



Alumni impact of Dutch knowledge institutions on dairy chain governance in Kenya and Ethiopia”

Promoting climate-smart
dairy practices for food
security and resilience

Marco Verschuur
(ed), 2020

Written in collaboration with the
**professorship Climate Smart Dairy
Value Chains.**

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Foreword

This booklet presents twenty-one impact stories of Ethiopian and Kenyan alumni of Dairy (Livestock) trainings in the Netherlands. The Dutch trainings consists of Master courses conducted by Van Hall Larenstein University of Applied Sciences (VHL) in Wageningen or Velp, short courses or diploma courses organised by Practical Trainings Centre (PTC+) in Oenkerk or Barneveld / Dairy Trainings Centre (DTC) in Oenkerk and short courses organised by Centre of Development Innovation – part of Wageningen University and Research Centre (WUR) in Wageningen. Most refresher course participants attended the Dutch trainings between 2010 and 2018.

These alumni attended the Refresher Course entitled “Assessing the impact of Dutch knowledge institutions on performance of Netherlands alumni on dairy value chain governance in Kenya and Ethiopia” organised by Van Hall Larenstein University of Applied Sciences (VHL), Agrikom (alumni organisation) and Egerton University on 7-16 July 2019 in Nairobi and Nakuru, Kenya. Part of the refresher course was dedicated to a write shop about the impact of the Dutch training.

The other part of the Refresher Course was dedicated to a current theme: “Promoting climate-smart agricultural practices for food security and resilience”. A link is made with the NWO-GCP4-CCAFS research project, which VHL is leading : “Inclusive and climate smart business models in Ethiopian and Kenyan dairy value chains (CSDEK)”. VHL, CSDEK project partners (UNIQUE agroforestry and land use, AgriProFocus) and Dutch (Dutch Embassy in Kenya (EKN), WUR through ‘3R’ project, Agriterro, SNV) and Kenyan (Kenya Dairy Board (KDB), Kenyan Climate Smart Agriculture Project (KCSAP), Githunguri Dairy Farmers Cooperative Society, Kenya Agriculture and Livestock research Organisation (KALRO), Egerton University, Happy Cow) and international (CGIAR-CCAFS, ILRI through NWO-CCAFS project ‘i-led’) organisations presented current developments and research results of climate smart agriculture practices related to the dairy sector. Therefore, the presented Back Home Action Plans are based on the promotion of Climate Smart Dairy Practices.

This refresher course is sponsored by the NUFFIC / Orange Knowledge Programme (OKP) programme, funded by the Ministry of Foreign Affairs of the Government of the Netherlands.

			
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Participants opening ceremony at Wida Highway Motel, Nairobi on 8 July 2019

REPORT ON REFRESHER COURSE IN KENYA

Reconnecting alumni for tangible and measurable impact

Take a minute and think about it! What kind of impact are graduates of Universities having in their respective fields and professions over the years, from the time the first graduates left to date? How about creating a forum where these alumni can pull together their influences, experiences, and find unique opportunities to leverage on their strengths for sustainable impact in the area of interest in the society?

This is exactly what the Van Hall Larenstein (VHL) University, Egerton University, and AGRICOM consortium organized for alumni of various Dutch institutions who graduated since early 2000. The programme dubbed --Refresher Course 2019 "Assessing the Impact of Dutch Knowledge Institutions on Performance of Alumni on Dairy Chain Governance in Kenya / Ethiopia"-- was held in Kenya both at Wida Highway Motel and Egerton University, ARC Hotel. These respective alumni were selected from programmes such as PTC+, OKP short courses, Wageningen University of Research and alumni of Masters programme from VHL.

Highlights:

The theme of the refresher course was "Promoting Climate Smart Dairy Practices for Food Security and Resilience". The matter of the Dutch alumni impact on the sensitive area of climate smart practices in Agriculture was central to the learnings, deliberations, and were considered at a great depth. Whereas it was apparent from the sharing that farmers in different countries have been involved in such practices that can be regarded as climate smart; the uncertainty remained: Do our farmers know these practices and how can they measure and quantify their successful applications? What Models for can be reliably applied for upscaling of best practices in this area?

What was new?

The concepts of the 'living lab' as a tool or model for upscaling of various programmes was discussed and the question was whether sharing of ideas and best practices among Dutch Institution's alumni can significantly contribute to adoption of climate smart practices among farmers in Africa?

Evidently, the concept of the 'living labs' combined with climate smart dairy practices can provide a platform for upscaling adoption of various climate smart practices to help achieving the "Triple Wins" of Climate smart agriculture, but also help address food and nutrition security, as well as safety. But to operationalize this, the idea of a Pan African Value Chain Development Forum (PAVCD) was adopted and there are plans to launch this unique platform in the next 1 year in Addis Ababa, Ethiopia. The coming days will be interesting to see how this concept evolves, creating and maintaining various country chapters and establishing itself as an agent and voice of real change by the alumni of various

Dutch institutions from Africa.

The final thoughts:

It is time we to think especially in our trainings as academics, how best we to introduce these concepts to prepare them for these challenges that are dominating conversations in the development fora and hopefully prepare them adequately to offer guidance on addressing their solutions.

RC participants during a visit to the Animal Orphanage at the Nairobi National Park on Sunday 14 July 2019.

Report compiled by Benard Oloo, Dairy and Food Science and Technology, Egerton University.



Value Chain Development for Self-Help Group Member Farmers in Ethiopia

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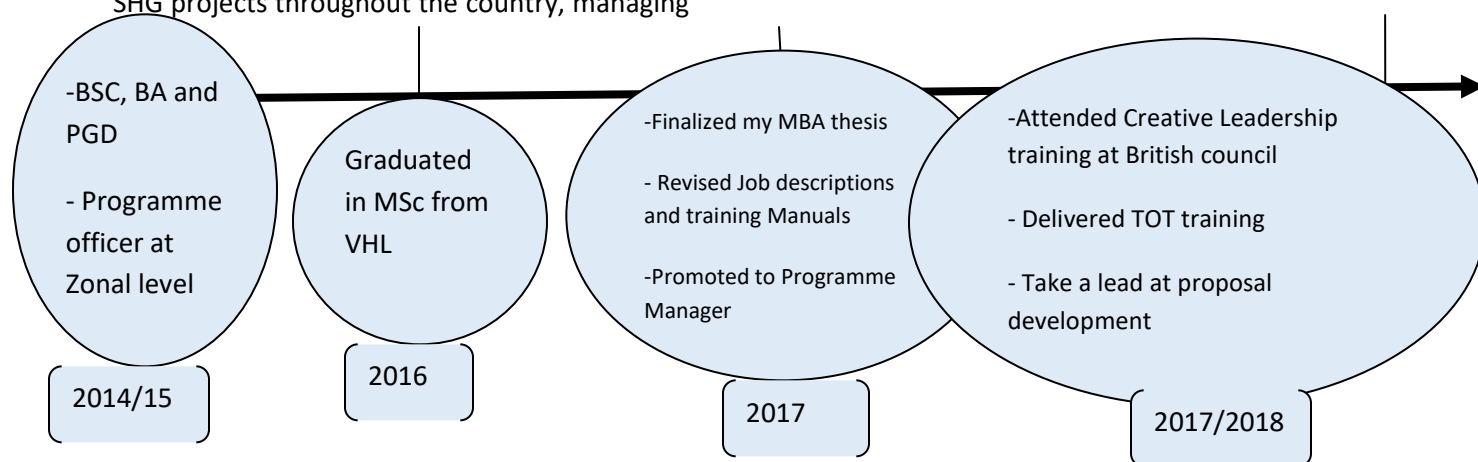
Van Hall Larenstein – MSc Management of Development, 2015-2016



1. Introduction

Since 2002, Ethiopian Kale Hewyet Church Development Commission (EKHC-DC) is a national faith based NGO, working as a supporter in the dairy value chain where our rural self-help group (SHG) member farmers are engaged in. It strengthens women, PWDs and youth through the SHG approach which was learnt and adapted from MYRADA in India with the generous support of Tear Fund UK and Tear Netherlands. The aim is to improve livelihoods through savings and access to markets for more than 17,000 SHGs and 93,000 member smallholders and households in Ethiopia. Since 2006, I joined EKHC as a Social Worker position in Nazareth Community Development Project. Following my performance, I was promoted to project coordinator, and later to programme officer. In 2015, I got the chance to join VHL University of Applied Science. After graduation in 2016, I was promoted to a Self-Help Group Promotion Programme Manager, managing all SHG projects throughout the country, managing

the second vastest and biggest programme under EKHCDC. The programme seeks to sustain the monthly income of the targeted low income community and create more sustainable livelihoods for the beneficiaries by incorporating them into a strengthened market linkages and value chains. The projects are also supporting the SHG members in identifying business opportunities and value chain operators through capacity building schemes in the target areas by incorporating them into strong marketing linkages. These activities, intended to impact gender empowerment were chosen, because of women's role in the local market and their availability for engagement. The activities were relatively low labour and within proximity to the household. They had the potential to build on cultural legacy that valued women's engagement in an economic activity that would work to decrease the current norms of male dominance.



2. Impact of VHL MoD

Before attending the Masters programme in the Netherlands, I was working as programme officer for Nazareth Community Development Program based at Adama City. As that time, I was graduated with a BSc in Mathematics from Addis Ababa University and a BA Economics from Adama University. I was also graduated with a PGD from Staffordshire University. I started my MBA, but did not finalize my research in September 2015. After graduation from VHL, I finalised my MBA thesis and took my degree. EKHDC organization management and leadership promoted me to administrative level manager, because of my educational preparation. My organization and my country have been benefiting from my knowledge I acquired from the Dutch University.

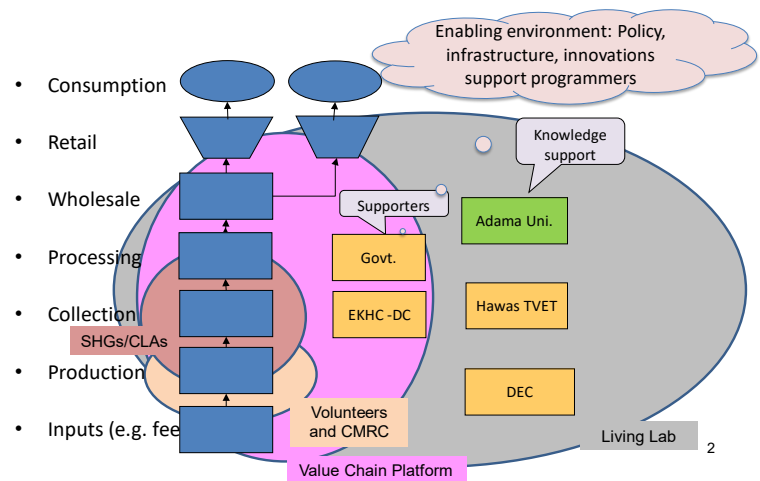
2.1 At personal and organizational level

After my return from the Netherlands, I presented my thesis results and shared it with three other staff in our organization. Then I continued with revising job descriptions for community facilitators and other staffs to minimize role duplication. I also continued with revising training manuals on basic business development, communication, Leadership and SHG and CLA concept and entrepreneurship. Later, I took the lead in project proposal development at Oromia region, Moyale district which mainly focuses on adolescent girls with title '**Leave no girls behind**' and submitted to DIFD through Tearfund and EDUKANS. Then we have also continued with proposal development with ICCO with the title '**Strategic partnerships convening and convincing**' which mainly works towards food security and PWDs inclusiveness in our SHG projects. With this project I was one of the researcher team conducted Food and Nutrition Security in five drought proven districts in Oromia regional state, and SNNP. Following the research finding we came up with five dialogue topics (sustainable food security, climate change, linkages to resources, inclusiveness and SHG Legalization) for our Cluster Level Association to deal with.

2.2 At Value Chain /SHG Community Level

EKHDC-DC is a supporter in the dairy value chain, where we have intervened at input, production, processing and retail levels. At input level, we have facilitated access to external loan for the SHG members from Tesfa and Metemamen MFIs. At production, processing and retail level, we have delivered capacity building trainings.

EKHDC-DC SHG Member Farmers Dairy Value Chain Map



What we have achieved so far

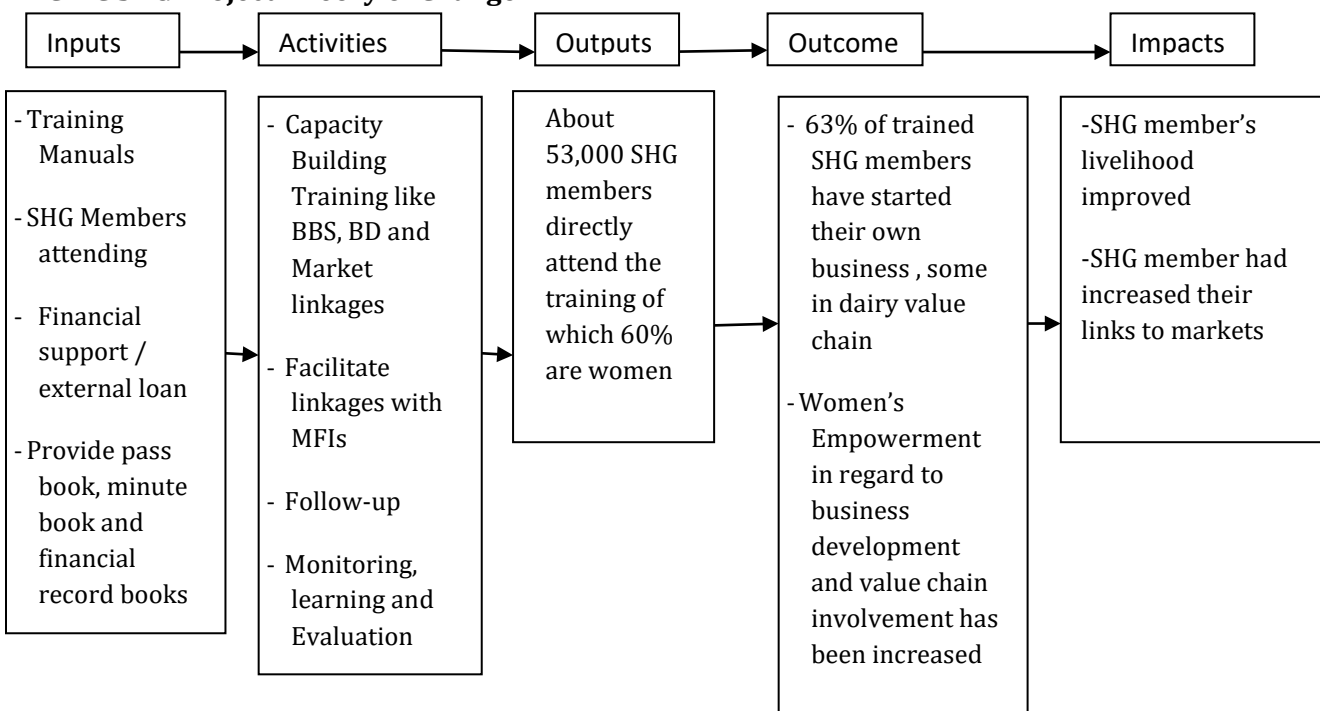
Women's Empowerment in regard to business development and value chain involvement has been Increased: The SHG projects that EKHDCDC have in different corners of the urban and rural part of the country has increased women's and PWDs business development and value chain involvement through different capacity building trainings on business development and value chain actors to enhance them and make them key players in the value chain they involved. A case study done in 2018 have revealed that women's monthly income from their business engagement has increased significantly and changes are emerging in community and value chain actor perspectives on women's role.

SHG member Farmers had increased their links to markets: The SHG projects under my supervision focuses on working with private sector companies in order to establish upward

market linkages for SHG member producers. Most SHG member farmers have adopted a strategy in which they sell to multiple buyers to ensure that they can sell their dairy and other products consistently and at fair prices. This flexibility allows SHG member farmers to be resilient despite the inconsistency of formal sector buyers and to cope when geography and climate may limit access to formal sector processors and throughout the flush season when formal sector demand is lower.

EKHC-DC has built the resilience of households and communities through different capacity building training. The organization is also promotes gender equality and accountability by improving household livelihoods through allowing poor and chronically food insecure households to increase their monthly income. This was achieved through 'Increasing Access to Markets' and value chain involvement. EKHC-DC has been worked with self-help group members to create market linkages.

EKHC-DC SHG Project Theory of Change



History has been changed: Personal Testimony

W/ro Tirhas Asreda is 35 old and lives in Nazareth. She is engaged in cattle farm and dairy farm. She is married and has three children. Before joining SHGs, W/or Tirihas Asreda has been suffering for lacking of her own job. She was living only by expecting her husband income. She had no social interactions with others and had failed in financial crisis.

Her family living status had been from hand to mouth types of living standard. In addition, she said lack of knowledge on how to change her

living status through small amount of saving and starting income generating with small money was like climbing mountain for her. Because of that she was not went out to work, she was only limited to live simply by expecting her husband's income.

After joining 'Yerasfikir' meaning 'Love to yourselves' SHGs in 2005, she said she had got knowledge and awareness about self-help groups role in overcoming poverty. The training she got from the project transformed with remarkable attitudinal change about saving and working with other similar people in her area.



She added that, she has begun saving some amount of money with support of her husband in the initial period. She was started saving 2 birr which increased to 200 birr now. Her total savings up to this reporting time has reached to 22,800 birr. Her initial loan was 3000 birr which helped her to start rearing a milk cow. The second was 10,000 birr, the third 15,000 birr and the fourth 69,000 birr. Currently, she has engaged to milk cow rearing and she has 3 exotic milk cows with an estimated price of 150,000 birr. She said with the income she got from milk selling she has managed her families' food and cover all her children school fee.

In the meantime, she had been divorced from her marriage and managed her three children school fees and food alone with the help of her SHGs. She said her self-help group has made her to think strongly and have purposeful life to lead her families with full confidence. She added that her SHG made her to feel that she is in a safe hand.

3. Lessons learnt

In my study in the Netherlands, the modules on value chain development and analysis; food security,

business economics and the research field work have supported best to learn about dairy chain governance in my projects.

To conclude: the knowledge I acquired from VHL University of applied science has brought great impact on my personal carrier, on my organizational implementation direction and on the Self Help Group community engaged in different businesses including dairy farming. The practical learning approach given by VHL has helped me to design a proposal that can solve the problem of the community and influence on my personal knowledge regarding management of development.

4. Back Home Action Plan

The main objective is to highlight and add climate-smart practices within the ongoing community development programme about climate change adaptation and mitigation with improving livelihoods and productivity of dairy farming in Adama District. As EKHC-DC, we will identify SHG dairy farmer members and then deliver training on value chain development. 97% of the SHG members in the district are women and our projects are inclusive in terms of participation of PWDs.

Action Plan Matrix

Planned Activities	Expected outputs	Desired Outcomes	Time bound
Identification of farmers engaged or interested in dairy farming	Number of male and female farmers identified	Know with whom to go forward	September 2019
Training on Climate smart dairy value Chain	No of training attendants	Increased awareness on CSDVC	October 2019
Identify existing Value Chain	Existing Value chain identified	Increased knowledge of existing VC	October 2019
Identify actors in the existing value Chain	Actors in the existing Value chain identified	Increased knowledge of actors in the existing VC	November 2019
Decide where to intervene in the chain	Area of intervention identified	Decision made where and when to intervene	December 2019
Facilitate linkages with different stakeholders	Number of stakeholders identified	Number and type of linkage made	January – April 2020
Have community dialogue at CLA Level	Identify number of topics for dialogue	Dialogue at community level started	May – August 2020
Follow up			September 2019 – August 2020
Monitoring, Learning and Evaluation			September 2019 – August 2020

On-farm demonstration and evaluation of milk churner in Farmers Research Groups

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Van Hall Larenstein - MSc MOD / Food Security, 2017

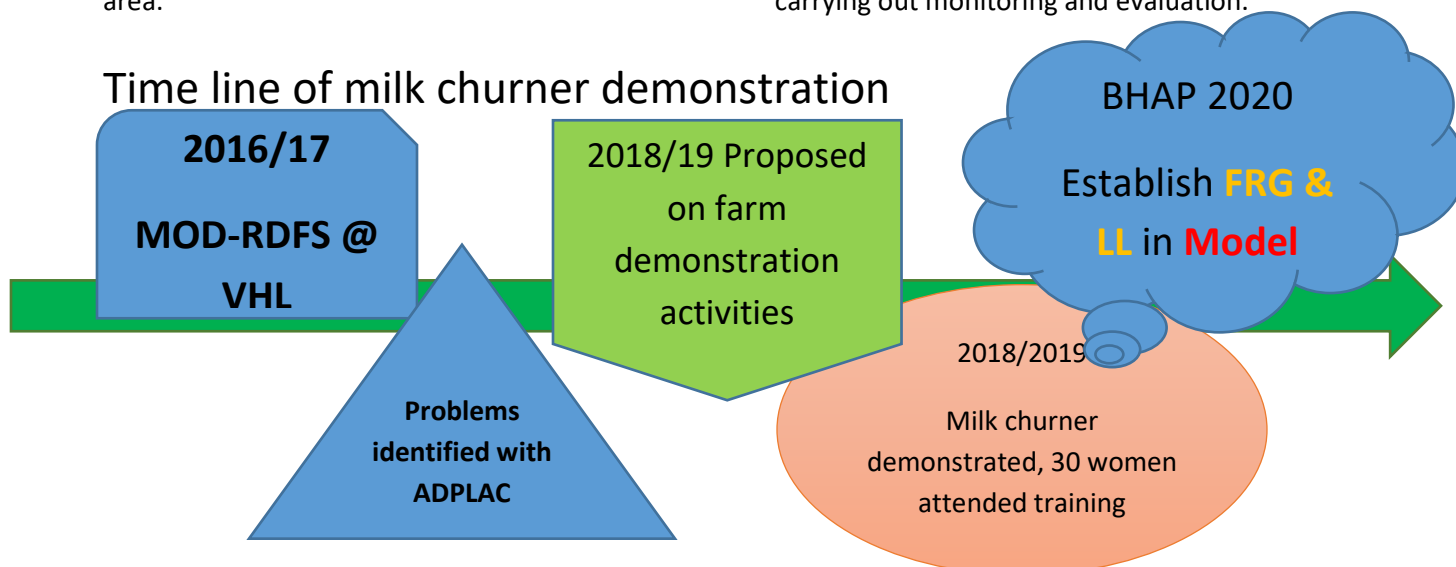


1.0 Introduction

In 2017, I have been graduated with a masters in Management of Development, specialized in Rural Development and Food Security from Van Hall Larenstein University of Applied Sciences, The Netherlands. In 2011, I have been graduated with a BSc Degree in Rural Development and Agricultural Extension from Haramaya University with great distinction. Currently, I am working in Bako Agricultural Engineering Research Center, Oromia Agricultural Research Institute as Associate Researcher of agricultural extension. For the last seven years, I have been contributing to improve the livelihoods of smallholder farmers while working as agricultural extension researcher and team leader in promoting agricultural mechanization technologies. As agricultural extension team, we are implementing milk churners that save time, labour and drudgery of women in our mandate area.

The demonstration of improved plastic milk churners was conducted in Horo district. Horo is a district which is found in Horo Guduru Wollega Zone of Oromia Region and well known with its peculiar livestock and livestock products. Milk and milk products particularly butter are very prominent commodities on the market and butter of this district is well known all the way from West Shoa Zone to the capital city of the country Addis Ababa, fetching more prices. Three kebeles from the district representing the three agro-ecologies (Highland, Midland and Lowland) were selected purposively. From each kebele, 10 women farmers who own at least one lactating cow and produce butter were purposively selected. The selection of farmers was done in collaboration with respected DAs and local administrators. Thenceforth, three Farmers' Research Groups (FRGs), each consisting of 10 members, was organized for the trials and given the task of carrying out monitoring and evaluation.

Time line of milk churner demonstration



One of the important inputs to speed up adoption of a given technologies is training. It can allow farmers and other technology users to acquire the basic knowledge before attempting to try the practices and/or technologies on their own farms. In this regard a two day training were organized and all FRG members (30 women), seven DAs (Development agents) and two SMSs (Subject matter specialists) from extension and mechanization processes were trained on technology application, the intended objective of the activity and ways to improve efficiency and quality of milk products production, handling and processing.

2.0 Impact of Dutch training

2.1 Personal level: self-development

On my career and performance, the Master MOD helped me a lot, because the programme is applied in nature and practical in real life. Most of the assignments were based on real situations they are remembered easily. After I graduated from VHL, I got a job promotion in my organization. Previously, I was assistant researcher, but now I am associate researcher. Regarding my work performance, I am doing well and my performance evaluation is very good. In addition to my regular responsibility, I am working as AGP II (Agricultural Growth Programme II) focal person. I am coordinating all activities of my research centre that are supported by AGP II.

2.2 Organization level:

After I coming back from the study, we have proposed four demonstration proposals that are supported by AGP II and another two proposals funded by regular budget. This was achieved by utilizing the knowledge and skills gained at VHL. For example the course "intervention and strategies for food security"

helped me to identify and prioritise problems and developing strategies for the identified problem.

2.3 Dairy chain level

As to dairy value chain (see figure 1) currently, we are running demonstration activity of milk churner as agricultural extension research team, supported by AGP II. Twenty (20) milk churners were manufactured in our metal shop; our team established three women groups that was used for demonstration.

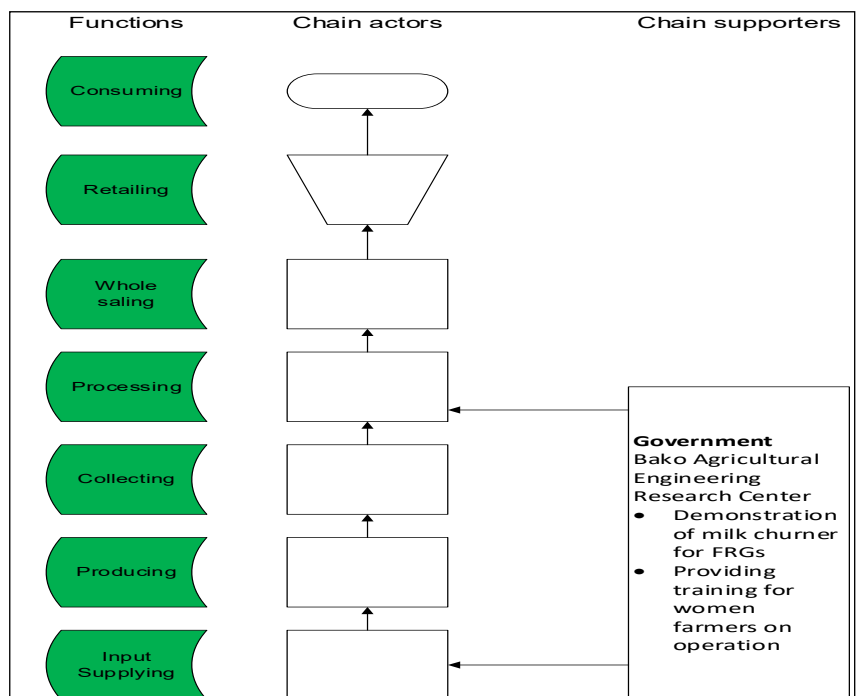


Figure 1: Milk churner - Dairy value chain

In the districts, churning is the responsibility of females and it can take from one and half to two hours depending upon their daily chores. Adult males do not churn, because of the gender division of labour, the suitability of the churner and different cultural issues. However, as the demonstration took place with the presence of male household members including the husband, participating female farmer have showed interest on the improved churner as it was found to be helpful in reducing the time of churning and its suitability to be used by men and boys (see figure 2).



Figure 2: Pictures showing participation of boys, men and women on improved plastic milk churner at Horo district

Table 1: Theory of Change: dairy value chain

Pre-intervention	Programme activities	Output(personal)	Outcome (organisational)	Impact (chain)
Master in MOD at VHL University of applied sciences	Food security and intervention strategies	Understanding of intervention strategies	Share experiences with colleagues on value chain map	Attitudinal change of men and boys on milk churning
	Value chain analysis	Team work skills, writing and analytical skills and time management	Coordinating AGP II activities	Farmers aware and demands on other livestock productivity
	Applied research	Confident on food security		Reduced drudgery of women

3.0 Lessons learnt

Value chain map tool, in a module Value Chains, Markets and Business for Food Security were the most striking modules to support dairy value chain stakeholders. Group assignment is very useful to learn from each other.

4.0 Challenges

During our demonstration activities, more demands are created for improved plastic milk churners from participants. However, there are no manufacturers of improved plastic milk churners near to the district that meets these demands.

5.0 Conclusion

The study was initiated to demonstrate and evaluate improved plastic milk churners (improved churner and traditional clay pot churner). For the study, 30 trial female farmers grouped in FRG in three kebeles of Horo district were involved. The improved plastic churners were produced in advance and the traditional clay pot churners already available on the farmers hand were used. Trainings were also prepared for all the trial farmers and other non-trial farmers including their husbands. The FRGs used time required for churning as criteria/parameters to compare the two churners. Furthermore, the study has created demand as the participating female farmers have showed interest on the improved churner. Based on the results, it can be concluded that

the improved churner was found to be more time saving than the traditional clay pot churner. Thus, further scaling up activity is recommended.

6. Back Home Action Plan

Title

Scaling up Livestock Input and Output Processing Technologies for Smallholders in Horro districts.

Targeted Problem

Livestock productivity in Oromia region is the lowest due to poor availability and access to livestock feed, insufficient health service and lack of improved breeds.

Objectives of intervention

To demonstrate, promote and provide recommendations on baler, chopper and milk churn technologies for dairy small-scale dairy farmers in Horo districts.

Matrix with your practical **Action Plan** time bound specific activities and expected outputs and desired outcomes.

Table 2: Back Home Action Plan

No	Activities	Unit	Annual plan (July 2020 - June 2020)	Distribution of the plan across quarters				Expected Output
				Q1	Q2	Q3	Q4	
1	Manufacturing of baler, chopper and milk churner	Number	1 each	1	1	1	-	
2	Site and farmers selection	Round	1	1	-		-	
3	Establish FRG Groups	Number	3	-	1	1	-	
4	Training	%	100	-	-	50	50	
5	Demonstration	%	100	-	-	50	50	
6	Data collection	%	100	-	25	25	50	
7	Monitoring and evaluation	Number	4	1	1	1	1	
8	Write up	%	100				100	
9	Number of farmers expected to participate							
	Adult men	Number	40					
	Adult women	„	40					
	Young men	„	14					
	Young women	„	6					
	Total	„	100					
10	Technologies (implements) planned to be supplied		3	-	1	1	1	

From a specialist to a generalist

Mulubrian Bayissa Tullu – Ethiopia

Jimma University - lecturer & head of department

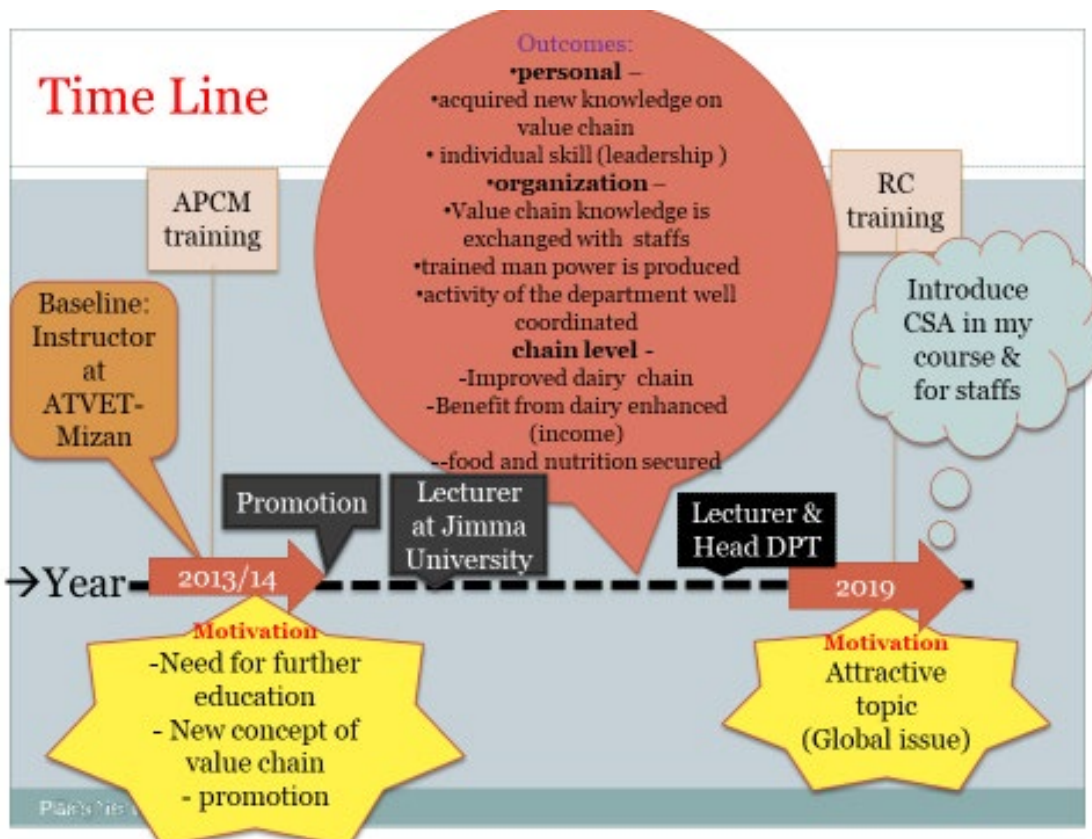
E-mail: mulubaytu@gmail.com

Van Hall Larenstein – MSc APCM – Horticulture chains, 2014



1. Introduction

As soon as I graduated from university I was directly employed at Mizan Agricultural technical vocational and educational training (ATVET) College on October 2004. Then I got the chance to pursue my MSc Study by the support of a Nuffic/Niche project working on staff capacity building and I joined VHL in 2013 and attended the APCM programme with specialization of Horticultural Chain and got graduated in 2014. After graduation from VHL, I served Mizan college only for one year and since October 2015 I got employed at Jimma University College of Agriculture and Veterinary Medicine (JUAVM) under the department of Agricultural Economics and Agribusiness Management with the main responsibilities of teaching, conducting research and delivering community service like training, consultancy service etc. The department has two study programmes namely Agricultural Economics and Agribusiness and Value chain Management both in MSc and BSc programmes. In addition, it is also offering common courses like



Entrepreneurship and Small Business Management, Agricultural Project Planning and Analysis, Agricultural Marketing & Value Chain Management and Farm management for other department (Animal Science, Plant Science, Horticulture and Rural Development programme) students. This is a point where I and my department contributed to Dairy value chain development. Right now, beside teaching and conducting research, I am a head department of Agricultural Economics and Agribusiness Management since July 2017 with main responsibility of leading the programmes and coordinating staffs under the department.

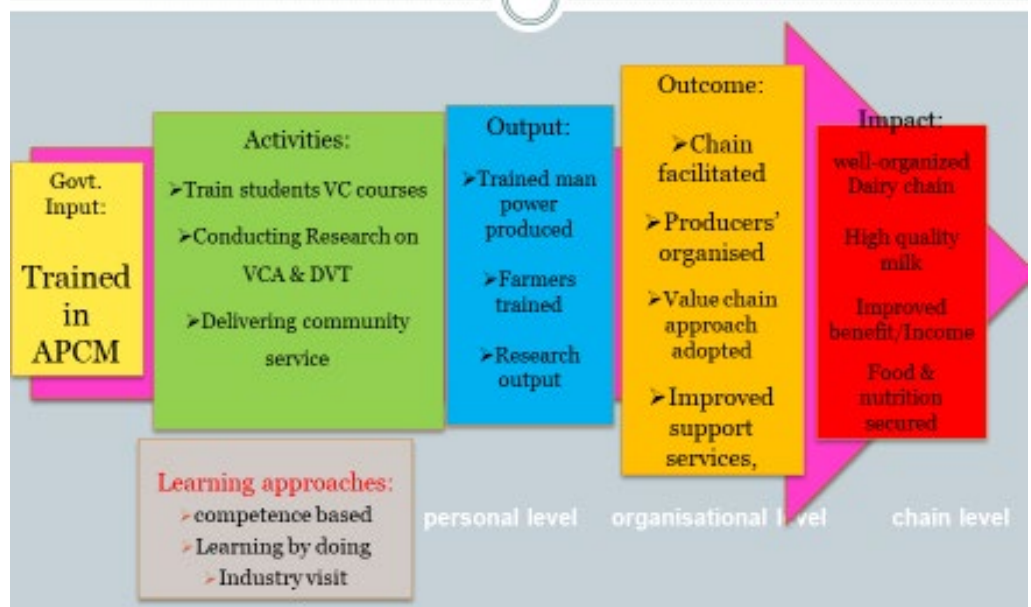
2. Impact of Dutch training

2.1. Personal Level:

The training I obtained from VHL have unreserved contribution in my personal life. It helped me to acquire detail knowhow in the area of agricultural products value chain analysis management. The training has contributed to be employed in one of the biggest universities (Jimma University) in Ethiopia which is an institution that pays a relatively better monthly remuneration. This means the training positively contributed to my monthly income. The Dutch training also equipped me with detailed skill of planning, monitoring and evaluation that helped me to lead the department of Agricultural Economics and Agribusiness Management in the university and make possible to coordinate the programmes under the department. The training have unreserved contribution also on my academic performance and make me competent in my career like in teaching, in advising both undergraduate and post-graduate students research work and in order to conduct research and deliver community service training individually or being in group in the area of value chain analysis and development, Agricultural Marketing, Farm management, Entrepreneurship.

training becomes imperative in order to maximize the job performance. In the same fashion, the training I obtained from VHL made me an asset for the university. As a Value chain specialist in the university, I am playing crucial role in teaching, delivering community service training and conducting research. For instance, under the Agribusiness and Value chain management programme there are a number of courses related to my specialization (value chain) like value chain analysis and Development, Value chain Approach in Agriculture, Logistics in Value chain; and Agricultural marketing and value chain management etc. for which I am very relevant person to deliver the course for our trainees.

Mulubrihan: Impact of Dutch training on Dairy value chain



2.2. Organizational Level:

Employees are major assets of any organization. The active role they play towards a company's success cannot be underestimated. It is crucial that staff needs to have better competences (knowledge, skills and attitude). Hence, equipping these unique assets through effective

2.3. Dairy value chain Level:

Ethiopia is the second most populous country by livestock in Sub-Saharan Africa. Thus, livestock plays an important role in the Ethiopian agriculture with a huge potential for poverty alleviation, improvement of food security, nutrition and employment generation and as a source of income. There is a continued increase in the demand of dairy products. From figure 1 we can see that the demand for cow milk consumption is highly increasing.

market (price) information, fluctuation of milk price, shortage of milk supply, poor milk handling skill, milk safety and quality problem; poor infrastructure (lack of cooling facilities, simple processing equipment and quality testing skills and equipment) are some of the constraints of milk marketing in the country.

The country also has huge opportunities in the milk production and marketing area. The existence of suitable agro-ecology for dairy

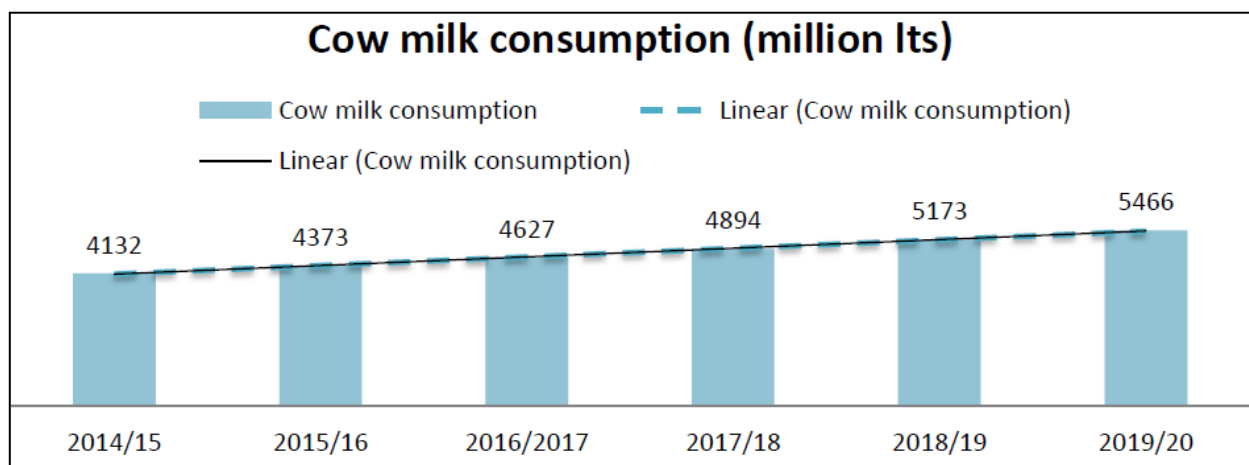


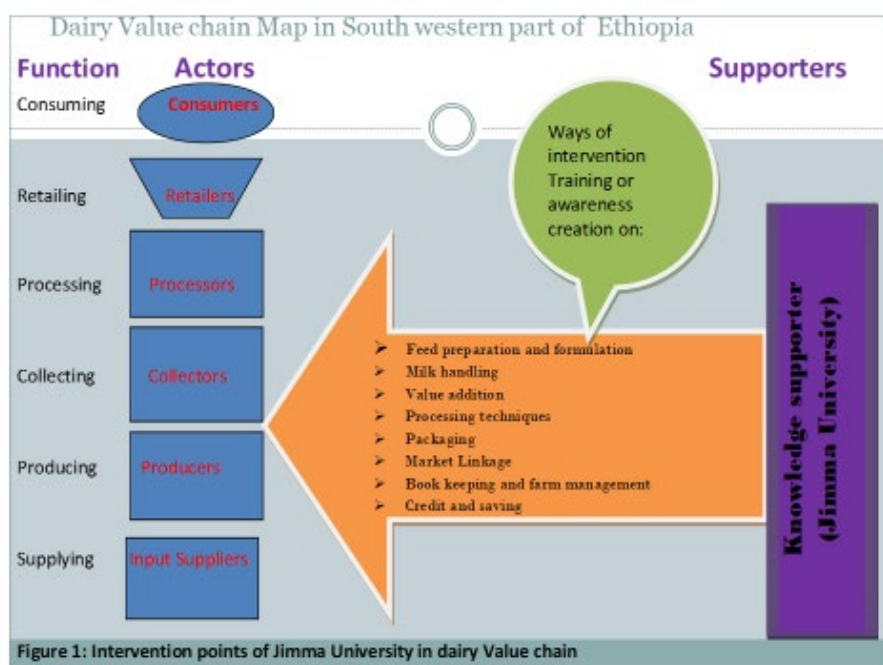
Figure 1: Cow milk consumption projection 2015-2019/20. Source: Livestock master plan

However, there are different production and marketing constraints that hinder the development of the dairy sectors in Ethiopia. High investment costs to start dairy farms, limited number of commercial farms, absence of feed sources, very high and ever increasing feed prices, low bargaining power of small scale dairy producers, low productivity of the local dairy cattle and the problem of accessing improved bull services and poor dairy management skill of small scale dairy farmers, prevalence of livestock diseases, limited extension services and technical support are the most important factors hindering milk production. While weak linkages among different participants in the dairy value chain, few actors in dairy value chain are monopolizing the concentrate market, shortage of milk

production; high domestic and export market demand for milk; emerging dairy processing industries working under extremely low designated capacity; relatively cheap labour force; strong support from federal, regional research institutions and universities for the development of the sector and increasing urbanization are the main opportunity of milk production. Whereas high domestic and export market demand for milk, good long term milk consumption habit of the community, highly increasing population in the country, introduction of information communication technology for instance mobile (could be used for price information dissemination, direction and location of livestock migration), pastoral area received great attention from government, many NGOs working in supporting the marketing are some of the opportunities for milk marketing in the country.

Therefore, to tackle the aforementioned constraints of dairy sector in the country, my organization have been playing unreserved role as a supporter of the chain. The university is supporting the dairy value chain in delivering short and long term training for all actors in the

animal science and Agribusiness and Value chain management have been conducting their MSc thesis or BSc research project in the area on Dairy value chain analysis and development, dairy market linkage which help to solve community problem in dairy sector.



chain based on their demand. In addition, we are producing qualified agricultural experts in different field of study like in the field of Animal science, Veterinary medicine and agribusiness and value chain management which could play critical role in alleviating the problems in dairy sector in general and dairy value chain development in particular.

Moreover, Jimma University is known by their motto 'WE ARE IN THE COMMUNITY' in which all students are expected to practice what they learned theoretically in the class in two phases. The first phase is the problem identification stage and the second is the intervention stage. Through this, the students are working on something that solve community problems. In other way round, the graduating class students and staffs are conducting researches in their field of specialization being in group or individually to tackle some community problems. For instance, some students from

3. Lesson Learnt

Value chain analysis and Value chain Governance were the most striking learning modules, because they are the base for other value chain courses. The two modules are very important to identify the main constraints and opportunities and to give the way forwards to develop the chain in all agricultural sector in general and for dairy sector in particular.

From the Refresher course, I realised that Climate Smart Agriculture (CSA) is an actual topic which needs to be implemented in the JU-CAVM curricula.

4. Back Home Action Plan

In four steps I want to incorporate CSA principles in education and research, as shown in the table below.

Back home action plan

Activities	Time line	Desired Outcome
Enhancing the knowledge attained on CSA	Aug 2019	Improved CSA knowledge
Create awareness on CSA to staffs, Students	Sep - Oct 2019	Professionals and farmers trained
Incorporate the concept OF CSA in my value chain courses.	Dec - 2019	Students become familiar with the concept of CSA
Conduct Research on CSA	Jan 2020 onwards	Research output produced

Training experts in Value Chain Approach

Shimelis Gizachew Desalegn – Ethiopia

Adami Tulu Agricultural Research Centre – researcher & head socio-economic department; lecturer at Oromia State University, Ziway; local consultant

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Van Hall Larenstein – MSc APCM – Livestock chains, 2014



1. Introduction

Van Hall Larenstein University of Applied Sciences (VHL) supports Ethiopian students to intensify milk production in Ethiopia. It achieves this by promoting a climate-smart portfolio of practices and technologies. Key climate-smart activities include better feeding using crop by-products, improved manure management, improved pasture species and planted legumes. The total of these activities allows farmers to make a transition to fewer cattle which are more productive, helping to reduce emissions per unit of milk. I firmly believe that it is possible to strike and damage food insecurity and poverty, existing in my country through appropriate trained manpower both in quality and quantity that can modernize agricultural production of the country. Due to the backwardness of agricultural production practice in the country for many centuries, Ethiopia is now working on doubling agricultural production and productivity to ensure food self-sufficiency and reduce poverty. To this end, the country puts increasing trained and skilled manpower as a strategy to achieve agricultural growth and transformation goals. The research institutes existing in the country were given the leading role to generate, develop and popularize appropriate and user and environmental friendly agricultural technologies in collaboration with relevant stakeholders. Adami Tulu Agricultural Research Centre is a government research institute working to contribute to achieve the

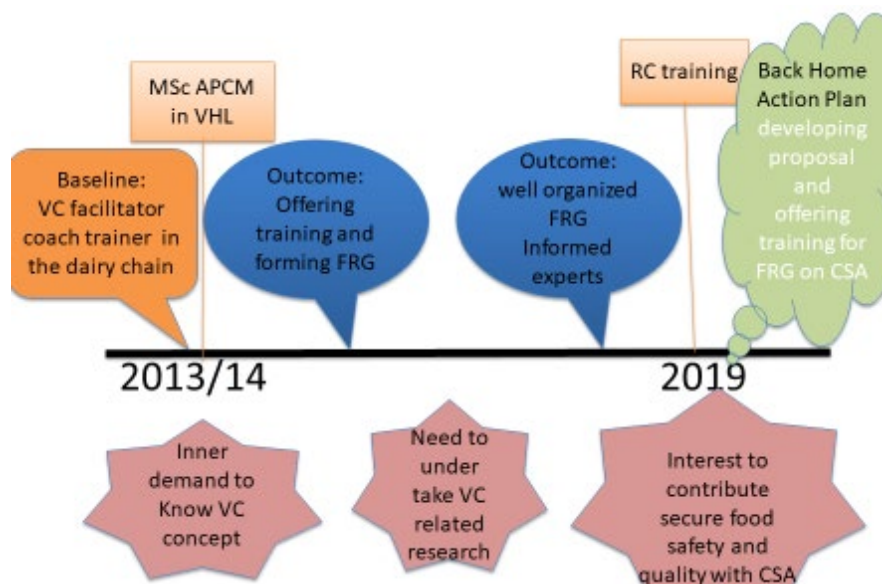
above goal. Moreover, VHL plays a major role in alleviating the trained man shortage of the research centre in the field of value chain.

2. Impact of Dutch training

2.1. Personal level

Basically I didn't have any knowledge about the value chain concept before I was trained. Soon after I finished my master studies and back home, I started to propose and implement value chain activities in dairy, small ruminant and poultry that further improve value chain development of particular commodities. Personally I became competent and confident in the discipline I studied and I became trainer, lecturer in Oromia state University and local consultant for a climate smart dairy project.

Figure 1: Training time line Shimelis



2.2. Organisational level

I provided trainings for more than 9000 experts from all Oromia regions on agricultural cluster and value chain approach, contributing highly in mainstreaming value chain development. Besides, I conducted a coffee chain analysis all over Oromia region. At team and centre level, I proposed value chain activities and secured budget for it. Also at regional level, while participating in the agricultural development partnership, linkage and advisory council (ADPLAC) in both East Shoa and West Arsi zone, I presented value chain activities. In terms of food safety, I proposed chemical reducing strategies and trained and certified farmers and provided them chemical spraying with fair price.

2.3. Dairy value chain level

In dairy chain level, I played a major role in facilitating the linkage between different actors and supporters of the value chain, such as input suppliers, smallholder or large farmers' groups or cooperatives, processors or supporters. Besides, I supported farmers in the chain development approach, value addition, quality systems, market development, chain linkages, establishment of farmers' research groups (FRGs) or cooperatives through providing training as well as technical support. Farmers are connected in FRGs, trained and provided with improved hybrid heifers and forage at fair prices. Moreover, I provided training about the

advantage of formal value chains, facilitated market linkages and advised about expansion of the dairy business focusing on processing.



Photo: Value chain training

2.4. Impact in Dairy Value Chain

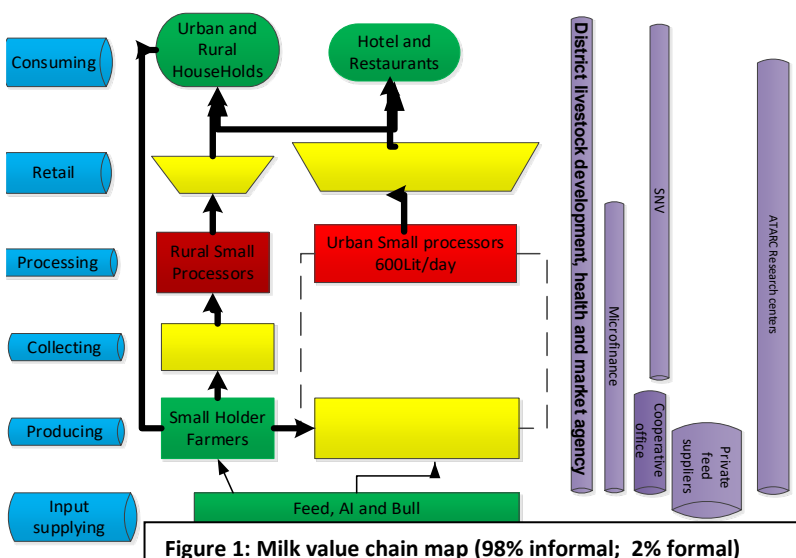
Improved production and productivity of milk (in quantity and quality) by provision of crossbred heifers and training of farmers about the full package of dairy (husbandry, health, nutrition and economics and extension system). It improved the income of smallholders by facilitation of savings and opening milk selling shops at the road side for the FGR members. It improved food and nutrition security through increasing production and productivity of dairy, and saved the planet by promoting climate smartness through awareness creation of the farmers to apply efficient manure management.

3. Lessons Learnt

The most striking APCM modules were value chain analysis and value chain development, while the most striking learning approach was the 'learning by doing'. Being trained in VHL had a positive impact on my knowledge development, I will be competent everywhere I go. In this Refresher course I learnt that climate-smart agriculture (CSA) is an integrative approach to address the interlinked challenges of food security and climate change and on improving dairy chain governance in Ethiopia.

4. Back Home Action Plan

Enhancing understanding of climate smart concept through developing climate smart proposals and offering training for FRGs, researcher experts and others stakeholders.





Dairy Chain development in Axum region, Ehtiopia

Dawit Mamo Zegeye & Michael Yirdaw Berhe

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Assistant professors

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PTC+: Poultry Husbandry and Animal Feed, 2013-2014 resp. 2016



1. Introduction

We are Dawit Mamo Zegeye and Michael Yirdaw Berhe, both working in Aksum University college of Agriculture, department of Animal science as Assistant professor. We have now 10 years' service since we have joined Aksum University. As university instructors, we are involved in teaching, research and community service. We have been delivered different courses to undergraduate students such as Dairy production, Animal Nutrition, and Livestock marketing and economics, and conducting different community based researches. We have attended the international diploma course at PTC+, in the Netherlands in 2014 and 2016 respectively. We have realized that the knowledge gained from the Dutch institution was very nice. It supports us to conduct so many effective practical trainings for

dairy cooperatives and different dairy experts related to farm feasibility and feed formulation for dairy cattle based on local feed ingredients and their requirements.

In 2015, Axum staff received a TMT training on 'Food security inclusive Value Chain Analysis' by KIT, the Netherlands. Some results from the studies conducted are presented in the form of narrations and tables and supportive pictures from the trainings are included.

2. Impact of Dutch training

Personal level: Personally, we gained good skills and knowledge in Animal feed and dairy management husbandry and we are trying to practice to help my communities. In the dairy value chain, one of the main challenges we have found is the skill gap. As university with its mission, we have identified the skill gap as leverage points from the other setbacks of the chain. In this regard, we are working as trainer and our role in the chain facilitation is providing training related to feeding management of dairy cattle and farm feasibility evaluations. Of course, it doesn't mean we are full, but we still have the gap with the skills related to product marketing and value chain governance. Different trainings on dairy husbandry practices, feed formulation and farm feasibilities are conducted to college instructors, livestock experts and farmers (Table 1).

Training Time Line – Dawit Mamo

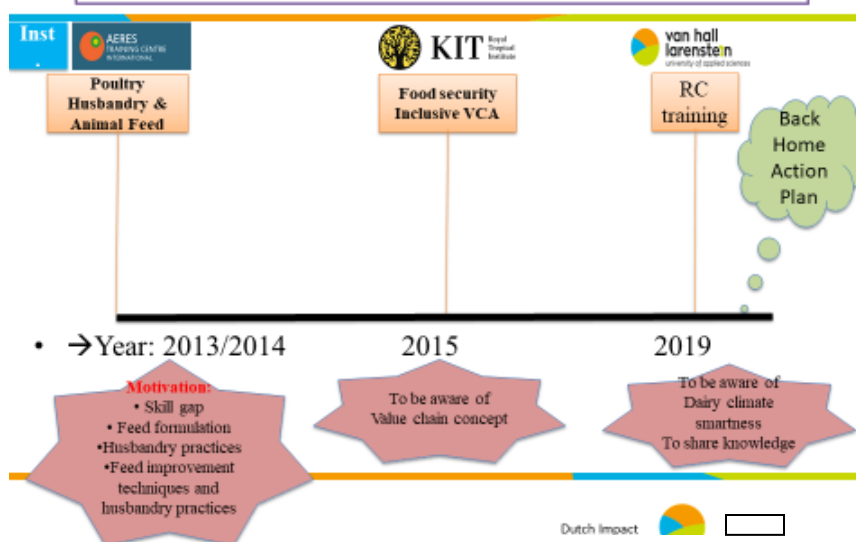




Figure 1: Delivered trainings to professionals and farmers on feed formulation and dairy husbandry practices at different time, and providing training materials

Organization level:

As a country, the linkage between institutions such as university, research, government institutions, private, NGOs is very poor. Instead

of working together for the same objective, it is common to observe similar activities and repetitions delivered by different institutions. It is possible to conclude that the integration between institutions is weak, this also facilitated for unfruitful result, wastage of money and time.

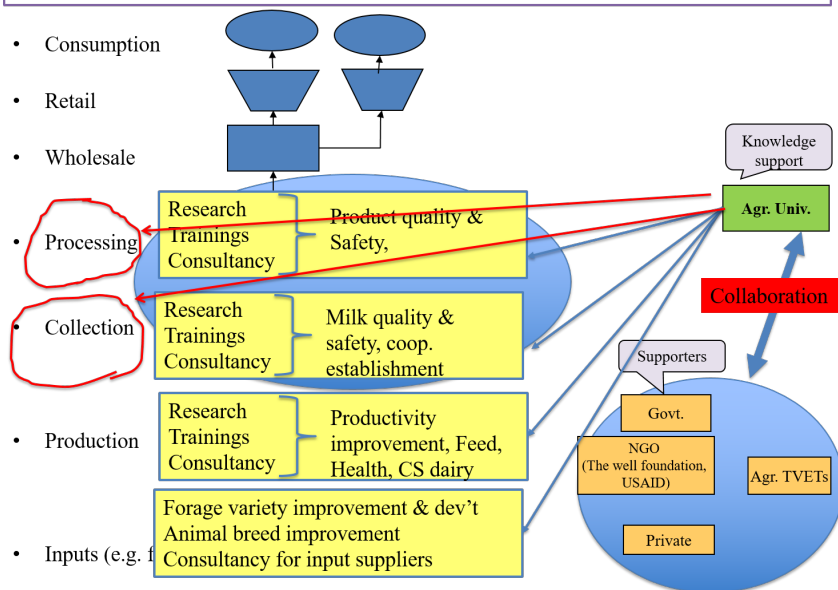
Dairy chain level

Together with the department staff, we had conducted dairy value chain studies in central zone of Tigray, Ethiopia in 2017GC. Based on the study, we have developed and analysed the dairy value chain actors in the urban and peri-urban area of different districts, the prices expressed in the discussions are based on the previous data's, not now about 100% is increase from 12.5 Ethiopian Birr (ETB) to 27 Ethiopian Birr (ETB).

Milk chain actors and functions

In the central zone of Tigray within the selected districts, different milk market participants were identified, these are input suppliers, individual

Value chain map – Role of Agr. Univ on Dairy Value chain



producers, dairy cooperatives, milk processors, consumers and supportive institutions. These actors have important roles to maintain the milk market chain in the districts.

Milk marketing channels

Six types of market-outlets to sell milk were identified in the study area, see figure 3. Generally, milk is channelled either to urban milk collectors, hotels, restaurants and cafés and then to consumers. Only two channel types are common in the peri-urban kebeles (Dura and Mahberselam) and the rest four channel types are commonly practiced in the urban markets that is Axum Town. The total milk marketed per day in Axum was through informal marketing system. There are no specialized milk processing industries in Tigray region except small scale milk cooperatives, cafeterias and hotels. Their capacity is low comparing to the milk production especially during fasting times.

Profitability analysis

The incomes of smallholder dairy producers have been partially improved. Contributing factors are proper management and improved feeding strategies. Dairy cattle could improve the milk production and as a result the farmer incomes. The dairy productions systems are still not commercialized. Table 1 shows the value addition and profit margin distributions among the different chain actors. The value share of dairy producers compared with other chain actors is reasonable and the profit share is relatively low.

Conclusions of the Dairy value chain study

Milk channels are short and simple and informal as compared to the capital city. The perishable nature of the product together with the absence milk collection centres and processing industry is challenging for milk producers. Dairy producers at fasting season sell their product at lowest price due to a decrease in milk demand.

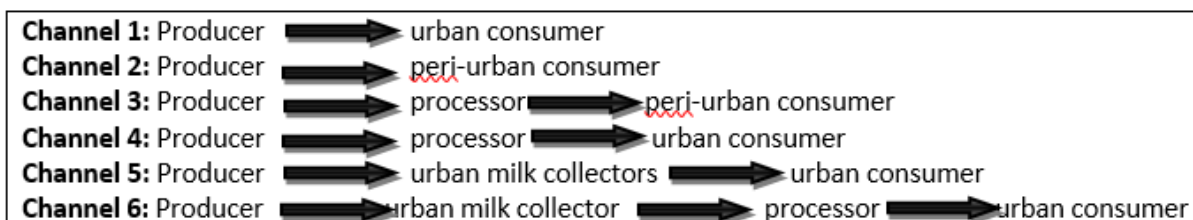


Figure 3: Milk marketing channels of the study area

Table 1: Average selling prices and operational costs/litre of milk in chain

Parameter	Actors					
	Producer		Milk collectors		Processor	
	Cost	%	Cost	%	Cost	%
Purchasing price			12.5		23	
Operating cost			2.025		2.54	
Total Variable cost	6.64		14.525		25.54	
Fixed cost	0.97		0.2		0.15	
Total cost of production	7.61		14.725		25.69	
Selling price	12.5		23		30	
Value Added – Value share	12.5	42	10.5	35	7	23
Profit margin – Profit share	4.89	28	8.275	47.4	4.31	24.7

The linkage between institutions towards the dairy value chain in Axum and its surrounding is poor. This also resulted to poor dairy value chains.

Therefore, there was a need to design a milk processing plant to mitigate the marketing problems of dairy producers and to improve the shelf life of milk through conversion to other dairy products. As a professional, Dawit has designed the milk processing plant (see figure 4), which is approved by Axum University as part of its community services. The construction is almost done and the machineries are on the way to supply by bid.

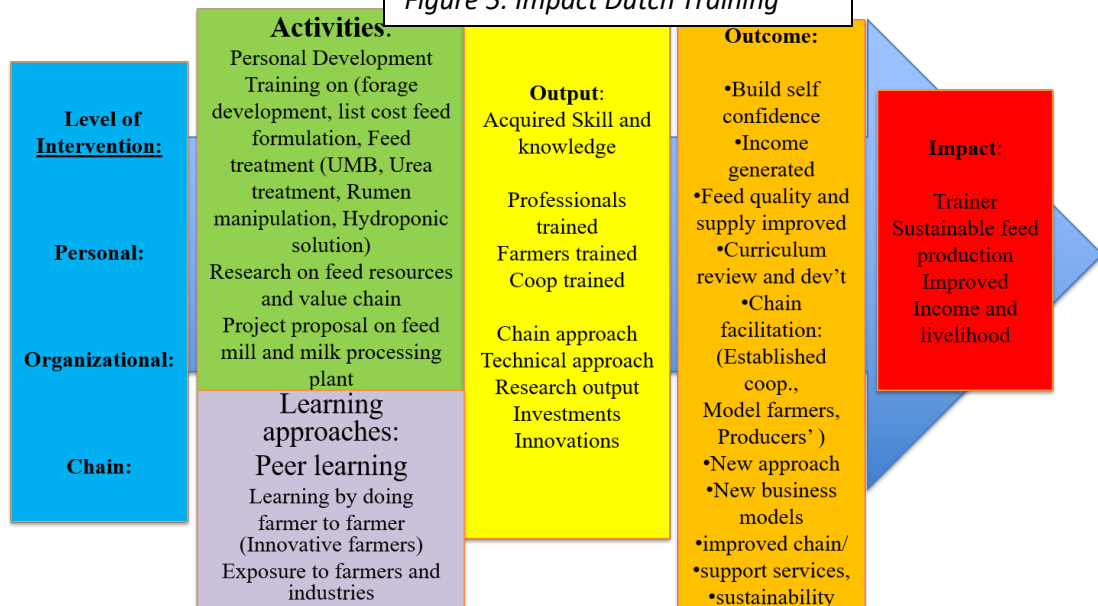


Figure 4: Design of the Milk processing plant of Aksum University

3. Conclusion impact of Dutch training

After acquiring more confidence on value chain approach, an extended dairy value chain study was undertaken by the livestock department of Axum

Figure 5: Impact Dutch Training



university. Strategies for upscaling feed and dairy production were taken and trained to farmers and a processing unit has been designed (figure 5).

4. Back Home Action Plan

During planned trainings on dairy feed development and feeding and dairy production management practices, we will create awareness on Climate Smart Dairy practices. In 2020, the department will start with establishment of biodigesters on farm level and research on climate smart feed improvement technologies (table matrix).

Back Home Action Plan Matrix

Activities	Time line	Expected output	Desired Outcome
Training on dairy feed development and feeding	Aug - Dec 2019	Professionals and farmers trained	Improved feeding strategy, Skill dev't
Create awareness on CS dairy practices	Aug - Dec 2019	Professionals and farmers trained	Implementation of CS dairy practices
Biogas development at farm level	After Jan 2020	Biogas plant installed	Alternative energy source secured
Training on dairy production management practices	Aug - Dec 2019	Professionals and farmers trained	Improved dairy production & management
Research on Feed improvement technologies	After Jan 2020	Research output (Quality and high productive feed)	Feed quality improvement

NB: In all the processes gender and youth inclusiveness will be considered

Increasing farm incomes through proper feed formulation and improved animal husbandry practices

Habtamu Taddele – Ethiopia

Mekelle University, College of Veterinary Medicine - Associate Professor

E-mail: hbtmtaddele@gmail.com

PTC+ International Diploma / Poultry Husbandry and Animal Feed, 2013



1. Introduction

I am Dr Habtamu Taddele, an Associate Professor at Mekelle University, College of Veterinary Medicine. I have a masters' degree in Veterinary Bacteriology from Indian Veterinary Research Institute, India, and bachelors' degree in Doctor of Veterinary Medicine (DVM) from Addis Ababa University faculty of Veterinary Medicine. In addition, in 2012-2013, I participated in the 9-months International Diploma Training on Poultry Husbandry and Animal Feed at Practical Training Centre (PTC+), Barneveld, The Netherlands. In 2014, I also attended a 3 month research based training on Serological and Molecular Diagnosis of FMDv in the Regional Research Laboratory of the LLR University of Veterinary and Animal Sciences, Hisar, India through the CV Raman Fellowship for African Researchers. Moreover, based on the experience of the Dutch training, I participated in the Global Initiated Biosecurity Academia for the Control of Health Threats (GIBACHT) organized by Bernhard Nocht Institute for Tropical Medicine, Robert Koch Institute, Swiss Tropical and Public Health Institute and African Field Epidemiology Network (AFENET) in 2014/15 and 2016/17 respectively. I have specialized in the areas of Veterinary Bacteriology, Veterinary Immunology, Poultry Husbandry and Animal Feed. My teaching and research interests are but not limited to the areas of Poultry Health and Management, Animal Feed Development, Dairy Health, Food Microbiology, Zoonotic Animal Diseases,

Molecular Disease Diagnostics, and Livestock adaptation to Climate Change.

2. Impact of Dutch training

a. Personal level:

After attending the training on Poultry Husbandry and Animal Feed from PTC+ at Barneveld, The Netherlands, I developed self confidence in tackling challenges related to poultry production and animal feed development. Since my training in 2012/13, I have been teaching Poultry Production, and Advanced Poultry Production courses to undergraduate and postgraduate students, respectively. Moreover, I have delivered several trainings to poultry and dairy entrepreneurs on several topics (Poultry production as an enterprise, Animal nutrition and Feeding, Dairy health management, etc) and also provided demand driven community services to entrepreneurs. In addition, I have consulted individuals in designing business plan for initiating poultry and dairy farming.

b. Organization level:

Immediately after completion of my training, I have developed and submitted a proposal for the establishment of Feed Mill in my college and also prepared a ration formulation for the dairy cows in our college as per their production potential. The feed mill has an economic impact for the university (a source of income for the college) and became a practical training center for students and entrepreneurs involved in livestock farming. For the surrounding areas, it functions as a regular supply of animal feed to entrepreneurs with affordable price and

training access of feed formulation. In addition, I have been involved in training and extension services provided by the college to poultry and dairy entrepreneurs. Furthermore, I have conducted research and advised students on several topics, of which some dairy topics, based on the Dutch training are listed below:

- Assessment on the Availability of Potential Feed Resources in Commercial Dairy Farms in Selected Districts of Tigray Region, Ethiopia
- Quality Assessment of Raw Cow Milk Produced and Marketed in Urban Areas of Central Zone of Tigray, Ethiopia
- Assessment of Major Clinical Health and Productivity Problems of Dairy Cattle in Debre Zeit Intensive and Semi-Intensive Dairy Farms, Ethiopia
- Prevalence of Mastitis and Identification of its Bacterial Causative agent in Smallholder Dairy Farm in and around Wukro
- Prevalence of Bovine Clinical Mastitis, and Isolation and Identification of Bacterial Pathogens in Selected Dairy Farms of Mekelle City

2.3 Dairy chain level

Being working in a government based institution, one of our mandate is to provide consultancy and community services to commercial and smallholder livestock farmers. Among which commercial dairy farming is one of them. Thus, we provided trainings to >50 dairy entrepreneurs, milk collection and distribution centers, and consumers on milk quality, milk-borne diseases, dairy husbandry and health, prevention and control of food-borne infections. We also try to associate our trainings with the research outputs, which resulted in improvement of dairy husbandry practice, increase in productivity and increased income.

2.4 Selected impacts

Through proper feed formulation and implementation of better husbandry practices, the smallholder and commercial farmers are

able to increase their farming income. Moreover, the trainings delivered on several topics has helped to improve the quality of milk and egg produced. E.g. i) Ration formulation for dairy and poultry with local available ingredients, ii) Poultry farming as an enterprise, iii) Dairy health management.

3. Lessons learnt

The module on Animal Feed has helped me a lot as this is a major challenge for commercial poultry and dairy farmers. If there is proper feed supply and husbandry, it is possible to prevent majority of the diseases in the sector and maximize the productivity. Thus, feed formulation was one of the major support that I delivered to poultry and dairy farmers, and for this, the knowledge and skill that I acquired from the module on Animal Feed was very helpful.

The practical based training approach was very helpful to acquire the required skills. At PTC+ learning is by doing and this is what I liked most. I could implement it in my teaching approach, while providing community based trainings.

The major challenge to fully apply the knowledge and skill acquired from the training was additional assignments and course load. In addition, finance is the other challenge.

4. Conclusion

The practical based training at PTC+ was the best experience and it has helped me a lot in discharging my responsibilities. I really appreciate the NFP fellowship and the instructors at PTC+.

From dairy theory to dairy practice

Wedajo Muleta – Ethiopia

Instructor at Kombolcha College of Agriculture; private inseminator and dairy consultant

E-mail: etateye@gmail.com

PTC+, Animal Feed – 2015; DTC, Dairy reproduction, breeding and health, 2016



1.0. Introduction

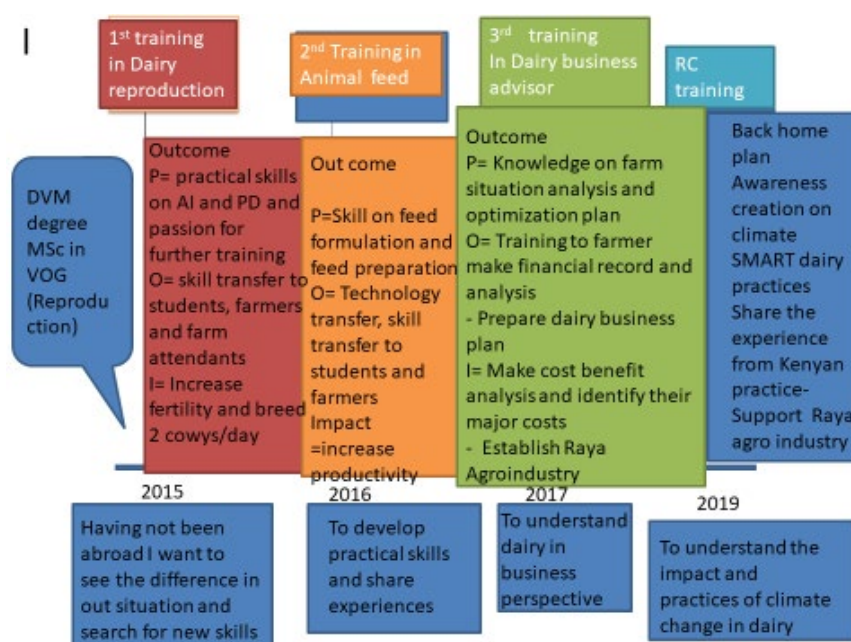
I am Dr. Wedajo Muleta, living in Kombolcha town South Woll administrative zone of Amhara regional state in Ethiopia. I work as senior instructor in Kombolcha College of Agriculture and a private business as dairy business advisor and artificial inseminator. In addition to formal teaching to degree students and training to level based trainees, I also provide informal trainings to low level professionals and farmers and provide technical support to the dairy farm in the college. In the Netherlands, I attended international trainings on animal feed in PTC+ in 2015 at Barneveld and on dairy reproduction breeding and health in DTC in 2016 at Oenkerk.

2.0. Impact of Dutch training

2.1 Self-development

After the completion of the trainings in the Netherlands I have developed professional knowledge and skills development. The training gave me tremendous benefit to personal development in developing self-confidence as well as professional developments, which includes in practical skills, networking skills and communication skills and knowledge of new approaches in the dairy sector. The exposure in the Netherlands helped me to search for other knowledge sources. I got the chance for further training as a Dairy business advisor in Addis Ababa by Dairy BISS, develop networking skills and there by registered as a member in AgriProFocus where I participate in business

links, find materials in the website, new agricultural events, and the call for this Refresher course. So, the Dutch trainings helped me to be proactive to participate and acquire new skills and knowledge in the dairy sector. Moreover, I develop confidence in my profession.



2.2 Organization level

At organizational level in Kombolcha college of agriculture, there is a dairy farm. So to improve productivity, I organize capacity building to the dairy farm professionals and attendants on dairy farm practice. Besides (see photo), I am currently establishing an innovative, hydroponic green fodder production unit. This fodder fed to cows will improve productivity and reduce the feed cost of the college farm. I am also trying to

improve the breeding efficiency of dairy cattle by use of effective AI service. The training helped me to prepare quality teaching materials for degree students at the college.

2.3 Dairy chain level

In the dairy value chain, I am trying to conduct capacity building, preparing a business plan for new dairy business and coaching dairy farms. Besides, I set up and formed Raya milk processing and dairy farm private limited share company.

2.4 Selected impacts

In dairy farming in Ethiopia, feed problems and AI inefficiency are the major bottlenecks. These problems have been tried to be resolved partially by direct involvement in AI service awareness creation to the dairy farmers and attendants on heat detection and breeding record and by Innovative fodder production technology tested. The technology is in process to scale up in the college dairy farm and will be disseminated to the dairy practitioners in the area.



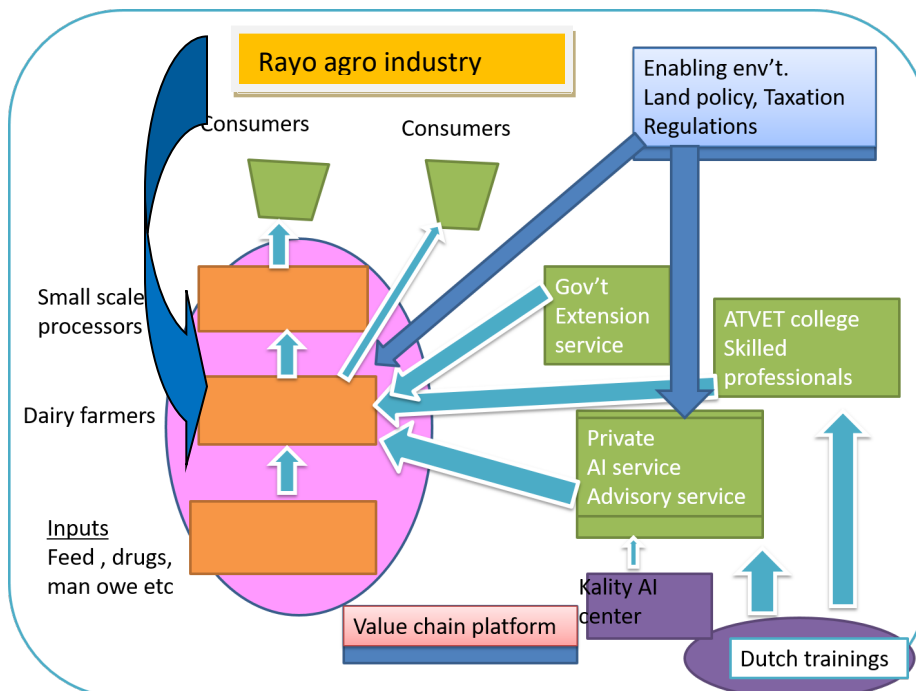
Photos: hydroponic green fodder and AI service

3. Lessons learnt

Artificial insemination and feed formulation were the most striking learning topics that helped me to effectively participate in the dairy value chain. The 'learning by doing' approach is the best method that builds practical skills and knowledge the practical learning style, which is lacking in our education system. The trainings I participated are the bases to my present and future carrier and are used as guides to new attitudes and approaches in my life. After my exposure to these new techniques, I am trying my best to change dairy practices to new good ractices.

4. Back home Action Plan

- Awareness creation on Climate SMART dairy practices
- Share the experience from Kenyan practice
- Support Rayo Agro industry



Livestock coach with international exposure on Climate Smartness

ALLEN KIIZA – Uganda

College of Veterinary Medicine Animal Resource and Biosecurity (CoVABs) –
Makarere University - instructor/coach – private consultant

e-mail: allenkiiza85@gmail.com

Van Hall Larenstein – MSc APCM – Livestock chains, 2018



1.0 Introduction

My name is Allen Kiiza, Ugandan citizen, working as a Coach for Dairy and Beekeeping value chains at African Institute for Strategic Services and Development (AFRISA) under the College of Veterinary Medicine Animal Resources and Biosecurity (CoVABs) at Makerere University, Kampala, Uganda. Allen is a Dutch Alumnus having graduated with a MSc degree of Agricultural Production Chain Management from Van Hall Larenstein University of Applied Science in the 2017/18 cohort. My participation in this refresher course is thanks to the thesis research that focused on “Climate Smart Dairy Practices in Githunguri Dairy Farmers Cooperative Society Ltd, Kiambu, Kenya”. The research was part of the CSDEK project “Climate Smart Dairy in Ethiopia and Kenya” of the professorships “Dairy value chain” and “Sustainable Agribusiness in Metropolitan Areas” that is being implemented by VHL in Kenya and Ethiopia. The research findings have

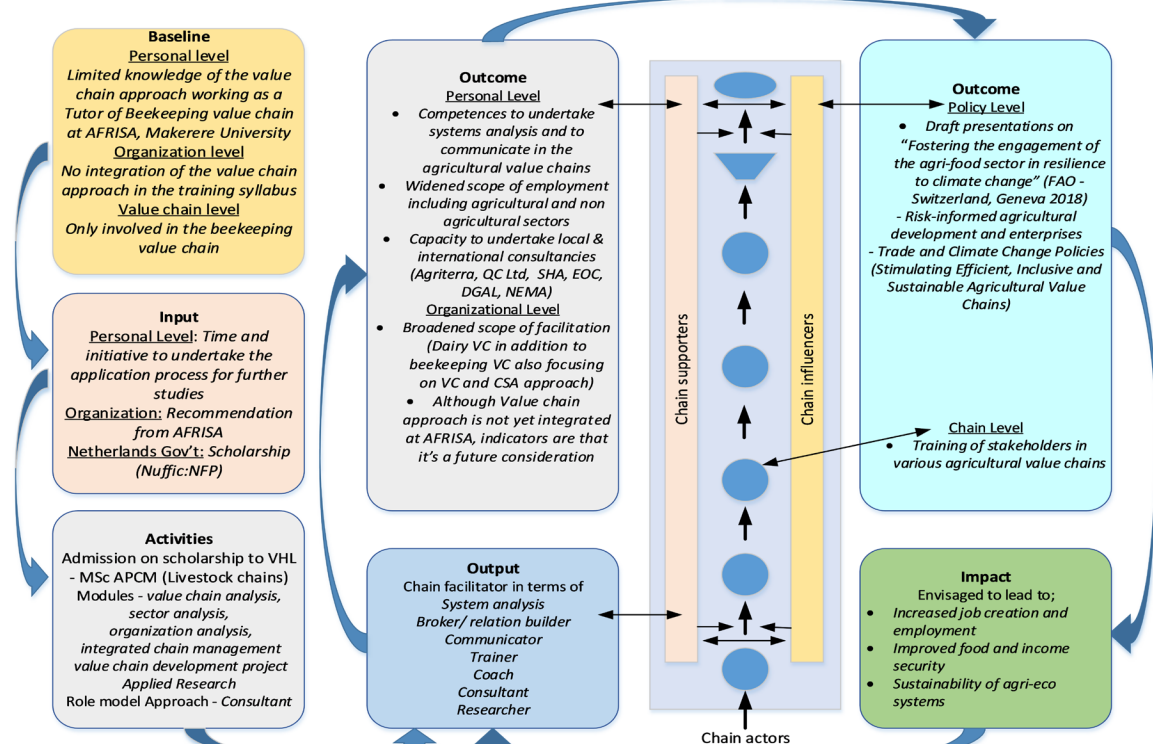
considered to enrich this refresher course.

2.0 Impact of Dutch training

2.1 Personal level

The Dutch training in regards to Van Hall Larenstein University of Applied Sciences uses a multifaceted approach to equip students with competences that enable them to master appropriate research and professional skills among others. Studying a Master of Agricultural Production Chain Management training enhanced my capacity to undertake various roles in the agricultural value chains.

Figure 1: Dutch Training Impact



Previously, my specialization was in livestock value chains however with the training in APCM, I can now competently and professionally communicate in the various horticulture and forestry value chains, therefore the trainings helped broaden my scope of understanding and facilitating in the various agricultural chains and systems. Undertaking APCM has eased my way of doing business, currently I find planning and executing lecture sessions very easy. Making use of visual learning aids and participatory approaches during trainings and lectures enhances knowledge transfer to students.

Among the activities I have undertaken since graduating with a masters in APCM in 2018, I have been hired as a private consultant by Quality chemicals Ltd – Uganda to apply for Dairy Funding Window titled “Increasing milk production and productivity of smallholder dairy farmers in South Western Uganda, Central Uganda and Rwenzori Region”, to be funded by Agricultural Business Initiative (aBi) Development Limited. The Concept paper and final application have since been accepted and currently awaiting on feedback about the application. Further to the work that am doing in the dairy value chain, I have also been involved in horticultural chains and have since been hired by the Mushroom Training and Resource Centre to head special projects in research and development of the mushroom value chain in south western Uganda. And have since undertaken and successfully completed several projects. I owe all this to the training and competences gained from attending APCM at Van Hall Larenstein University of Applied Sciences in the Netherlands.

2.2 Organization level

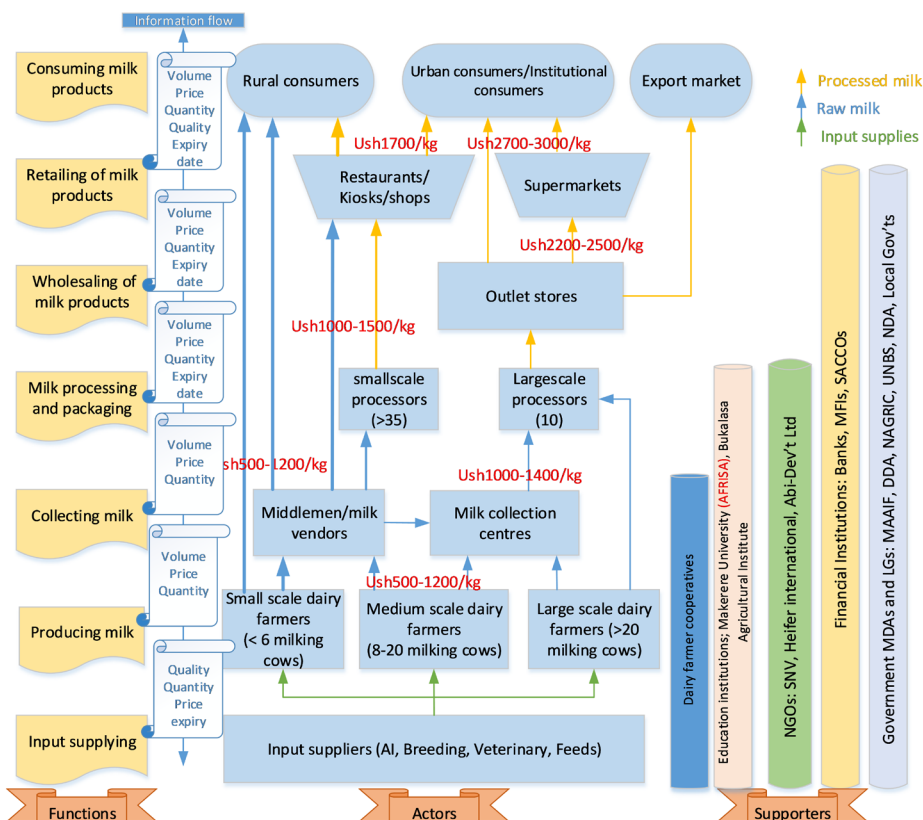
Before I left to study APCM in the Netherlands, I was only facilitating in beekeeping value chain but currently

based on competence and understanding of the dairy value chain, I have been enlisted to facilitate in the dairy value chain programme of AFRISA in addition to beekeeping value chain. During lectures, I find it convenient to explain to students from the value chain perspective which has been well appreciated by students. Management at AFRISA is keenly following my approach to facilitation during lectures which will hopefully be adopted by the Institute.

2.3 Dairy chain level

Before joining APCM course at VHL, I was never worked on any business plans especially in the livestock value chains. However since completing the course, I hired have been hired as a private consultant to do business plans for various dairy farms and farmer groups and some of the work is still on going. I also engage in various social platforms to discuss and address issues related to development of the dairy value chain in Uganda and especially in regard to addressing impacts of climate change.

Figure 2: Dairy value chain – Central Uganda



2.4 Selected impacts

The impacts of the Dutch training in Uganda include increased job creation in the dairy sector especially focusing on the value chain approach. This will also lead to increased food and nutrition security as well as income security especially for small holder farmers.

Incorporation of climate smart approaches and practices in the dairy sector will contribute to sustainability of the dairy sector as well as increasing dairy productivity.

3.0 Lessons learnt

All modules taught at VHL for the APCM course have been very handy in as far enabling me to adequately address issues and/or stakeholder in the dairy value chain in Uganda, however I find a combination of modules under Value chain analysis and development as well as value chain governance very striking. The modules included value chain analysis, sector analysis, organization analysis, personal development as well as integrated chain management and value chain development project. These modules equipped me with models and tools that help especially when analyzing and developing the various value chains and projects. During the course, undertaking various roles including acting as role models of a consultant has helped me to successfully conduct several consultancy assignment both in Uganda and abroad not only in the dairy value chain but also horticultural chains.

The commissioned assignments learning approach was most striking where I worked on several assignments in the dairy value chain including “Dairy value chain development business proposal for supplying quality raw milk to happy cow ltd - Kenya”, “Circular dairy farming manual focusing on a dairy farm in Ethiopia”, as well as working on the CSDEK project during my final thesis which focused on “Scaling Up Climate Change Mitigation Practices in Smallholder Dairy Value Chains: A case study of Githunguri Dairy Farmer Cooperative Society Ltd, Kiambu County, Kenya”. These assignments gave me a real feeling of what happens out of class – real life experience. This approach has

contributed greatly to my experience in proposal writing and conducting value chain development related work not only in the dairy value chain but also in other fields.

4.0 Challenges

One challenge stands out especially regarding to adopting the value chain teaching approach at the Institute where I am currently coaching. Whereas the management appreciates that value chain based learning approach is the best way forward, a number of technical challenges in terms trained human resources in the value chain approach hinders its adoption and roll out.

5.0 Conclusion

The Dutch training has equipped me with competences to undertake development assignments not only in the dairy value chain but also in other chains. I am able to undertake development assignments either individually or in groups. With the exposure that I gained through participating in the Dutch training, I can comfortably initiate and conduct research and other value chain related development assignments beyond Uganda and in a multicultural setting. The skills that I gained from participating in the APCM course at VHL have enabled me to undertake and successfully complete non-agricultural value chain related work. Finally, Master of APCM offered at VHL is a programme that I would recommend to anyone interested in sustainable development of agricultural value chains especially in the developing countries.

Figure 3: Back Home Action Plan

Objective (s)	Activity	Timeline	
		Year 1	Year 2
To ensure integration of value chain and CSA approaches in the AFRISA's Modules	• Presentation at AFRISA focusing on Value chain and CSA in dairy production	4 months	
	• Liaise with management for inclusion into curriculum	Continuous	
To foster operationalization of the Pan African value chain Forum	• Coordinate and profile Dutch Alumni in the dairy value chain in Uganda	2 months (Continuous)	

Mainstreaming Value chain approach in AHITI curriculum

ANNIE MWENDE MUMO – Kenya

AHITI Ndomba (TVET college) - lecturer

E-mail: anniemumo@yahoo.com

Van Hall Larenstein – MSc APCM – Livestock chains, 2015



1.0 Introduction

My name is Annie Mwende Mumo. I graduated the master programme Agricultural Production Chain Management (Specialization Livestock Chains) at Van Hall Larenstein University of Applied Sciences in 2015 (photo 1). In 2017 and



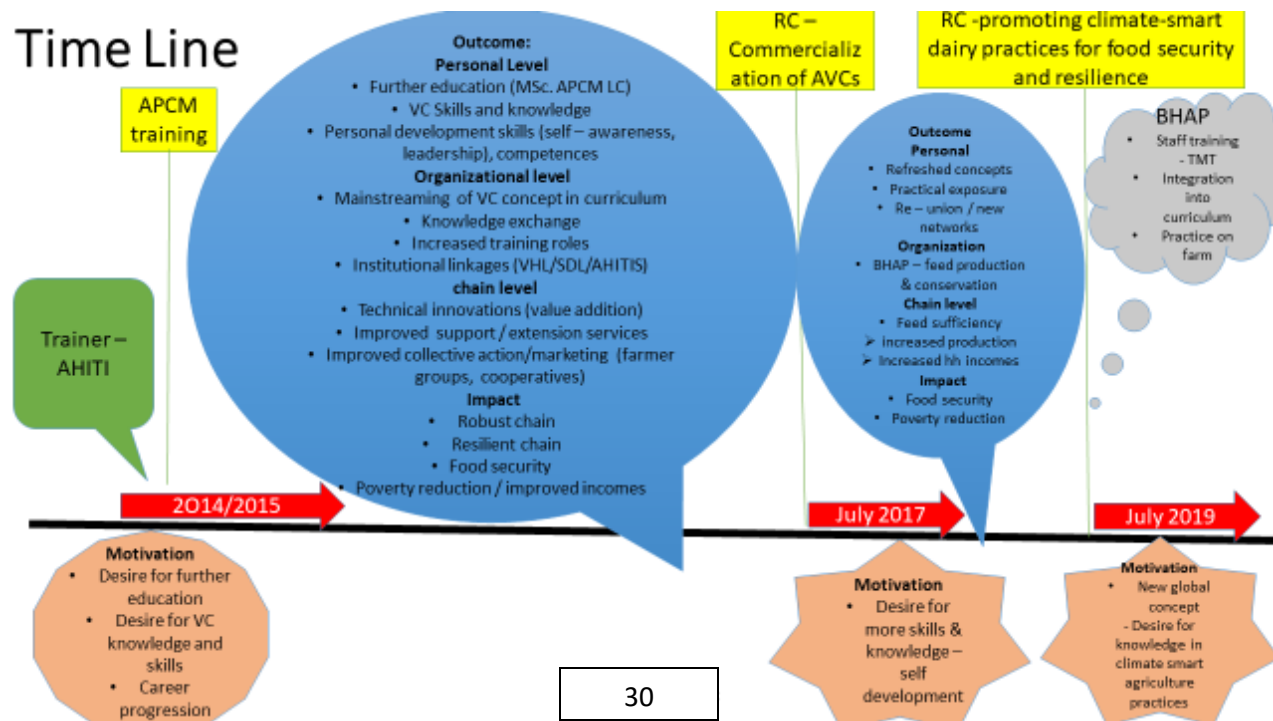
Photo 1: Expert lecture

2019, I participated in two refresher courses organised by VHL, Agrikom & Egerton University. I have been working in the Ministry of Agriculture, Livestock, Fisheries and Irrigation for ten years. I still work in the same organization as a lecturer in the Animal Health and Industry Training Institute (A.H.I.T.I) within the State Department of Livestock. My work entails training of students undertaking certificate and diploma courses in Animal Health and Production.

2.0 Impact of Dutch training

2.1 Personal level

Studying in the Netherlands gave me the opportunity for further training which is crucial for my continuous professional development and a requirement for my upward progression in my career. As a professional working within



the agriculture sector, I had a deficiency in skills and knowledge in agricultural value chains development, management and governance, which are crucial in enhancing the competitiveness of the sector and promoting food and nutritional security in the country.

My training in Agricultural Production Chain Management helped in bridging this gap, hence

enhancing my competence in my career as a trainer.



Photo 2: Group work in APCM

Personal development training was

very resourceful as it led to self-awareness about my own strengths and weaknesses, competences which I needed to develop more, how to be more effective and communication tools to improve my own position/role and that of my team/organization.

Some of the training methods at VHL such as group work and presentations really enhanced my skills in teamwork, interpersonal relations and presentation.

2.2 Organization Level

My organization has benefited from my training in that I have been instrumental in the mainstreaming of the value chain concept in the training curriculum. Because of this, the students are trained in various aspects of livestock value chains.

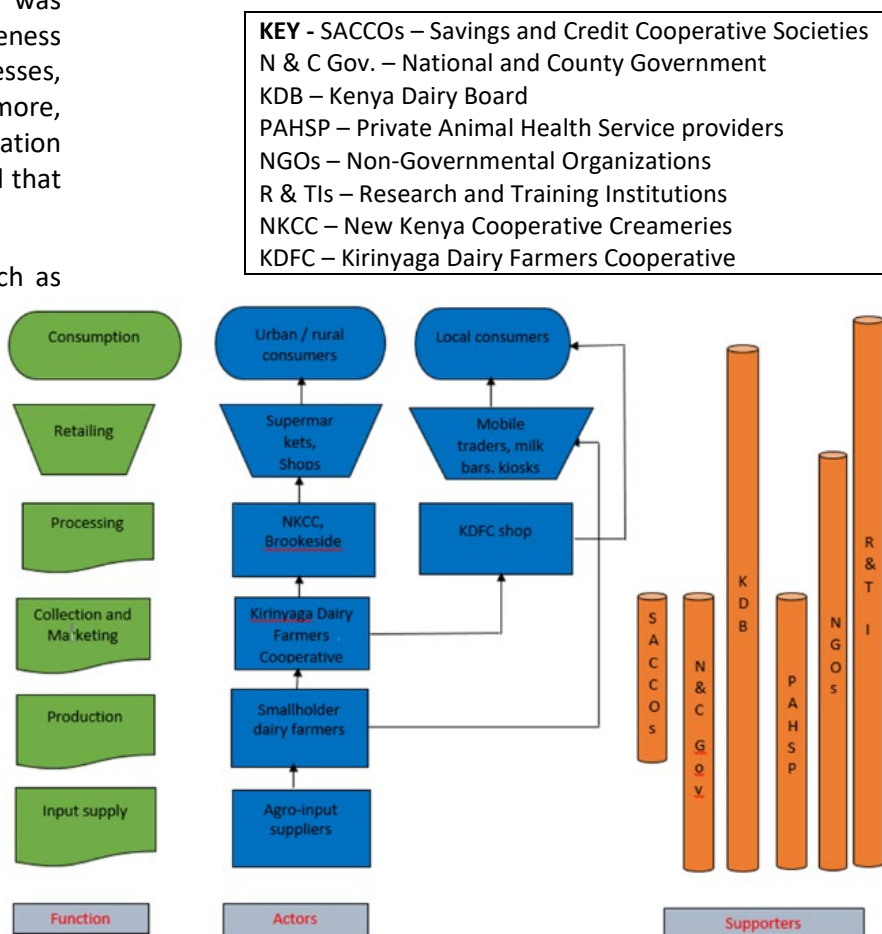
My Dutch training has also led to the creation of institutional linkages between VHL and the State Department of Livestock. The two

institutions have an agreement for more cooperation through capacity building for the department's staff, particularly trainers in the training institutions. This is through Tailor Made Trainings (TMTs), the first one expected to be conducted before the end of this year. The TMT is expected to equip the staff with more skills and knowledge in the area of climate smart dairy practices. VHL has also proposed to set up a living lab which will contribute more to capacity building within the department.

2.3 Dairy chain level

The knowledge and skills I pass to my students contribute to the development of the dairy value chain as they work as extension agents with the various value chain actors such as input suppliers, farmers, cooperatives and processors.

Figure 1: KIRINYAGA DAIRY VALUE CHAIN



The students pass on the skills and knowledge to the farmers such as value addition, marketing and the importance of forming or joining farmers' groups/cooperatives.

2.4 Selected impacts

The knowledge and skills from my Dutch training passed on to my trainees has impacts in the development of the livestock sector by contributing to food and nutrition security and improving the incomes of smallholder farmers by increasing the productivity of their enterprises and improved marketing of their products.

The enhanced institutional linkages between VHL and the state department of livestock will contribute to more capacity building for the department staff especially trainers through knowledge exchange hence contributing to more development of the sector.

3.0 Lessons learnt

The study units which supported best in performing in the dairy value chain or supporting dairy value chain stakeholders include value chain analysis, value chain development, value chain governance (quality management, producer organizations), and marketing. The learning approaches which supported best in learning about dairy chain governance include case studies, group work, classroom lectures, field visits and expert lectures.

The challenges I encountered during my Dutch training included home sickness and a congested study programme. Other challenges

Photo 2 : Field visits



included some study methods which I wasn't used to at first such as critical thinking, conducting independent research, writing reflection papers, and time management.

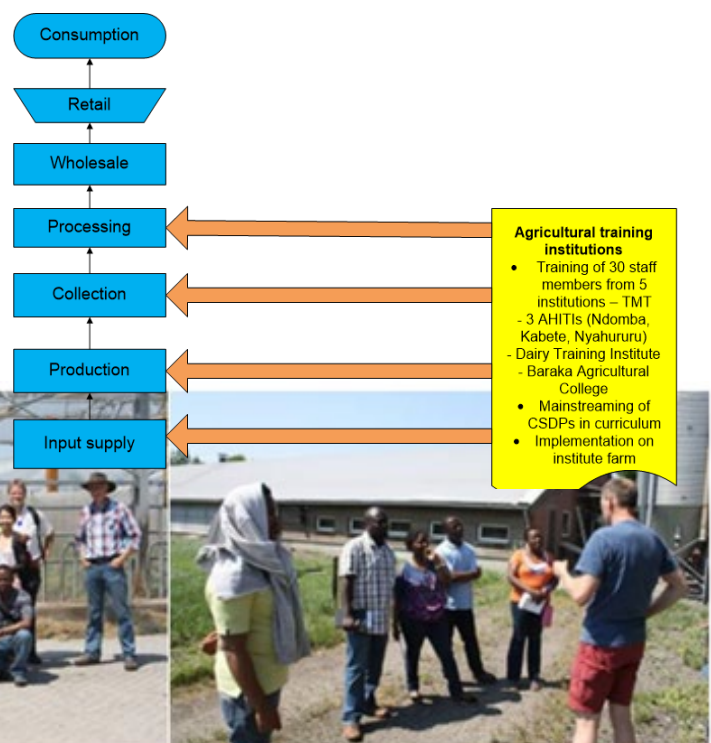
Despite the challenges, the experience from my Dutch training was life changing. The knowledge, skills and experience obtained will be instrumental in contributing to food and nutritional security in my country.

4.0 Back Home Action Plan

Title: Climate Smart Dairy Practices (CSDPs)
Targeted problem: Implementation of CSDPs in dairy training
Objective of intervention: To integrate CSDPs in training curriculum

Activity	Time line	Expected output	Desired Outcome
Training / sensitization of staff from 5 training institutions, through Tailor Made Training (TMT), facilitated by VHL, sponsored by NUFFIC	Aug – Dec. 2019	25 training staff from 5 institutions trained (13 men, 12 women)	Staff equipped with CSD knowledge and skills
Integration of CSDPs in curriculum	May – July 2020	Curriculum with CSDPs	Students equipped with CSDPs knowledge and skills
Implementation of CSDPs on institute farm	From January 2020	CSDPs implemented on institute's farm	Students exposed to practical implementation of CSDPs

The table above shows my Back Home Action Plan, while the figure below shows which value chain actors will be effected by the plan.



Dairy Value Chain : Beyond conventional veterinary medicines

Edward Gichohi Kanyari – Kenya

Nyandarua County / Olkalou subcounty – Veterinary officer

E-mail: kanyarieg@yahoo.com

Van Hall Larenstein – MSc APCM – Livestock chains, 2016



1.0 Introduction

I'm a veterinarian working in the Department of Agriculture, Livestock and Fisheries, Nyandarua County. I'm the Subcounty Veterinary officer (Olkalou Subcounty) and the acting Deputy County Director of veterinary services. I have attended two trainings in the Netherlands; international Diploma in Dairy Husbandry and Milk processing at PTC+ Oenkerk (2012) and a Master degree in agricultural production chains management at VHL University of Applied Sciences, Velp (2015-2016).

On March, 2018, I was sponsored by Danida to attend one month training on Entrepreneurship, Innovation and Value chains at Bygholm Agricultural College, Denmark.

2.0 Impact of Dutch training

2.1 Personal level

I am a Supervisor of the veterinary internship programme in Nyandarua County. This is a programme that is being implemented jointly by the state department of livestock, Director of veterinary services and the Kenya Veterinary board. My duties and responsibilities include;

- Expose the interns to all the relevant areas of veterinary practice and ensure they acquire the necessary knowledge, skills and competence.

- Provide the necessary guidance to the intern throughout the internship.
- Identify and liaise with veterinarians in other stations to facilitate internship rotation.
- Provide feedback to the Kenya veterinary Board (KVB) regarding the performance of the intern and any other relevant information.

IMPACT OF DUTCH EDUCATION



- Provide objective assessment of the intern and make recommendations to the Board.

2.2 Organization level

I am the Subcounty Veterinary officer and I also deputise the County Director of Veterinary Services. The County government of Nyandarua is partnering with the AFRIFI in a project that

will address the issues of the Food safety in dairy, horticulture and aquaculture value chains. I am among the few staff that will be trained as trainer of trainers (TOTS) and later I will train actors in the dairy value chain.

2.3 Dairy chain level

I have partnered with private service providers to form a consultancy firm called Nderi vet Limited. We wrote a proposal to Kenya Climate Smart Agriculture Project (KCSAP) and we have been funded to train farmers in the dairy value chain in Nyandarua County.

3.0 Lessons Learnt

The starting module 'Value chain analysis' was the most striking, because it helps to scan the whole value chain, identifies the actors and the stakeholders and their roles. One is also able to identify the challenges facing the value chains and give recommendation on how they can be addressed.

Use of case studies helped in learning about value chain governance. This is because one was able to read and understand the management of various value chains from different regions.

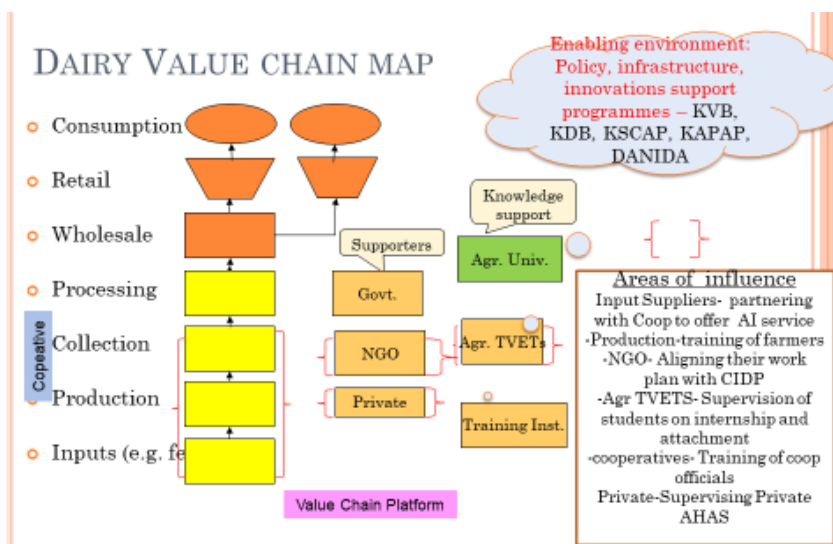


Figure 2: Value chain map in Nyandarua

The time allocated for the master programme is too short thus making the programme to be squeezed and denies the students time to network and internalize with other students.

The Dutch training has enabled me to widen my scope beyond the conventional veterinary medicine and I can now actively participate in tackling myriad of challenges bedevilling the dairy value chain in my county and Country.

4.0 Back Home Action Plan

In our proposal, we will deliver the following;

- Increase the average production of milk from the current 7 litres per cow per day to 12 litres per cow per day.
- Increase average farm gate price of milk from KES.30 per litre to KES 35 per litre.
- Reduce production cost through use of Feed formulated from locally available materials.
- Reduced cost due to procuring inputs such as AI services, Vaccine and other inputs as a group.

- a) Project on climate smart dairy
- b) Consultancy firm called Nderi vet limited
- c) Recruited by KCSAP to implement the project in Nyandarua County
- d) It will be a 5 year project
- e) Our Activities will focus on;
 - Reducing cost of production
 - Increasing productivity
 - Improving resilience to climate change
 - Improving the bargaining power for the farmer through formation of farmer's groups

From dairy extension officer to dairy value chain officer

Florence Wesonga Okwero – Kenya

Vihiga County Government – Livestock production extension officer

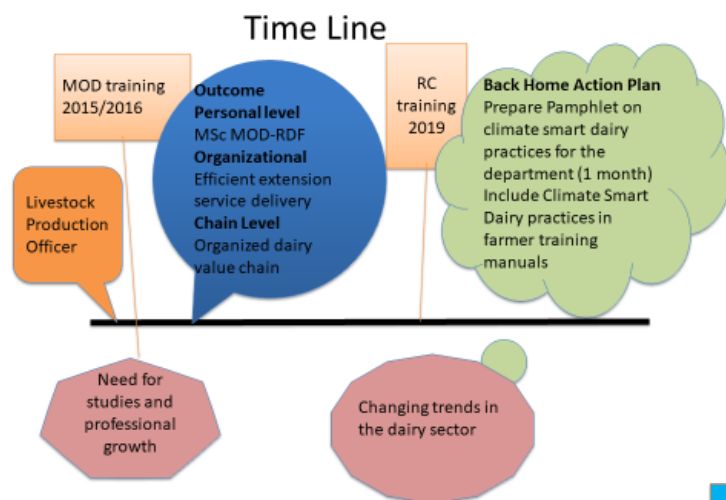
E-mail: fwesonga2012@gmail.com

Van Hall Larenstein – MSc MOD – Food Security, 2016



1. Introduction

I am Florence Wesonga Okwero. I attended a professional master programme Management of Development; Rural Development and Food Security at Van Hall Larenstein University of Applied Sciences, in the Netherlands, Velp, in academic year 2015/2016. My employer is the County Government of Vihiga in the department of Agriculture, directorate of Livestock Production Extension services. I haven't changed my employer.



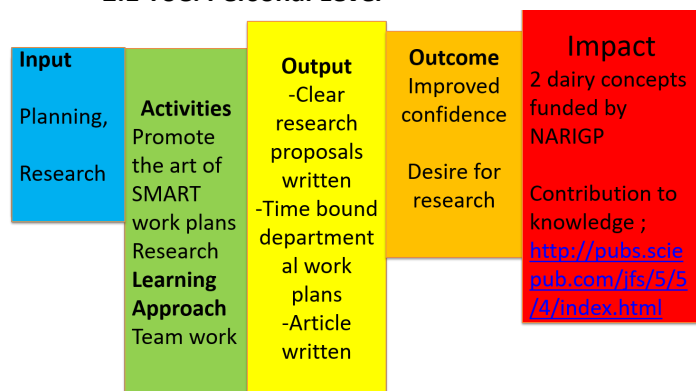
Undertaking studies in the Netherlands has improved my work performance. I am able to work and interact with stakeholders from diverse background and cultures. There has been a positive progression in my career. As a change agent I am able to handle different work situations with ease. I am supporting the department to attain its vision and mission:

Vision: To be a leading county in sustainable utilization of available resources for rural development.

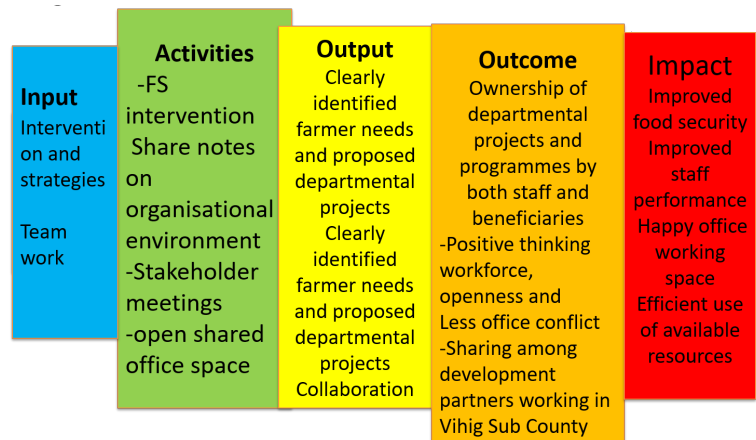
Mission: To contribute to poverty reduction through the promotion of food security, agro-industrial development, trade, water supply, rural employment and sustainable utilization of the rural resources.

2. Impact of Dutch training

2.1 ToC: Personal Level



2.2 ToC: Organisational level



2.3 Dairy Chain Level

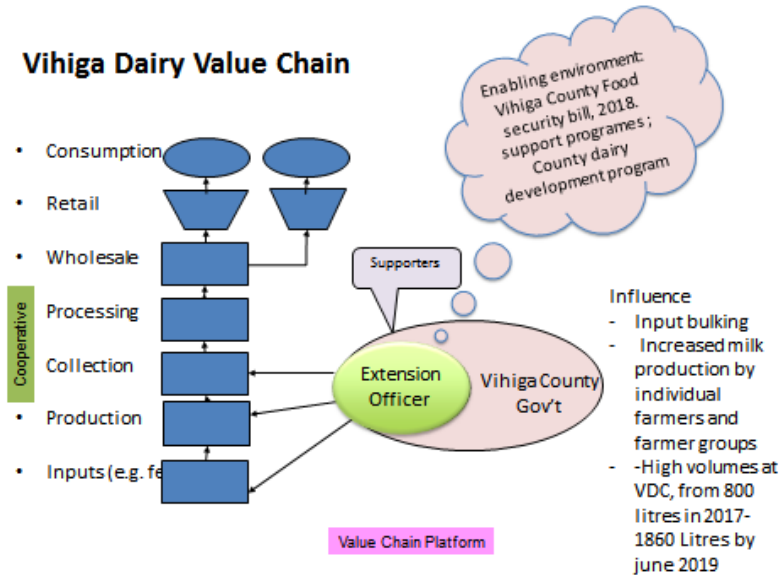
I work in a government institution as a livestock Production extension Officer. In Kenya, agriculture is a devolved function, about 80% of agricultural extension services are provided by the government. After my training in the Netherlands I have closely worked with the dairy value chain actors to improve the performance of Vihiga dairy value chain in the following ways.



Photo: Author's farm visit in Vihiga County

Participated in drafting of Vihiga County Food Security bill, 2018. In addition, I share knowledge on diversification of livelihood strategies skills acquired after farm visits to the rural De Kraats in Bennekom in Wageningen. Farmers now diversify and manage their on farm enterprises with aim of making a profit. For the department of agriculture to promote social inclusion farmers have been sensitized on the need to work in groups. As a result 3 women and youth dairy groups have been formed in every Ward. These farmers have been trained and given dairy cows under county dairy development program. They thus supply their milk to Vihiga Dairy Cooperative which pays them fortnightly. Income from sale of milk is used to purchase adequate food for their household thus attaining improved food security. Vihiga County has 25 Wards.

Additionally to improve women and youth participation in the dairy value chain governance. Trained women groups have formed fodder bulking groups, while youth have formed livestock spray groups. Being members of the dairy value chain they also participate in the election of group and dairy cooperative officials. They also participate in changes in the cooperative's constitution and any other



managerial changes. This has thus improved their participation in the dairy chain governance in terms of decision making.

I have also participated in the County dairy stakeholder forums which have resulted in formation of Vihiga Dairy Platform that brings together dairy sector actors such as International Livestock Research Institute (ILRI), National Agricultural Rural Inclusion Growth Program (NARIGP), Agriculture Sector Development Support Program (ASDSP) and Welt hungerhilfe (BMZ). The platform champions the dairy Value chain matters. Also the department implements the County procurement policy which requires that 30% of departmental supplies be allocated to youth and women farmer groups. Through this women and youth have been able to supply fodder bulking planting materials for the department.

2.4 Selected impacts

The skills I acquired after training in rural development has led to contribution of knowledge in food security through a publication available at <http://pubs.sciepub.com/jfs/5/5/4/index.html>

Formation of dairy value chain platform in Vihiga has created a forum through which dairy actors interact and streamline their activities this results in low wastage of resources because roles are not duplicated. This will impact the rural livelihood and improve performance of agriculture sector in Kenya. Through creation of awareness with knowledge acquired, two staff members have being trained in the Netherlands and South Africa through WUR-CDI. Knowledgeable human resources results in improved performance which further leads to improved efficiency due to changed attitude.



A team working on a paper on Conflict of Natural Resource Use in Tana River in Kenya

3.0 Learnt Lessons

The study units which improved my performance in my career and the dairy value chain were; Reflection, Research, Livelihoods, Interventions, food security tools and Value Chains; as an individual I had to always relate

what I learnt and real life situation back home through critical thinking.

In the module Value Chains, I specifically related with the book of KIT, AgriProFocus, IIRR (2012) 'Challenging chains to change'. As an extension worker this article presents the really life situation of dairy farmers' experience and dairy cooperatives transformation.

Most striking learning approaches were group work and field visits.

The challenges I faced while in Netherlands were; Congested learning time table with long assignments. Cold weather, inner loneliness due to missing my family. Unlearning what I had learnt in doing research.

In conclusion: The training in Management of Development; Rural Development and Food Security has had a positive impact in my career and improved performance of dairy Value Chain in the department of Agriculture in Vihiga County.



5.0 BHAP- NAKURU REFRESHER COURSE

After training on Climate smart dairy practices, I have the responsibility of sharing with the stakeholder in the dairy value chain in Vihiga County and beyond

Title: Climate Smart Dairy Practices for improved economic returns among smallholder dairy farmers

Targeted Problem: Changing Dairy Trends

Objective: To transfer Climate Smart Dairy technologies among smallholder dairy farmers in Kenya

Departmental objectives	Individual objectives	Activity	Target	Time frame	Output	Outcome
Promote Climate Smart Dairy practices	Dissemination of Climate Smart Dairy technologies to at least 200 dairy value chains actors.	Report on CSD training	Staff	25/30/7/19	Increased sensitization on CSD practices	CSD practices aware staff
		Farmer training Demo farms Conducting Field days	200 (120M+80F) farmers reached through 4 field days	Aug 2019 April, 2020	Farmers adopting CSD practices	Farmers embracing CSD practices
	-Increase Clean milk production by at least 10%.	-Capacity building using farmer group approach - Identify one demo farm on Climate smart dairy practices	-80 farmers reached through 4 trainings of 1 day each - Sensitize Vihiga Dairy Coop on quality milk and milk products	Aug 2019 to June, 2020	CSD practices aware staff	-Increase in milk production - Cooperatives adopting quality testing in milk and Climate smart dairy Technologies, Innovations & Management Practices (TIMPS) being embraced
			4 demo farms established	Aug 2019 to Dec, 2020	CSD aware dairy value chain actors	



Improved Milk quality control at Brookside Dairies

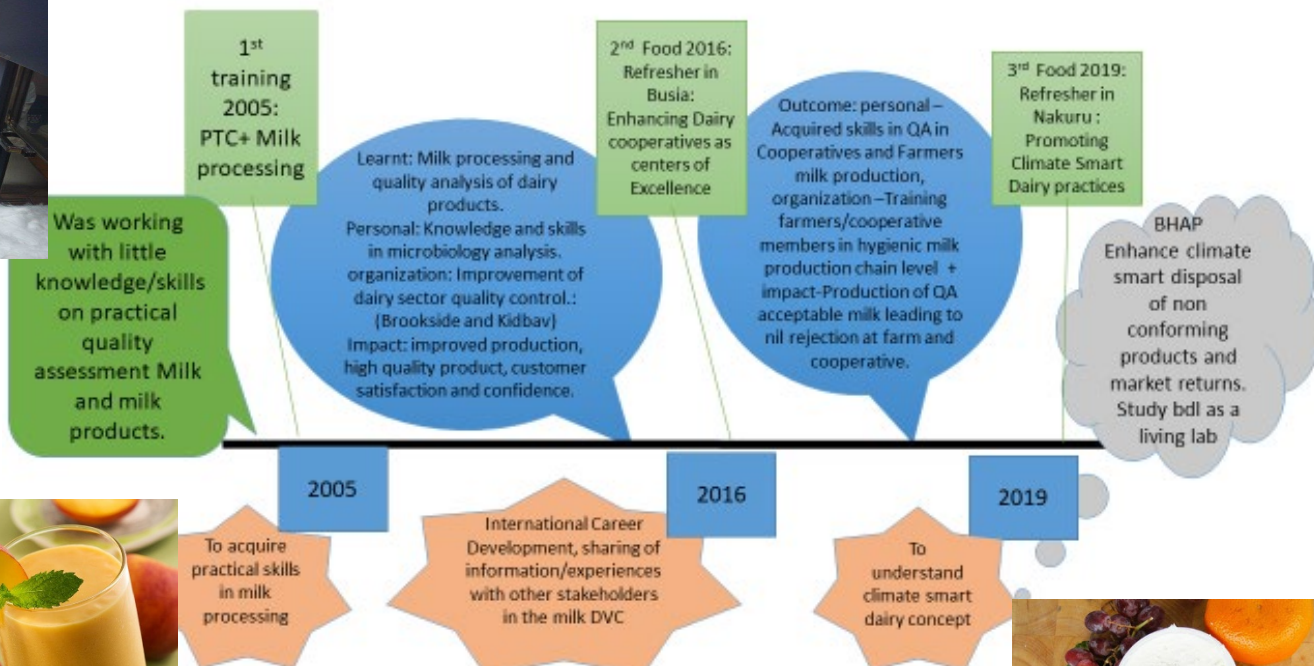
Ms. Hannah Munyoro – Kenya

Brookside Dairies – microbiology laborant

E-mail: Hannah.Munyoro@brookside.co.ke



PTC+, Dairy Husbandry and Milk Processing, 2005; PTC+, RC / Enhancing Dairy Cooperatives, Nambale, Busia County, 2016



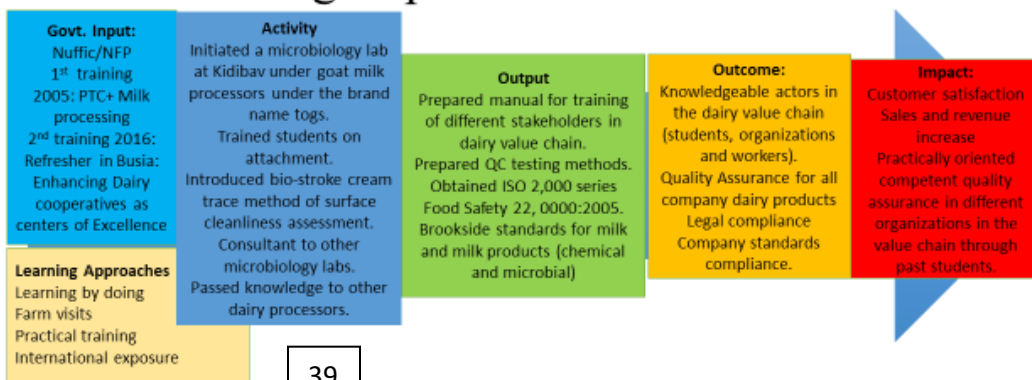
Brookside Dairies

- A private dairy processing company-1993
- Brands include: Brookside, Ilara, Delamere, Tuzo, Molo
- Products: Fresh Milk, UHT, Fermented Milk (Yoghurt, Lala), Butter, Ghee and Cream Dehydrated products (milk powder).
- Gross revenue is USD 176 M

- Full production capacity 1,000,000 Litres per day; currently operating at 750,000 Litres



Dutch Training Impact at Brookside Dairies



Improved Milk Quality and improved Ayrshire breeding stock

Ann Kabene – Kenya

Kabete Livestock Recording Regional Centre – Lab analyst and trainer; Ayrshire Cattle Breeders Society - member

E-mail: annkabene@yahoo.co.uk

PTC+/Oenkerk – diploma Dairy Husbandry and Milk processing, 2010



1.0 Introduction

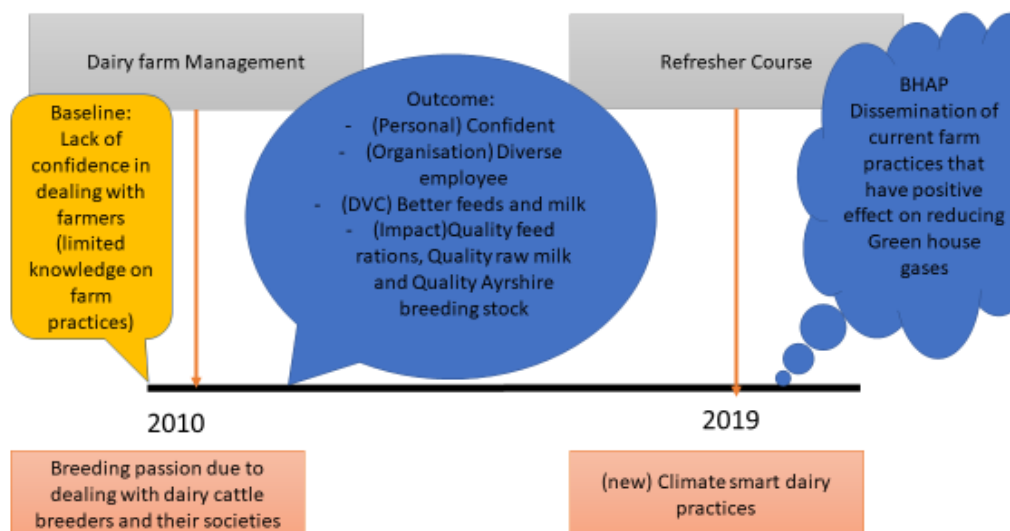
Stationed at Kabete Regional Livestock Recording Centres in the state department of livestock since 1991 which is preceded by National Livestock Extension work in Meru county from 1987. In 2010, I was fortunate to get the opportunity to be trained at the PTC+ in the Netherlands on Animal Husbandry and Milk Processing course, specializing in Dairy Farm Management. Through dissemination of the knowledge and experience acquired especially on breeding aspects i.e. artificial insemination (AI), pregnancy diagnosis (pd) and dairy cattle selection from PTC+, I have the confidence in performance and have contributed in making some changes at the producer and inputs levels in the dairy value chain.

2.0 My Impact of Dutch training

2.1 Baseline status

At Kabete Livestock Recording Regional Centre I am providing laboratory services for dairy cattle breeders and general farmers. The Dutch training impact might not look massive, but through dissemination of the knowledge through farmers, friends and relatives, my contribution adds up to the national impact in the dairy industry.

I advise farmers and breeders on clean milk production i.e. when and how to do the milking, type of milk containers to use, the effects of



environmental factors on the cow during milking, its milk quality which in turn affects the end product in the dairy value chain; feed formulation using available forage and feeding practices which affect the end product quality. This is done along with milk sample analysis in the lab to determine its nutritional value whereby, butterfat, protein, solid non fats, added water in milk, freezing point and density are analysed. This information is used to determine the bulls' performance stationed at the Kenya Animal Genetics Resource Centre (KAGRC) through the Kenya Livestock Breeders Association (KLBA), specifically the Dairy Recording Services of Kenya (DRSK) and the National Livestock Recording Centre (LRC). I also get involved in preparations of the national and international livestock shows where my participation includes selection of quality dairy cows for the shows. While searching and doing the recruitment, I teach farmers on good selection(s) in dairy cows on conformity which in turn affects its production and longevity.

2.2 Action/Intervention

The module on breeding from PTC+ had great impact on me since I'm now able to confidently perform certain aspects I had a passion for but was not able to. These are:

- Artificial Insemination. I'm now able to confidently perform AI and advice on choice of semen to farmers in general.
- Pregnancy diagnosis. From the date of insemination, I can deduce whether I will do an internal or external examination. Internal for 2-7 months and external for above 7 months.
- Dairy cattle selection. This is indirectly through breeders society. Since I work with breeders, we have had a close association leading me to be a member of the Ayrshire Cattle Breeders Society (ACBS). In order to achieve the best show Ayrshires, I am compelled to help select the best in the country for the Livestock Breeders Show and the Nairobi International show. This involves moving round the country in search of very good Ayrshires in terms of production, conformity and longevity, which are the most desirable traits for

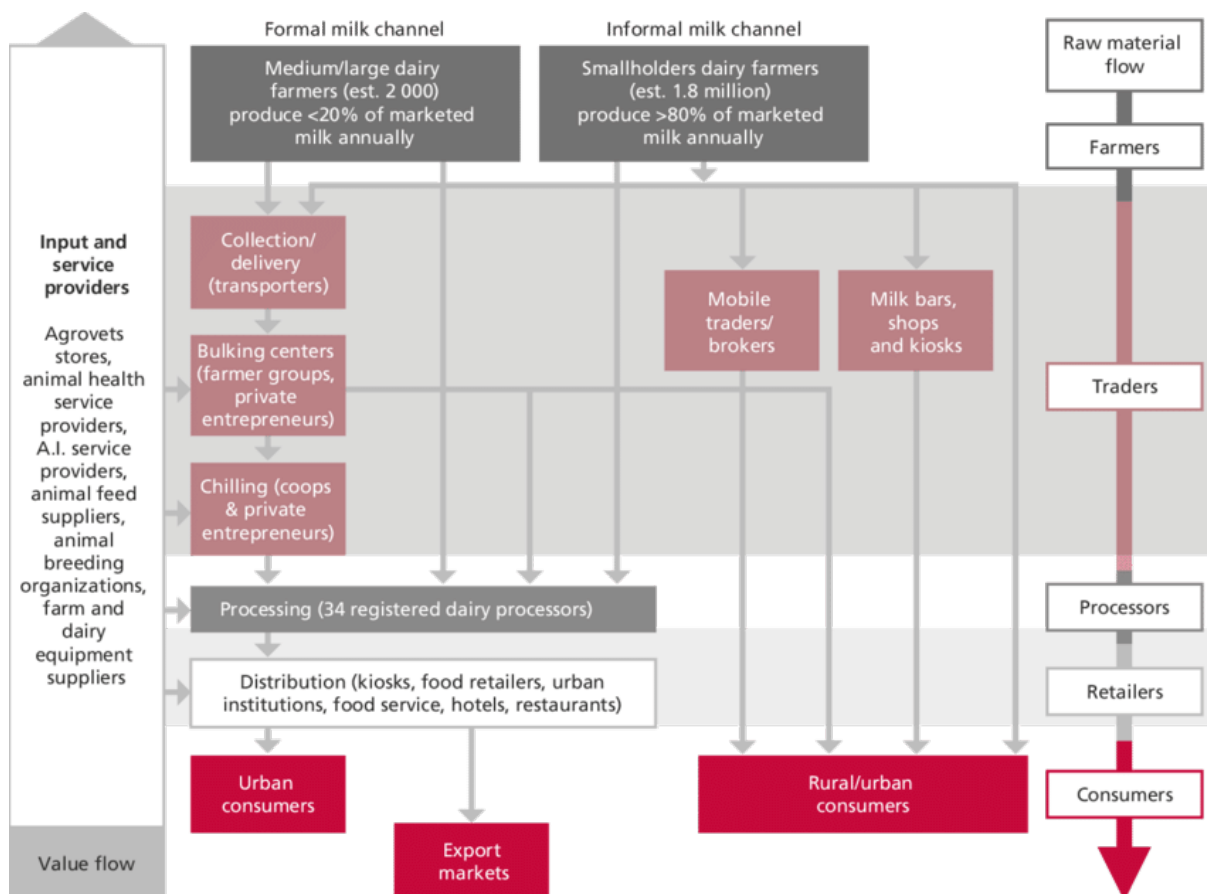
Kenyan farmers. This means having the ability to identify depth of a cow, udder attachment, height of the udder, teat placement, suspension ligaments, back line, legs whether sickle or straight, feet angle etc. All these together with proper management have an effect on levels of production.

2.3 Output (Change)

The ACBS has become one of the strongest and the best cattle breed society compared to the other dairy cattle breeds with approximately 200 registered members. The Ayrshire cattle population has increased over the years to an estimate of 1.2 million Ayrshires with 41 bulls at the bull station. The bulls produce 200,000 doses of DF semen per year which is all distributed.

Through the society, I have improved in the choices of breeding bulls/semen, selection of show cows at the inputs level and raw milk quality at the producer level in the value chain (figure 1).

Figure 1: A typical Dairy Value Chain in Kenya

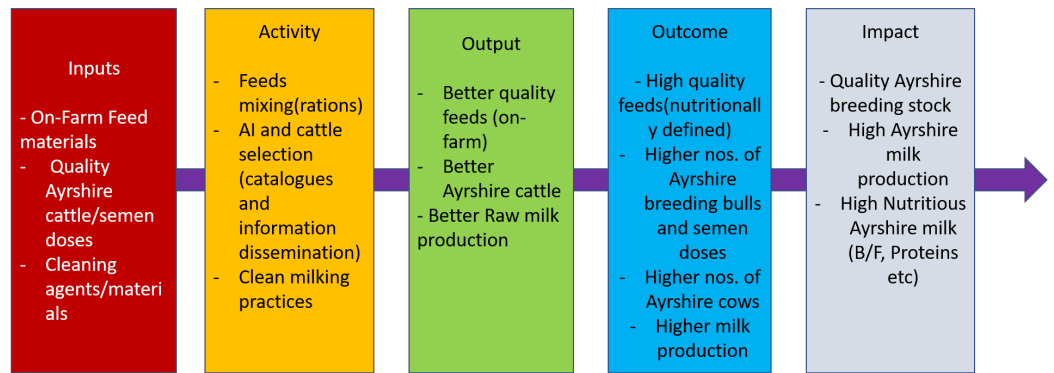


2.4 Outcome/Impact

The farmer is able to select good breeding stock from good choices of semen, correct timing for AI, keeping breeding records and the right time to do pd. The outcome might not be very visible but with time from breeder to farmer the outcome can be felt at the producer level. Higher levels of milk output have been observed.

It is small but through farmer to farmer, definite changes could be seen in future.

Theory of Change (ToC)



3.0 Lessons learnt

Feeds and nutrition, AI, pd and dairy cattle judging modules have supported best in my performance in the dairy value chain at the farmer level with the best approach being “learning by doing” and interaction and teamwork, whereby there’s interaction and networking with course mates. A number of farmers now make home-made mixes by buying or producing the ingredients on farm and then mixing them. This can be a cost-effective feeding regime and can provide a higher level of reliability regarding the nutritive content of feeds.

4.0 Conclusion

From my perspective, my impact on the dairy governance is presently felt just at the few farmers and breeders I interact with i.e. at the inputs and the producer levels. On-farm feed formulations seem to be the preferred feed since the farmer is sure of the feed’s contents. Though it takes time, future to be breeders have the knowledge required to become breeders.

5.0 Back Home Action Plan

As Back Home Action plan of this Refresher course, I present table 1.

Promoting climate-smart dairy practices for food security and resilience

Addressing cattle feed deficiencies

Objective	Activity	Output	Outcome	Impact
<ul style="list-style-type: none"> - Improving nutritional value of on-farm feed rations - Improving Ayrshire breeding stock 	Dissemination of current climate-smart dairy practices for improving the nutritional value of on-farm feed rations	DVC level facilitator at Inputs and Producer levels	<ul style="list-style-type: none"> - Quality on-farm feeds - Quality Ayrshire cows - Quality Ayrshire semen doses - High milk production 	<ul style="list-style-type: none"> - Optimal milk production - Quality Ayrshire breeding stock

Tabel 1: Back Home Action Plan

Improved breeding and feeding practices through ADC farms

Charles Bwabi – Kenya

ADC – Agricultural Development Corporation – production manager

E-mail: cbwabi@yahoo.com

PTC+/Oenkerk – diploma Dairy Husbandry and Milk processing, 2013



1.0 Introduction

My name is Charles Bwabi. I am an alumni of PTC+/Oenkerk. I attended the 6-months diploma course on Dairy Husbandry and Milk Processing in 2013, with specialisation Dairy Farm Management. I currently work for Agricultural Development Corporation (ADC), which is a government organization. My organization mostly focuses on the dairy farmers and AI providers (input suppliers). Its main mandate is to produce and supply quality semen and breeding animals to the Kenyan farmer. It also offers training and extension services to the public. The motivation to study in the Netherlands was to gain skills and knowledge for increasing productivity in the organisation farm and dairy value chain.



2.0 Impact of Dutch training

2.1 Personal level

The training has enhanced my knowledge and skills in animal husbandry through topics on nutrition and fodder production. It has made me more confident in the discharge of my duties and improved my leadership and supervision skills. After attending the short course my responsibilities have included serving as a trainer, coach, production manager, consultant and policy maker.

2.2 Organisational level

I have trained and coached fellow staff in different dairy activities leading to better efficiency. This has resulted into improved production and productivity. Through adoption of improved feeding practices milk production per cow has increased. I was able to formulate rations for the different production groups based on the stage of lactation and level of production. This led to increased Gross Margin for the dairy enterprise. As a result of good young stock management heifers are attaining target weights to be served at 17 to 18 months from the previous average of 33 months.

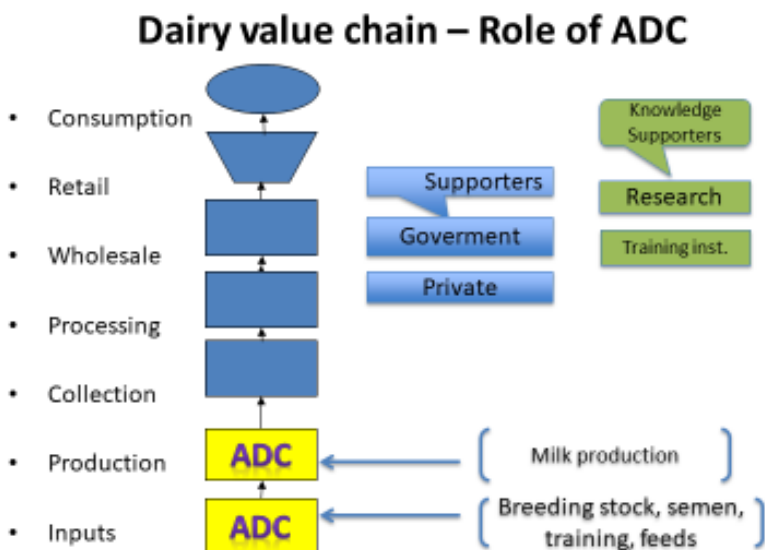
Figure 1 : Impact Dutch Training



Through topics in mini dairy, milk quality produced on the farm has improved. Safe and hygienic milk is being produced through effective cleaning procedures. The basic period of the course, gave me a broad knowledge and understanding of milk production, collection,

processing and marketing to be able to give a sound and valid advice.

Topics on accounting and farm analysis have been very essential in monitoring and improving on farm performance. I have been able to analyse the financial, economic and technical performance of the farm.



2.3 Dairy Chain level

The farm is used as a demonstration, extension, education and training centre where best practices in dairy management are showcased. Farmers have been able to learn about fodder establishment and conservation. I have trained dairy farmers on quality milk production. A number of farmers have been guided to set up sustainable dairy farms by my organisation.

Dairy value chain in Kenya

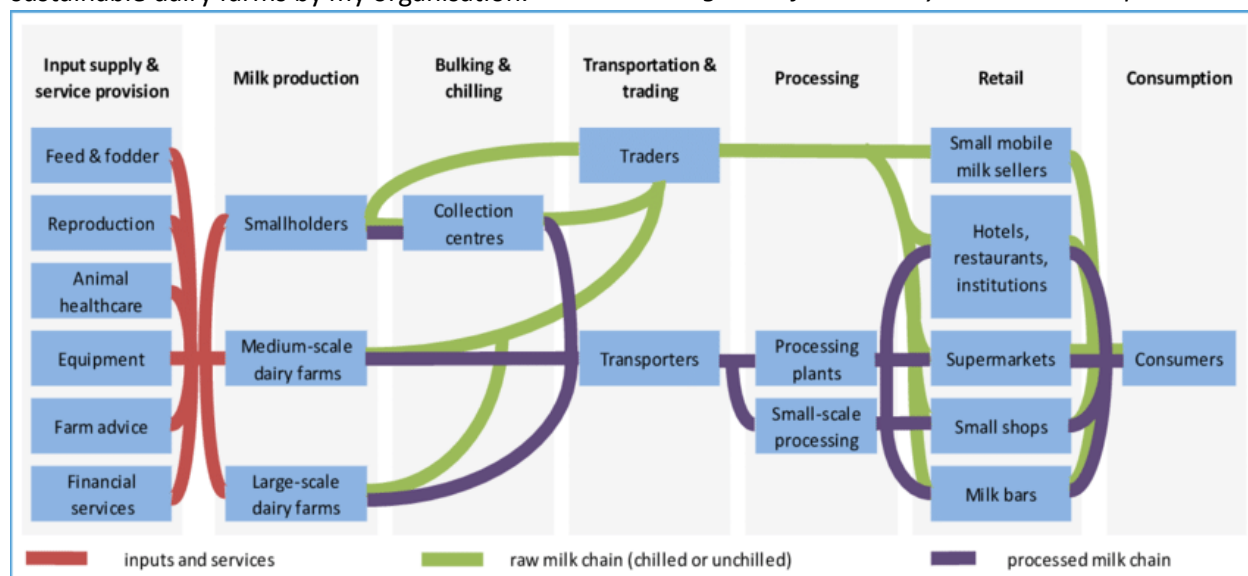
Small-scale farmers supply more than 80% of the total milk consumed in Kenya, obtained from mostly crossbred animals raised on open and semi-zero grazing systems. They sell milk directly to consumers or through local traders, and tend to have a diverse array of access issues, including difficulties obtaining feed, fodder, and water. Informal milk traders are the single most important marketing actor, controlling over 70% of marketed milk.

At farm level, major challenges include longstanding issues, such as poor quality and high cost of inputs and services, poor terms of trade and hence low prices for milk, and poor access to information and markets.

At the market level, challenges include the quality and safety of milk, owing to the high proportion of raw milk channelled through the market; the cost of milk collection, transportation and distribution, due to poor infrastructure; and under-utilization of processors' capacity, owing to the higher demand for liquid milk than for high-value products.

All of these issues should be addressed through a combination of training, information

Figure 3: formal dairy value chain map.



dissemination and policy that creates an enabling environment for honest trade and robust regulations. The quality and availability of dairy information continue to be challenges. In conclusion, there is a general shortage of well-trained and updated personnel in the whole value chain.



Photo: A group of cows at pasture.

3.0 Lessons learnt

The study unit at DHMP course, that has best supported stakeholders in the dairy value chain is nutrition. There are significant gaps in feeding dairy cows with most farmers relying on inadequate and low quality feed. Poorly fed animals compromise dairy productivity. Farmers have been able to learn about fodder establishment and conservation. Most farmers in the locality are now making maize silage and hay for feeding their dairy cows. The most striking learning approach was the “Competence Based Learning”. The combination of skills, abilities and knowledge makes it easy for one to perform a specific task. The concept of “Learning by Doing” was noble in that it leaves one with practical lifelong skills. Also working in small groups and farm excursions were very effective.

4.0 Conclusion

ADC has adapted modern dairy management practices on its dairy farms thanks to the input of the PTC+-training. ADC has supplied farmers with better breeding animals. When farmers have been trained at the ADC farms, they learn of the improved management practices in place and apply them in their respective units. This

has resulted in improvements in production, income and food and nutrition security. Farmers have received proper advice to improve the performance of their farms based upon farm analysis. Such initiatives will increase productivity, improve the livelihoods of the people of Kenya and contribute to the achievements of national food security.

5.0 Back Home Action Plan

I formulated three major activities to undertake in my organisation ADC as a result of this refresher course. Achieved till so far (Jan’20) : i) proposal submitted for installation of a biodigester on the farm for approval and funding; ii) improving feed and fodder availability on the farm through increasing area under fodder (Desmodium and Brachiaria grass) from 35 ha to 80 ha; iii) creation of awareness on causes and impacts of climate change among fellow staff and farmers is ongoing.

Plan of Action: Targeted problem and intervention - BHAP

Activities	Time line	Expected output	Desired Outcome
Installation of a manure biodigester on the farm.	Sep. – Nov. 2019	Reduced intensity GHG emissions and biogas production	Biogas to be used as a source of energy for heating.
Improving feed and fodder availability and quality.	From Jan. 2020	Improved basal feed for livestock productivity	Increased livestock production.
Creating awareness on the causes and impacts of climate change among dairy farmers.	From Aug. 2019	Farmers informed	Increased uptake of climate smart practices.

From Training Dairy Farmers to Climate Resilience Consultancy Services

MIRIAM MAINA - Kenya

CENTRE FOR CLIMATE RESILIENCE INITIATIVES Ltd. (CCRI Pearls) – Managing Director

e-mail: ccrigoals@gmail.com

**PTC+/Oenkerk – diploma Dairy Husbandry and Milk Processing , 2013;
DTC/RC Gender and dairy value chains, Tanzania, 2015**



1. Introduction

My name is Mariam Maina. My training in the Netherlands was on dairy husbandry and milk processing at PTC+ Oenkerk, in 2013. This was a result of dairy skills gap identification in the loan provision company I was working at. Prior to that I completed a BSc in information technology. A few year later, I attended a DTC Refresher course on gender in dairy value chains. In 2018, I have completed my MSc. Climate Change and Sustainability from Brunel University, London. Holding an ardent interest in the field of research, I have been on a fervent pursuit for a suitable project to be associated with since the consummation of my last degree. Though Climate Change and Sustainability is a vast field of study, I am more predisposed towards the field of impacts of climate change, environment pollution, toxicology and waste management/recycling. My thesis during my Master program was on 'Carbon Foot Print in a Dairy Farm-Case study in Tanzania' and this study enabled me to thoroughly understand emission sources and mitigation strategies towards reduction of greenhouse gases. In that study, I used Life Cycle Assessment method to calculate every process involved in the sector from farm to fork. It directly links to this refresher course on 'promoting climate-smart dairy practices for food security and resilience'.

2. Impact of Dutch Training

2.1. Personal level

On individual basis, I was able to learn by doing, acquire knowledge and practical skills. This empowered my dairy skills and was able to transfer the same to my community especially Women and Youth. It was clear to my reach on managing the

wellbeing of a dairy herd from health, vigour, to maximise quality and quantity of production. I was able to create networks and gain exposure, learnt different ideas from course participants interaction e.g. learnt that Buffalo milk was nutritious as well in Bhutan is common, learnt how in Sri Lanka they intercrop leguminous crops within the farm which serves as fodder, provides shade and its useful in nitrogen cycle. Learnt on how to add value in milk. It motivated me to continue my post-degree studies.

2.2 Organisational level

Before leaving for further studies, I used to train farmers on dairy management, climate change, milk hygiene, feed and nutrition, breeding, calving, fodder management. All these skills were acquired during the Diploma Course attained. I could train farmers on managing the wellbeing of dairy herd.

I was able to integrate skills in the organization where I was working through training of trainers to other staff. The impact was recorded through the development of customised dairy financial products, an increase in milk production and sales, improved livelihoods. The skills went a long way into clientele increase which led to portfolio growth in the organization. The training exposed me to the best players in the



dairy sector, created networks and gave me a platform to train small scale farmers.

I was selected as a product development committee member where I was leading a team in modelling a financial dairy product which was issued to farmers as a loan. This included appraisal, assessment, insurance and breed selection. The project created a positive economic reward to farmers who were given the product as a loan and managed to finish paying. There was a notable improvement to these homesteads as well as gender empowerment. Milk value chain training especially on enlightening the farmers on stakeholders and policies affiliations concerning milk.

2.3 Dairy Chain Level

Dairy training motivated me to further my career which has turned out to be an asset in the community. Establishment of a youth

mentorship programme on milk processing and herd management has evolved. Research in the area seeking to address policy integration in gender, climate change, leadership and food nutrition. The organization was able to streamline the dairy value chain, model into a loan opportunity to farmers. This motivated funding of chain actors such as input suppliers, smallholder or large farmers, creation of cooperatives, processing and supporters.

The course remains an asset to my community as we plan to install a youth dairy empowerment project where we are planning to create employment. The acquired knowledge and skills have empowered me to manage a consultancy firm which trains stakeholders on Climate Change integration into dairy management, food security and Health.

3. Lessons learnt

BSc. / DHMP

- Knowledge and skills transfer to other staff.
- Creation of dairy project wing.
- Improved dairy projects.
- Improved livelihood due to change of incomes
- Creation of Farmers cooperatives
- Organized Value chain
- Portfolio growth in loan disbursements, Clientele growth

RC

- Dairy Research
- Gender Integration
- Sensitization, mobilization, advocacy for dairy project
- Setting of model farms.

MSc./RF

Building Networks

- Agribusiness Consultancy work
- Climate Change skills

Impacts of the Trainings

- Created Dairy skills Platform for staff
- Promoted to be team leader in the dairy project.
- Formed a team of 6 persons to lead in trainings in their branches
- Improved dairy management projects.
- High milk production
- Improved livelihood due to change of incomes
- Farmers cooperatives
- Portfolio growth in loan disbursements.

Personal Level

MSc Achievement, Promotion, KLPA, AAS Workshop Trainings, NASA Presentation, Improved on self-confidence, References.

Improved input supply through training

CAROLYN WANGARI WERU – Kenya

OSHO CHEMICAL INDUSTRIES LTD NAIROBI, KENYA – trainer

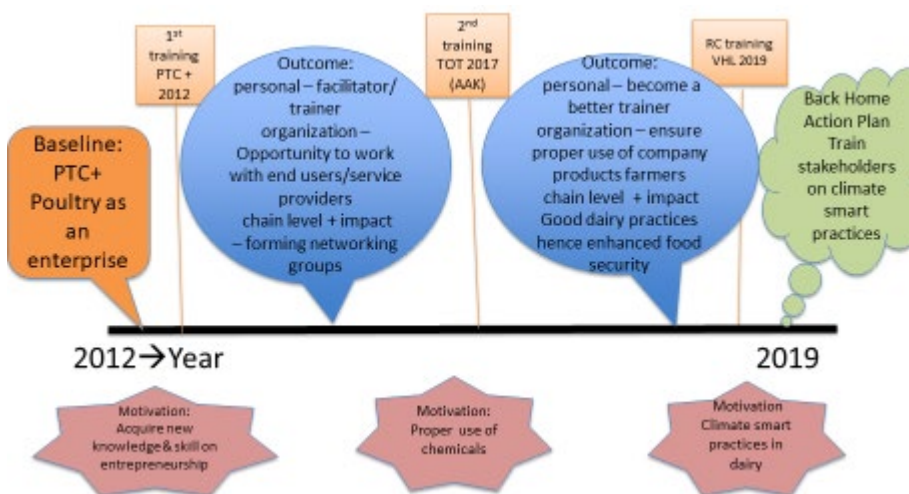
E-mail: weru.wangari@gmail.com

PTC+/Barneveld – short course Poultry as an enterprise, 2012



1.0 Introduction

Currently am working with Osho Chemical Industries Limited. The company is a leading manufacturer, dealer and distributor of crop protection products, animal health products, public health, industrial chemicals, farm equipment, allied products and services. The entity aims at providing quality and affordable life science, industrial, farm equipment and allied products and services in the East, Central and Southern African region. I attended a short course (Module on poultry as an enterprise) at Barneveld, The Netherlands in 2012 sponsored by Nuffic which helped me to attain valuable knowledge and skills. The course has helped to expand my knowledge base and assist stakeholders e.g. farmers, service providers Agrovets, dairy cooperatives. Due to the short course, I was nominated to take a course on proper use of agrochemicals as a trainer of trainers (TOT) sponsored by Agriculture Association of Kenya (AAK). In the Dairy Value chain, I am involved in training farmers, colleagues, students, women and youth and coordinate supply activities. Also supply veterinary products such as mineral supplements, acaricides, dewormers, anti-microbials, disinfectants and many more hence ensuring increased yields and production of quality milk.



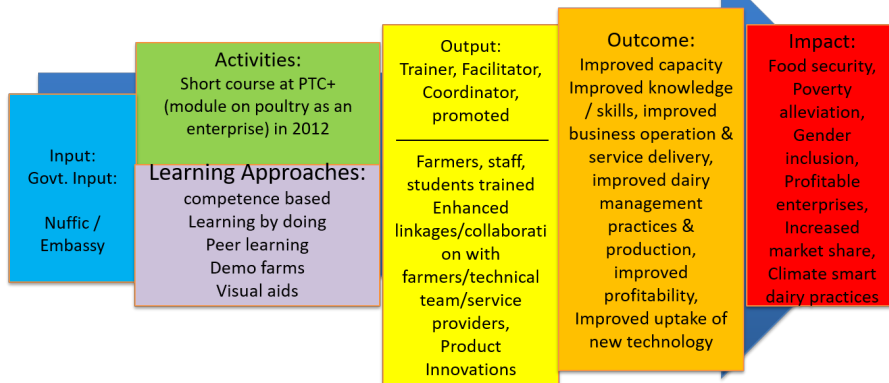
2.0 Impact of Dutch training

2.1 Personal level:

With the knowledge I am able to

- Understand the role of Kenya veterinary Board and attend the continuous professional development.
- Train and encourage farmers to take up dairy farming as an enterprise not as a hobby.
- Assist colleagues to train farmers in their jurisdiction in the field of dairy production.
- Assist in strengthening of existing rural farmer production to a large commercial scale.
- Enhance level of quality in local milk production.
- Explore ways and means of attractively marketing of locally produced dairy products.
- Assist in enhancing the knowledge of extension staff of the Department.
- Coordinate and organizing farmers field days in the country.

ToC: Osho Dairy Value Chain



- Offer training to Animal Health Training Institutes.

2.2 Organization level

My (private) organization is involved in the dairy value chain which include interaction with the dairy farmers, cooperative societies, feed millers, distributors of farm inputs (e.g. stockists) and NGOs in Kenya. The organization supplies farm inputs and offer technical information and advisory services to distributors, farmers and NGOs in most parts of Kenya who are taken care by the employees of the organization who include technical area representatives (veterinary doctors, para-vets, agronomists), sales managers and customer care representatives. The organization works well with Kenya Veterinary Board and Kenya Dairy Board in order to get the genuine veterinary professional and assist in policies formulation. The numbers of qualified trained personnel working in the department has increased. The acquired new skills and knowledge assisted the department in implementing activities in the rural areas. The services delivery became efficient with having diverse knowledge in technical field to provide enough guidance to rural clients in the animal health production. The vision of farmer's group formation and cooperatives has fulfilled in more meaningful way. I assisted other extension peers and heirs to conduct standard farmers training on dairy production and I

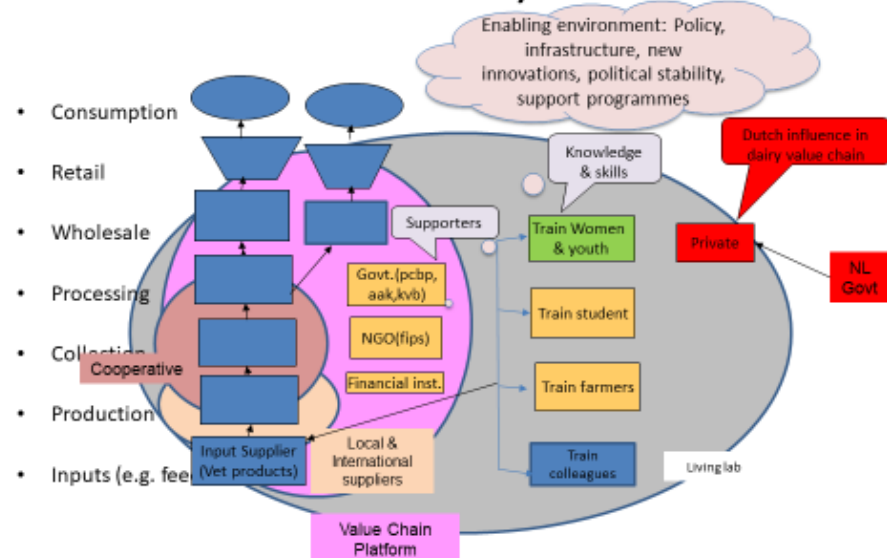
assisted in achieving the goal of poverty alleviation through set up of community based groups and marketing.

2.3 Dairy chain level

Dairy farming is a booming business especially with the high demand for tea by Kenyans. With the knowledge I got from the Dutch on dairy farming, especially during the farm visits, I am able to:

- Recruit more suppliers of inputs in the rural area to help farmers to easily access the goods and vet services.
- Establishment of farmers groups who get trained regularly.
- Train on the importance of bio security.
- Keeping the animal comfortable e.g. enough space, lighting, proper ventilation, proper housing.
- Computerize record keeping especially per animal on milk production.
- Early disease detection and proper use of Antibiotics.
- Proper breeding, cleaning milk hygiene, proper feed ratios, mechanization e.g. machine milking.
- Calf feeding and feed storage.
- Importance of value addition and traceability.

Osho Chemical Dairy Value Chain



3.0 Lessons learnt

Having done the module 'Poultry Farming as an enterprise', it really was an eye-opener for me in training farmers to look at their dairy farming as an enterprise which should be profitable. Topics such as Farm management economics, farm analysis, practical disease prevention and monitoring and farm strategies were really striking. Also field visits to dairy farms was very educative, where I learnt about dairy comfort, bio security, feed storage especially during winter and high standard of mechanization and importance of individual daily record for each cow.

The practical learning approach of the course was most striking where we made various field visit to pig farms, poultry farm and dairy farm which enable me to appreciate the value chain hence help in embracing dairy value chain here at home. Technological advancements in The Netherlands helped me to advice farmers that they should leave their traditional conventional ways of doing things by trying to avoid losses in their enterprises.

4.0 Conclusion

It will be good to continue having this kind of refresher courses or forums for continuous capacity building, because the dairy farming industry has over the past decade faced numerous and substantive changes especially with the intensification and the scaling up for effective milk production driven by the high demand for milk products through the expanding population in the Kenyan markets. Trends such as technological advancements in the field of animal breeding, supplements and nutrition, cow health and automation has made it a viable source of income for many farmers in Kenya. Special efforts need to be made to incentivize women dairy producers/processors to improve their capacity. In particular, women veterinary or extension agents should be empowered to better help women breeders and processors through extension and support services.

5.0 Back Home Action Plan

BACK HOME ACTION PLAN

Objectives	Timeline	Expected out put	Desired out come
Promote climate smart dairy practices	August 2019 – December 2020	Professionals & Farmers trained	Reduced carbon emissions
Consumers awareness on milk quality	August 2019 - ???	Educated Consumers	Reduced diseases prevalence's e.g. Brucellosis
Promote Gender Equity	August 2019 – December 2019	Empowered women & youth	Increased enterprises operated by women & youth
Promote new dairy innovations	August 2019 - December 2019	Trained farmers	Increased milk quantity and quality

OSHO CLIMATE SMART FEED FORMULA

Preparation of MACHICHA in 200 lts drum.

Ingredients

- Maize germ – 25kg
- Wheat bran – 25kg
- Molasses – 5litres
- Biovet YC Gold – 500g
- Toxorid Bio – 500g
- Cattlemin Maziwa – 5kg

Procedure

- 1) Mix maize germ and wheat bran together
- 2) Mix Biovet YC gold, Toxorid bio, Molasses and water together
- 3) Mix the mixture in (b) and (a) using your hands until it is wet.
- 4) Put the solution in 200 litre drum
- 5) Let it settle for 3days this will allow for fermentation for 2 days.
- 6) Feed the cow 2kg per day in either fodder, dairy meal or give alone, mix with 200g Cattlemin Maziwa during feeding.

Benefits

- ✓ Increase butter, fat and milk production
- ✓ Helps in digestion
- ✓ Feed utilization
- ✓ Increased appetite
- ✓ Triggers the activities of ruminal microflora

Female Dairy Farmer Trainer

Christine Muchanga – Kenya

Dairy farmer – Kitinda Dairy Cooperative Society

PTC+/RC in Bungoma county, 2015; DTC/TMT Dairy farming and entrepreneurship, 2017



1. Introduction

Dairy farming is a strategic enterprise in my county that provides food security and daily incomes to thousands of smallholders including me. However, low milk productivity per cow estimated about 5 liters per cow daily has continued to limit our profitability, yet milk demand in our area/county is growing at high rate per annum due to growing population and increasing per capital milk consumption. After acquiring knowledge and skills through refresher course organized by PTC+ which took place in Bungoma County 2015 and a Tailor made training at DTC/Oenkerk about Dairy farming and entrepreneurship in 2017. At personal level, I am trying to implement on my farm what I learned. Practicing good dairy practices together with chain actors this includes: willing smallholder farmers, Dairy Cooperatives, women groups, youths, transporters county Government, privates sectors, microfinance institutions, product consumers, vet officers, NGOs, dairy input suppliers, Kenya Dairy Board among others.

This actor has played big role in dairy value chain. Milk production has increased from form 3 liters to 8 liters per day per cow. At the Dairy Cooperative the milk intake has gone up from 1000 to 1500 Liters per day, which has enabled my society to process quantity and quality products to scarify customers which has rescued market on this competitive field. Apart from Dairy Farming, I am encouraging farmers i.e. youths, woman groups, dairy cooperatives to run different enterprises which will generate income for their better life as we do. For example

Bomarhodes seed multiplication, Napier plantation, Desmodium, Mollato grass for commercial purposes and their dairy animals. See photos below:



For an effective and efficient process, there is need to develop and implement relevant



policies towards transformation of the dairy value chain for food security and sustainable development in Bungoma County.



2. Impact Dutch training

Baseline	Action /Innervations	Output (change)	Outcome/Impact
Farm level Poor Dairy Practices 	1. Soil Sampling together with willing farmers 2. Early and partial Budgeting for forage production and conservation 3. Proper Record Keeping	Use manure instead of artificial fertilizer. - Good germination and cutting at the right stage. - Know the input and output. - When to inseminate on time use AI (pedigree)	- Has increased pH fertility of the soil by adding nutrients which has led to quantity and quality milk production - High yield of fodder throughout the year which leads to consistence milk production for food security. - Know if you are making profit or loss. - Replacement of my hard structure consistence milk production. - From 5 liters per cow per day.
Poor /Bad attitude	- Changed attitude to Dairy as a business. - Planting of BomaRhodes grass for Hay and seed multiplication with youth groups & women.	- Multiplication of BomaRhodes grass from 100 Kgs – 300 kgs per 1 st of harvest. - Production of Hay from 500 to 1000 bales.	- Generates income which has improved livelihoods of our people.
Cooperative level Poor Management of officials 	- Employ Trained Workers (Professionals)	- Proper Record Keeping and accountability. - Capacity Building of farmers - Use of modern equipment for processing.	- Best Quality Payment System (Safe Milk in liters). - Farmers gained trust in them. - Quantity and Quality milk Production. - Production of Quality Products for ready market and reliable
Dairy chain level Poor networking	- Supply inputs at low costs. - Offer trainings to the farmers	- Quantity and Quality milk Production	- Food and nutrition Security. - Generates income of small scale holders which has improved their standards of living.

3. Lessons learnt.

Lessons learnt from stakeholders supported best in performing in dairy value chain is as follows:

- Has increased income of small scale farmers by raising milk productivity and production levels.
- Has improved milk quality through establishment of more efficient collection and marketing system.
- Has increased value addition and product diversification through milk processing.

Forward and backward linkages are very important, because without one actor no

processing will take place (and no food security from grass to glass).

4. Back Home Action Plan

- Continue with implementing Agroforestry.
- Implement new Climate Smart Dairy Practices in our farm.



Female Dairy model Farmer

Priscah Mayende – Kenya

Dairy farmer – Kitinda Dairy Cooperative Society

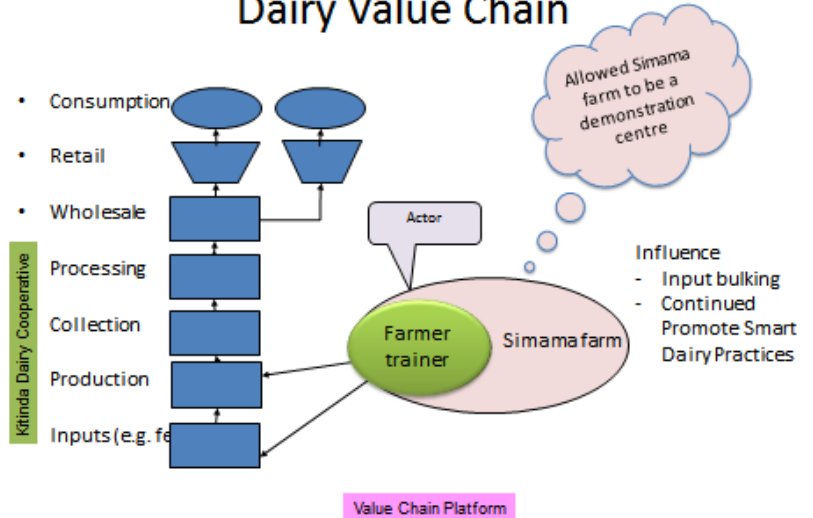
PTC+/RC in Bungoma county, 2015; DTC/TMT Dairy farming and entrepreneurship, 2017



1. Introduction

I am Priscah Mayende. I am a dairy farmer. I attended the TMT dairy farming and entrepreneurship at DTC Oenkerk in the Netherlands. I work on my farm; Simama Farm in Bumula constituency in Bungoma, Kenya. My farm is about 3- 8 acres thus I am a smallholder dairy farmer. Undertaking farm experience visits in the Netherlands has improved farm performance. I used to produce about 5 liters per cow/day, but now I produce 12 liters cow/day. It motivated me to develop a farm plan. I have planted woodlots and fodder pastures. I sale feeds to dairy farmers.

Dairy Value Chain



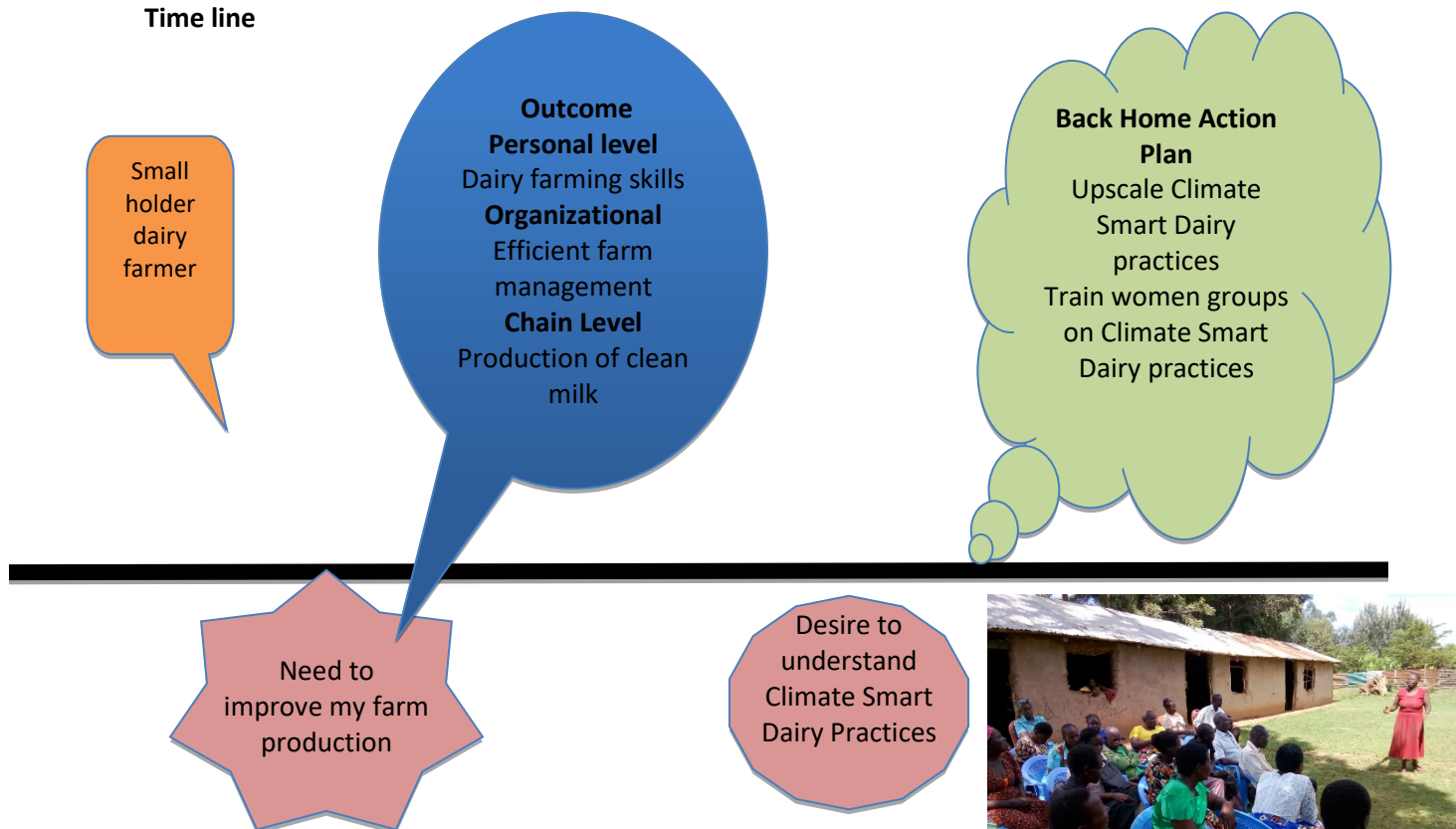
2.0 Impact of Dutch training

Baseline	Input/ learnt	Activities	Output	Outcome	Impact
2.1 Personal level Low farm planning	Farm plan	Farm planning	A model farm	Improved planning skills	Increased productivity in terms of milk and livestock fodder
2.2 Organisational Low development	Management of soil by using organic manure	On farm diversification composting	Clearly outlined farm project	Many farm enterprises	Improved income
Low stakeholder collaboration	Networking	Attending stakeholder forums	Collaboration	Improved networking skills	Collaboration with VI Agroforestry. This an NGO supporting Climate Smart Dairy practices
Gender inequality	Capacity building	Train women and youth group on agricultural technologies	Trained women and youth group	Empowered women and youth groups	Women and youth generating income
Low milk quality	Training	Milk handling	Clean milk produced	Aware of milk quality standards	Quality milk

4.0 Learnt Lessons

I enjoyed on farm visits. I then made my farm to be a model farm, where farmers come and learn demonstration. As a farmer, the visit to the Netherlands was an eye opener. I participated in the dairy platforms in Bumula constituency. I also sensitize other partners on Carbon offsetting.


Time line



4.0 BHAP- ON NAKURU RC REFRESHER COURSE

After training on Climate smart dairy practices, I have the responsibility of sharing with the stakeholders in the dairy value chain in Bumula Sub County and my farm (see photos Nov 2019).



Objectives	Individual objectives	Activity	Target	Time frame	Output	Outcome
 Promote Climate Smart Dairy practices	Dissemination of Climate Smart Dairy technologies to farmers	Report on CSD training	Farmers	1 month	Increased sensitization on CSD practices	CSD practicing farmers
		Demo farms Conducting Field days.	Reach at least 60 farmers	2019-2020	Farmers adopting CSD practices	Farmers embracing CSD practices
	Increase woodlot area	Plant more trees	Encourage at least 10 farmers plant woodlots	Aug 2019 to Oct 2019	Climate Smart Dairy practices aware farmers	Reduction of greenhouse gasses

Boosts in teaching and writing about dairy value chain and food safety

Benard Oloo – Kenya

Egerton University – Dairy and Food Science and Technology - lecturer

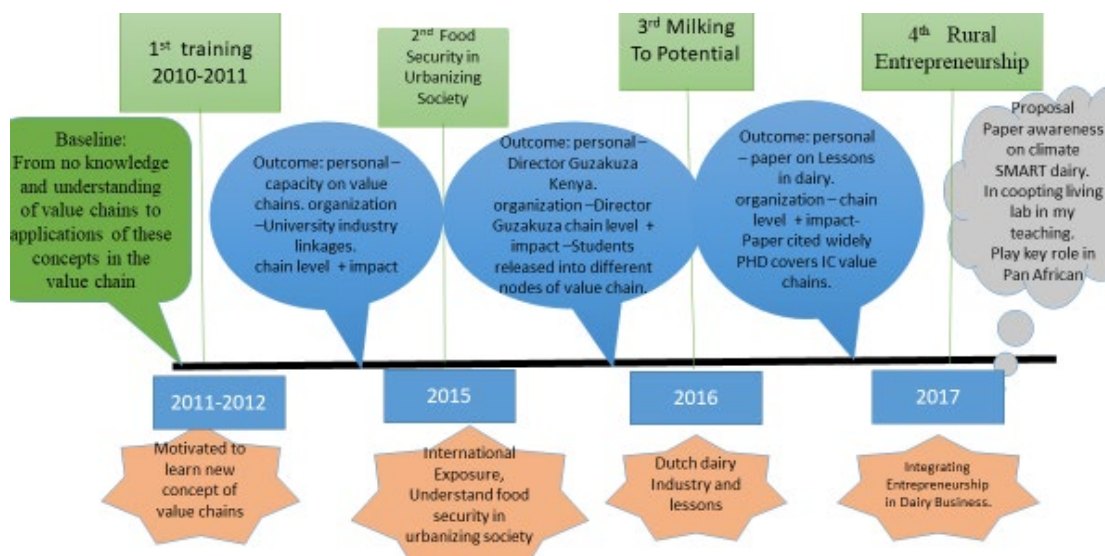
E-mail: olooo.odhiambo@gmail.com; benard.oloo@egerton.ac.ke

WUR/CDI – short courses Food Security in Urbanizing Society, 2015 and Milking to Potential, 2016; RC – Rural Entrepreneurship, Ghana, 2017



Introduction

I attended the Milking to potential course in the Netherlands in 2016. By then I was teaching diploma students of Dairy Technology at Egerton University. I had little exposure to large scale farms to the extent we experienced in the Netherlands. I also had little exposure to the value chain concept and its approach in education.



The action and interventions

The training was thorough combining different models of learning and learning atmospheres.

We explored different dairy value chains from studies across the world. We took case studies from Ethiopia, Vietnam and shared experiences from all the different participants involved.

We explored practically the different nodes of Dutch dairy value chain through practicum and field visits. We visited to the large and small farms. We visited organic farms as well as those that are conventional. We visited farms that were automated from feeding, diseases diagnostics, milking to other management practices. We visited supermarkets and other important players of the Dutch dairy value chain. We got exposure to the Dutch dairy

farmer's cooperative FrieslandCampina from where several highly placed officials visited us and gave talks. An interesting aspect of the Dutch dairy farming is the integration with the research, dairy industry and Dairy Campus of Wageningen University in Leeuwarden at which most of the important research that directly support and solve dairy farmers problems were explored and dealt with.

OUTPUT and CHANGE

There were several important output for my training in the Netherlands. My teaching took a different lift. I was able to infuse practical examples and showed videos of the kind of milking that goes in there. I was specially able to change the way I was evaluating the course with most of the assignment connecting the students directly to the different dairy value chain practitioners.

Dutch Training Impact-Curriculum Development at Egerton University



I published the paper 'Lessons in Sustainable Dairy Farming from the Dutch to Kenya'. This paper has received great international attention. It has been cited widely and will be forming an important component of the background material I will use for this RC.

Outcome and Impact

My University and Department has been in fore front of training farmers and students who eventually become important personnel in dairy production industries in Kenya. These students are employed everywhere across the country where they are helping different companies to create and add values into different products thus generating more income and resulting in better livelihoods and creation of more employment.

Our outreach to the dairy farmer community around Nakuru county has resulted in signing of contracts where the farmers become suppliers at the Guildford Dairy at Egerton University. The citations from my paper among various stakeholders is a clear indication of its impact among the decision makers at the different levels of the society.

Lessons learnt

Feeding of dairy cattle was realized as the biggest hindrance to the advancement and productivity of the dairy industry in Kenya. Improved management

proved to be the missing link in ensuring productivity and yield among dairy animals.

The value chain concept particularly how value chain upgrading can work especially for the poor was also an important lesson.

That the most important concept for farmers is to organize into business groups from where they can begin to command respect and gain bargaining power to help them fetch best input prices that will reduce their costs and results in their commanding better prices in the market.

Challenge and conclusions

The greatest challenge still remain the issue of climate change that results in intermittent rain supply and sporadic droughts. This has to do with gap between different players in the value chain that does not allow quick flow of solutions to be shared among stakeholders of the value chain. There is urgent need for coordinated effort to empower the smallholder farmers find solutions to the climate change that is devastating their productivity.

Back Home Action Plan

Proposed activity	Target Group	Timeline	MoV	Expected Output
Draft concept note together with Maria and Mulubrihan for submission to various funding organizations	Living lab	August, 2019	The concept ready for submission. No. of calls responded to	Attracted funding to impact on the CLIMATE SMART Dairy Value chain.
Write a paper on 'Concepts of Living lab as an entry point to sensitize on climate smart practices in the sweet potato value chain in selected counties	Food science professionals and Students. Food industry in Kenya	October, 2019	Submission of paper to appropriate journal	Awareness of all players in Kenyan Food and Dairy industry of The concepts.
Conduct seminar and present a paper on concepts of living lab and climate smart agriculture on Food safety and Quality.	Food safety professionals	September, 2019	No. of participants and number of seminars attended.	100 students and staff from Egerton University reached
Organized the HUIPD competition among students on climate smart applications!	University staff and Food industry in Kenya	December, 2019	National level competition and the 3 new incubates.	Attract at least 5 universities participating in the HUIPD programmes

Training students in dairy value chain development at Maseno University

Carolyn Wambui – Kenya

Maseno University - lecturer

WUR/CDI – short course milking to potential, 2016; WUR/CDI – Refresher course
Rural Entrepreneurship, Ghana, 2017



1.0 Introduction

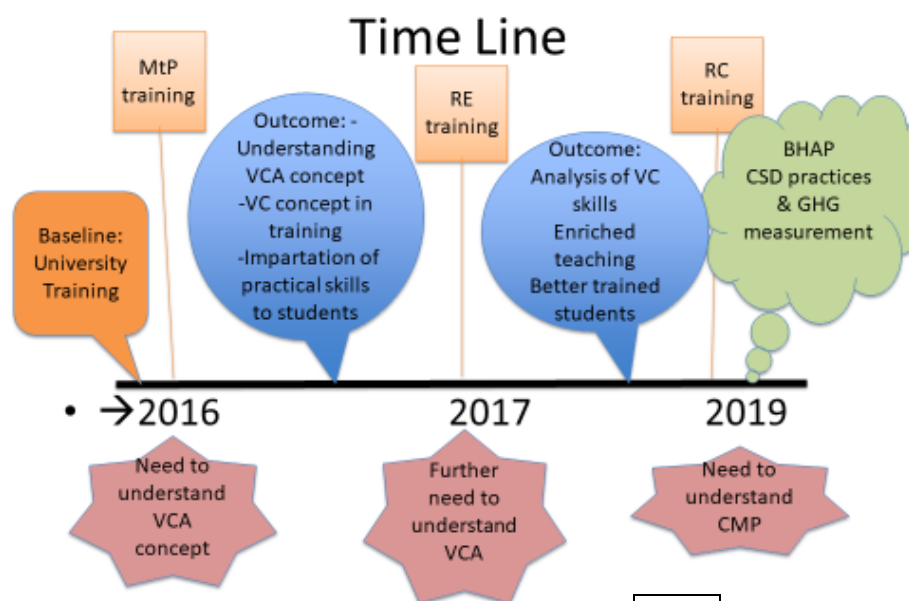
Maseno University is a premier public university institution in the western region of Kenya whose main mandate is training, research and development and community service. The School of Agriculture and Food Security (SAFS) is home to five departments namely Agricultural Economics and Rural Development, Animal Science, Applied Plant Sciences, Fisheries and Natural resources, and Soil Science. Agriculture is the main stay of people around Maseno area and livestock production is an integral part of agricultural production. The Animal Science curriculum is one of the programmes offered in SAFS and the institution is thus poised for producing competent graduates to serve in the region and the country as a whole to boost animal production. I have attended two trainings sponsored by

NUFFIC and organised by Centre for Development Innovation (CDI). The first was Milking to Potential course in Wageningen, The Netherlands was held in May 2016 with the theme of developing a strategic framework for dairy sector development in emerging economies. The second was Rural Entrepreneurship held in Ghana in June 2017 with the theme of driving innovations in agri-food value chains. Dairy sector is a key livestock enterprise in the region and the demand for milk outstrips the supply. The two courses were thus key in understanding the dairy sector and its potential to improve rural livelihoods.

2.0 Impact of Dutch training

2.1 Personal level

Prior to attending the two CDI trainings, I had little appreciation of the value chain approach to livestock enterprises. Focus was mainly on training for optimum production without a broader approach of looking at the various actors involved from farm to table for specific animal products. As an animal production specialist, the training was relevant in upgrading of knowledge and understanding of dairy value chain. It presented us with the opportunity to work on real case problems from member countries and develop mitigation strategies to challenges experienced.



The experience was enlightening and of value in my training of dairy cattle production and other production courses offered in our Animal Science curriculum. The training offered tools for looking at an animal product in the broader picture factoring in all key players involved from production to market. The impact has been manifested majorly in the fourth year student projects where most have opted to work with farmers looking at various animal products from farm to market. Additionally as a professional, it was critical to refresh and upgrade skills and competencies in area of specialization so as to remain relevant in delivery of subject content that is in tandem with prevailing industry scenarios. Continuous personal development is one of the criteria used in evaluation for promotion thus the training courses have enhanced accumulation of professional points for career advancement.

2.2 Organization level

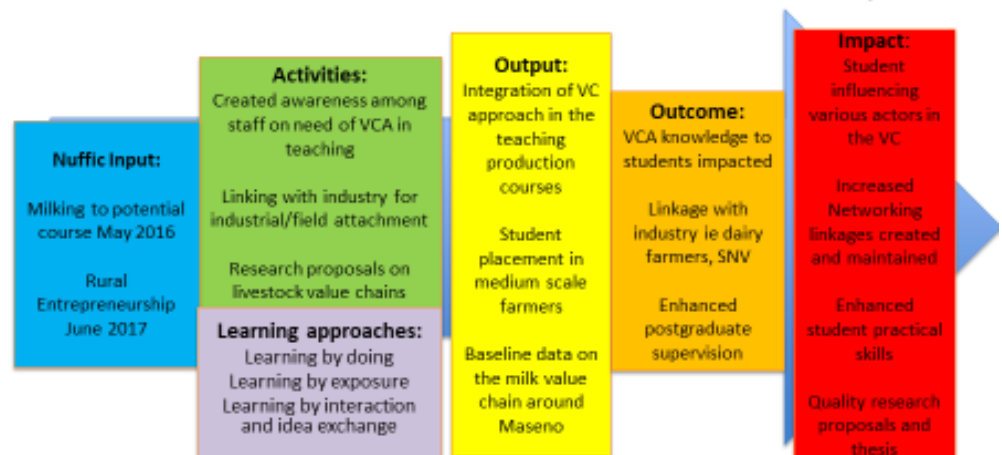
CDI trainings in milking to potential and rural entrepreneurship have been instrumental in training of students both at undergraduate and post graduate levels. This has been through mainstreaming of value chain approach in the teaching of animal production courses at third and fourth year level. Presentations used as training materials during the courses have been beneficial in updating of lecture notes and use of relevant up to date examples of current trends in the dairy sector during lectures. Preliminary data on milk marketing channels, constraints to dairy production, prevalence of tick borne diseases, milking practices and effect on milk quality and evaluation of nutritive value of Bracharia forage are among studies conducted by our undergraduate students around Maseno area and

its environs. At post graduate level, factors influencing market participation around milk cooling plants by farmers has been concluded while a study to look at impact of climate smart practices on greenhouse gas emission in the dairy value chain is in progress. Students from my university were thus able to gain from knowledge and skills gained from the Dutch trainings through enhanced supervision of research projects targeting to understand and map out the dairy value chain around the university environs. This has enhanced the understanding of the dairy value chain both for the students and faculty who help supervise the projects. However, more needs to be done to provide feedback to the farmers through advising and training farmers on how to improve the efficiency of the dairy value chain within the region. To this end this has yet to be fulfilled.

2.3 Dairy chain level

Main mandate of university is training of graduates who act as inputs in the dairy values chain and therefore have potential to impact on the various functions of the chain like production, collection, processing, wholesaling and retail. The trainings have been instrumental in networking and linking with other players in the dairy value chain, e.g. SNV, county

Impact of Dutch training on dairy training curriculum – Maseno University



governments, feed manufacturers, and medium to large scale farmers. Through these linkages, Maseno University students have benefited from placement for industrial and field attachment opportunities where they learn by doing and are exposed to current developments in the sector. After completion of undergraduate course some have had internship and job opportunities.

2.4 Selected impacts

The trainings have been insightful in the supervision of student research projects both at undergraduate and post graduate level. This has been key in shaping of my research theme where more than five research projects have been conducted in the dairy production to collect baseline data in various aspects of dairy value chain. This theme is evolving and expanding to link climate smart dairy management practices with climate change and greenhouse gas emissions. The trainings have been thus very key in achieving this outcome.

3.0 Lessons learnt

The SWOT (Strength, Weakness, Opportunity and Threats) was a vital tool to learn in analysing a given intervention or strategy especially where many stakeholders are involved due to conflicting interests. The “Rich picture” tool was critical in visualizing the context of a problem using pictures. Other approaches that have been impactful are learning by doing, interacting and exchange of ideas.

4.0 Challenges

The teaching component of our job description takes much of our time, leaving very little time for research and community outreach. Constraint of funding also limits the type and depth of research undertaken by our students. Development of Institutional linkages where students and staff can benefit from practical experience is a slow process that needs facilitation. Opportunities and support for students to get attachment, internships and

exposure in the livestock sector are also few thus making engagement with industry slow.

5.0 Conclusion

The training on milking to potential and rural entrepreneurship were mere eye openers of the various dynamics involved in the dairy sector in Kenya. More emphasis needs to be placed on developing and implementing practical oriented curricula to provide hands on skills that are required by the farmers. Universities and training institutions thus have a key role in producing graduates of high calibre and conducting research to inform on policy direction. Support of alumni to impart change has to be promoted and natured to realize meaningful progress in addition to providing partnering opportunities and support for students to get practical skills and exposure in the livestock sector.

6.0 Back Home Action Plan

I will supervise one of my post-graduate student, who is conducting research for the NWO-CCAFS project ‘Climate Smart Dairy Business models in Ethiopia and Kenya’.

My Back Home Action Plan entails:

- Enhance understanding of climate smart practices and link with GHG – smartness category, indicators and the practices & emissions
- Develop research tools with students to capture & quantify
 - a) Climate smart agricultural practices by smallholder dairy farmers
 - b) Greenhouse gases emission by small holder dairy farmers

Improved job opportunities

Victoria WANJERI NYUTU – Kenya

In between jobs and studies

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WUR/CDI – short course milking to potential, 2017



1.0 Introduction

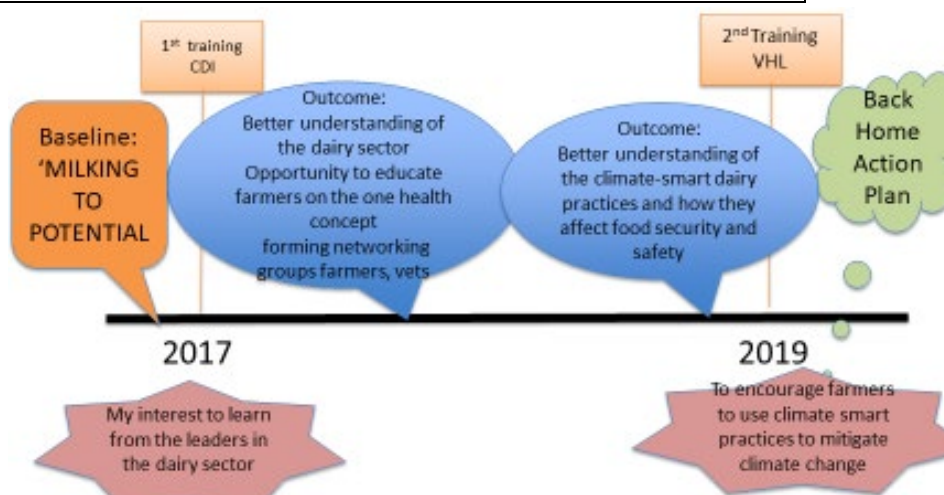
I am a graduate from Kenyatta University having pursued BSc Foods, Nutrition and Dietetics. I am also in the final stages of my Masters' Degree in Food Science & Nutrition at Jomo Kenyatta University of Agriculture and Technology. I am an alumnus of the international Course on 'Milking to potential' 2017 - developing strategic framework for dairy sector development in emerging economies at the Wageningen Centre for Development Innovation, the Netherlands.

At the time I was working for Duke Insights. The organization is in the business of production, collection, processing and retail of milk and milk products. The company does the bulking of milk to improve prices of sale to major processors. This makes a >5 KShs difference than if the milk was sold individually by the farmers to the processor. Hindrances include bad roads, unscrupulous farmers and business men adding chemicals such as hydrogen peroxide to increase shelf life.

2.0 Impact of the Dutch training

2.1 Personal level

Though there were many things to learn from the two weeks course, there are two topics that have stuck with me to date. They are natural dairy farming and dairy farm gas emissions. Kenya is facing so many problems and especially on milk quality, misuse of antibiotics in animals and issues on animal



welfare. The cost of living is high and many farmers are unable to keep up with these changes. The two presentations on natural dairy farming, and greenhouse gas emissions and manure handling forever changed my views on dairy farming. I realised that the issues on milk quality can be addressed if the farmers are aware on the dangers of misusing antibiotics to the people and environment. The training struck me to start searching for indigenous knowledge on use of locally available herbs for treatment of common diseases. The importance of proper milk handling was also impacted on me as I was able to see the difference milking directly to a chilling facility makes. As such I encouraged farmers in my region of work to use the locally available chilling facilities provided free of charge by the county government of Nyandarua. The same course challenged me to change careers and consequently prompted me to apply for a job at Kenya Bureau of Standards and was earlier this month (June) absorbed. Other than my Masters in Food Science, I feel the course also helped increase my chances.

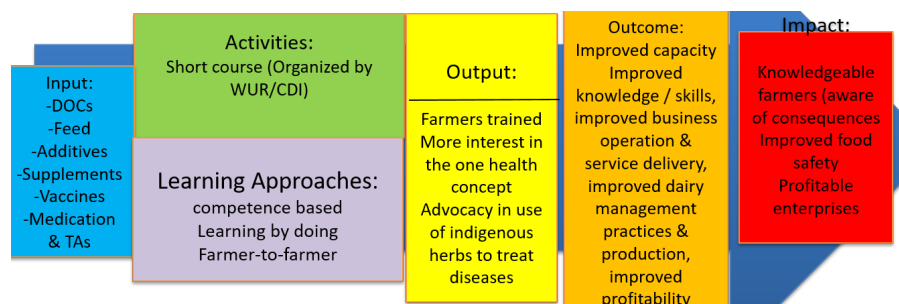
2.2. Organizational level

Though the organization still focuses on intensification and maximum yields there are bits on the topic of gas emissions, animal welfare and environmental effects. The farmers are not as pressured to produce more as was in the past. Another bit that was introduced was on the cost calculation when training farmers. In the past, the occasional trainings would be on how to produce most from the cow, feed formulation and disease control. The other bit was on checking the milk for impurities. Before the training, we did not test the raw milk to be used for sale at milk ATMs other than the organoleptic test. The milk used to make yoghurt would be tested for antibiotics but since coming back, occasionally we would do other tests in the interest of human health.

2.3 Dairy value chain

The farm cost of inputs and medicine may have gone down as knowledgeable farmers know they don't need a lot of the antibiotics, supplements and shed structures. The customers are also able to get quality products, because now occasionally we test for antibiotics and other impurities. Occasions of milk rejection due to organoleptic failures have reduced marginally due to farmers taking their evening milk to locally available coolers. The slight change in behaviour of unscrupulous farmers putting impurities to milk can be credited to knowledge passed to them on effect on health. Supporting factors include many different processors hence we are able to competitively negotiate for better prices. Hindering factors include greed especially by farmers still selling milk that has antibiotic residues knowingly and water added to it. There are very few dairy innovations support opportunities, but the adoption of natural dairy farming seems to pay off as milk adulteration has slightly reduced and has alleviated the stress and excess workload that comes with modern styles of farming.

2.4 Selected impact I personally see a positive outcome on the quality improvement



on the use of aluminium cans as opposed to using plastic cans to transport milk to the collection point. Another benefit is on the increased income to the farmer, because milk rejection is not as common. The increased information on cow welfare for example grazing outside is beneficial the cow and thus its life span is increased.

3. Lessons learnt

The most striking topics were natural dairy farming and cost calculation in a dairy farm, because several studies on the Kenyan system of zero grazing seems to be unsustainable and low in profits. A combination of both would be best for our food security, sustainability and proper use of available resources. This would support the dairy value chain in that the farmers do not feel so pressured to adulterate milk to get more profits and value for money. Our indigenous knowledge on use of herbs for animal medicine needs to be made available so that there are options.

The most striking learning approach was competence based approach because after being exposed to a scenario or case, I was able to gauge and ask questions or see another way of doing things other than what is the norm.

The challenge I have found is implementing what I learnt to my work place, because I worked for a private company where profits come first and any new procedures to be introduced is a cost which the company is not willing to bear since enforcement of standards has no consequences.

4.0. Conclusion

This was an eye opening experience that challenged me to think outside the box and what can work well for us. It helped me have a greater understanding of the dairy sector and made little changes at my place of work. I am forever grateful for the opportunity.


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