-up training conducted by Mr. Guillemainault – 60 viable projects that met the two criteria established in the standard grant model were submitted.

Pending Grants and New Applications for Assistance

Cooperative KAWANZIZA resubmitted a revised assistance request to install anti-erosion terracing and boost soil fertility on their coffee plantation near CWS Kagombe in Muyinga Province. BAP evaluated their original request however it was submitted too late in the 2010/2011 coffee campaign. BAP expects to decide on an award in mid-January 2012 for the 2011/2012 campaign (\$3,362)

BAP has completed 2 of 3 business plans for the *Cooperative Mboneramiryango-Korane* (\$38,968), *Cooperative Kazoza n'Ikawa* (\$39,045) and *Cooperative Dusangirijambo* (\$39,372) to install mini-washing stations. These grants have been pending for some time however, due to their pioneering nature; BAP felt it critical to guide the cooperatives through the detailed business plan development process. BAP subcontractor Agri-Dev consultant Stefan Jean-Pierre completed the business plan for Dusangirijambo in December 2011 and will complete the remaining two plans in early January. BAP is confident it will receive a swift approval from USAID and have agreements signed by month end.

BAP is providing technical assistance to *Sogestal Kirundo – Muyinga* in completing its grant dossier to upgrade the effluent control system at their Kagombe coffee washing station to the configuration promoted by BAP, and by installing a rain water collection system (\$3,741).

BAP continued to provide technical assistance to three associations in finalizing their long pending grant dossiers:

- *Burundi Bio Agricultural Community (BBAC)* - increase milk production through installation of a veterinary inputs shop (\$8,807).
- *Programme d'Appui au Développement Social de Muyinga (PADS)* and *Le Groupement de Production Agro-Pastorale de Muyinga (GPAP)* – increase honey production through modern beekeeping (\$8,656 and \$3,565 respectively).

The following new requests for assistance were submitted in the last quarter:

- *Cooperative KANOVERA (Bubanza)* - Profiting from the recent in-country exercise with consultant Stephan Jean-Pierre to complete the business plans for mini-washing stations for the three cooperatives above, BAP's coffee and grants team was able to assist this new cooperative to complete a first draft business plan to install and operate a mini-washing station in Musigati commune (\$38,615).
- *Laiterie Nyabisabo (Bujumbura Mairie)* – Request for technical assistance in equipment modification and appropriate packaging to produce and market ESL or long life milk (\$7,700).
- *Fromagerie Saint Ferdinand (Ngozi)* – Equipment procurement to expand artisanal cheese production (\$32,887).
- *Christine NGARUKO, Nature Grown Burundi (Bujumbura Rural)* - Technical assistance in production, preservation and appropriate packaging from West African specialist to export the Helonica ornamental plant requested by import partners in Nairobi(\$3,434).

Financial Intermediation

From 7-9 December, EGAT/DC Africa Portfolio Manager Joseph Obi conducted a mandatory progress report visit to Bujumbura to review the utilization and performance of the \$3,000,000 DCA guarantee with Interbank. BAP accompanied Mr. Obi to his planned meetings with Interbank Burundi and the USAID Burundi Mission, as well as organized visits to two DCA loan recipients; the Laiterie Nyabisabo and l'Industrie Alimentaire de Buterere (IAB).

Key findings from DCA performance Report:

- IBB disbursed \$1,272,202 USD (42.4% of the facility) in DCA backed loans to 14 SMEs in agricultural value chains and one microfinance institution. The 42.4% disbursement rate is below USAID's 3 year target of 60%.
- The average term for the loans is roughly two years, with five loans of less than one year. The loans are for a variety of purposes, such as working capital, investment loans, and on-lending for Turame community microfinance bank.
- The loan sizes range from \$16,000 to just over \$300,000 USD. The average loan size is about \$105,000, which indicates that the majority of loans are to agro-processors, rather than directly supporting producers.
- More than half of the beneficiaries (8 out of 14 or 57%) are located outside of the capital city of Bujumbura. This is due to the fact that this guarantee focuses on agriculture, and as such many of the loans are provided in the rural branches outside of the capital.
- IBB reported a very positive experience with the DCA as it has allowed the bank to lend to previously unserved sectors such as dairy, and clients such as farmer cooperatives. The DCA has also allowed IBB to offering reduced interest rates. Typical interest rates for Interbank are 17.25%, while the rates for the DCA-backed borrowers are between 14 and 16%. A loan to Murambe Coffee was cited as an example of IBB allowing an interest free grace period (the borrower does not have to make interest payments) until the coffee harvest begins. Several borrowers who had no repayment issues were able to receive subsequent non-guaranteed loans.
- The bank credited BAP as being the driving force behind these disbursements due to the sector-specific training it provided to the bank and the recommendations of several quality projects for financing.
- Despite the positive experience, the bank has requested additional technical assistance and training from the mission to address some on-going challenges such as the bank's inability to offer long term financing, the fact that it has no specific products and has not done any marketing of the facility to date.

- BAP has been asked to work with the bank on these issues so that there is a steady stream of clients after BAP closes down. The bank feels it can spend the remaining \$1.7M of the facility in the next 4 years by exploring new sectors such as fish preservation, palm oil and fruit cultivation, and by making more loans to microfinance institutions.

Visit to Nyabisabo Dairy and the Buterere Food Company (IAB)

BAP's COP and Grants and Financial Intermediation Manager accompanied Mr. Obi on a visit to the Nyabisabo Dairy managed by Mr. Joseph BUTOYI. Nyabisabo dairy began operations in 2010 with the purchase of milk pasteurizing equipment bought with a 5-year DCA-backed loan in the amount of 170 million FBU (approx. \$141,670 USD). The dairy hired 15 workers and produces an average of 1,000 liters of pasteurized milk per day and various flavors of yogurt. In 2009, Mr. Juma MOHAMED launched IAB with a 369 million FBU loan from IBB and now has a 12,000 liter capacity to process pasteurized milk, fruit juice and water.

Lessons Learned:

1. A major problem in moving BAP's small grants program forward was the way in which the BAP field team thought about small income grants. Basically, no one could answer the following simple questions:
 - Will the farmer have more money in their pocket at the end of the grant period than before?
 - and
 - Will that money be enough for him/her to keep on doing said activity?

Also, no one was thinking in the following manner: to make money, it is easier to sell something that has a high sales price and a large demand. Many associations produce tomatoes, but the exercise revealed that tomatoes are expensive to produce (due to fertilizer needs, the price of tutors for the tomato vines), easily spoiled, not sold at a consistently high price (average seemed to be about 390 FBU a kg, though sometimes it could go up to 700 FBU a kilo), and are not eaten by a large majority of Burundians. Compare that to say, Japanese Plums, which are sold at a minimum of 2000 FBU a kilo, for which there is high demand, and has only one time high investment costs and little maintenance thereafter (one tree produces for 3 years, versus a tomato vine that must be replanted each season).

This way of thinking about profitability was the single greatest challenge, but once out in the open and discussed, it seemed to be widely accepted.
2. Collecting the basic production cost and market price information for the various proposed grant activities was a time consuming affair. The BAP horticulture team is now creating a database of these costs on installing nurseries, out-planting and selling a range of crops, particularly those with high sales prices. In the future, when designing a grant program aimed at income generation, it might be advantageous to design in the development of such a cost database as soon as the program's promoted crops are selected.
3. All DAI programs/projects should use the TAMIS system particularly if a project contains a grants component. If funding is an issue then DAI management should consider creative ways of assisting the field in obtaining TAMIS. USAID should encourage the use of technology by contractor/recipient organizations by recognizing MIS as appropriate for USAID funding.

Activities planned for Q2 PY5:

In order to achieve the deliverables set for fiscal year 5, the main activities planned for the second quarter are:

1. Complete remaining grant agreements documents for the “70 small income generating grant activities” in both French and English and deliver to grantees;
2. Work with dairy and coffee sector component leaders to develop secondary income generating projects for coffee producers;
3. Review close-out procedures and ensure final grant documentation is uploaded in TAMIS for closed grants;
4. Work with IBB and DAI finance specialists to develop a marketing strategy to increase the pipeline of credit applications under the DCA;
5. Upon receipt of password, set up and begin using the CMS DCA reporting system;
6. Technical support to partners in the preparation of their project and guide them in banks and microfinance institutions to access credit;

Clean Productive Environment (Formerly Community Water and Sanitation)

Introduction

BAP Community Water and Sanitation interventions from years 3 and 4 are being expanded to include broader environmental protection and coffee quality improvement technologies under the *Clean and Productive Environment (CPE)* earmark in year 5. During the reporting period, BAP's CPE team coordinated with the Coffee and Grants Management teams to conduct field visits to 6* new coffee washing stations interested in installing the BAP promoted model for waste water effluent control infrastructure and ventilated block latrines with hand washing facilities. Washing station operators (see table below) received technical assistance in designing schematics for system lay-out, estimating construction costs and developing associated budgets. Washing stations Gatara owned by Sogestal Kayanza, and Teka and Butemba managed by Sogestal Kirimiro under funding from ARFIC, will pilot waste water recycling technology to reduce the amount of water used by the stations which will in turn, reduce the amount of pollutants entering the environment.

The construction sites of four mini-coffee washing stations managed by Cooperatives Dusangirjambo, Kazoza n'lkawa, Mboneramiryango and Cooperative Kanovera were visited last quarter to assess progress on station construction and to collect data to assist them in designing a modified solid and liquid effluent control system adapted to each station's plot size, processing capacity and layout (see Annex, Modified Effluent Control System at Mini-Coffee Washing Stations). Each station will have 2-cabin ventilated block latrines and hand washing facilities. Cooperative Kanovera located in Bubanza Province is the newest candidate to request BAP assistance in bringing a mini-coffee washing station online.

Coffee Washing Stations Visited Last Quarter		Partner/Owner	Effluent Control	Sanitation	Waste Water Recycling
1	SDL Gatara*	Sogestal Kayanza	Solid & liquid	6 cabin vent. latrines + HW	Yes
2	SDL Butemba*	Sogestal Kirimiro	Solid & liquid	6 cabin vent. latrines + HW	Yes
3	SDL Teka*	Sogestal Kirimiro	Solid & liquid	6 cabin vent. latrines + HW	Yes
4	SDL Kagombe	Sogestal Kirundo-Muyinga	Upgrade to include liquid	6 cabin vent. latrines + HW	
5	SDL Kavugangoma	African Promotion Company (APROCO)	Solid & liquid	"EnviroSan" 4 cabin vent. latrines+HW	
6	SDL Wingoma*	Cooperative Nkamwayacu	Solid & liquid	6 cabin vent. Latrines + HW	
7	Mini-SDL Ntamba*	Cooperative Kanovera	Modified solid & liquid	2 cabin vent. Latrines + HW	
8	Mini-SDL Mpemba*	Cooperative Kazoza n'lkawa	Modified solid & liquid	2 cabin vent. Latrines + HW	
9	Mini-SDL Kibimba*	Cooperative Mboneramiryango	Modified solid & liquid	2 cabin vent. Latrines + HW	
10	Mini-SDL Kinzobe*	Cooperative Dusangirjambo	Modified solid & liquid	2 cabin vent. Latrines + HW	

BAP conducted a monitoring visit to CWS Kavugangoma owned by African Promotion Company (APROCO) in Mwakiro Commune, Muyinga Province to monitor system construction and source water capture begun at the end of PY4. The system is approximately 70% complete with 1,800 linear meters of PVC piping installed, a 5 m³

water storage tank constructed, 4 cabin “EnviroSan” latrines built and connection to the spring water source completed. The drinking water system includes 2 faucets that will provide access to clean drinking water to the neighboring collines of Kavugangoma, Gihoma, and Mukungu Rugabano. Remaining construction and system testing should be complete in time for the start of the coffee season in Muyinga Province which BAP coffee staff estimate to be early March 2012. The station will serve approximately 1,700 coffee producers.

Subcontractor Planning the Future Company (PFC) made progress on completing the construction phase on the rehabilitation of the community drinking water system at Kigoganya-Rusengo, the fourth and final community drinking water system to be brought back on line under funding from the Paul Simon Water Act (the “Water earmark”) during project year 3. Project completion is estimated at 75%. Activities were delayed last quarter due to delayed shipment of the motor pump which is being imported from Belgium and the HDPE pipes imported from Uganda.

BAP’s community development agent facilitated planning meetings with the community in Kigoganya in preparation for system hand over after definitive reception scheduled to take place in the next 5-6 months. The water management committee comprised of 4 men and 3 women were elected. The user fee system at Kigoganya is based on point of sale where users pay a fee per liter at the water point. Next quarter BAP will contract local NGO AVEDEC to conduct a specialized training for the water management committee and water user associations to assist in designing an appropriate cost recovery plan.

Effluent Control, Sanitation and Water Management

APROCO promoter Richard Kaderi is partnering with South African Engineering Company “EnviroSan”, to test their double chamber ‘Urine Diversion’ latrine which separates liquid and solid human waste by collecting solid waste into a two chamber pit and diverting urine away into a separately constructed soak pit (see Annex Two for a detailed diagram). After 12-24 months the decomposed solid waste can be removed for disposal or treated to become compost. The activity is funded under APROCO’s portion of cost-share funding.

Progress at CWS Kavugangoma, Mwakiro Commune, Muyinga Province



Photo 1: Blocs latrines « EnviroSan»



Photo 2: Pulp pit



Photo 3: water storage tank 5m³

Wash Water Recycling

One of the early recommendations made to improve waste water treatment at coffee washing stations is to treat and re-use the wash and soak water used during the final washing of the parchment. Large quantities of water are typically used for this phase of processing thus these wash waters tend to dilute and diminish the strength of the fermentation water that is mixed in during the washing process. The effluent control

infrastructure at washing stations Gatare (Sogestal Kayanza), and Butemba and Teka (Sogestal Kirimiro) will include the construction of 1 reservoir down slope from the station to collect parchment wash/soak water exiting the station immediately after this stage is complete. A second reservoir will receive the recycled water which is pumped uphill by a small motor pump, to be piped back into the CWS. Each station's recycling system lay out and specifications will be finalized in Q2.

Kigoganya Community Drinking Water System

By the end of the quarter, all construction work had been completed except for the installation of the diesel motor pump and associated HDPE piping. This equipment is being imported from Belgium and was to be delivered in Bujumbura by early December 2011. However, due to poor weather conditions in the Arabian Sea during late November/early December, as well as congestion at both ports through which the equipment transits (Oman and Dar Es Salam), the delivery of the motor pump and piping is delayed by approximately one month. PFC has kept BAP informed on the equipment's location and as of the writing of this report it has left Dar Es Salam with an expected arrival in Burundi by early February. Once the equipment arrives, PFC estimates that it will take no more than one week to install the motor pump and test the system. BAP expects to be able provisionally receive the Kigoganya system by the end of February/early March 2012.

Table 1: Tasks and Deliverables Calendar – Reconstruction of the Community Water System at Kigoganya-Rusengo - Planning the Future Company (PFC)

Tasks	Planned Activities and Deliverables	Results
<p>Task A : Submission of new work schedule and delivery documents for imported equipment, bank guarantee for advance supply of materials</p>	<ul style="list-style-type: none"> • Purchase and supply of required materials and equipment to implement all civil engineering construction, and trenching to lay all HDPE piping required for the project. • For imported equipment the subcontractor is required to provide DAI/PAIR with delivery documents such as certificates of origin and technical specifications before delivery to the site. 	<p>All civil engineering construction is completed:</p> <ul style="list-style-type: none"> ✓ New work schedule submitted ✓ Delivery documents to be submitted 3 days before equipment delivery ✓ Bank guarantee submitted  <ul style="list-style-type: none"> ✓ All 6 water tap stands and water kiosks have been erected.
<p>Task B: Hydraulic works construction</p>	<ul style="list-style-type: none"> • Construct and install a water catchment chamber which will serve also as a departure chamber • A 30 m³, semi interred water storage tank to supply the pumping station 	 <ul style="list-style-type: none"> ✓ Spring source catchments and departure chambers (1.5m x 1.5m x 1.3m) completed ✓ 30m³ water storage tank to supply the pumping station completed and filled.

Tasks	Planned Activities and Deliverables	Results
Task C : Supply and install PVC, HDPE and galvanized piping with associated plumbing accessories	<ul style="list-style-type: none"> • Install motor pump MCH14A*10.5 • Install water transmission piping of 150m of 63 mm PN10; 1,500m of 63 mm HDPE PN 20; and Approximately 18m of 3" galvanized steel pipe. 	<ul style="list-style-type: none"> ✓ The two spring sources are connected, ✓ the trenches for piping have been dug; concrete canals constructed ✓ The HDPE piping has been ordered from Uganda and should arrive with the motor pump and its associated piping.
Task 4 : Network brought online and provisional reception scheduled	<ul style="list-style-type: none"> • Test the functionality of the system and the network. • Provisional reception completed and system available for community use 	The system will be tested once the motor pump is installed
Task 5: Definitive Reception of the system	<ul style="list-style-type: none"> • Final inspection 	Evaluate the system 6 months after the provisional reception; make necessary repairs; formal system turn-over to the community.

Water Management Committees

The final grant agreements between BAP and the Water Management Committees of the Kinyovu, Kayenzi and Murima community water systems were signed at the end of PY4. These systems are now completely under community management with oversight from the communal water authority (Regideso). So far the Water Committee Members report their systems as functioning well with regular collection of user fees from the broader community.

The Kigoganya community's choice to use a motor pump instead of the proposed solar powered pump will require consideration of additional costs such as diesel fuel and maintenance costs when designing a cost recovery. During the quarter two meetings facilitated by the local BAP ADC, were held with the community discuss the financial, human and organizational resources required to ensure the proper management long term sustainability of the system.

The major recommendations coming from the community meetings were:

- 1) Involve local government in key decisions, inform beneficiaries and establish with them the rules of distribution;
- 2) Ensure transparency of accounts both internally but also externally through tracking documents and management reporting;
- 3) Ensure that funds raised through the sale of water is sufficient to cover all operating charges and maintenance costs;
- 4) Compensate the team responsible for system operation;
- 5) Monitor all financial transactions and secure the amounts collected; employ a guard to safeguard against equipment theft;
- 6) Ensure the customer is satisfied and encourage them to buy water from the network;
- 7) Allow constant monitoring to adequately and quickly respond to all technical, logistical and financial incidences.

Challenges and Solutions

1. Delayed equipment delivery to the site at Kigoganya resulted in at least one month extension of the project execution calendar. It may be possible to recover this time during from the 6 month system testing period.
2. Heavy rains in December damaged the access road to the SDL Kavugangoma resulting in a temporary halt in construction during the month of December. Construction will resume in January 2012.
3. Engineering firm PAIHAR responsible for quality assurance and technical oversight of the Kigoganya system has not met the requirements of their contract with BAP due to the continuing absence of the firm's Director and lead Engineer, Alex Bandy. In Q2 BAP will review procedures to terminate their contract.

Activities for the Next Quarter

1. Evaluate new washing stations to determine candidate to pilot water source treatment technologies.
2. Begin sample collection for baseline water analysis for the 2012 coffee campaign.
3. PY4 Water quality analysis recorded results below expectation for CWS Rutanga, Gitwa and Rwintare of Sogestal Ngozi who did not follow the operating instructions of the effluent control infrastructure during the 2011 campaign. The results recorded suspended solids concentrations above the acceptable limit for direct discharge (50 mg/l) and indirect discharge (600 mg/l). The recorded values vary between 225 and 4293 mg/l respectively. In Q2 BAP will conduct follow-up trainings with the operators of these stations as well as Ubwiza bw'Ikawa in Ruhororo, on proper operation and maintenance of their effluent control systems.
4. Assist the water management committee of the Kigoganya system to more clearly define their roles and responsibilities, and finalize their cost recovery plan with local NGO AVEDEC.
5. Assist BAP Grants and Financial Intermediation staff in monitoring grant financed effluent control systems.

Burundi Business Incubator

Introduction

This quarter emphasis was placed on pre-incubation assistance to Shika Business Plan competitors, a retreat organized for the Executive Committee, Annual work planning and budgeting activities, the finalization of an operations manual for personnel and finance for the BBIN and preparation for an annual auditing exercise. In addition a general assembly meeting of founding members occurred in late November 2011. STTA during the period was offered by Damian Gillemnault, June Lavelle and Bill Grant and mentoring of the management team was provided locally by Hussein Jumaine.

Performance Indicators

	Réalisations
# of clients benefitting from enterprise development services	21
# of preincubatees(Compétition SHIKA)	17
Incubation clients (Hotdesk)	0
Resident Incubation clients	0
Affiliate Incubation clients	1
New Commercial Renters	2
Financial Accomplishments	
Total Sales (FBU)	50,277,925
Total Expenses (FBU)	57,778,236
# of Training participants	44
First Steps	10
Business Concepts(BCC)	13
Business Plan	21

In addition, annual interest on the blocked escrow account for 2011 equals 6.775.140 FBU. This amount is not included in quarterly sales revenues.

Activities accomplished during this reporting period

Shika

- Visit to the SOSUMO Sugar factory by SHIKA contestants. The objective of the visit was to show new entrepreneurs a functioning agricultural processing facility. The Managing Director of the establishment shared his experiences in turning around a state run enterprise with the contestants.
- Training on how to present one's enterprise to a potential venture capital partner.

- Training for Assessors- the 5 people selected to review and assess Shika competitor business plans were trained by BidNet before beginning their analytical work to choose the five best business plans. All five participants in this training were men
- The five finalists are:

No	Enterprise	Entrepreneur	Product
1	Burundi Tropical Fruits	Dieudonné NDAYIRAGIJE	Passion Fruit and Pineapples
2	Heal IT Burundi	Thierry NTAKO/Nadège KABAGENZI	Health Care Software
3	TOP TOMATO	Frederic BANGIRINAMA	Tomato products
4	NIYON AGRO	Chantal NTIMA	Mushrooms
5	La Reine Burundaise (The Burundian Queen)	Denis NAHIMANA	Honey

BBIN Operations Manual

The personnel procedures and financial management manuals were finalized during this reporting period with implication from BBIN personnel, the executive committee and the members of the BBIN Audit Committee.

Strategic Retreat

This strategic retreat, held from 3 to 5 November 2011 in Mwaro with the members of the Executive Committee and Bill Grant of DAI, was designed to define strategic priorities for the 2012 work planning exercise. It was an opportunity for the Executive Committee to reflect of appropriation of the BBIN by the founding members and the transition from a project assisted NGO to a financially independent one. Two key recommendations were to: a) hold a retreat for the Founding Members to discuss appropriation, operations and the transition and b) to hire a training and marketing assistant who would take the lead in providing Monitoring and Evaluation information to the management team. The report of this retreat is presented in annex_____.

At the retreat a recommendation was made to recruit a senior mentor to provide local mentoring on a continual basis to the BBIN director and his management team. To this end Hussein Jumaine was engaged to provide this service on average 2 days/week through 30 Sept 2012.

Business Edge

A training calendar for the Business Edge modules was developed by the management team, assisted by June Lavelle of the National Business Incubator Association, under contract with DAI. Meetings were held with the other selected training companies to harmonize approaches and pricing in order to ensure they were relevant and affordable to Burundi's small and medium enterprise sector. A number of modules were also selected as priorities for offerings during 2012.

Training Courses

Three modules were offered during this reporting period, First Steps to becoming an entrepreneur, Business Concepts and Business Plan Development. Five students from the Economics Faculty at the University of Ngozi participated in all three sessions.

Participants in the First Steps Course also included 4 private entrepreneurs and one employee of a micro-credit institution.

In the Business Concepts Course, the 10 participants previously noted subscribed as did two other private entrepreneurs and a second employee of a micro-finance institution.

In December, 21 participants, of whom 8 were repeats from the previous two sessions, participated in the Business Planning course. In addition, 2 Burkinabe and 1 Guinean cadre working for a Belgian NGO operating in the Democratic Republic of Congo, one employee of the American Friends Service Committee NGO, two employees of the Environmental NGO Action Ceinture Vert pour l'Environnement, an employee of the Youth Center in Kamenge and six other youth interested in starting their own businesses participated.

General Assembly of Founding Members

On November 25, the Founding members met to approve the 2012 workplan and budget for the BBIN. An operations budget of 256.425.169 FBU was approved as was the workplan.

BBIN Marketing (Outreach) Activities

In order to increase the visibility of the BBIN the following outreach/marketing activities were undertaken during Q1:

- Participation at the 6th Conference of the Women Entrepreneurs of East Africa, Bujumbura 3 to 5 Oct 2011
- Participation at the African Industrialization Day Ceremonies hosted by the Burundi Office of Investment Promotion 21 Dec 2011
- Presentation on Entrepreneurship at the workshop organized by the Alumni Association of Burundians who have studied in the United States
- Presentation of BBIN and its activities to ROTARACT

Consultant Visits

- Sarah Japengo (BidNet) 4-10 Oct 2011. Provided training to assessors identified to analyze business plans in the context of the Shika competition
- Damian Guilleminault (15 Oct-30 Oct)- Training of new accountant, assistance in producing monthly financial statements and in furnishing financial justifications to BAP for grant monies advanced
- Bill Grant (30 Oct-5 Nov 2011) Assistance in development and facilitation of the Executive Committee Strategic Retreat and the BBIN workplanning/budgeting process
- June Lavelle (30 Nov-16 Dec 2011) Provided technical assistance in planning Business Edge Curriculum and Training calendar, assisted in orientation of the Senior Mentor Hussein Jumaine and participated in evaluations of the senior management team of the BBIN

Capacity Reinforcement offered to BBIN Staff

From 21 to 25 November 2011 the BBIN Director and his Deputy attended a regional training workshop hosted by BidNet in Kigali to train trainers of trainers in the Module “Ready 4 Finance”. The BBIN has been identified as an institution to receive a franchise license for this course in Burundi.

The BBIN has been offering its staff the possibility of improving their English through subsidized coursework since late August 2011

The New Accountant has received training in fiscality from AFFICADE

BBIN CLIENTS

In addition to clients who have participated in training sessions and those who regularly use the IT and office services of the BBIN, three new clients have joined BBIN during this reporting period.

1. ONR has rented the old “panic room”. A new enterprise, ONR assists businesses in recovering debts owed to them as well as in providing backup data services in case of server crashes
2. VULCAN- a construction company has rented space as a commercial client, but now is expressing interest in becoming an incubatee
3. An entrepreneur has signed a lease agreement for the restaurant space previously occupied by Yummy Barbeque. His intention is to open a high end coffee shop in the facility.
4. An entrepreneur from Makamba has signed a contract for affiliated incubatee status. His business involves processing of wood
5. A young woman has joined BBIN as a pre-incubatee. Her business interest lies in “Design”

Other Activities

- An external audit of BBIN accounts was contracted to BEECAGEM. The audit covered the period 1 Jan – 30 Sept 2011. A draft report has been received and is currently under review
- A Fiscalist was recruited to clarify with the Burundi Revenue Authority (OBR) the fiscal position of the BBIN, specifically in the areas on VAT and Revenue Taxes.

Constraints and Perspectives

- The biggest uncertainty facing BBIN at the present time is whether it will be ready to stand and operate independently at the end of its current donor grant (31 August 2012). Preparing for this transition will be one of the subjects to be covered at the Founding Member’s retreat in early March 2012
- BBIN needs to implement a monitoring and evaluation system that is capable of capturing the impact of the BBIN on its clients and the community of Burundian PME
- A 2nd Shika competition is planned to attract 2 more clients to the core business of the BBIN “incubation”.
- BBIN needs to reflect strategically on questions related to- who are the target clients? What should be the conditions established to access incubation services? What are the true needs of Burundi’s PME and how can the BBIN offer services to respond to these needs?

Conclusion

Once again BAP had a highly kinetic first quarter full of activity and with impact across the board in all components. The biggest stories however are the start of milk collection activities at the center in Bukéyé and the freeing of the logjam for small grants to client producer associations. The groundswell of interest deriving from our work demonstrating the benefits of soil amendments in improving coffee productivity and the results of the horticultural demonstration fields from the 2011-C season should not be minimized, as both of these activities have led to farmer adoption of new technologies and the replication of best production practices.

We appreciate greatly the increased interest from the DPAE and their staff in our activities and the continued support and encouragement we receive from USAID/Burundi and USAID East Africa. Our challenge over the coming months as we transition to close down will be transferring the responsibility for assisting our clients to our national partners, closing out the coffee campaign with a triumphant Cup of Excellence competition, completing the 2012 B agricultural season successfully while inaugurating the second milk collection center and monitoring the management of the two models to develop a comparative case study, while documenting lessons learned and impacts from our work in the hopes that the foundation we have laid will be capitalized upon in coming years.

Annexes

- 1) Irwin Foreman's Trip Report
- 2) Reinvestment of 2011-C Season Revenues in 2012-A Season Horticulture Activities
- 3) Grants
- 4) Clean and Productive Environment

Burundi Agribusiness Program

Technical Support for Burundi National Veterinary Laboratory and Dairy Processors

30th October – 13th November 2011

Consultant

Irwin Foreman MSc

Dairy Technologist/Processing Engineer
Dairy Industry Consultant

Contact Information:

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Field Report

To: Ben Lenz (COP), Pierre Ndikumagenge (Dairy Specialist)

Lodged by: Irwin Foreman (Consultant)

Covering period: 30th October – 13th November 2011

Location: Bujumbura, Burundi

Scope of Work, dated 17th October, 2011

Activities

The consultant will do the following:

A. Operational Assistance to the NVL

Assist NVL managers in structuring/assigning staff duties in the NVL and provide capacity reinforcement of NVL staff in relation to their functions.

Assist in setting up/improving laboratory record keeping and stock management processes for maximum quality assurance

Review the NVL Standard Operating Procedures Draft for conformity with East African Norms and standards

B. Training Activities for Dairies

Deliver a one-day workshop for dairy processors and their staff in importance of cold chain integrity, factory hygiene and HACCP

Assist MilkChel SA in the sourcing of equipment

Develop a plan for individualized assistance to different dairies, in coordination with the BAP Dairy VC leader and COP

Deliverables

1. A written trip report detailing assistance provided and any unmet needs for further assistance at the NVL, along with a training/assistance plan for individual dairies
2. A one-day training workshop on cold chain management and HACCP for dairy staff with slides.

Executive Summary

A series of presentations and discussions were conducted with the staff of the National Veterinary Laboratory.

The topics included, quality assurance methods in analytical laboratories, writing Standard Operating procedures, reviews of the East African Community Dairy Product and Analytical Standards, a presentation on the public health aspects of milk pasteurization systems and equipment, and a review of the text of the newly drafted Kenya Dairy Regulations.

At a workshop with dairy processors on 8th November, processing methods for the production of extended shelf life products were reviewed and explained. The products of most interest were Extended Shelf Life milk, and thermized yoghurt. Also discussed were the practical aspects of purchasing dairy processing equipment and machines.

At meetings with individual processors and potential investors, discussions focused on equipment options, types of equipment, performance characteristics and choices of specific equipment conformations. Requests for quotations, for four processors/investors were sent to a supplier.

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Operational Assistance to the National Veterinary Laboratory: Topics Reviewed and Discussed

In total six full-day sessions were held with the staff of the laboratory.

The following topics were reviewed.

Writing, Preparation and Formatting of Standard Operating Procedures for Laboratories

A number of examples of SOP's were provided to illustrate the structure and formatting required, and a practical instruction exercise in writing a SOP for a specific laboratory analysis was conducted. Ways to structure the laboratory quality assurance document system was discussed.

Accompanying documents on creating SOP's, used as discussion documents with the trainees, follow:

Laboratory Quality Assurance

Detailed laboratory quality assurance procedures were provided and discussed.

The following section was used as the discussion document,

Laboratory Quality Control

Classification of Procedures

Class O

A method or procedure that has been subjected to a thorough evaluation, has been widely used, and has thereby demonstrated its value by extensive application, but that may not have been formally, collaboratively tested.

Class A1

A method or procedure that has been subjected to a thorough evaluation, has demonstrated its application for a specific purpose on the basis of extensive use, and has been successfully, collaboratively tested.

Class A2

A method or procedure that has been subjected to a thorough evaluation and has been successfully, collaboratively studied.

Class B

A method that has been used successfully in research or other situations has been devised or modified explicitly for routine examination of samples, has had a limited evaluation, and has not been tested collaboratively.

Class C

An unproved or suggested method that has not been previously used, but that has been proposed by recognized laboratory workers as useful and gives promise of being suitable to meet and immediate need.

Classes O, A1 and A2 are *standard* methods.

Collaborative Studies

A method to be adopted by the laboratory should be collaboratively studied before being approved as a standard method by the laboratory.

The criteria of a collaborative study are as follows:

- a) If possible several collaborators should participate. Recommended 8 collaborators.
- b) A minimum of five test samples in duplicate should be analyzed. Test samples should cover the concentration range expected of the method. The identity of the duplicate test portions should be unknown to the collaborator.
- c) Estimates of experimental error should be computed from the duplicate observations for each test sample.
- d) Estimates of variation should be computed among laboratories. Variance components among laboratories and between replicates should be evaluated for method reproducibility.

Uniformity of Methods

Emphasis must be placed on uniformity of testing procedures used in various laboratories. Minor variations in technique can cause significant changes in analytical results.

Example: Need to standardize culture media among lots is essential. Failure to monitor quality of media can produce a variation in microbial numbers and can adversely affect compliance with official legal limits.

Split-Sample Testing

Within the laboratory, the performance of the individual analysts should be evaluated by establishing a split-sample testing program, where each individual performs a specific analysis on a split sample. The results are then compared and a statistical evaluation carried out.

The test samples should represent typical ranges of samples being tested in the laboratory, as well as results above and below the normal range and the official limits. This enables the laboratory analysts to determine whether the work is being done satisfactorily by the analysts. Systematic errors can easily be identified and eliminated, while random errors can be minimized.

Precision Parameters

Precision parameters are measures of the variability of analytical methods. In practice, all methods demonstrate some differences in repeated measurements. Duplicate portions of the same test sample will not yield exactly the same value of an analyte all the time. Only rarely do two analysts using the same method obtain the same results on repeated tests. These differences represent the variability in the application of test procedures among analysts.

Quantitative methods have precision parameters. The precision estimates follow:

The Repeatability Variance (S^2) measures the variation within laboratories or among independent replicate determinations from one test unit (e.g. a package of milk). Reproducibility variance (S^2_R) represents the sum of replicate variance (repeatability) and variation among laboratories, on the same test sample. For repeatability relative standard deviation, the formula is,

$$RSD_r = (S_r/X) \times 100$$

In other words, repeatability standard deviation (RSD_r) equals 100 times the repeatability standard deviation divided by the average (X) of all results used to estimate S_r . The repeatability standard deviation is the square root of the repeatability variance. Thus if you know the RSD_r and the average (X), you can compute the S_r and S^2_r . The same is true for RSD_R , S_R , and S^2_R .

Relation of Farm and Plant Inspections to Laboratory Control

Laboratory data is needed to guide plant inspectors and operators to improve milk quality and to correct sanitation failures. Farm and plant operations should be closely allied with laboratory tests.

Suitability of Methods for Measuring Sanitary Quality

Determinations on individual test samples by any one method should be interpreted solely on the merits of that method. The microbiological method by which the limits for acceptability are officially established should permit everyone concerned, when shown the test results, to come to one of several conclusions about the product.

1. That it has good margins of safety in terms of sanitary standards
2. That it falls just within 'acceptable' limits
3. That it marginally violates standards
4. That it is grossly contaminated

Laboratory procedures to evaluate dairy products cover materials of widely different physical and chemical composition and products in which certain constituents of milk are present in amounts that represent concentration in some instances and dilution in others. Details of procedures for sample preparation applicable to one product may therefore be quite unsuitable for another. Further, constituents that may be added in the formulation of certain products can complicate examination procedures. Therefore, not only the final product but also the individual materials used to make the final product must be examined.

Microbiological methodology differs somewhat among products because of variations in processing, holding conditions, and other factors. The presence of yeasts or moulds, the total bacterial population, or the numbers of thermophilic, thermophilic, or psychrotrophic bacteria in a product may be of greater significance in some circumstances than in others.

Because pasteurization is universally used to destroy pathogens, phosphatase tests should be mandatory to determine that pasteurization processes have been effectively and efficiently carried out.

Protection of products from post-pasteurization contamination is evaluated by testing for coliform bacteria, which are destroyed by effective pasteurization.

The presence of nonspore-forming psychrotrophic bacteria also may be interpreted as resulting from post-pasteurization contamination because most of these organisms are unable to survive the heat treatment. Because psychrotrophic bacteria grow in refrigerated dairy foods, high numbers of them found in dairy foods stored at refrigeration temperature may not indicate the number present immediately after pasteurization.

Laboratory Quality Assurance and Safety

Quality assurance and safety are vital components of laboratory operation. Without proper attention to these areas, the validity of analytical results could be questioned and the safety of laboratory staff could be jeopardized.

Quality assurance is a systems approach to achieving quality results. Quality control encompasses the individual components, e.g. control tests, record keeping, of the quality assurance system.

Quality assurance includes the following:

- The physical facility – the laboratory premises
- Basic equipment and supplies requirements
- Control tests
- Record keeping
- Laboratory safety

Laboratory Operational Management

Laboratory Organization

The organization of the laboratory is important to its successful operation. For the NVL, where the primary function of the lab will be to monitor chemical and microbiological quality in milk and products, probably the favored structure should be to organize the work around laboratory functions.

Functional organizational structure is developed around similarities of technique, procedure and instrumentation. The work flow through the laboratory will be divided so that each

function, e.g. sample reception, preparation, microbiological analysis and chemical testing is done by a separate section of the laboratory.

The functional organization will encourage development of specific expertise by individual workers in the laboratory. The workers will invariably develop specialization, e.g. chemical analyses, microbiological analyses, sample preparation, each requiring specific technical skills, knowledge and use of equipment. However, in a small laboratory such as NVL, all the analysts should be trained to perform all and any analytical method carried out in the laboratory.

Laboratory organizational structure is a function of both the philosophy of the manager and the nature of the work being done. Organizational structure is seldom static. As the nature of the work changes over time, the organizational structure must be re-evaluated.

Laboratory Staffing and Training

Typically, staffing includes technical staff, management and support staff. Chemists, microbiologists, laboratory technicians and assistants form the basis of the technical staff, while laboratory managers and section leaders form the management team. Support functions can include personnel who prepare media, cleaners, accountants, purchasing staff, and maintenance staff. The administrative support functions increase as the laboratory grows and develops.

Every function within the laboratory should have a written job description, where the position title, reporting relationships, position responsibilities and educational and experience qualifications required are described.

Once a position has been filled, management must train the individual to perform his/her specific responsibilities. Formal training within the laboratory is essential and can be accomplished in one of two ways. The new individual may be trained by working with an experienced individual or with a staff trainer who is familiar with the responsibilities of the position. Alternatively, training may be through the use of written descriptions of methods of analyses, instrument operating manuals and procedures, policy and procedural texts.

The new employee should not be allowed to work without close supervision until the training process is complete and the responsibilities understood and mastered.

Management must ensure that the newly hired individual has demonstrated an ability to perform the job adequately before discharging its responsibilities to the employee. On-job activities of the new employee should then be monitored until it is obvious that the quality of his/her work is satisfactory. If a problem arises, the employee needs to be informed and shown again how to perform that specific responsibility properly.

Individual training, as well as periodic retraining, should be well documented in the laboratory records. This is an essential requirement of the laboratory's quality assurance program. Not only does it ensure that the management is performing its training responsibility, but it also allows supervisors to review qualifications and specific experience levels of personnel in unfamiliar departments.

Documentation of all training activities is essential. This will be the responsibility of section leaders and the laboratory manager.

Standard Operating Procedures

General

Several procedures are necessary to describe and document the multitude of functions covered by an analytical laboratory. Procedures routinely fall into the following general divisions: policy, administrative, technical operations, equipment operation, and analytical methods.

Procedural documentation – from dishwashing to balance calculation and maintenance to analytical assay procedures – is essential to overall laboratory quality control. Written and approved procedures should be readily available to laboratory personnel, and should be reviewed and updated regularly. Inaccurate or outdated procedures within the laboratory can cause severe quality problems.

Methods

Laboratory analytical methods are of two types, 1) standard or official methods, and 2) methods developed or modified by the laboratory or taken from the literature. The need for the latter category normally arises because the in-house method repertoire does not include the method for an analysis that the laboratory has been requested to perform, or because the laboratory cannot use the repertoire method owing to other circumstances.

Whatever method is used, the laboratory should be able to demonstrate with historical validation data that it can perform the analytical determination described by the method. The validation data should be evaluated for precision, both within a trial and between trials. In addition, recovery or spiking studies should be performed routinely.

When a modified method is used, the responsibilities of the laboratory go beyond the validation requirement. The laboratory in this instance must show that the modified and the reference methods are equivalent. Equivalence is determined by showing, with statistically evaluated data, that the modified method is capable of generating data with precision and accuracy that are equal to or better than those generated by the reference method.

All validation data, equivalence data and written procedures should be reviewed periodically by management and quality assurance personnel. Procedures should be reviewed not only for technical content but also for format and readability. The process of review should be repeated on a regular basis to ensure that the current written procedures reflect the laboratory's current practices.

Records and Reports

Original raw data must be kept in case a question arises later as to the accuracy of the results, the data used to calculate the results and a total reconstruction has to be carried out. Thus the laboratory should have a secure records archive in which its original raw data are maintained. A recommended way to do this is to provide a substantially bound note book to each analyst where detailed records of each operation are recorded by hand. Such records will include for example, tare weights, sample weights, balance calculations etc.

All data that are necessary to reconstruct the reported result can be considered raw data. Raw data include not only the final results, but also recorded data such as microbial colony counts of each dilution plate, optical densities, peak heights, strip charts, calculations etc. The laboratory should establish a records retention policy that clearly defines period of time for which records will be kept.

A system of cataloging records by department, sample number or data, or assay should be developed so that records may be located easily when the need arises, and review and ultimate disposal may be accomplished in an orderly fashion. raw data should be stored in clearly labeled record-retention boxes and housed protected from damage by vermin. If a computerized laboratory management system is available, then these issues become easier to establish and manage.

Copies of final analytical reports must be kept as permanent records of results sent to clients. Security against tampering and loss is very important.

The end product of laboratory analysis is the report of results. The format of the report should ensure that the data are clearly presented. At a minimum, the analysis report should contain the following information:

- a) Laboratory name and address
- b) Laboratory sample number
- c) Time and Date of sample reception
- d) Temperature of sample on reception
- e) Description of the sample when received
- f) Report of any damage to sample container and/or leakage
- g) Person collecting the sample
- h) Person delivering the sample
- i) Date of the analysis
- j) Date of final report
- k) Name of the test method used and if it is an official standard method the standard name and number cited
- l) Assay result(s) and units reported
- m) Plus/minus of the analytical method used
- n) Analyst's signature
- o) Laboratory manager's signature

Within the laboratory organization, sample logs, section logs, laboratory worksheets, the final analytical report and other pertinent records and data should provide sufficient information to

document the chain of sample custody from collection through receipt, analysis, storage and disposition.

Analytical Quality Control

Analytical quality control is needed to ensure that laboratory personnel are performing the analyses in such a manner that the accuracy and precision of the method are as good as the method is capable of providing. Additionally, the laboratory must ensure that, as analysts change over time, the precision and accuracy of results do not change greatly. Variation in technique in such procedures as pipetting, use of volumetric glassware, weighing, colony counting, peak measurement etc can exist between analysts, thereby leading to differences in the final results. These variations must be minimized.

The laboratory should establish a daily, routine quality control program that monitors assay and analyst quality by generating data on instrument performance and analysis results from known control samples, sterility controls, blanks, known additions etc. The data should be sufficient so that acceptance or rejection of laboratory results on unknown samples can be made based on results obtained from the quality control program. Quality control data should be preserved historically.

Laboratory proficiency testing should also be used periodically. Proficiency samples that give acceptable limits of performance can sometimes be obtained externally. When no such samples are available, the laboratory must prepare its own proficiency samples, either by pooling samples or by preparing samples of known quantities of test components by standard additions. In the case of self-prepared samples, the laboratory must generate sufficient data to be statistically significant, reflecting precision within and across days, and between and among analysts.

A special type of proficiency testing commonly used is the split-sample program. Samples are split by the laboratory, and results are obtained by different analysts either within the same laboratory or among different laboratories. The data are analyzed statistically to determine which analysts and/or laboratories are yielding data that are significantly different. When evaluating data among laboratories, it is essential that all analysts clearly understand that the specified procedure must be followed uniformly. Although this caution appears obvious, it is probably the single most serious obstacle to obtaining comparable data among laboratories in split-sample programs.

Sample Control and Preparation

It is axiomatic that the laboratory result is only as good as the sample obtained for the analysis. Proper sample control, involving identification, preparation, storage, and disposal, is important for maintaining the integrity of the sample, and thus for the ultimate generation of reliable analytical results. Written procedures for sample receipt, identification, sub-sampling, preparation, storage, distribution, retention, and ultimate disposal should be standard.

The process of sample control begins with collection. Key factors that affect sample quality at this stage include proper collection, refrigeration, and shipment of samples: contamination of

samples during transportation, contamination during transportation due to improper packaging, leakage, or breakage, contaminated or inappropriate sample containers, and inadequate sample identification. Standards for sample identification and supporting instructions should be established. Examples of information that may be required include, sample description, approximate sample size required, sample collector, time, date and temperature at collection, safety precautions, stability information (heat, light, air etc), analysis requested, specific methods to be used (optional), client contact information, date that results are needed, and where results are to be sent.

The sample receipt function is primarily one of inspection to ensure that all the required information is present. Special attention should be given to the sample size at shipment, transportation conditions required, safety precautions and stability information. Time of receipt at the laboratory is invariably important. If anything is unusual in these areas, the client and/or the laboratory should be notified immediately.

If the sample has been properly received with sufficient information to perform the analyses requested, the laboratory normally must translate the request into a format that is acceptable to the laboratory. If the laboratory analysis request form is properly designed, all that may be left to do is to pass on the form or copies along with the sample for analysis. The laboratory in all cases, must record reception of the sample in its own records documentation.

Many laboratories identify sample by a unique sample number, which is assigned to the sample at receipt. In addition to a sample number, some laboratories also list sample description, storage conditions, and abbreviated sample requests on the label. The laboratory may place incoming samples into containers of standardized size to facilitate their orderly flow and storage within the appropriate work areas. Because the label will not normally provide space for sufficiently detailed information, the laboratory must have a system to match the sample number on the label, with the analysis request form or worksheet system.

If samples are to be sub- sampled, it is normally most efficient and appropriate to do so in a centralized preparation area. Samples must be well mixed before any portion is withdrawn. Microbiological sampling should precede chemical sampling. If more than one preparation technique is to be used on the same sample because of differing analyses, sub-samples must be clearly identified as to the analysis intended.

The analysts must be responsible for ensuring that samples are maintained within the laboratory under the conditions specified. A sample that requires refrigeration and is found at room temperature after being left out long enough to warm should not simply be placed back into the refrigerator. If a sample must be kept frozen before analysis and if multiple analyses are to be performed on it, the laboratory must either request individually frozen subsamples or ensure that all analyses are started concurrently with the initial thawing of the sample. Multiple thawing and refreezing of samples can adversely affect sample stability and homogeneity.

To meet these issues, it is necessary for the laboratory to design a stringent sample control procedure, which must be evaluated periodically and modified to meet the needs of the laboratory and its clients. Because mistakes will happen, the laboratory should also maintain a reserve portion of the sample (preferably unaltered from its original state) for reanalysis

should that be requires owing to a problem encountered by the laboratory. The reserve sample can also serve as the laboratory retention sample. The laboratory should establish its own criteria for establishing the retention time of different categories of samples. Dry samples such as milk powders may be retained in dry storage indefinitely, while liquid milk samples may only be feasibly stored for a few days in refrigeration. There should be a Standard Operating Procedure defining the retention of samples schedule.

The sample tracking system within the laboratory is critical to efficient laboratory operation. If samples are coded with a sample number at receipt, tracking becomes efficient and effective. Samples can be stored in refrigerators in numerical order. If analysts replace the samples into their appropriate positions after use, then the system will be self-sustaining. Responsibility for monitoring the orderliness of the sample storage area should be assigned to someone in the laboratory. This individual should also be responsible for removing samples from the storage area for disposal as directed.

Control Tests and Record Keeping

Control tests and record keeping are a vital part of laboratory quality assurance. Use of control tests and associated records assists in avoiding problems and in resolving difficulties, should they arise. For microbiological testing, it is necessary to adhere to all control tests and record keeping.

The control tests should include the following:

- a) Air bacterial quality
- b) Autoclave time and temperature
- c) Autoclave sterilization adequacy
- d) Balance sensitivity
- e) Dilution bottle fill
- f) Glassware cleanliness
- g) Incubator temperature
- h) Refrigerator, freezer temperature
- i) Sterilization over time and temperature
- j) Thermometer calibration
- k) Water quality
- l) Sterility controls
- m) Sample receiving/laboratory analytical logs
- n) Analytical worksheets
- o) Media pH
- p) Inventory control

Air Bacterial Quality

Laboratories should be well ventilated and free from dust and airflow. Hazardous or flammable solvents use should be restricted to fume hoods. Chemical storage areas should be well ventilated.

In microbiological laboratories, when plating is being done, the microbial density of the air should be determined. The number of microorganisms (bacteria, yeasts and moulds) in air in plating areas should not exceed 15 colonies per plate during a 15 minute period.

When plating throughout the day, analysts should prepare one plate for samples plated in the morning, and one for samples plated in the afternoon. Records of all air quality tests should be maintained. Steps to improve air quality include 1) improving laboratory cleanliness, b) closing windows and reducing air currents, and 3) keeping work spaces isolated from the discharge of air conditioners.

Autoclaves

Autoclaves should be of sufficient size to prevent crowding of the interior, and shall be constructed to provide uniform temperatures within the chamber up to and including the sterilization temperature of 121°C. Autoclaves must be equipped with a pressure gauge and a properly adjusted safety valve, as well as an accurate mercury thermometer, or a temperature controller-recorder to register the minimum temperature within the chamber, usually located on the exhaust line.

Records must be maintained for each sterilization cycle, including items treated, date, start-up time, temperature, time temperature was reached, length of time at temperature, and time item was removed. If automatic recorders are used, charts recording usage must be maintained.

The chamber temperature should be checked at least semi-annually, though monthly would be preferable, using a maximum registering thermometer positioned in a vessel of liquid, with the results recorded and maintained. Sterilization should be checked weekly using spore strips or suspensions, with the results recorded and maintained. To ensure safe and adequate operation, autoclaves should be inspected periodically and serviced by qualified service representatives.

Balances

Analytical balances with a sensitivity of 0.1 mg or less at a 10-gram load must be used when weighing items of 2 grams or less. For larger quantities, a balance with a sensitivity of 0.100 mg may be used.

Balances should be checked monthly with a set of certified weights (weights traceable to a national Standards organization, e.g. Kenya), and records of checks must be maintained. This procedure is especially important for electronic balances, in which component failure can lead to unnoticed measurement inaccuracies. Balances and weights should be cleaned after each use. Weights should be protected from manual contact, corrosion and laboratory atmosphere. Balances should be serviced and checked for accuracy at least annually by a qualified maintenance representative.

Centrifuge

Verify speed on a periodic schedule, check and calibrate the variable speed indicator. Verify the timer is accurate.

Colony counters and tallies

A standard colony counter, Quebec model, is preferred, otherwise one providing equivalent magnification and visibility should be used. Grid plates should not be excessively scratched or etched. Internal mirror placement and cleanliness should be checked periodically to ensure optimal illumination. Hand or probe tallies should be used and checked periodically to ensure accuracy. If instrumental colony counters are used, they must be evaluated periodically to provide results equivalent to manual counts.

Dilution bottles

Dilution bottles (capacity of about 150 mL) shall be of borosilicate glass, polysulfone, polycarbonate, polypropylene, or other autoclavable, non-toxic plastic material. They should be closed by screw caps. Use friction fit liners in screw caps to make the closure leak-proof. Each batch of dilution blanks must be properly filled. Dilution bottles must be marked indelibly, preferably etched at the graduation level of 99 ± 1 mL.

New Bakelite-type plastic caps and closures for sample containers should be treated before use to remove toxic residues. This may be accomplished by autoclaving them twice at 121°C for 15 minutes while they are submerged in microbiologically suitable water. Toxic residues can be evaluated using the *Bacillus stearothermophilus* disc assay on the second autoclaved rinse water.

Blanks should be filled to contain 99 ± 2 mL of dilution water after sterilization. Following sterilization, standardized blanks may be visually surveyed, and those appearing to be under- or overfilled, should be discarded. Then the volume of one of every 25 blanks must be checked with a Class A graduate, and if any of these blanks is less than 97 mL or more than 101 mL, the entire batch must be discarded. For batches exceeding 200 blanks, the frequency of testing may be reduced if test results warrant. Maintain records for each batch of blanks prepared.

Glassware

Laboratory glassware should be free of scratches, chips, cracks, bubbles or other imperfections and defects. Damaged glassware should be discarded. Graduations on pipettes, dilution bottles and all measuring items should be clearly, distinctly and indelibly marked with a contrasting color. Calibrations on Class A glassware are reliable, and the glassware can be used without re-calibration. The presence of residual acid or alkali on each batch of cleaned glassware should be determined using bromthymol blue indicator. Results and records must be maintained.

Cleaning glassware and testing for detergent residues: Modern detergents are effective for cleaning laboratory glassware. Most of these detergents are of the anionic type, usually with alkaline substances such as phosphates, carbonates, or silicates. Some detergents, especially the cationic type (with quaternary ammonium compounds) are highly inhibitory, and great care must be exercised to ensure their removal. Detergents and soaps have an affinity for

surfaces. They displace dirt and allow it to be washed away, but they themselves are difficult to remove completely.

Deposits of milk-stone, or calcium salts, which are resistant to ordinary detergents are sometimes encountered. Remove salts by glass ware for several minutes to acid solutions and then rinsing thoroughly. The detergent wash is best done with hot water after a preliminary rinsing with warm water to remove most of the soil. Soaking aids in the removal of stubborn residues. Six to twelve rinses with running tap water, followed by several rinses with laboratory distilled water, may be necessary to remove a detergent completely. If glass petri dishes are used, laboratories should check for inhibitory detergent residues whenever changing brands or lots of detergents.

Evaluate the detergent by preparing three sets of three glass petri dishes. One set is washed and sterilized by the method routinely used. The second set is then rinsed four times in tap water and six times in laboratory water before sterilization. A third set is dipped in the currently used detergent solution and sterilized without rinsing.

A sample of milk is plated in triplicate in these dishes, and colonies are counted after 2 days at $32 \pm 1^\circ\text{C}$. There should be no significant difference between the first and second set of plates. A reduction in bacterial count of more than 20% or a diminished size of colonies may be apparent in plates of the third group if the detergent in use is bactericidal or bacteriostatic.

Media pH

The pH of each prepared batch of media should be measured. The results must be recorded and records maintained.

Prior to use determine the pH of culture media at 25°C . Determinations made at 45°C to take advantage of the fluid state of agar may be low. Meters only measure pH accurately if samples and buffers are at the same temperature.

Macerate solid medium thoroughly with a glass rod before inserting electrodes. Be sure that electrodes and sample are both at 25°C .

Sterility Controls

Sterility controls should be prepared for each batch of media, dilution blanks, pipettes, blenders or other items used in microbiological analysis. Records should be kept and maintained.

Pipettes

Pipettes may be made of glass or plastic. They should conform to specifications and be non-toxic, undamaged and the graduations marked to contrast with milk. Disposable pipettes should be used one time only.

Several tolerance specifications exist to describe pipette accuracy.

Types of Pipettes

The major types of laboratory pipettes are classified according to the method of draining.

To Deliver (TD) pipettes: Pipettes designed to release the calibrated volume when the pipette tip is held against the receiving vessel wall until draining stops. Certain types of serological pipettes are calibrated for “blowout”, which is for delivering the indicated volume when the small amount remaining in the graduated tip, *after* free delivery, has ceased, is blown out and added to the main delivery. These pipettes are marked with either a opaque ring, two narrower opaque rings, or two printed rings near the top.

To Contain (TC) pipettes: Pipettes calibrated to hold or contain the amount specified. They must be completely emptied to provide the stated volume. These pipettes are used in many operations in which accurate dilutions are made by rinsing the pipette with dilute solution after the initial delivery.

The International Standards Organization designation for “**to deliver**” is ‘**EX**’ and for “**to contain**” is “**IN**”.

Pipettes used in testing milk: Pipettes are calibrated to deliver the correct volume of undiluted milk when the small amount remaining in the tip, after free delivery has ceased, is gently expelled and added to the free delivery volume. However, for diluted milk, the correct volume is delivered by touching the pipette to a dry area after free delivery has ceased.

Mechanical pipettors/diluters: Various semi automatic repeating pipettes exist that can be used in analyses. Volumes can be adjusted on some. Sterile disposable tips exist, which can make them adaptable to microbiological techniques. The volume delivered must be determined before using the mechanical pipettor/diluter.

East African Community (EAC) Standards

The EAC Standards for milk and milk products were reviewed and discussed.

On my previous assignment in May, I provided copies of the milk product Standards. This trip I have been requested to provide copies of the laboratory analytical Standards. These will be sent of Ben L. and Pierre as attachments to an email, and should be passed on to Lazare at the laboratory.

Kenya/East African Community Dairy Regulations

Together with the NVL staff, I reviewed the Kenya Dairy Regulations produced in the last two years under the Land O’Lakes KDSCP program. According to recent information I have received, the EAC has taken an interest in the text with a view to reviewing it for possible adoption by the EAC. Burundi dairy industry stakeholders, operating within a member state of the EAC, should be aware of and familiarize themselves with this document, as predictably it will eventually become applicable to Burundi.

The Dairy Regulations text will form part of this report. It should be noted that the attached document is the text as it was before it underwent legal formatting in preparation for gazetting into Kenya legislation as sub-section of the Kenya Dairy Act.

Public Health Aspects of Dairy Pasteurization

In order to familiarize the laboratory staff with the public health significance of the heat processes commonly used in milk processing plants, a presentation was given to describe and explain the operation of milk pasteurization systems. The presentation focused on a description and operation of the safety devices associated with plate heat exchangers.

Training Requirements

In discussion with the Head of Laboratory, we determined the following training requirements.

A contract for provision of training should be concluded with Analabs (Nairobi). The training should have the following elements.

NVL should send in total four members of staff to Analabs. This should be done in two trips, each of one week's duration, and each time sending two persons. This will enable staff members to be trained to perform the various analyses and familiarize themselves with the documentation, record keeping, SOP's, and laboratory routines and organization. Following the visits by NVL staff, Analabs should send a staff member to NVL for two weeks to help commission the laboratory, set up analytical methods, problem shoot and provide training and advice on daily operations.

This arrangement should provide a sufficient level of training to enable NVL staff to proceed independently.

Details of the scope and content of the training program will have to be discussed and negotiated with Dr. Capstick at Analabs. The training should include the following elements at minimum:

1. Training in the procedures and performance of the common analyses described in the EAC dairy product standards.
2. Explanation of the structural organization and overview of Ananlab's quality assurance documentation.
3. Training for 4 NVL staff in Analabs, to observe the analytical procedures.
4. Following the installation and commissioning of the equipment, a member of Staff from Analabs should come to NVL for perhaps 2-3 weeks to provide support training on implementation of analytical procedures and documentation..

Processors

A workshop meeting with a group of processors was held.

Attending the workshop:

Serufunya Etienne	Counseiller	Laiterie Ntazimba
Sibomana Nestor	Chef de Production	Industrie Agro-Alimentaire
Ntamubano Alphonse	Chef de Production	Laiterie Nyabisabo
Butunungo Lazare	Responsable	Labortoire National Veterinaire
Nkezabahizi Emmanuel	Directeur General	Director Generale de l'Evevage
Bigirindhuyi Edward	Gestionnaire	Ferme Biranyuranwa

The processors chose the topics for discussion.

1. Purchasing Dairy Processing Equipment.
2. Processing extended shelf life yoghurt, cream and cheese.

The presentations used at the workshop accompany this report, with the intention that they should be passed on to the processors group.

Visits to the following dairy processing plants were made:

1. Laiterie Ntazimba:

This small plant processes pasteurized milk packaged in polyethylene sachets and drinking yoghurt in plastic bottles. They are experiencing a shelf life problem with the pasteurized milk. The plant equipment is rudimentary. The 1200 litre/hr Alfa Laval plate pasteurizer has undergone modifications and has been stripped of all its safety and temperature recording equipment. The plant does not have a cream separator or homogenizer.

The lack of a cold chain through the distribution channels, is creating shelf life problems. Consequently, the owners are contemplating adding preservative to the yoghurt filled in cups, to prevent blowing and so extend the shelf life. To improve the shelf life of the pasteurized milk, I suggested that they consider Extended Shelf Life (ESL) milk. To process ESL milk would require purchase of a suitable processing line. The owners appeared to be interested and asked for advice and help in receiving quotations. I subsequently sent a request to an equipment supplier (Nikos, Bulgaria) to prepare a quotation for them. In the ESL process, the milk is pasteurized at an elevated temperature at approximately 128°C, cooled and filled aseptically. A sterile tank is located between the pasteurizer and the filler. The approximate cost of this line is \$700,000.

Recommended Interventions: The plant should receive training on chemical cleaning agents and cleaning and sanitizing procedures. With proper routines, this will

improve the shelf life of the pasteurized milk. They were unaware of how to sanitize equipment and what chemicals to use. Following the presentation on thermization of yoghurt to extend its shelf life, and an explanation of the processing procedure, they understood that there is an alternative to adding a preservative to the product. Thermization is achieved by use of a specific stabilizer. Pierre will contact the agent (Taj Kassam, Snowmans, Kampala) and request a sample. The sample should be given to the processor for the purpose of conducting a trial.

2. Industries Agro-Alimentaire de Butere dairy plant.

This impressive plant is currently undergoing upgrading. A substantial Chinese manufactured mineral water line has been installed, though it has not yet been commissioned 6 months after purchase, due to problems with Chinese sourced spare parts.

The owners discussed their equipment purchase plans and asked for advice on options for a UHT line. Again, I discussed the ESL line as a low-cost option, and also the pros and cons of a range of supplier options for UHT lines.

I was given a list of equipment that they plan to buy and was asked to help them seek quotations. I have forwarded the list to Nikos, who will prepare a quotation in due course.

Follow up here will be when the quotation is received.

At their request, I also discussed the processing methods for the production of thermized yoghurt, which will have a shelf life of approximately 2 months without refrigeration. This was a follow-on from the presentation of the previous day. There is considerable interest in this product and its potential for the special conditions of the Burundi market.

3. Milk Chel

Visited the intended site for the dairy plant to view the building. The building is suitable.

Discussed the equipment purchasing plans and reviewed various options. The plan is to buy a UHT line from Elcester (Finland). A milk reception, cooling, storage and pasteurization line will also need to be bought, together with a steam boiler, chilled water system and air compressor, The list of equipment items was discussed and finalized. A request for a quotation has been sent to Nikos.

4. Laiterie Nyabisabo

The visit was hosted by the owner Mr. Butoye Joseph.

This small plant is equipped with Chinese dairy processing equipment, purchased last year from China. The plant is equipped with an autoclave sterilizer for bottles and a standard Chinese tubular pasteurizer, which operates at 90-95°C. Various other items include a sugar cooking pots, and a double jacketed vat pasteurizer, a homogenizer and a sachet filling machine.

This equipment enables the plant to process milk at high temperatures, as is commonly done in China, where raw milk quality is poor. The equipment is eminently suitable for the low quality milk conditions pertaining in Burundi. The products from this plant, assuming proper operation of the equipment, should give the plant the ability to process products with superior shelf life.

At the moment the plant has problems with completing the installation of some of the equipment items as the instructions are in Chinese. Though currently processing up to 1000 l/day, the installation of all the equipment items has not been completed. Technicians from Kenya are being recruited to complete the installation.

5. Bernard Biranyuranwa: Fariana

At the meeting with Mr. Biranyuramwa, we discussed his plans to purchase a processing plant. I reviewed the options of UHT and Extended Shelf Life products and ballpark cost estimates for each of the options.

Bernard favored the ESL option due to its significantly lower cost. He asked for a quotation for a plant to process 5000-10,000 litres/day and to include a yoghurt line. A request for a quotation has been sent to Nikos.

Recommendations

1. Laboratory Scope

I see the scope of the laboratory as being two-fold. In the first instance it will have the function of improving milk quality through the provision of analytical results. In addition, it has the potential to provide the analytical component for a dairy (and possibly also food) regulatory service. The dairy laboratory being provided to NVL should be seen as one component in reinforcing NVL's capacity to become leading players in improving the quality of Burundi's milk and milk products. From my conversations with the staff, I learned that NVL also has a role as a regulator with an inspection of dairy businesses and processing plants function. I suspect that the regulatory inspection function is not currently operational, since the staff lacks technical knowledge and capacity to inspect milk collection centers, processing plants and other dairy related businesses.

With the establishment of the dairy laboratory NVL will have the ability to test samples and generate analytical data. The laboratory should not be regarded as a stand-alone unit, but as a potential support to a regulatory inspection service. There is an opportunity to utilize the potential of the laboratory, and create an effective regulatory inspection service.

A regulatory inspection service requires three components, a laboratory to generate analytical results, a trained group of competent inspectors and appropriate legislation to impose penalties for non-compliance with quality standards.

If the newly drafted Kenya Dairy Regulations are adopted by the EAC, then they will become relevant to Burundi. In this scenario, Burundi will have two of the three components required for a dairy industry regulatory inspection service, the laboratory and the dairy regulations. The missing piece is a group of trained inspectors. While with Land O'Lakes, I created a training course for dairy regulatory inspectors. I based it on the requirements of the US Pasteurized Milk Ordinance Grade A Milk. I have delivered the course to the regulatory inspectors of Uganda Dairy Development Authority, the Nigeria National Agency for Food and Drug Administration and Control, and to the regulatory inspectors of Kenya Dairy Board.

The course is a series of presentations and exercises, based on the Kenya Dairy Regulations. It can be delivered intensively in 8 days, or spaced over a number of sessions. It culminates in a practical inspection exercise in a local dairy plant, where the trainees have to apply what they have learned in class.

This might be option for BAP to consider.

A copy of the Kenya Dairy Regulations text accompanies this report.

In view of the close-down timing of the project, efforts should be made to deliver the laboratory equipment as soon as possible. Basic commissioning of the laboratory will probably require 4 to 6 weeks. I think that the time available for delivery and commissioning the laboratory might be tight.

2. Training Laboratory Staff

Training Contract: On my previous assignment, I recommended that BAP should negotiate a training contract with Analabs in Nairobi. I have spoken to Dr. Capstick, the MD, and he is ready to provide the training. Four members of NVL staff should be sent to Analabs, in batches of two, for one or two-week periods. When the laboratory equipment has been delivered, then Analabs should send a staff member to spend 3-4 weeks in NVL. The details need to be worked out with Analabs. Again, as time is running short, attention should be given to setting this up.

3. Business Plan and Sustainability

Since a laboratory incurs operating costs due to replacement of equipment, disposables and chemicals, it will be necessary to ensure that the laboratory becomes an income generator in order to meet the operating costs. BAP should consider hiring a local consultant to write a business plan. Business training would also be useful.

4. Processors

The processors generally lack access to technical information and equipment suppliers. They have limited knowledge of processes, product processing operations and basic plant operations procedures. The lack of technical capacity extends to the use of inadequate cleaning and sanitizing routines, which contributes to low product shelf life.

A series of presentations and workshops aimed at filling the gaps should be considered.

I found that there was a lot of interest in my presentation on thermized yoghurt and Extended Shelf Life Milk. Both products, having improved shelf lives, would be suitable for Burundi conditions. Thermized yoghurt can be processed in the plants I visited. The key to processing the product is the use of a pectin stabilizer, obtainable from Snowmans (Uganda), who are the regional agents for Danisco, the manufacturer of the stabilizer. I have written to Snowmans MD, Mr. Taj Kassam, and asked him to arrange for supply of a 1 kg sample to be coordinated for delivery with Pierre. If it doesn't materialize let me know and I will intervene.

In response to processors' requests for information about processing equipment, I have requested several quotations from Nikos. Nikos will prepare the quotations and communicate directly with the processors, with Cc's also to Pierre and myself. I should think that if the Nikos sales engineer sees an opportunity to sell equipment, he will quickly plan a visit to Burundi. This should be coordinated by Pierre, and I will help where required. The exposure of the processors to a significant equipment supplier will create linkages, and the personal contact should ease the purchase of equipment for the processors.

Appendix I: SOP's for Laboratories

STANDARD OPERATING PROCEDURES FOR LABORATORIES

1. Definition

An important aspect of a quality system is to work according to unambiguous Standard Operating Procedures (SOPs). In fact the whole process from sampling to the filing of the analytical result should be described by a continuous series of SOPs. A SOP for a laboratory can be defined as follows:

"A Standard Operating Procedure is a document which describes the regularly recurring operations relevant to the quality of the investigation. The purpose of a SOP is to carry out the operations correctly and always in the same manner. A SOP should be available at the place where the work is done".

A SOP is a compulsory instruction. If deviations from this instruction are allowed, the conditions for these should be documented including who can give permission for this and what exactly the complete procedure will be. The original should rest at a secure place while working copies should be authenticated with stamps and/or signatures of authorized persons.

Several categories and types of SOPs can be distinguished. The name "SOP" may not always be appropriate, e.g., the description of situations or other matters may better designated *protocols, instructions* or simply *registration forms*. Also *worksheets* belonging to an analytical procedure have to be standardized (to avoid jotting down readings and calculations on odd pieces of paper).

A number of important SOP types are:

- Fundamental SOPs. These give instructions how to make SOPs of the other categories.
- Methodic SOPs. These describe a complete testing system or method of investigation.
- SOPs for safety precautions.
- Standard procedures for operating instruments, apparatus and other equipment.
- SOPs for analytical methods.
- SOPs for the preparation of reagents.
- SOPs for receiving and registration of samples.
- SOPs for Quality Assurance.
- SOPs for archiving and how to deal with complaints.

2. Initiating a SOP

As implied above, the initiative and further procedure for the preparation, implementation and management of the documents is a procedure in itself which should be described. These SOPs should at least mention:

- a. who can or should make which type of SOP;
- b. to whom proposals for a SOP should be submitted, and who adjudges the draft;
- c. the procedure of approval;
- d. who decides on the date of implementation, and who should be informed;
- e. how revisions can be made or how a SOP can be withdrawn.

It should be established and recorded who is responsible for the proper distribution of the documents, the filing and administration (e.g. of the original and further copies). Finally, it should be indicated how frequently a valid SOP should be periodically evaluated (usually 2 years) and by whom. Only officially issued copies may be used, only then the use of the proper instruction is guaranteed.

In the laboratory the procedure for the preparation of a SOP should be as follows:

The Head of Laboratory (HoL) charges a staff member of the laboratory to draft a SOP (or the HoL does this himself or a staff member takes the initiative). In principle, the author is the person who will work with the SOP, but he or she should always keep in mind that the SOP needs to be understood by others. The author requests a new registration number from the SOP administrator or custodian (which in smaller institutes or laboratories will often be the HoL). The administrator verifies if the SOP already exists (or is drafted). If the SOP does not exist yet, the title and author are entered into the registration system. Once the writing of a SOP is undertaken, the management must actively support this effort and allow authors adequate preparation time.

In case of methods or apparatus SOPs the author asks one or more qualified colleagues to try out the SOP. In case of execution procedures for investigations or protocols, the project leader or HoL could do the testing. In this phase the wording of the SOP is fine-tuned. When the test is passed, the SOP is submitted to the SOP administrator for acceptance. Revisions of SOPs follow the same procedure.

3. Preparation of SOPs

The make-up of the documents should meet a minimum number of requirements:

1. Each page should have a heading and/or footing mentioning:
 - a. date of approval and/or version number;
 - b. a unique title (abbreviated if desired);
 - c. the number of the SOP (preferably with category);
 - d. page number and total number of pages of the SOP.
 - e. the heading (or only the logo) of originals should preferably be printed in another colour than black.

Categories can be denoted with a letter or combination of letters, e.g.:

- *F* for fundamental SOP
- *A* or *APP* for apparatus SOP
- *M* or *METH* for analytical method SOP
- *P* or *PROJ* for procedure to carry out a special investigation (project)
- *PROT* for a protocol describing a sequence of actions or operations
- *ORG* for an organizational document
- *PERS* for describing personnel matters
- *RF* for registration form (e.g. chemicals, samples)
- *WS* for worksheet (related to analytical procedures)

2. The first page, the title page, should mention:
 - a. general information mentioned under 2.3.1 above, including the complete title;
 - b. a summary of the contents with purpose and field of application (if these are not evident from the title); if desired the principle may be given, including a list of points that may need attention;
 - c. any related SOPs (of operations used in the present SOP);
 - d. possible safety instructions;
 - e. name and signature of author, including date of signing. (It is possible to record the authors centrally in a register);
 - f. name and signature of person who authorizes the introduction of the SOP (including date).
3. The necessary equipment, reagents (including grade) and other means should be detailed.
4. A clear, unambiguous imperative description is given in a language mastered by the user.
5. It is recommended to include criteria for the control of the described system during operation.
6. It is recommended to include a list of contents particularly if the SOP is lengthy.
7. It is recommended to include a list of references.

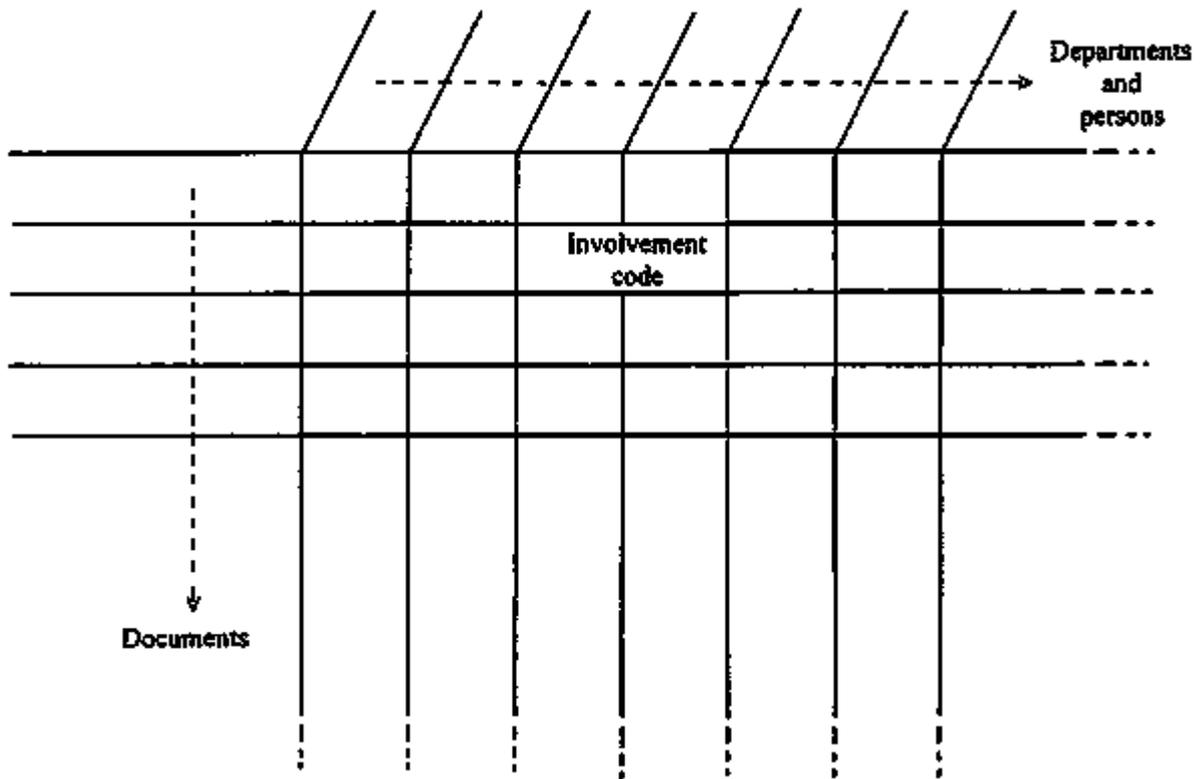
4. Administration, Distribution, Implementation

From this description it would seem that the preparation and administration of a SOP and other quality assurance documentation is an onerous job. However, once the draft is made, with the use of word processors and a simple distribution scheme of persons and departments involved, the task can be considerably eased.

A model for a simple preparation and distribution scheme is given in Figure 2-1. This is a relation matrix which can not only be used for the laboratory but for any department or a whole institute. In this matrix (which can be given the status of a SOP) can be indicated all persons or departments that are involved with the subject as well as the kind of their involvement. This can be indicated in the scheme with an *involvement code*. Some of the most usual involvements are (the number can be used as the code):

1. Taking initiative for drafting
2. Drafting the document
3. Verifying
4. Authorizing
5. Implementing/using
6. Copy for information
7. Checking implementation
8. Archiving

Fig. 2-1. Matrix of information organization (see text).



There is a multitude of valid approaches for distribution of SOPs but there must always be a mechanism for informing potential users that a new SOP has been written or that an existing SOP has been revised or withdrawn.

It is worthwhile to set up a good filing system for all documents right at the outset. This will spare much inconvenience, confusion and embarrassment, not only in internal use but also with respect to the institute's management, authorities, clients and, if applicable, inspectors of the accreditation body.

The administrator responsible for distribution and archiving SOPs may differ per institute. In large institutes or institutes with an accredited laboratory this will be the Quality Assurance Officer, otherwise this may be an officer of the department of Personnel & Organization or still someone else. In non-accredited laboratories the administration can most conveniently be done by the head of laboratory or his deputy. The administration may be done in a logbook, by means of a card system or, more conveniently, with a computerized database such as PerfectView or Cardbox. Suspending files are very useful for keeping originals, copies and other information of documents. The most logic system seems to make an appropriate grouping into categories and a master index for easy retrieval. It is most convenient to keep these files at a central place such as the office of the head of laboratory. Naturally, this does not apply to working documents that obviously are used at the work place in the laboratory, e.g., instrument logbooks, operation instruction manuals and laboratory notebooks.

The data which should be stored per document are:

- SOP number
- version number
- date of issue
- date of expiry

- title
- author
- status (title submitted; being drafted; draft ready; issued)
- department of holders/users
- names of holders
- number of copies per holder if this is more than one
- registration number of SOPs to which reference is made
- historical data (dates of previous issues)

The SOP administrator keeps at least two copies of each SOP; one for the historical and one for the back-up file. This also applies to revised versions. Superseded versions should be collected and destroyed (except the copy for the historical file) to avoid confusion and unauthorized use.

Examples of various categories of SOPs will be given in the ensuing chapters. The contents of a SOP for the administration and management of SOPs can be distilled from the above.

5. Laboratory Notebook

Unless recorded automatically, raw data and readings of measurements are most conveniently written down on worksheets that can be prepared for each analytical method or procedure, including calibration of equipment. In addition, each laboratory staff member should have a personal Notebook in which all observations, remarks, calculations and other actions connected with the work are recorded in ink, not with a pencil, so that they will not be erased or lost. To ensure integrity such a notebook must meet a few minimum requirements: on the cover it must carry a unique serial number, the owner's name, and the date of issue. The copy is issued by the QA officer or head of laboratory who keeps a record of this (e.g. in his/her own Notebook). The user signs for receipt, the QA officer or HoL for issue. The Notebook should be bound and the pages numbered before issue (loose-leaf bindings are not GLP!). The first one or two pages can be used for an index of contents (to be filled in as the book is used). Such Notebooks can be made from ordinary notebooks on sale (before issue, the page numbering should then be done by hand or with a special stamp) or with the help of a word processor and then printed and bound in a graphical workshop.

The instructions for the proper use of a laboratory notebook should be set down in a protocol; an example is given as Model PROT 005. A model for the pages in a laboratory notebook is given.

6. Sustainability and Growth

Documentation should not be overdone and the implementation of all new Quality Management rules, the philosophy of a step-by-step approach should be adopted. It is emphasized that protocols and SOPs, as well as the administration involved, should be kept as simple as possible, particularly in the beginning.

The Quality Management system must grow by trial and error, with increasing experience, by group discussions and with changing perceptions. In the beginning, attention will be focused on basic operational SOPs, later shifting to record keeping (as more and more SOPs are issued) and filling gaps as practice reveals missing links in the chain of Quality Assurance. Inevitably problems will turn up. One way to solve them is to talk with people in other laboratories who have faced similar problems.

Do not forget that Quality Management is a tool rather than a goal. The goal is quality performance of the laboratory.

Appendice 2: SOP Format

Example of Document Layout and Sections

1. Introduction

Describes the background and purpose

2. Scope

Describes the application of the analytical method

3. Reference Documents

Lists all associated and referenced SOP's

4. Responsibilities

States who can perform the analysis and the level of training required and the person responsible for ensuring the procedure is carried out correctly.

5. Safety

Describes any special safety precautions to be observed when performing the analysis.

6. Equipment

Lists all the laboratory equipment required to perform the analysis.

7. Reagents

Lists all the chemical reagents required to perform the analysis.

8. Method/Procedure

Describes the method of analysis and procedure.

9. Results

Describes how to read the results, the units to be used when reporting the result, and interpretation.

10. Accuracy of the Method and Tolerances

Provides information on the accuracy of the method.

Appendix 3: A Practical Method for Writing SOP's

The following eight steps describe a method that will produce excellent procedures and generate maximum buy-in from the workforce.

1. Plan for Results

Standard operating procedures work best when they are designed to achieve specific results. Consider what laboratory quality assurance routines will be more effectively managed through the use of SOPs and consider how successful performance can be targeted and achieved.

2. Produce First Draft

Select a format for the document layout. If you choose to use simple steps, hierarchical steps, or perhaps a graphic format, first make a detailed list of the steps in the order that they are to be done. A simple way to get started is to observe someone performing the process as it now exists and write down everything that the person does. This list is now a draft of the procedure. If the procedure needs to appear as a flowchart, start with the most reasonable start point. Draw the decisions that a worker will need to make and the actions that follow each decision. Don't try to be perfect with the first draft, because it is very likely that you will need to make several revisions.

3. Conduct Internal Review

Provide each worker who performs the procedure with a copy of the draft SOP. Ask the workers to review and suggest changes that will make the procedure easier to understand or more accurate, or will improve performance. Assure the workers that their input is important and will be used. People are much more likely to accept and use an SOP if they feel a sense of ownership in it. Another reason to involve the workers is that they are likely to have good ideas and they inevitably are more familiar with the routines and procedures than administration staff. Highly successful managers actively engage their work teams in a continual quest to become more efficient, increase efficiency, and improve quality.

4. Conduct External Review

The laboratory manager should appoint a quality assurance team, working under the laboratory quality assurance manager. The SOP writing process is an excellent way to tap the experience of the laboratory staff. Provide the individual members of staff with a copy of the SOP draft. Ask them to suggest any changes that will make it clearer and more effective. Revise the procedure as necessary to incorporate their input.

5. Test

For procedures to be effective, they must perform in the workplace. There is only one way to be absolutely certain that a procedure is well written and performs as expected. Have someone test the procedure by performing each step exactly as it is described while the procedure writer watches. Have a person not familiar with the work follow the procedure. Any steps that cause confusion or hesitation for the test worker should be revised.

6. Seek Input from Laboratory Staff

Make a final draft of the procedure and distribute it to all the members of staff in the laboratory, and ask them to review the text and provide comments and suggestions. A master SOP file should be kept in a central location so workers can review little-used SOPs when necessary. It is essential to review and keep SOPs up to date.

7. Train

One of the last steps in the SOP writing process is often the most neglected. Train or retrain everyone as necessary to follow the procedure exactly. Even with very detailed steps, it is necessary to train all workers. Otherwise, individuals will interpret the meaning of procedures in different ways, leading to inconsistency in work routines and performance.

An effective SOP training program first will make the worker aware of what training activities will take place and what the trainee will be able to do when training is complete. The trainer will explain and demonstrate both why and how each step in the SOP is performed and then allow the learner a chance to practice. The trainer will provide positive feedback as the learner masters parts of the procedure and revisits those parts that need improvement.

8. Audit

The quality assurance team should conduct internal audits of procedures according to an agreed schedule. An audit will show whether the procedure is being adhered to and whether the objectives are being met. It can also help identify areas where improvements can be made. Each SOP should be audited about three months after implementation and thereafter at least annually. In addition, the SOP should be audited when dispensing errors or “near misses” occur, to identify ways of preventing their recurrence.

Num	DP owner	Crop 2011 C	Location	Total Input Costs Season 2011 C	Revenues 2011 C	Revenues-Cost 2011 C	Crop 2012 A	Land Area under Production in ha	Amount Reinvested (FBU)	Technology Adopted	Observations
18	Girumwete	amaranth	Buja R	230,000	249,000	19,000					bought 4 goats for 160,000 FBU
19	TU	Cabbages	Gitega	313,000	366,790	53,790	Cabbage	0.04	50,800	Nursery	Invested 300,000 Fbu in 15 piglets
22	Deo	Cabbages	Kayanza	313,000	616,000	303,000	Green Pepper	0.12	60,000	Nursery, Raised beds	
21	Turyekamwe	Cabbages	Kayanza	335,000	395,000	60,000	Beans		30,000	Nursery	2 goats worth 80,000 FBU by individuals receiving plants from the nursery
20	Francine	Cabbages	Mwaro	351,500	154,000	-197,500	Cabbage	0.05	80,000	Nursery	200 kg harvested sold for 18,000 FBU (90 FBU/kg); harvest continues
23	clement	eggplant	Buja R	310,000	75,000	-235,000	Leeks	0.04	45,000	Nursery	
24	Benoit	Green pepper	Kayanza	310,000	590,000	280,000	Maracuja	0.13	65,000		purchased 0.20 ha of farmland using 450,000 FBU of revenues from 2011-C production
15	Kazozza keza	Onion	Gitega	305,000	495,000	190,000					Revenue destined as community contribution for BAP small grant
16	Turwanyinzara	Onion	Gitega	305,000	255,000	-50,000	Rice	0.08	127,000	Nursery	
17	Dufatanemunda	Onion	Makamba	305,000	500,000	195,000				Nursery, Raised beds	Members replicated techniques learned on demo plots to their own fields
14	Remesha	Onion	Muramvya	305,000	195,000	-110,000					Revenue destined as community contribution for BAP small grant
3	Canut	Tomato	Bubanza	420,000	2,300,000	1,880,000	Tomatoes	0.15	1,400,000	Nursery, Trellising	Harvest ongoing has earned 90,000 FBU from sales of 300 Kg (300FBU/kg)
4	DTU	Tomato	Bubanza	517,000	640,000	123,000	onions	0.06	269,000	Nursery	
7	Dufatanemunda II	Tomato	Bubanza	535,000	654,700	119,700	Green pepper (.08 ha); eggplant (.02 ha), onions (.02 ha), tomatoes(.03 ha), and groundnuts (.03 ha)	0.18	228,000	Nursery	
8	Eric	Tomato	Bubanza	420,000	660,000	240,000	Rice	1	660,000		Rented farmland
5	TB	Tomato	Bubanza	503,000	1,718,000	1,215,000	Tomatoes	1	450,000	Nursery	Purchased 0.4 ha of land for 600,000 FBU; Rented additional acreage for 375,000; purchased tomato seed for 50,000 FBU; 118,000 loaned by assn to its members; 575,000 deposited to assn account at CECM
2	Abakenyezi Twisununure	Tomato	Buja R	455,000	978,000	523,000				Nursery	reserved 500,000 FBU as assn contribution toward BAP small grant
1	Evariste	Tomato	Buja R	475,000	850,000	375,000	Beans	0.07	105,000		Purchased Acreage for 500,000 FBU and renovated house for 150,000 FBU
11	Twitezimbere	Tomato	Gitega	405,000	72,000	-333,000	Tomatoes	0.02	11,000	Nursery	
13	MIGI	Tomato	kayanza	500,000	17,900	-482,100	Cabbage	0.1	17,000	Nursery, Raised beds	purchased seeds
12	Dukorerahamwe	Tomato	Makamba	410,000	164,500	-245,500	Tomatoes	0.5	58,000	Nursery	Purchased tomato seeds and pesticides
6	Tunganyubuzima	Tomato	Makamba	410,000	129,000	-281,000					
9	Claver	Tomato	Mwaro	425,000	330,850	-94,150	Tomatoes (1 ha), onions (0.1 ha), cabbage (0.1 ha)	1.2	60,000	Nursery and trellising of tomatoes	Allocated 180,000 to purchase a cow. Tomatoes in production - has sold 80 kg for 20,000 FBU (250 FBU/kg); cabbage and onions ripening but not yet harvestable
10	Imelde	Tomato	Mwaro	415,000	253,000	-162,000	Cabbage	0.09	97,500	Nursery	
								4.83	3,813,300		

**APPROVED, IN PROCESS AND REJECTED GRANTS
PROJECT YEAR 5 – Q1**

COFFEE											
WP Target: 20 Grants to associations/cooperatives for income generating projects											
N	Requesting Organization	Date Received	Project Location	Project Activity	Total Cost (Fbu)	Beneficiary Contribution (Fbu)	%	Financing Requested (Fbu)	%	Financing Requested (USD)	Status
1	Dushirukubute	23-Nov-11	Butaganzwa, KAYANZA	Production and marketing of green pepper (.2 ha)	2,310,480	863,700	37%	1,446,780	63%	\$1,113	Approved
2	Dufatanemunda	23-Nov-11	Matongo, KAYANZA	Production and marketing of cabbage (.1 ha)	1,363,100	596,800	44%	766,300	56%	\$589	Approved
3	Dusanuribidukikije	23-Nov-11	MUYINGA	Production and marketing of onion (.5 ha)	2,369,910	1,083,500	46%	1,286,410	54%	\$990	Approved
4	Tugwizumwimbu Bwayi	23-Nov-11	Matongo, KAYANZA	Production and marketing of cabbage (.15 ha)	1,639,700	757,600	46%	882,100	54%	\$679	Approved
5	Najenje	23-Nov-11	KAYANZA	Production and marketing of onion (.5 ha)	3,276,500	1,227,500	37%	2,049,000	63%	\$1,576	Approved
6	Shigikirabarimyibikawa	23-Nov-11	KAYANZA	Production and marketing of onion (.5 ha)	4,381,000	1,816,500	41%	2,564,500	59%	\$1,973	Approved
7	Kameniyobweze	23-Nov-11	Busoni, KIRUNDO	Production and marketing of garlic (.25 ha)	3,845,360	933,400	24%	2,911,960	76%	\$2,240	Approved
8	Twugubumwe	23-Nov-11	Busoni, KIRUNDO	Production and marketing of cabbage (.5 ha)	2,814,530	1,003,800	36%	1,810,730	64%	\$1,393	Approved
9	Murimiyiwikawagirijambo	23-Nov-11	KAYANZA	Production and marketing of garlic (.5 ha)	4,456,300	1,438,200	32%	3,018,100	68%	\$2,322	Approved
10	TWIJUKIRIKAWA	1-Dec-11	KAYANZA	Production and marketing of green pepper (.12 ha)	2,044,960	539,940	26%	1,505,020	74%	\$1,158	Approved
11	MUTSAMA WA MPIGWE	1-Dec-11	KAYANZA	Beekeeping	5,009,000	1,255,000	25%	3,754,000	75%	\$2,888	Approved
	Total				33,510,840	11,515,940		21,994,900		\$16,919	
COFFEE/CLEAN AND PRODUCTIVE ENVIRONMENT (Cross Cutting) WP Target: Effluent control systems installed at 6 new coffee washing stations											
1	Sogestal Kirimiro	1-Sep-11	Muramvya - SDL Teka	Waste water effluent control structures & block latrines	35,029,470	24,093,970	69%	10,935,500	31%	\$9,505	Approved
2	Sogestal Kirimiro	1-Sep-11	Gitega - SDL Butemba	Waste water effluent control structures & block latrines	35,029,470	24,093,970	69%	10,935,500	31%	\$9,505	Approved
3	Coopérative Nkamwayacu	26 Juin 2011	Province Muyinga - SDL Wingoma	Waste water effluent control structures & block latrines	24,362,750	12,121,250	50%	12,241,500	50%	\$9,225	Approved
4	SOGESTAL Kayanza	23 Feb, 2011 (v1) 13 June 2011 v(2)	Kayanza - SDL Gatare	Waste water effluent control structures & block latrines	27,250,250	16,672,250	61%	10,578,000	39%	\$8,137	Approved
	Total				121,671,940	76,981,440		44,690,500		\$36,372	

**APPROVED, IN PROCESS AND REJECTED GRANTS
PROJECT YEAR 5 – Q1**

HORTICULTURE											
WP TARGET: 30 Grants to POs to initiate horticulture production programs											
N	Requesting Organization	Date Received	Project Location	Project Activity	Total Cost (Fbu)	Beneficiary Contribution (Fbu)	%	Financing Requested (Fbu)	%	Financing Requested (USD)	Status
1	TUGWANYUBUKENE-tugwizumbu	9-Nov-11	Bujumbura Rural	Production and marketing of Japanese plums (1.5 ha)	4,101,844	1,164,660	28%	2,937,184	72%	\$2,259	Approved
2	TUNGANYUBUZIMA	Sep-11	Nyanza Lac, MAKAMBA	Production and marketing of egg plant (.5 ha)	3,758,794	1,613,130	43%	2,145,664	57%	\$1,651	Approved
3	DUFATANEMUNDA	Sep-11	MAKAMBA	Production and marketing of garlic (.05 ha)	6,954,810	2,031,720	29%	4,923,090	71%	\$3,787	Approved
4	Dusozanye	23-Nov-11	NGOZI	Production and marketing of cabbage (.14 ha)	974,400	326,200	33%	648,200	67%	\$499	Approved
5	Tugarukiramatunda	23-Nov-11	NGOZI	Production and marketing of white egg plant (.144 ha)	1,162,640	441,600	38%	721,040	62%	\$555	Approved
6	Girivyizigiro	23-Nov-11	MUYINGA	Production and marketing of carrots (.005 ha)	994,920	281,050	28%	713,870	72%	\$549	Approved
7	Turwanyubukene	23-Nov-11	MUYINGA	Production and marketing of amaranths (.005 ha)	1,372,580	280,300	20%	1,092,280	80%	\$840	Approved
8	Twizigirane	24-Nov-11	Mutimbuzu, BUJ R	Production and marketing of cabbage (1 ha)	4,138,660	1,304,600	32%	2,834,060	68%	\$2,180	Approved
9	Urumuri Rw'Abarimyi	24-Nov-11	Isale, BUJ R	Production and marketing of white egg plant (1 ha)	4,614,420	1,705,400	38%	2,909,020	62%	\$2,238	Approved
10	Assaka	24-Nov-11	Rugombo, CIBITOKE	Production and marketing of onions (.5 ha)	3,304,110	1,384,000	39%	1,920,110	61%	\$1,477	Approved
11	Twisunge Ibihe	24-Nov-11	Kabezi, BUJ-Ru	Production and marketing of onion (.15 ha)	2,008,710	703,610	35%	1,305,100	65%	\$1,004	Approved
12	Sohora Isuka	25-Nov-11	MWARO	Production and marketing of onion (.25 ha)	1,704,570	800,910	47%	903,660	53%	\$695	Approved
13	Tugwizumwimbu	2-Dec-11	Giheta, GITEGA	Production and marketing of garlic(.1 ha)	1,744,390	434,700	25%	1,309,690	75%	\$1,007	Approved
14	Kazozakeza	25-Nov-11	GITEGA	Production and marketing of cabbage (.2 ha)	1,128,960	318,760	28%	810,200	72%	\$623	Approved
15	Twitezembere II	25-Nov-11	MURAMVYA	Production and marketing of cabbage (.35 ha)	1,810,390	838,350	46%	972,040	54%	\$748	Approved
16	Majambere	25-Nov-11	MURAMVYA	Production and marketing of cabbage (.25 ha)	1,481,630	653,150	44%	828,480	56%	\$637	Approved
17	Remesha	25-Nov-11	Rutegama, MURAMVYA	Production and marketing of cabbage (.25 ha)	1,794,490	815,350	45%	979,140	55%	\$753	Approved
18	Tugarukirubimyi	30-Nov-11	KIRUNDO	Production and marketing of cabbage (.5 ha)	3,139,530	1,023,800	33%	2,115,730	67%	\$1,627	Approved

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19	TERIMBERE	30-Nov-11	KIRUNDO	Production and marketing of cabbage (.5 ha) and white egg plant (.25 ha)	4,368,640	1,576,700	36%	2,791,940	64%	\$2,148	Approved
20	Tugwizumwimbu	30-Nov-11	NGOZI	Production and marketing of tomatoes (.12 ha)	1,253,500	274,500	22%	979,000	78%	\$753	Approved
21	Twiyungunganye	30-Nov-11	NGOZI	Production and marketing of tomatoes (1 ha)	4,022,800	1,536,000	39%	2,486,800	61%	\$1,913	Approved
22	TWIJUKIRE UBURIMYI BW'IMBOGA N'IVYAMWA	1-Dec-11	KAYANZA	Production and marketing of cabbage (.15 ha)	1,783,440	574,800	32%	1,208,640	68%	\$930	Approved
23	ABAKAYENZI TWISUNURE		BUJUMBURA RURAL	Production and marketing of tomatoes (.5 ha)	6,477,334	2,531,610	39%	3,945,724	61%	\$3,035	Approved
24	Twiyungunganye		KAYANZA	Production and marketing of cabbage (.2 ha) and carrots (.1ha)	1,977,560	576,780	29%	1,400,780	71%	\$1,078	Approved
25	Tuzamurane	25-Nov-11	MWARO	Production and Marketing of carrots (.25)	1,676,500	691,460	41%	982,040	59%	\$755	Approved
26	ABASANGIRAJAMBO	25-Nov-11	Bukeye, MURAMVYA	Production and marketing of cabbage (1 ha)	3,376,360	1,487,360	44%	1,889,000	56%	\$1,453	Approved
27	Sangwe	25-Nov-11	Bukeye, MURAMVYA	Production and marketing of cabbage (.25)	1,269,940	432,260	34%	837,680	66%	\$644	Approved
28	Dufashanye	25-Nov-11	Bukeye, MURAMVYA	Production and marketing of cabbage(.25)	1,202,800	417,650	35%	785,150	65%	\$604	Approved
29	DUSASIRIKAWA	9-Dec-11	KAYANZA	Production and marketing of tomatoes (.12)	2,606,220	863,620	33%	1,742,600	67%	\$1,340	Approved
	Total				76,204,942	27,084,030		49,117,912		\$37,783	
WP Target: Grant to CNTA for Appropriate Technology Processing and Storage Prototypes											
1	CNTA	8 Aug-11	Bujumbura	Food conservation/ transformation, prototype construction and training	68,488,900	6,811,000		61,677,900		\$49,342	Approved

**APPROVED, IN PROCESS AND REJECTED GRANTS
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Gender											
WP Target: 20 grants to women's associations for income generating projects											
N	Requesting Organization	Date Received	Project Location	Project Activity	Total Cost (Fbu)	Beneficiary Contribution (Fbu)	%	Financing Requested (Fbu)	%	Financing Requested (USD)	STATUS
1	Union des associations apicoles de Mwaro (Union TUGWIZE UMUTSAMA)	2-Feb-11	Kayokwe, MWARO	Beekeeping	9,676,000	2,676,000	28%	7,000,000	72%	\$5,385	Approved
2	Association TUGWIZUMWIMBU	22-Sep-11	Kayokwe, MWARO	Production and marketing of tomatoes (.5 ha)	2,806,410	1,302,970	46%	1,503,440	54%	\$1,156	Approved
3	Association DUSHIREHAMWE	22-Sep-11	Kayokwe, MWARO	Production and marketing of cabbage (.5 ha)	1,804,150	823,110	46%	981,040	54%	\$755	Approved
4	Association TUREMESHANYE	22-Sep-11	Kayokwe, MWARO	Production and marketing of onions (.5 ha)	3,143,960	1,879,120	60%	1,264,840	40%	\$973	Approved
5	Association TWIZERANE	22-Sep-11	Kayokwe, MWARO	Production and marketing of onions (.25 ha) and cabbage (.25 ha)	3,159,640	1,903,520	60%	1,256,120	40%	\$966	Approved
6	Association Twumvikane	2-Feb-11	Rugombo. CIBITOKE	Production and marketing of soap	5,725,000	2,810,000	49%	2,915,000	51%	\$2,242	Approved
7	Association TWIYUNGUNGANYE	22-Sep-11	KAYOKWE, MWARO	Production and marketing of onions (.5 ha)	1,737,070	1,160,410	67%	576,660	33%	\$444	Approved
8	Abarwizanyanya	23-Nov-11	MUYINGA	Production and marketing of onions (.5 ha)	3,027,060	1,570,500	52%	1,456,560	48%	\$1,120	Approved
9	Kazemumahoro	23-Nov-11	Gashikanwa, NGOZI	Production and marketing of cabbage (.07 ha)	917,710	260,500	28%	657,210	72%	\$506	Approved
10	Twizeranenyabibuye	23-Nov-11	butaganzwa, KAYANZA	Production and marketing of cabbage (.15 ha)	1,697,310	652,600	38%	1,044,710	62%	\$804	Approved
11	Abeshizehamwe	23-Nov-11	Busoni, KIRUNDO	Production and marketing of cabbage (.5 ha)	2,933,610	979,800	33%	1,953,810	67%	\$1,503	Approved
12	Girumwete	24-Nov-11	Kabezi, BUJ R	Production and marketing of onions (.3 ha)	2,127,990	923,000	43%	1,204,990	57%	\$927	Approved
13	Viyiziro	24-Nov-11	Mabanda, MAKAMBA	Production of the marketing of amaranths (.25 ha) and cabbage (.25 ha)	2,939,405	1,247,700	42%	1,691,705	58%	\$1,301	Approved
14	Dukorerehamwe Twungurane	24-Nov-11	Gihanga, BUBANZA	Production and marketing of onions (.2 ha)	2,295,890	932,000	41%	1,363,890	59%	\$1,049	Approved
15	ECOFA	24-Nov-11	Gihanga, BUBANZA	Production and marketing of green pepper (.2 ha) and onion (.2 ha)	4,542,070	1,492,400	33%	3,049,670	67%	\$2,346	Approved
16	Twiyounganyane bakenyezi	24-Nov-11	Gihanga, BUBANZA	Production and marketing of onion (.2 ha)	2,265,790	773,000	34%	1,492,790	66%	\$1,148	Approved

APPROVED, IN PROCESS AND REJECTED GRANTS

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17	Abasangirakivi	25-Nov-11	BURURI	Production and marketing of cabbage (.25 ha)	1,505,240	562,780	37%	942,460	63%	\$725	Approved
18	Turwanyinizara	25-Nov-11	GITEGA	Production and marketing of cabbage (.1 ha)	1,085,030	186,550	17%	898,480	83%	\$691	Approved
19	Murima Wacu	25-Nov-11	Matana, BURURI	Production and marketing of cabbage (.4 ha)	2,079,540	636,320	31%	1,453,160	70%	\$1,118	Approved
20	Twijukiribikorwa	25-Nov-11	Matana, BURURI	Production and marketing of onion (.2 ha)	1,997,360	652,000	33%	1,345,360	67%	\$1,035	Approved
Total					57,466,235	23,424,280		34,051,895		\$26,194	

COFFEE

N	Requesting Organization	Date Received	Project Location	Project Activity	Total Cost (Fbu)	Beneficiary Contribution (Fbu)	%	Financing Requested (Fbu)	%	Financing Requested (USD)	Status
1	Coopérative KAWANZIZA	1-Feb-11	SDL Kagombe	anti-erosion and soil protection on coffee farm	12,032,000	7,492,000	62%	4,540,000	38%	\$3,632	In Process
2	Cooperative MBONERAMIRYANGO-KORANE	1-Mar-11	Commune Giheta/ Province Gitega	Installation of a mini-coffee washing station	71,607,350	22,910,350	32%	48,697,000	68%	\$38,958	In Process
3	Cooperative Kazoza n'ikawa	8-Feb-11	Commune Matongo/ Province Kayanza - SDL Bwayi	Installation of a mini-coffee washing station	59,441,600	10,635,600	18%	48,806,000	82%	\$39,045	In Process
4	Cooperative Dusangirijambo	1-Mar-11	Commune/Province Kayanza - SDL Karinzi	Installation of a mini-coffee washing station	77,277,950	28,062,950	36%	49,215,000	64%	\$39,372	In Process
5	Cooperative KANOVERA	Nov-11	Commune MUSIGATI/ Province Bubanza	Installation of a mini-coffee washing station	78,098,900	27,898,900	36%	50,200,000	64%	\$38,615	In Process
Total					298,457,800	96,999,800		201,458,000		\$159,622	

COFFEE/Clean Productive Environment (Cross cutting)

1	Sogestal Kirundo - Muyinga	26-Aug-11	Commune Mwakiro/ Province Muyinga	Upgrade waste water effluent control infrastructure/ adding rain water collection system	8,958,700	3,998,700	45%	4,960,000	55%	\$3,741	In Process
Total					8,958,700	3,998,700		4,960,000		\$3,741	

**APPROVED, IN PROCESS AND REJECTED GRANTS
PROJECT YEAR 5 – Q1**

DAIRY											
N	Requesting Organization	Date Received	Project Location	Project Activity	Total Cost (Fbu)	Beneficiary Contribution (Fbu)	%	Financing Requested (Fbu)	%	Financing Requested (USD)	Status
1	Burundi Bio Agricultural Community (BBAC)	12-Jan-11	Commune et province MURAMVYA	Increase dairy production through installation of veterinary inputs shop	31,328,000	19,350,000	62%	11,978,000	38%	\$8,807	In Process
2	Laiterie Nyabisabo	31-Oct-11	Bujumbura Mairie	Equipment modification and appropriate packaging to produce long life milk (ESL)	22,369,880	12,348,200	55%	10,021,680	45%	\$7,709	In Process
3	Fromagerie Saint Ferdinand	Dec-12	Vyegwa, province Ngozi	Expansion of artisanal cheese production, equipment and packaging	71,188,055	26,462,284	37%	44,725,711	63%	\$32,887	In Process
Total					124,885,935	58,160,484		66,725,391		\$49,403	

MSME											
N	Requesting Organization	Date Received	Project Location	Project Activity	Total Cost (Fbu)	Beneficiary Contribution (Fbu)	%	Financing Requested (Fbu)	%	Financing Requested (USD)	Status
1	Christine NGARUKO for Nature Grown Burundi	23-Dec-11	Bujumbura Rural	Technical assistance for flower export	6,230,874	1,560,702	25%	4,670,172	75%	\$3,434	In Process
2	Programme d'Appui au Développement Social (PADS)	23-Dec-10	Commune Gashoho, Province Muyinga	Beekeeping	13,447,500	2,195,000	16%	11,252,500	84%	\$8,656	In Process
3	Groupement de Production Agro-Pastorale (GPAP)	22-juin-11	Commune Gashoho, Province Muyinga	Beekeeping	5,439,000	804,000	15%	4,635,000	85%	\$3,565	In Process
4	Association des Familles Chrétiennes pour le Développement (AFCD)	8-Jul-11	Commune Buganda et province Cibitoke	Production of wheat flour and opening a bread shop	9,668,000	2,859,000	30%	6,809,000	70%	\$5,447	In Process
Total					34,785,374	7,418,702		27,366,672		\$21,102	

**APPROVED, IN PROCESS AND REJECTED GRANTS
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HORTICULTURE										
N	Requesting Organization	Date Received	Date Rejected	Project Location	Project Activity	Total Cost (Fbu)	Beneficiary Contribution (Fbu)	Financing Requested (Fbu)	Financing Requested (USD)	Reason For Rejection
1	Dukorere Hamwe	12 Nov-11	2-Dec-11	MAKAMBA	Production and marketing of tomatoes	6,188,434	2,856,570	3,331,864	\$2,563	Not-profitable due to input costs and small surface area
2	Mpamagarangukize	6-Dec-11	15-Dec-11	BUBANZA	Beekeeping	17,855,000	4,970,000	12,885,000	\$9,912	ADC determined the group was not an official association
3	Ubumwe	24-Nov-11	8-Dec-11	Mutimbuzu , Buj Rural	Production and marketing of onion (.5 ha)	4,068,010	1,714,600	2,353,410	\$1,810	withdrawn by the association
4	Dufatanemunda	24-Nov-11	2-Dec-11	Rugombo, CIBITOKÉ	Production of onion (1 ha)	10,748,920	6,850,500	3,898,420	\$2,999	ADC determined the group is not a good partner for BAP
	Total					38,860,364	16,391,670	22,468,694	\$17,284	
COFFEE/Clean Productive Environment (Cross Cutting)										
N.	Requesting Organization	Date Received	Date Rejected	Project Location	Project Activity	Total Cost (Fbu)	Beneficiary Contribution (Fbu)	Financing Requested (Fbu)	Financing Requested (USD)	Reason For Rejection
1	SOGESTAL Kayanza	23 Feb, 2011 (v1) 13 June 2011 v(2)	15-Oct-11	Kayanza - SDL Mutumba	Waste water effluent control & bloc latrines	28,789,350	16,685,350	12,104,000	\$ 9,683	SDL Gatere is not a BAP supported coffee washing station. The Sogestal should finance this activity themselves
	Total					28,789,350	16,685,350	12,104,000	\$ 9,683	

Sector	Total Grants In Process		Total Grants Rejected	
	Value (USD)	Number	Value (USD)	Number
Coffee	\$ 159,622	5	\$ -	-
Coffee - effluent control	\$ 3,741	1	\$ 9,683	1
Dairy	\$ 49,403	3	\$ -	-
Horticulture	\$ -	-	\$ 17,284	4
Gender	\$ -	-	\$ -	-
MSME	\$ 21,102	4	\$ -	-
Total	\$ 233,868	13	\$ 26,967	5

Annexes

ANNEX ONE:

MODIFIED WASTE WATER TREATMENT SYSTEM FOR MINI-WASHING STATIONS

Liquid effluent treatment design:

Water charged with mucilage is directed into a cylindrical shaped collection pit made with local stone masonry. This pit is divided into three parts from bottom to top. The first compartment, constituting half the total volume, is a cesspit. The second compartment that contains the sand (pea gravel?) and charcoal (1/4 of the total volume) serves as pre filtering and pretreatment. The third compartment whose volume is equal to the second plays the role of treatment by raising the pH level of the water and filtering remaining suspended solids and absorption of odors by coal.

Solid effluent design:

The pulp separated from the water is collected and transported by wheelbarrow to a covered storage pit. The development of a staging area planted with a "plant filter" for the wastewater before discharge to the marsh is necessary. Its layout is as follows:

1. Construct a storage water tank (semi-buried) 7 m x 5 m x 60 cm (depth).
2. Line bottom and side walls of the bin with clay to a thickness of 10 cm and cover the clay layer by a plastic sheet in polythene;
3. Load the tray and spread the gravel grain size almost standard 16/32 mm to a depth of 15 cm;
4. Cover the gravel with a layer of sand all comers with a thickness of 15 cm;
5. Set above the sand layer a layer of topsoil (20 cm thick);
6. Planting cuttings or reed cane and bamboo on the total area of the filter.

Annex Two: Env

Double Chamber Urine Diversion



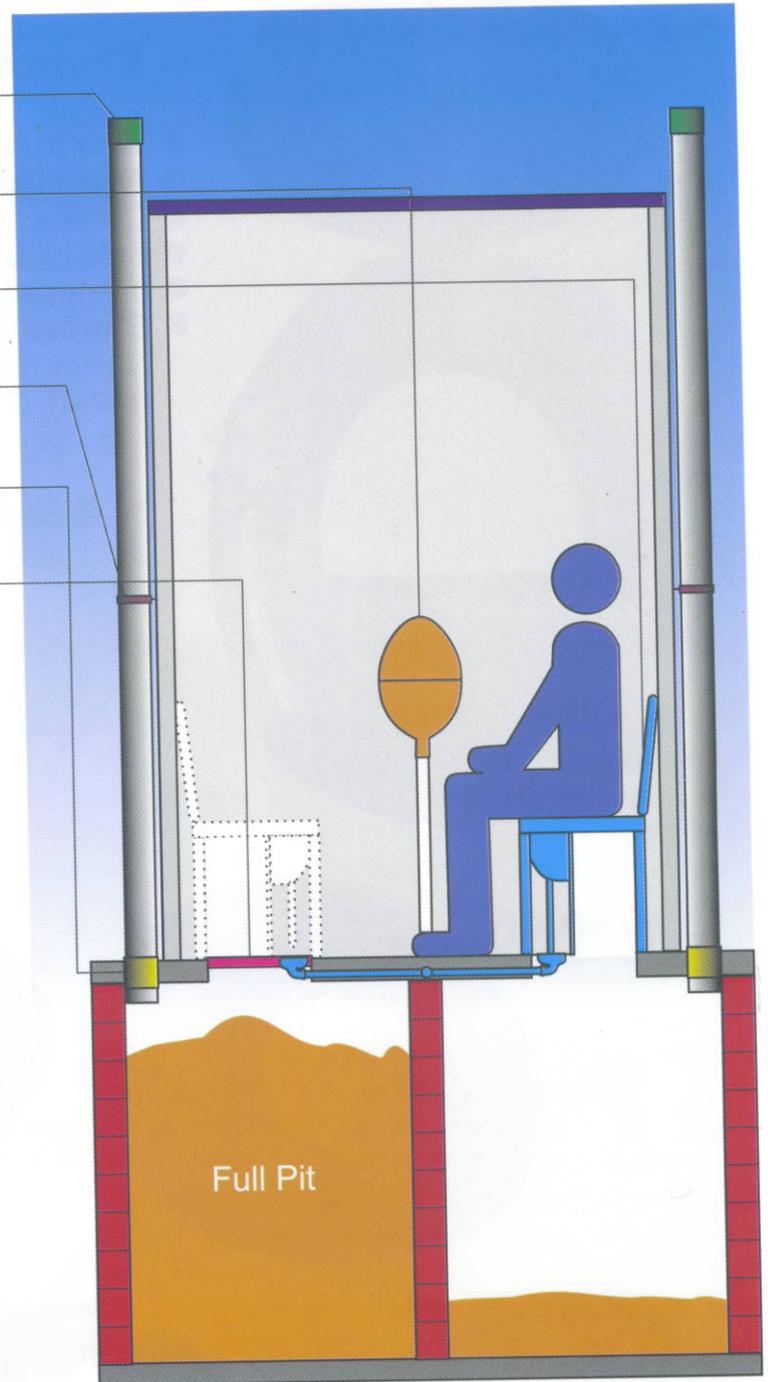
- Fly Screen
- EnviroMan
- EnviroUD
- Vent Clamp
- Socket
- EnviroLid

Operational Principles:

The double chamber Urine Diversion sanitation system is a dry, on-site sanitation system consisting of a sub-structure with two chambers. The chambers are completely sealed to ensure no water ingress from surface and/or ground water.

Waste drops into the pit where organic material decomposes and the liquids are diverted into a separately constructed soak away. One pit is used until filled, which takes approximately 12 months per chamber. Once the chamber is filled, the defecation hole is completely sealed and the other pit used (the pedestal are relocated to the other chamber on the inside of the top-structure). The first chamber's contents are left to decompose after which the matter can be removed once the second chamber is filled.

Once the second chamber is filled, the decomposed content of the first chamber is emptied (after 12 months of decomposition) to a suitable disposal site or designated area.



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