



Visions on dairy capacity building for East Africa

Adriaan Vernooij, Arjen Wals, Jan van der Lee

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Wageningen UR Livestock Research

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Foreword

The demand for animal protein is growing. A large part of the growing demand can be met by dairy products. As a result, also production systems are changing: farms are becoming larger or intensify their production is land is scarce. The growing demand will have to be met from ever diminishing resources. Production will intensify; the world will produce more from less.

This was also recognised by the East Africa Dairy Expert Consultation (EADEC) which was held in April 2014 in Uganda. During this meeting, the donors involved agreed that better coordination is needed and decided to create thematic lead agencies which would coordinate additional investments and actions in areas of dairy development where they are most needed. The Netherlands took on the task of leading the discussion on improving "*competency of dairy farmers, staff and entrepreneurs along the value chain*".

As part of the implementation hereof, workshops were held in Rwanda, Tanzania and Kenya in the second half of 2014. Existing information on dairy training and education from Ethiopia was added and a follow up analysis in Uganda will still be made in due course. During the workshops it was realised that dairy training and education face the challenge of keeping up with and anticipating the changes in dairy production, as knowledge and skills are important for quick adoption of appropriate technology.

This report is a first steps towards an appropriate country-based approach to improve dairy training and education. No blueprint exists, as the situation differs very much from country to country. The report however provides an outline for assessing and improving dairy training and education and provides advices that can serve as a handle to improve the approaches towards a more labour market oriented training and education.

The Netherlands Government has taken a first step as follow up to the EADEC conference. The results will be fed back into the donor discussion and will play an important role in bridging the gap between dairy value chain development and dairy training and education.

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The survey and report could be implemented thanks to the financial support received from the Ministry of Economic Affairs in the Netherlands.

List of abbreviations and acronyms

ATVET	Agricultural Technical and Vocational Training
BOP	Bottom of the Pyramid
CBAHW	Community Based Animal Health Workers
DRTE	Directorate of Research, Training and Extension
DTC	Dairy Training Centre
DTI	Dairy Training Institute
EADEC	East Africa Dairy Expert Consultations
Eiar	Ethiopian Institute for Agricultural Research
EMDIDI	Ethiopia Meat and Dairy Development Institute
FFS	Farmer Field School
HAE	Higher Agricultural Education
IADG	Inter Agency Donor Group
ICT	Information and Communication Technology
IPRC	Integrated Polytechnic Regional Centre
KMDP	Kenya Market-led Dairy Development Programme
LITA	Livestock Training Agency
MOOC	Massive Online Open Courses
NABC	Netherlands Africa Business Council
NGO	Non-Governmental Organisation
NICHE	Netherlands Initiative for Capacity development in Higher Education
PCTC	Practical Dairy Training Centre
RAB	Rwanda Agricultural Board
RADD	Rwanda Agro Dealers Development
RALIS	Rwanda Agriculture and Livestock Inspection Agency
RDCP	Rwanda Dairy Competitiveness Programme
SNV	Netherlands Development Organisation

SUA	Sokoine University of Agriculture
TDB	Tanzania Dairy Board
TVET	Technical and Vocational Training
USAID	United States Agency for International Development
VETA	Vocational Education Training Authority
WDA	Workforce Development Authority

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Summary

For a long time the Netherlands has provided support to dairy development in the East African countries Kenya, Tanzania, Uganda, Rwanda and Ethiopia. Most of this support has been provided through non-governmental organizations (NGOs) and the successive development departments of the Ministry of Foreign Affairs. The support in most cases was aiming at a pro-poor approach, with a focus on supporting smallholder farmers.

Over the past decade the demand for dairy products has increased. Growing urbanisation rates and rising incomes lead to a higher demand in terms of volume, rising income levels also increase the demand for quality products and more diversified dairy products.

This demand growth offers opportunities for increasing commercial investments in the dairy sector. In potentially good dairy production areas, farmers are changing from risk adverse mixed farming systems to more specialised commercial systems. Smallholders too are in a position to make more income from their milk sales due to this rising demand. In many parts of East Africa, investments in large scale dairy farms have taken off as well.

The changes in production systems require other knowledge and skills to manage individual animals more intensively and to manage the more specialised dairy farms and farmer organizations as commercial units. More intensive production needs better balanced feeding and can potentially lead to new diseases if the animals are not managed to their requirements.

Larger farms need other types of housing and usually apply more mechanisation. Cooperatives need to be run as a business to remain players in a competitive market.

The knowledge base for these changes in most countries needs attention. Specialisation on dairy is limited in livestock production curricula at all levels anyhow. Moreover, current curricula do not yet take the recent changes in production systems and value chains into consideration. This calls for improvements in training and education to prepare farmers, their staff, advisors and suppliers for the new knowledge and skills that are necessary to get successfully involved in market-oriented dairy farming.

This was also realised during the workshop of the Inter Agency Donor Group (IADG) on dairy development in East Africa, in April 2014 (Makoni et al. 2014), also known as the "White Gold process". This workshop concluded that better coordination for dairy development is necessary, especially in the field of "joint learning". Donors want to move towards being enablers and co-investors. They find it particularly important to agree on and advocate best practices and approaches. The workshop further decided to create thematic lead agencies for eight key themes. The thematic lead agencies will take the lead in exploring approaches and best practices for each theme. The Netherlands took on the role of lead agency on five key themes, including the one on capacity building (formulated as "*competency of dairy farmers, staff and entrepreneurs along the value chain*"); other themes with Dutch lead include "more milk from roughage", "safeguarding and rewarding good milk quality, strengthening farmer organizations and access to finance", and "sustainable intensification related issues – biogas and closing the nutrient cycle" (Makoni et al., 2014).

The White Gold process (Makoni et al. 2014) led to a follow up assignment with the aim of *developing a new vision on use of innovative approaches towards capacity building at farm level as part of the follow up activities under Dutch responsibility of the IADG East Africa Dairy Expert Consultation.*

In all East African countries, the growing specialisation and market orientation of milk production requires new knowledge in training and education programmes. New approaches are needed to prepare future farmers, farm managers, farm workers and workers and staff of input suppliers, service providers, processors etc. for the changes taking place in the production systems. Apart from adaptation of the contents of the training and education programmes, education needs to get a more flexible approach, be more labour market oriented, and incorporate problem solving

competences through which professionals in the dairy sector can successfully perform their duties within and increasingly changing world.

The main challenge (and probably paradox) of an innovative approach towards capacity building is not the content of the curriculum, but rather the structure - it inevitably will have to fit in the existing agricultural education system. For that matter, it is necessary to evaluate the current dairy knowledge system, analyse bottlenecks (e.g. poor attention for vocational training in many countries), and describe possible options for innovations and new approaches in the education system that are needed for a more future oriented and market-oriented dairy education.

Main emphasis for future development should be on bringing up to date the content of curricula with differentiation between subsistence and market oriented production systems and to improve didactic methods such as more competence based learning, peer to peer learning, increased use of ICT based education and learning. Collaboration between educational institutes should be encouraged and on-farm private practical training initiatives need to be better integrated in the formal education system of the county.

Focus should be more on sector development rather than on individual institute improvement and with more attention for long term perspectives rather than short term projects. Inclusion of the private sector, both from Eastern Africa as well as from the Netherlands should be encouraged to use their specialised knowledge and to create practical learning situations.

1 Analysis of current dairy training and education in East Africa

1.1 Introduction

Netherlands support is provided to the dairy sector in all East African countries, be it in different types of projects in each country. Because production systems differ from country to country, so do training and education support projects in dairying. Main aim of this analysis is to strengthen the capacity building aspects of the Dutch funded dairy programmes in the East African countries within the boundaries of the existing (Dutch funded) country programmes. Through better tuning of activities and innovations in the training programmes, the individual country programmes can be strengthened in their implementation of capacity building programmes, without compromising the project implementation at country level.

The objective of this study is to *formulate advice on elements and approaches to be incorporated in a regional East African dairy capacity building programme to be implemented by the Netherlands in the five East African countries.*

Approach

During various visits to the region in 2014, discussions and workshops were held with the aim to analyse the current state of affairs of dairy training and education in the five East African countries. Missions or workshops were held in all countries, apart from Uganda; due to a lack of time, it was not possible to include Uganda in the activities of 2014. See annex 7 for Terms of Reference.

The analysis was made from a sector development perspective: In order to establish a thriving dairy sector (or any other sector), a sound knowledge base of education and training is necessary at four different levels:

- (1) Practical, hands on training, also called informal training.
- (2) Vocational training (Certificate / Diploma level)
- (3) Higher Agricultural Education (BSc)
- (4) University Education (MSc, PhD).

The **practical hands-on training** can be carried out in different ways: in courses of different course lengths; on-farm or on a training station; by separate institutions or as part of the work of vocational training institutes or colleges; and for different target groups: farmers, farm workers, extension officers, students, teachers.

Duration of courses can be anything from one day up to several weeks, usually depending on the level of previous education of the trainees, the type of technology introduced, and the possibilities of farmers or advisors to be involved in longer term training courses.

Vocational training leads to certificate or diploma levels, usually in training programmes of 2 or 3 years. It provides students with a broad base for a mid-level career in the dairy industry.

College level training usually prepares students for a future life in advisory or extension services, either with government, in the private sector or with NGOs.

Graduate education at the university (2nd degree, PhD) leads to specialist functions at research organisations, government services, private sector, or NGOs.

In order to implement this assignment, the following activities have been carried out:

- map current formal and informal education/training activities and institutes in the agricultural knowledge system, with special focus on the dairy sector
- identify gaps in the agricultural knowledge system
- briefly describe current dairy production systems and expected changes in the future

-
- list all relevant stakeholders in the dairy sector and their contribution towards dairy development
 - study and analyse approaches to training in other sectors (arable farming, horticulture, but also e.g. technical training) to stimulate out of the box thinking; special attention was given to the use of massive on-line education tools (MOOCs)
 - describe possible options for innovations and new approaches in the dairy knowledge system
 - work out job profiles and competences of trainers and extension staff and define implications for their initial and continuing training and education.

These activities were implemented during various visits to the region in 2014.

- In February 2014, all aspects of dairy training and education were included as part of the dairy trade mission to Ethiopia organised by NABC (NABC, 2014). Quite uniquely, seven out of the sixteen participants were from Dutch knowledge institutes, covering all levels of education¹, reflecting the growing interest of knowledge institutes and private sector to collaborate internationally.
- Further discussions were held during a visit to Kenya in July and especially during a series of three workshops held in November in Kigali, Dar es Salaam and Nairobi. The reports of these workshops have been included in annexes 1-4 of this report.

This report describes the present situation with regard to dairy training and extension in four East African countries, advices on possible improvements of capacity building in the dairy sector and describes some training and education practices from other sectors. The first part summarizes and synthesizes the discussions of the workshops in the region. These are described more in detail in the annexes. Furthermore, AgriProFocus conducted an inventory into comparable examples from other sectors. An overview thereof is given in appendix 6.



Figure 2 Practical dairy training activities in Tanzania

¹ Participants included DTC, Dairy Training Centre; AOC Groenhorstcollege; AOC Wellantcollege; Van Hall Larenstein and Wageningen UR.

1.2 Brief summary per country

In all four countries, an overview was made of the present education and training practices at all four levels. These overviews are included below. A more detailed description of the situation in each country is given in annexes 1-4.

1.2.1 Rwanda

For more details see annex 1.

Informal Training

The Government of Rwanda, through the Rwanda Agriculture Board (RAB) and NGOs, trains community based animal health workers (CBAHW). These are selected from farmers to assist in addressing animal health issues. Insufficient trainers are available for CBAHW training.

Both government and NGOs employ extension workers who provide informal training to farmers at production level. The Girinka Program (one cow per household) organizes Farmer Field Schools through which 'training of trainers' courses are given to participants selected by committees at the district level. The scope of this training is limited to the basics in animal husbandry, the coverage is limited in number of farmers reached. In many cases qualifications of the staff used are not very high – lack of skills.

Apart from these categories of dairy value chain stakeholders (CBAHWs, dairy extension workers, and dairy farmers), others hardly receives any informal training.

The major players in informal dairy training include:

- *Ministry of Agriculture (MINAGRI)* – through the Girinka Program and the district based extension workers that provide training to dairy farmers.
- *Rwanda Agriculture Board (RAB)* - implements the National Policy of Agriculture and Animal Industry; is responsible for research and extension services in the country and trains farmers in animal husbandry practices; it runs a training center at Masaka, near Kigali. In conjunction with the Rwanda Agriculture and Livestock Inspection Service (RALIS), RAB implements the training, inspection, auditing, and certification of dairy value chain actors including farmers, transporters and milk selling outlets in urban centres.
- *Rwanda Cooperative Agency* - capacity building for producer cooperatives.
- *Heifer Project International* – Provides training in basic animal husbandry for farmers. In addition Heifer trains Artificial Insemination Technicians who work in their areas of operation.
- *Send a Cow Rwanda* – Provides training in basic animal husbandry practices to farmers.
- *Land O' Lakes International* - Implements the Rwanda Dairy Competitiveness Program II (RDCP II).
- *Davis Global HealthShare Initiative* as part of the Rwandan Dairy Competitiveness Program, funded by USAID, provided short-term training to veterinarians, veterinary students, university staff, and government officers in improved animal health management, productivity, milk safety, and dairy management techniques.
- *GAHINI Diocese, the Lutheran World Federation* and other faith based organizations that have livestock projects train farmers in basic animal husbandry practices.
- *INGABO* - Training of artificial insemination technicians
- *Rwanda Agro-Dealers Development (RADD)* engages in building capacity of agro-vet dealers.

Overall the informal training provided is just basic animal husbandry practice and has no laid down curriculum to follow. The kind of training provided therefore cannot prepare the stakeholders in the dairy value chain for the upcoming changes in the dairy sector.

Formal Training

The Workforce Development Authority (WDA) is mandated to provide strategic response to the skills development challenge facing Rwanda across all sectors of the economy, including agriculture. The WDA is responsible for Vocational Education and Training (TVET) and development of the various curricula for the vocational schools.

Technical and Vocational Education and Training Programme (TVET)

This is a national vocational training programme. The Workforce Development Authority (WDA) organises the TVET strategy at national level and has embarked on a process of establishing Integrated Polytechnic Regional Centres (IPRCs) in the main regions of the country. Several public, public aided and private IPCRs have been established in Eastern, Kigali, Northern, Southern and Western Provinces. Whereas curricula have been developed for several areas, the curricula for dairy related areas has not yet been developed, except for general food processing and milk reception. The WDA Curriculum Development Unit developed three programs for the food processing trade, using the competency-based approach concept. These programs are:

- *Food processing Qualified Worker (TVET Certificate I)*
- *Food processing Assistant Technician (TVET Certificate II)*
- *Food processing Technician (TVET Certificate III)*

University level training

Rwanda currently has one university. The University of Rwanda trains animal production specialists and veterinarians at degree level. The Umutara Polytechnic and Nyagatare Campus of the University of Rwanda have recently been merged to form the College of Agriculture, Animal Science and Veterinary Medicine.

The College currently runs the traditional curriculum, similar to that of other East African region universities, that trains veterinarians and animal production scientists. This traditional curriculum will not necessarily address the changes envisaged in the future dairy subsector. The university produces general practitioners responsible for animal health and production who do not have dairy specialist training. The Faculty of Veterinary Medicine has embarked on the process of reviewing its curriculum in order to address the current and future workforce requirements in the country. This is preceded by a preliminary labour force skills survey that currently is implemented in the various subsectors to inform the required change in the curriculum. The review process is expected to start in 2015 and to be finalized in 2017 or 2018.

Summary:

In Rwanda, various organizations are active in practical training of dairy farmers, both government departments and NGOs.

Due to a recent overhaul in the educational system, there is no formal dairy training at vocational level until 2017 or 2018, when the revision has been completed. At university level, curricula from other East African Universities are being used, until new curricula have been developed.

1.2.2 Tanzania

For more details see annex 2.

The most important actors in dairy training and education in Tanzania are:

- *Sokoine University of Agriculture, SUA*
- *Livestock Training Agency, LITA*
- *Vocational Education Training Authority, VETA*
- *Directorate of Research, Training and Extension under the Ministry of Livestock and Fisheries Development, DRTE*
- *Tanzania Dairy Board*
- *Folks/Community Development Centres, e.g. Sengerema,*
- *Farm Schools*
- *Dairy Development programme/ NGOs.*
- *Private training institutes, e.g. Kaole Institute in Bagamoyo that are approved by the NECTA (National Examination Council of Tanzania).*

The Livestock Training Agency (LITA) runs six Livestock Training Institutes with a total capacity of 970 students.

- *These are LITA -Tengeru, Mpwapwa, Morogoro, Madaba, Buhuri and Temeke.*
- *Five of the LITAs offer long courses at certificate and diploma levels in addition to farmers training, while LITA Buhuri is specifically for short courses on dairy cattle husbandry.*

The Vocational Training Authority (VETA) is set up for the provision of quality vocational training that meets labour market needs. VETA has Dairy Modules based on work place competence.

The Directorate of Research, Training and Extension of the Ministry of Livestock and Fisheries Development performs amongst others the following activities:-

- Develop extension packages and methodologies;
- Establish demonstration farms and pilot initiatives;
- Provide farmer's education and publicity;
- Provide technical information on livestock development to general public;
- Facilitate formation of livestock farmers groups.

The Tanzania Dairy Board has developed six training guides/manuals and has started the setting up of a training and certification scheme called the Business Development Support. The role of training is to develop, implement, coordinate, monitor and review training programmes in order to produce well trained livestock personnel and other stakeholders for development of the livestock industry, as formulated by the National Livestock Policy. However, the livestock extension service is constrained by weak collaboration amongst stakeholders, insufficient expertise, weak research-training-extension-farmer linkages, and inadequate infrastructure and facilities.

Summary.

A large number of training and education activities take place in the dairy sector of Tanzania, at all levels. There is however a lack of coordination - dairy training is fragmented. Dairy production is offered as part of animal production courses at certificate, diploma and degree level. There is no dedicated dairy specialisation level. The level of coverage of dairy in the livestock curricula is insufficient. E.g. there are only 80 hrs of dairy production and 80 hrs of dairy science and technology at degree level. This is considered to be inadequate to produce skilled and competent dairy graduates.

1.2.3 Kenya

For more details see annex 3

In Kenya, the agricultural education and training systems is in a process of changing from a national government based system to a more decentralised training and extension system.

A large number of NGOs, and to a diminishing extent government departments, are involved in various kinds of short term practical training and extension activities.

Through its Kenya Market-led Dairy Development Programme, SNV Kenya supports the establishment of Practical Dairy Training Centres (PDTC). Two PDTCs are operational at the moment. Baraka Farms near Eldoret has established a special small unit on its farm, solely for training purposes. Mawingu dairy near Nyeri uses its existing dairy herd (approx. 30 dairy cows) for the training purposes. It can be observed that in both cases the practical training facilities clearly meet a demand, but need to be more imbedded in the normal livestock/dairy training and education. This applies both for functional linkages (how to establish contacts with whom) as well as for improvement on didactical approaches: not every practitioner is a good trainer. Trainers/instructors tend to stick to their own experiences, which do not broaden the views of the participants².

Specialised dairy training has been organised at the Dairy Training Institute (DTI) in Naivasha for several decades. The Dairy Training Institute in Naivasha (DTI) is mandated to carry out technical dairy training and has been providing this training since the 1960s. DTI currently falls under the Department of Livestock Production of the Ministry of Agriculture, Livestock and Fisheries. As such it is constrained by not being able to receive direct external funding or to invest revenues back into

the institute, to manage the institute in commercial manner, to employ its own staff and to develop a training portfolio based on market needs. For this reason, the parent ministry and the DTI steering committee have embarked on establishing a more commercially oriented and (semi-) autonomous DTI. A business plan has been worked for the new set-up of the DTI (Draaijer et al, 2013). Good thing is that the organisational set up is now arranged and the position of DTI clearer in the educational system. New modules such as on fodder production will be worked out.

Various agricultural colleges are involved in vocational training, usually with a broad livestock orientation, and relatively little focus on dairy specialisation. Bukura carried out a survey amongst their (former) students, in which they specifically raised the point that they lacked practical skills. This will be addressed; the programme will become more skills based.

In 2012 SNV Kenya conducted a labour needs assessment study for the dairy sector, which' objective was to assess the demand and supply of skills and competences in the dairy sector and to give recommendations to the institutions to bridge the gaps identified. The findings show that the fundamental need across the sector is the employability skills of the graduates. The soft skills required play a major role as the industry diversifies. In terms of technical needs, the study found that the curricula for Kenyan institutions are very heavy on the theoretical aspects and tend to cover a lot of ground; what lacks is the practical training to complement the theoretical training (PKF Consulting, 2014).

Summary:

The Kenyan agricultural education system is in a process of transition. Devolution of implementation of e.g. extension activities by regional authorities (County Councils) and growing involvement of the private sector (e.g. DTI and the emerging PDTCs).

This offers good opportunities for a more demand driven dairy training and education system, though low resilience of government systems will still be hampering the progress.

² On one of the PDTCs trainings are given on silage making from maize. During follow up visits, the instructors found that none of the trainees had started silage making on their own farm. "We don't have maize on our farm" was the explanation. The training received was highly specific on how to ensile maize, not explaining the general principles of silage making and enabling and stimulating the participants to practice silage making also with other crops, such as Napier grass which they abundantly grow on their farms.

1.2.4 Ethiopia

For more details see annex 4.

As a result of the discussions in the Netherlands on stronger collaboration between the private sector and knowledge on international activities, it was decided to actively invite knowledge institutes to also participate in the dairy trade mission to Ethiopia in February 2014. Eventually 7 out of the 16 participants came from knowledge institutes (1x practical training, 4x vocational, 1 x college level, 1x university). During this week various visits were made to agricultural education institutes such as Holeta TVET and Ambo University.

The present education system was matched with the different existing and emerging production systems, which led to the following picture:

Capacity building/training/education Dairy production/processing systems

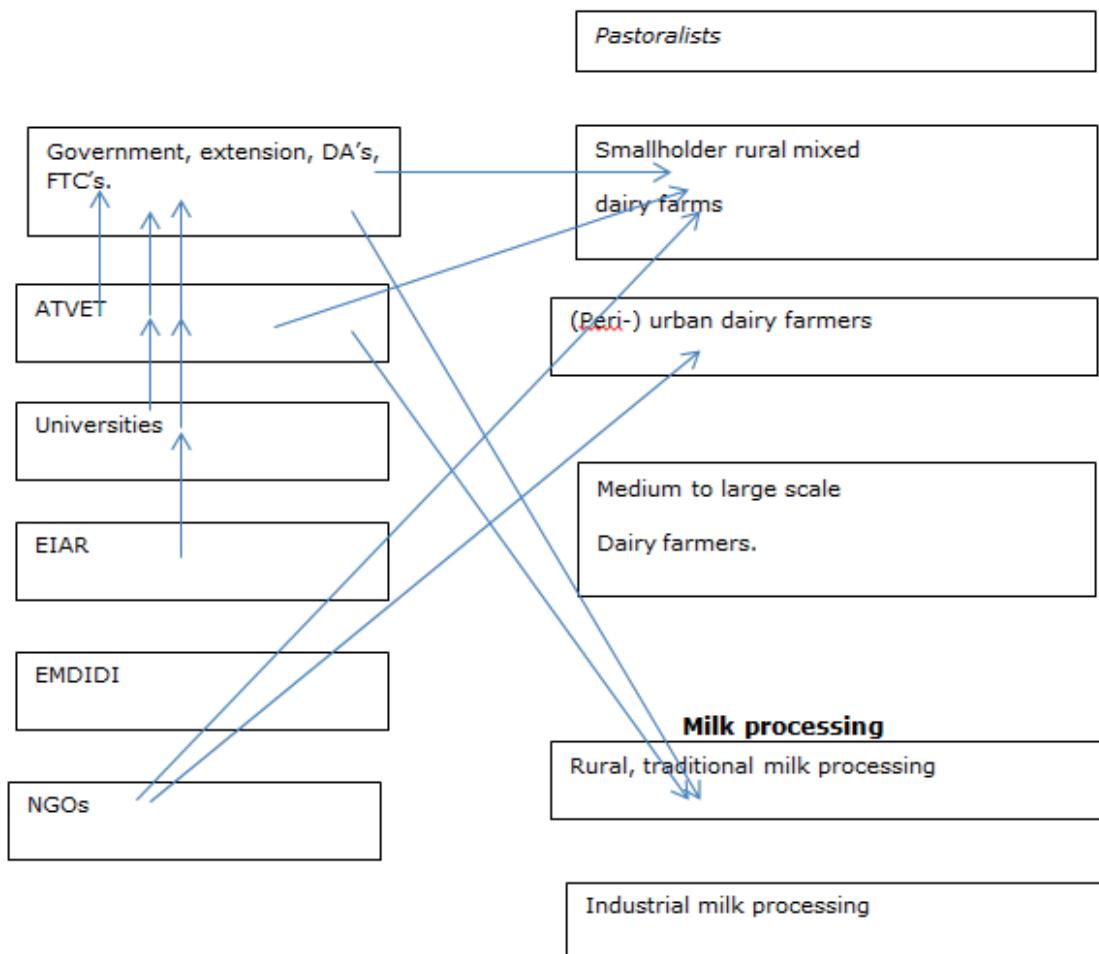


Figure 3 Capacity building in Ethiopia and their relation to production systems.

General conclusion: knowledge flow is from research to universities. University graduates are the teachers at the ATVET colleges and find employment in government service. So do most of the ATVET graduates: most of them are still employed by the government extension service. Extension service only focusses on the existing majority of smallholder rural mixed farmers. The (peri)urban small but more specialised dairy producers receive some support in terms of training, advice, finances from development NGOs, which furthermore also focus on the smallholder farmer.

The current agriculture education system does not cater for the newly emerging specialized dairy farms and dairy plants.

Summary:

Ethiopians enrol in either the (A)TVET system or enter university depending on their secondary school result exams. Virtually all graduates from both the (A)TVETs and the Universities find employment in government where they focus entirely on existing smallholder mixed farming systems. There is hardly any knowledge and experience available in the country that can facilitate the further growth and market orientation of the dairy industry.

2 Redesigning capacity building in the East African dairy sector: linking education and practice

Capacity building in the East African dairy Sector takes place in different ways within different agronomic and agro-logistic contexts. Based on a quick scan of a number of key documents³ and field consultations in Uganda, Kenya, Rwanda and Ethiopia over the course of 2014 with stakeholders from across the dairy value chain, we distinguish different capacity trajectories that all have potential for further improvement and development.

Roughly speaking these trajectories vary from more formalized education and training contexts to more informal peer-to-peer, intergenerational, and master-apprenticeship contexts. These trajectories tend to correspond with the different agronomic and agro-logistic contexts that can be found in East Africa, varying from smallholder, local market and/or subsistence-oriented strands of dairy production to commercial, large scale and export-oriented ones. In principle all these forms and strands are legitimate and all can be improved in terms of their efficiency and reach. It can also be concluded that the private sector's involvement in capacity building is stronger in the more commercial and export-oriented strand, while the world of NGOs is more connected to the smallholder 'pro-poor' strand. Finally, the role of the government in capacity building varies from country to country - from rather strong authoritative and centralized involvement (prescriptive) to more laissez-faire modes of governance that leave more space for multi-stakeholder involvement. Figure 1 shows the relative position of four countries (Ethiopia, Rwanda, Kenya and The Netherlands) on two axis of involvement (government involvement and private sector involvement). The figure is not meant to be accurate and a scientific finding, but is meant as a conversation starter for discussing the different capacity trajectories and their appropriateness, given a country's innovation climate. The figure shows three of such trajectories where trajectory 'a' follows the private sector initiated route (Rwanda), trajectory 'b' the government initiated route (Ethiopia) and trajectory 'c' a blended route where it is left open whether in future arrangements the government or the private sector will take on a stronger role (Kenya, The Netherlands).

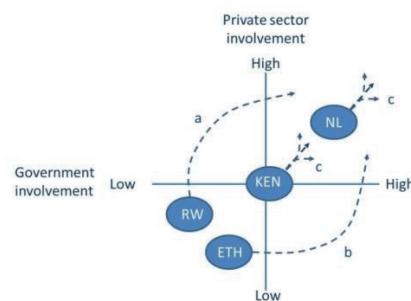


Figure 4 Positions and trajectories for strengthening capacity building in relation to level of government and private sector involvement for four countries

³ Including: White gold: Opportunities for dairy sector development collaboration in East Africa (Makoni et al., 2014); Promoting critical knowledge, skills and qualifications for sustainable development in Africa: How to design and implement an effective response by education and training systems (Afetu and Adubra, 2012); Learn4Work: Opportunities in the Netherlands for Dutch-African public private partnerships in skills development and vocational education and training (Vogel, 2013); Dairy Sector Policy Study and Capacity Needs Assessment of Stakeholder Associations (PPD Consultants, 2013)

Let us reaffirm that in the East African context, there are at least two viable responses to the challenge of making the dairy sector more sustainable. Alongside making current pro-poor small scale farm systems sustainable by making them more responsive and resilient, taking advantage of new knowledge, improved access to local markets and easily accessible technologies, etc., there is also the possibility of a transition to more commercial enterprises that use sustainable intensification in order to serve regional and even global markets.

Based on our quick scan we distinguish three options for strengthening Dairy Capacity Building in East Africa:

1. Developing TVET and Competence Based Education & Training at the crossroads between formal education and workplace learning
2. Strengthening peer-to-peer learning in (experimental) workplaces and exemplary practices
3. Utilizing emerging ICT-based education & learning that bypasses the creation of formal education and training facilities and structures, but takes advantage of farmers' increased access to cell phones and other ICT.

It should be noted that some of these approaches are more appropriate for the large scale farming systems, while others are more appropriate for keeping smallholder farming systems viable. It should also be noted that some approaches require more involvement of the government, while others require more involvement of the private sector and, indeed, other stakeholders. Just as a differentiated approach will be needed to accommodate the diversity of the East African dairy sector, the capacity building system will need to reflect this diversity as well.

Option 1. Developing TVET and Competence Based Education and Training at the crossroads between formal education and workplace learning

A general complaint about education, even vocational education, is that there is a gap between theory and practice. Students are not being prepared for the kind of jobs they expect to do after graduation. This complaint is not new and not limited to education systems in the North or South, East or West but rather universal and pertains to all sectors. What is new is that the changes taking place in science, society and the world of work, are taking place at a higher speed as a result of digitalization, globalization and related innovations. This is certainly also the case in the agriculture sector - the East African dairy sector is no exception.

One way to bridge the gap between the rather traditional, disciplinary-oriented, slow changing and more theoretical education systems and the world of work is to make the curriculum more competence-based. Rather than letting disciplinary knowledge questions and challenges drive the curriculum, the competences as deemed valuable by the world of work become leading in determining what takes place in vocational education and training and agricultural universities. Students who enter the professional sector after graduation are quite good at articulating what they did not learn in school but would have liked to, in order to be more effective in their work. So are employers when asked for the key capabilities they are looking for in their employees.

It is not surprising that the current content of the curriculum becomes obsolete even quicker than before. In the dairy sector the knowledge that is literally 'taught' usually is based on traditional mixed, subsistence-oriented, small-scale farming systems. Students are prepared to help sustain such systems, even though the environment in which these systems are to function have completely changed (economic, environmentally, socio-culturally). Students are usually not prepared to anticipate change , to become proactive and entrepreneurial in responding to opportunities, set-backs, and unexpected turns of events. For instance, the sustainable intensification perspective will need to be developed in the education & training of students in

both TVET and Higher Agricultural Education (HAE), if only to provide dairy products to the rising middle class in rapidly growing urban and peri-urban areas in the region.

Several knowledge institutions in the Netherlands over the years have contributed to the development of competence-based education and training in African countries in the agriculture sector. The development of a competence-based curriculum, grounded in the needs of society, involves many stakeholders, such as the students and staff of the educational institution, the (many) schools in the region, the employers' associations, professional associations, government bodies, research organizations and public institutions, etc.. These stakeholders often having different views and interests. A key assumption is that the various voices of the stakeholders need to be heard in education review, design and development processes, in order to assure that the curriculum is relevant. Therefore an interactive and participative multiple-perspective and multi-stakeholder curriculum development process is used to co-design a competence-based curriculum. 'Competence' here tends to refer to the integrated use of head (knowledge), heart (attitudes, motivation, meaning), and hands (psycho-motoric skills, trying-out) in professional settings (both in routine and in critical job situations). Figure 2 shows the various phases that can be distinguished in this curriculum design process.

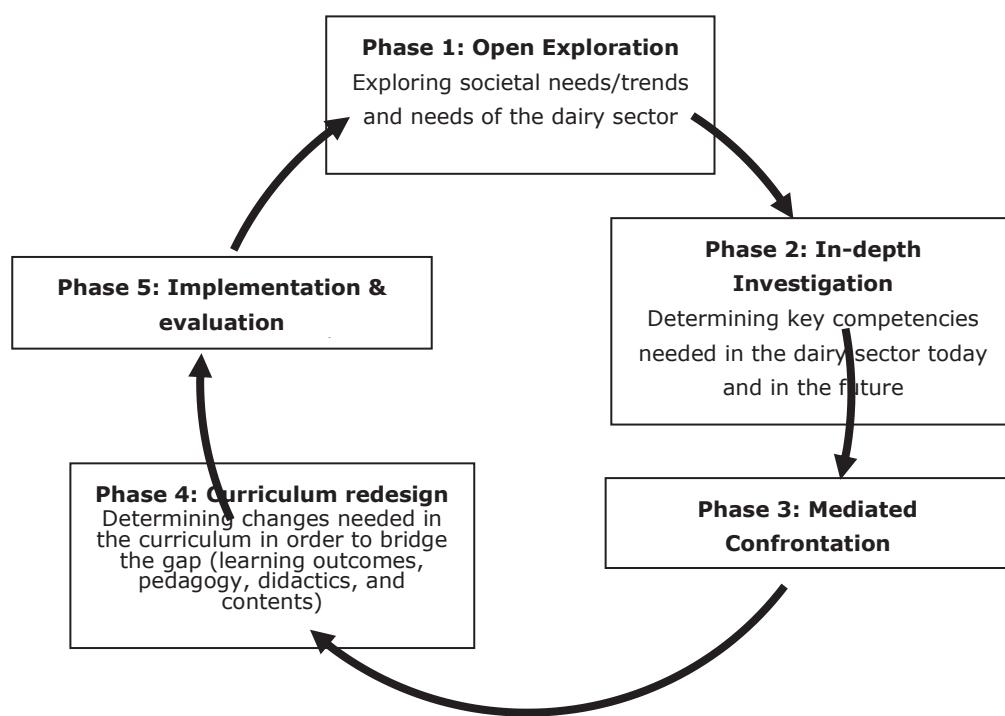


Figure 5 Five phases in the iterative multi-stakeholder design of a competence-based curriculum

One recommendation would be to identify existing education institutions and programmes – both old and new – that would be willing to redesign their curriculum, using an iterative multi-stakeholder process similar to the one outlined here. Obviously doing so would also require government support, as in most countries it is the government that approves and accredits formal education.

Option 2. Strengthening peer-to-peer learning in (experimental) workplaces and exemplary practices

'Facilitate involvement of youth in the dairy subsector e.g., in starting dairy farms, assisting farmers in fodder production, milk transportation, and testing. Also, mainstreaming youth into dairy activities in preparation to take over as the older generation retires or adult men get engaged in urban employment' (Makoni et al., 2014)

Apprenticeship training in Africa has been described by several authors (including McLaughlin 1979; Lave and Wenger 1991; Breyer 2007; Palmer 2007) with a predominant focus on the social nature of learning. Probably most learning in the East African dairy sector falls in this category. It is no secret that not all knowledge and skills are best obtained through formal education. As Bas (1989) puts it: 'the school system frequently proved incapable of transmitting the skills, attitudes and know-how that young people need to enter the labour force'. The apprenticeship training involves a highly social and situational or contextual form of learning that is different from more formally organised apprenticeships as they exist in western countries (Jaarsma et al., 2011).

Apprenticeship learning can be seen as a special form of peer-to-peer learning in that some 'peers' have more knowledge and experience than others and are seen as 'experts', while others with less knowledge and experience are seen as 'novices'. By creating environments where both can interact meaningfully the novices can become experts more quickly than when they were to leave to rely on their own experience and self-reflection, without guidance and probing from more experienced others. The farmer field school idea mirrors such a view of learning as it creates a space for experimenting, experiencing and exchanging. Figure 3, taken from the Nepali Farmer Field School on integrated plant nutrient systems, illustrates this.

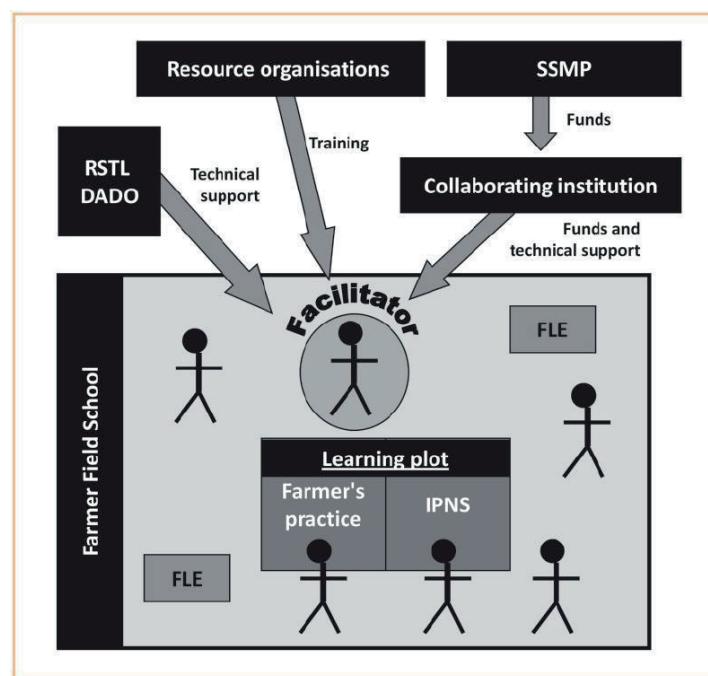


Figure 6 Basic working model of a farmer field school (source:
<http://teca.fao.org/technology/farmer-field-schools-integrated-plant-nutrient-systems>)

One recommendation here would be to identify and develop possibilities for creating educational experimental farms for training and demonstration, or use farmer field schools and local/regional farms that represent desirable exemplary practices where farmers can meet and learn from each other. In this case both government and the private sector will need to play a facilitating role to allow farmers to make their workplace environments more conducive to education and learning,

to develop the capacities of those facilitating this type of learning, to provide extra income to farmers whose farms are identified as exemplary, and to connect this type of learning to other forms of farm advice and extension.

Option 3. Utilizing emerging ICT-based education and learning that bypasses the creation of formal education and training facilities and structures but takes advantage of farmer's increased access to cell phones and other ICTs.

The introduction of the cell phone and wireless technology has allowed billions of people living in areas with poor infrastructure to leapfrog into the digital age without having to invest heavily in cable-based communication networks. The massive production of these technologies has also led to a dramatic drop in prices, allowing even the poor to take advantage of them, although it must be recognized that relative to wealthier people a rather large portion of their income goes to the use of such technologies. With the growing interest in approaches like e-learning, MOOCs, education apps, and online knowledge platforms, a good question to ask is whether the ICT-revolution can enable the East African countries to bypass ineffective formal education systems whose redesign will require huge investments. As an illustration box 1 describes the iCow app that is currently used by Kenyan farmers.

A recommendation here would be to identify, develop and support easy access, low cost ICT applications that could facilitate farmers' access to information, provide quick feedback on their performance, enable them to connect better with the whole chain and, finally, can help them make better decisions about production, breeding, purchasing, selling, hygiene, future planning, etc.

Box 1 – The iCow app
by Ian Tucker

Idea: To harness the power of [mobile phones](#) to encourage best practice for dairy farmers and increase milk production.

Problem addressed: Smallholder dairy farmers often living in remote areas and don't have access to valuable information about latest prices of milk or cattle; they may not keep accurate records of important details such as their cows' gestation periods or their livestock's lineage – often resulting in inbreeding and disease.

Method: Created by Kenyan farmer [Su Kahumbu](#), [iCow](#) is an app that works on the type of basic mobile phones farmers own. Each animal is registered with the service, which then sends SMS reminders to the farmer about milking schedules, immunization dates, tips about nutrition and breeding, or information about local vets or artificial insemination providers. The UK-based foundation the [Indigo Trust](#) helped fund iCow's development. Its executive Loren Treisman says: "It's exciting to see a technology-driven project targeting such an unexpected constituency. Farmers have been empowered to improve their own lives through accessing critical agricultural information as opposed to depending on [aid](#). What particularly excited us is that as a social enterprise, the iCow team has a sustainable business model which will enable them to expand rapidly and maximize their reach and impact without dependence on ongoing funding."

Verdict: "The wonderful thing with iCow is that by the time you have used the app and adhered to all the instructions, your cows end up healthier, bigger and stronger. They can easily fetch you more money in the marketplace. Every smart farmer will use iCow," a small-scale farmer based in the central highlands of Kenya told *Forbes* magazine.

Source: <http://www.theguardian.com/world/2012/aug/26/africa-innovations-transform-continent>

3 Synthesis: what options for the road ahead?

"Population growth, economic growth, and food security are challenging dairy sectors all over the world. How can dairy sectors develop to meet the domestic and global demand for milk? There is no clear-cut answer to this question. The development pathway depends on the local context" (Van der Lee et al., 2014).

The development pathway indeed depends on and relates to the local context and so do the capacity building activities that are needed to make the dairy sector grow. Dairy production is in transition, both in terms of quantity as well as quality. World population growth and income rise lead to a higher demand for dairy products, but also to a growing demand for safer and more diversified products. This growth is only expected to rise and the demand for more milk and milk products can be recognised in most countries worldwide.

As dairy production systems are changing, there is a need for adjustments also in dairy training and education. Dairy training and education have not always received the special attention they need as a basis to develop sound and sustainable dairy production systems. Too often, dairy has been subtopic of broader livestock curricula, which does not always lead to the right and most optimal in-depth preparation for a professional career in the expanding dairy industry.

The labour markets needs assessment within the Kenyan dairy sector (PKF Consulting, 2014) commissioned by SNV Kenya clearly emphasizes the need for changes:

The liberalization of the milk based industry in Kenya has greatly attracted entrepreneurship in the dairy industry. There is a paradigm shift in the industry towards self-employment and commercialization. The market requires more food; more varieties of food; the Base-of-the Pyramid (BOP) market is expanding and more and more private companies enter the market. Also the government is not employing (anymore) so there is no job guarantee for graduates. Many large milk producers are increasingly turning to processing milk on the farm; there are also an increasing number of entrepreneurs who will depend on outgrowers. These entrepreneurs require trained personnel with in-depth knowledge of milk processing. There is therefore need to have courses designed to produce graduates qualified to work in milk processing industries in production and managerial capacities; to venture into entrepreneurship in the food industry; to teach; and to pursue further education in food related disciplines.

This clearly proves the point that changes are needed in the dairy training and education systems to prepare the students for their future role in the dairy industry. Also in other countries, similar changes can be distinguished. In Ethiopia, ATVET and University students are being prepared for a role in the government extension system, which only focusses on the rural mixed smallholder farming system. There is no attention yet for educating students for a future in the emerging specialised commercial dairy farms. With one exception though: Holeta ATVET has recently adjusted the contents of their dairy education and will in the future be focussing more on preparing students for jobs on specialised dairy farms, both on medium-scale peri-urban farms and larger farms further away from the population centres. This change is based on a labour needs assessment, carried out as part of a Nuffic funded NICHE project (NICHE-ETH-146⁴). Furthermore, the Government of Ethiopia is stimulating ATVET students to start their own enterprise by providing them with land and soft loans.

These changes in production systems and operational methods on the larger, specialised and more complex dairy farms require a more future oriented curriculum including all aspects of

⁴ <https://www.nuffic.nl/en/programme-administration/niche/countries-and-projects/ethiopia/niche-eth-146>

new production systems and requires different didactical approaches. It will not be possible to prepare students for an active professional career in the dairy industry based on a relatively short mainly theoretical dairy orientation in a livestock or animal production study.

Training and education needs to form the basis for further sector development, and should be built upon four different pillars:

(1) practical, hands-on courses. These can be short courses to update knowledge and skills of farmers, but could also provide practical training opportunities for students at all levels. The providing institutes could either be specialised government training institutes; or be part of a regular educational institute (both at TVET and at University level) or could be a private initiative. Experiments with private Practical Dairy Training Institutes in Kenya have recently started. First experiences show that such institutes, whilst they are able to provide good practical training circumstances, should be properly embedded in the regular educational system of the country. This is necessary for didactical support and to ensure a good integration in regular livestock education in the country.

(2) education and training at vocational level (both Certificate and Diploma). The TVET systems currently often still prepares students for a career within government services, either as field assistant (Certificate holder) or extension officer (Diploma holder). Graduates from TVETs with a good basic theoretical and practical training from the heart of the workforce, farm managers and farm owners in many countries in the world.

(3) higher agricultural training (BSc level). This level of education prepares students for a mid-level position in either larger dairy farms, livestock input supply industry and government.

(4) university level education (MSc., PhD), which prepares students for various specialist positions in the private sector and government service (nutritionists, breeding specialist etc.).

The current state of affairs with regards to dairy training and education in most East African countries shows a rather varied perspective. In Rwanda, the educational system has only recently been overhauled and the dairy components will only be worked out in three or four years from now. Presently, the educational system uses curricula from Uganda. In Tanzania, changes in the educational system are ongoing, though scattered, inadequately coordinated and need more specific focus on the better dairy potential areas according to the participants of the workshops. In Kenya educational changes are part of the devolution to County Councils and have started integrating private initiatives. In Ethiopia, the educational system still fully prepares the students for a career within government circles, with recent exception of the curricula changes at Holeta ATVET.

In general, it was concluded by the workshops that:

- dairy education in most cases is still too much theory based, with not enough practical exposure
- the curricula are not consistent with changes in dairy production systems (from subsistence farming to commercial dairy enterprises), changes in demand profiles, changing rural-urban labour markets.
- graduates will no longer automatically all be government employees in future and need to be prepared for those different labour markets.

In general, dairy training and education was concluded to be outdated and insufficient, resulting in insufficient trained people at all levels.

Therefore the major challenges to the educational system are:

- learning methods and materials need to be updated and professionalized to more modern standards
- there should be more coordination within the system. University students should also be exposed to practical situations through internships and trainings on the practical training centres. Investments in dairy training and education should be well balanced over all four levels (practical hands-on training up to university level) responding to the needs of the labour market.

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- there is a consistent lack of well-trained dairy instructors and teachers in all the countries involved, showing the need to invest more in professional training and teaching staff
 - there is a need to pay more attention to strengthening research-education linkages in the dairy sector. Presently, many research activities are detached from the training and education system leading to a slow throughput of research findings into educational programmes.
 - in all countries involved, there is not enough attention for training on dairy processing technology, despite the fact that many investments in new dairy plants are taking place, which will have to operate with under-trained staff.

"Without education no innovation" is the slogan developed during the workshops. But it must also be realised that without innovation in the dairy training and education system, no appropriate and future oriented improvements will be made. The most important improvements to be made have been dealt with in chapter 2 and can be summarized as follows.

(1) Developing TVET and Competence Based Education and Training at the cross-roads between formal education and workplace learning. This will avoid focussing too much on existing educational contents that does not take into consideration that changes taking place in science, society and the world of work, are taking place at a higher speed as a result of digitalization, economic globalization and related innovations. Students and practitioners need to develop the competence to anticipate changes and respond accordingly in their work environment.

(2) Strengthening peer-to-peer learning in (experimental) workplaces and exemplary practices. Peer to peer learning enriches the learning process through confrontation with other learners through which learners also learn to reflect better on their own performance. Peer learning can be defined as the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions. It involves people from similar social groupings who are not professional teachers helping each other to learn and learning themselves by so doing (Topping, 2005).

(3) Utilizing emerging ICT-based education and learning that bypasses the creation of formal education and training facilities and structures but taking advantage of farmer's increased access to cell-phones and other ICTs. Several examples hereof are available and many more are under development. These offer still largely unexplored options for inclusion in training and education.

(4) Focus less on numbers (of "farmers reached") more on quality of training and long term production change perspectives. Spreading efforts over many farmers, will lead to inefficient results: where the hogs are many, the wash is poor. A more focussed and intensive approach, consciously addressing the farm as an integrated system, will lead to better understanding and uptake of the learning by the farmers involved.

(5) Building stronger linkages between private sector and education in the Netherlands and East African countries will have several advantages. The specialised knowledge available with private companies can be utilized in education; through better contacts traineeships can easier be made available and furthermore, better linkages with both Dutch and East African private companies will offer increasing possibilities to meet the objectives of internationalization in education in the Netherlands.

(6) Stimulate education institutes to approach internationalisation from a sector development perspective which necessitates a joint approach from practical hands-on training up to university level. There is a need for better collaboration between educational institutes at all levels, to be able to make balanced contributions to building up the knowledge base that is needed for further professional specialised dairy development.

(7) Strengthen didactical skills and integration in education system of PDTCs. Presently, the private initiatives to establish on-farm training facilities are usually on top of the normal day to day farm management work, without professional investment in setting up a training programme

and integrating this in the formal educational system. This will lead to suboptimal results and disappointments both from investors in the training facilities as well as from the trainees.

(8) Challenge Dutch agriculture education to participate more intensively in international projects, also as part their own internationalisation objectives and programmes. Dutch agricultural education institutes need to decide how to invest (or not) in internationalization. Based on these decisions, Dutch agriculture education institutes can be better included in international dairy capacity building projects and achieve more of their own internationalization objectives as well build up the capacity to professionally contribute to dairy development in Eastern Africa and other countries.

(9) Distinguish between subsistence and market oriented dairy farming and focus on potential dairy areas. Production systems differ and strengthening different production systems need different approaches. In production systems where dairy is integrated in a wider mixed farming system, investments in dairy production and management practices will be different from intensive specialised dairy farms and this will have to be reflected in training and education.

(10) Experiment further with private extension and training. Private extension and training (e.g. on the PTDCs) will continue to play an increasingly important as a result of ongoing privatisation of government tasks. There is a need to carry out more pilots in order to get experience with the most appropriate modes of operations of private extension services, but also to develop insights into the most suitable business models on which private extension and training services can be built.

To implement these advices, existing education institutes should be identified willing to redesign their curriculum using iterative multi-stakeholder process. There are some good examples of educational institutes that have been changing their curricula into a system whereby theory and practice are more in balance and that are adapting the contents of their training and education more towards the needs of the labour market. In several cases, Nuffic sponsored NICHE projects have been instrumental in stimulating this process of change. The full effects of these changes cannot be realised in one project period, but require a longer term collaboration between the partners involved.

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Appendix 1 Rwanda

A. Overview of the Rwanda Dairy Training

Introduction

The vision of the Rwanda dairy subsector is to effectively contribute to the growth of the national economy and improve the standard of living for the largest number of Rwandan households in a sustainable and environmentally sound manner. Rwanda's national dairy goal is to have a competitive dairy sector providing affordable and accessible quality products locally and within the region. It is anticipated that milk production will double by 2020.

Dairy production presents an opportunity to convert scarce land crude and improved feed resources into high quality protein food for human consumption. It also provides an opportunity for the current government program of one cow per poor household is aimed at distributing dairy cattle all over the country where there is low cattle population.

As the dairy subsector grows, it will require different education and training for sustainability and competitiveness. The number of extension workers including dairy specialists in the various segments of the dairy value chain is still low and they are constrained by lack of relevant dairy knowledge amongst others to service and expanding dairy industry. It is important therefore for Rwanda to set out a process of education and training of all key stakeholders that would deliver and manage the changed dairy sector in the future.

Informal and Formal Dairy Training and Education Activities

Informal Training

Government through the Rwanda Agriculture Board (RAB) and Non-Governmental Organizations (NGOs) train community based animal health workers (CBAHW) selected from farmers to assist in addressing animal health issues but there are not sufficient trainers for available.

Both government and NGOs employed extension workers provide informal training mainly to farmers at production level. The Girinka Program (one cow per household) organizes Field Farmer Schools through which trainers of trainers' courses are given for participants drawn from committees at the district level. This training coverage and scope is limited to basics in animal husbandry as well as number of farmers reached. In many cases qualifications of the staff used are not very high – lack skills.

Apart from the above two categories (CBAHWS and dairy farmers) of dairy value chain stakeholders, the rest hardly receive any informal training.

The major players in informal dairy training include:

- *Ministry of Agriculture (MINAGRI) – through Girinka Program and the district based extension workers provides training to dairy farmers.*
- *Rwanda Agriculture Board (RAB) - Implements the National Policy of Agriculture and Animal Industry. Is responsible for research and extension service in the country and trains farmers in animal husbandry practices. It runs a training centre at Masaka. RAB in conjunction with the Rwanda Agriculture and Livestock Inspection Service (RALIS) implements the training, inspecting, auditing, certifying dairy value chain actors including farmers, transporters and milk selling outlets in urban centres.*
- *Heifer Project International – Provides training in basic animal husbandry for farmers. In addition Heifer provides trains Artificial Insemination Technicians who work in their areas of operation.*
- *Send a Cow Rwanda – Provides training in basic animal husbandry practices to farmers.*

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- *Land O' Lakes International - Implements the Rwanda Dairy Competitiveness Program II (RDCP II).*
 - *Rwanda Cooperative Agency - capacity building for producer cooperatives.*
 - *Davis Global HealthShare Initiative as part of the Rwandan Dairy Competitiveness Program, funded by Feed the Future, US government's Global Hunger and Food Security Initiative through USAID. Provided short-term training for veterinarians, veterinary students, university staff and government officers in improved animal health management, productivity, and safety of milk and dairy management techniques.*
 - *GAHINI Diocese, the Lutheran World Federation and other faith based organizations that have livestock projects train farmers in basic animal husbandry practices.*
 - *INGABO - Training of artificial inseminators*
 - *Rwanda Agro-Dealers Development (RADD) engages in build capacity of agro-vet dealers.*
 - *Overall the informal training provided is just basic animal husbandry practice and has no laid down curriculum to follow. The kind of training provided cannot therefore prepare the stakeholders in the dairy value chain for the future changes in the dairy sector.*

Formal Training

The Workforce Development Authority (WDA) is mandated to provide strategic response to the skills development challenge facing Rwanda across all sectors of the economy including agriculture. WDA is responsible for Vocational Education and Training (TVET) and development of the various curricula for the vocational schools.

Technical and Vocational Education and Training Programme (TVET)

This is a national vocational training programme. It is supported by Belgian Federal Government (DGD) through the Belgian Development Agency (BTC) and APEFE (Association pour la Promotion de l'Education et de la Formation à l'Etranger). The Workforce Development Authority (WDA) organises the TVET strategy at national level and has embarked on a process of establishing Integrated Polytechnic Regional Centres (IPRCs) in the main regions of the country. The target is to have access to quality training system, adapted to the needs of the labour market of the country. Several public, public aided and private IPCRs have been established in Eastern, Kigali, Northern, Southern and Western Provinces. Whereas curricula have been developed for several areas, the curricula for dairy related areas have not yet been developed except for general food processing and milk reception. The WDA Curriculum Development Unit developed three (3) programs within food processing trade using the competency-based approach concept. These programs are:

- Food processing qualified worker - (TVET Certificate I)
- Food processing Assistant Technician - (TVET Certificate II)
- Food processing Technician - (TVET Certificate III)

The TVET training is proved from Level 1 (Foundation) to Level 7 (Advanced Diploma) being the highest as summarised in Table 1 below. If developed, the dairy related curricula are expected to follow the same.

Table 1
Summary of TVET Training and Qualifications

Level	Summary	Qualification Type
Level 1	Foundation program: includes learning in experiential situations to the achievement of basic tasks, with varying support.	TVET Foundation
Level 2	Graduates with knowledge & skills for basic vocational activities & community involvement.	TVET Basic Vocational Skills Certificate
Level 3	Graduates with knowledge & skills for initial work, community involvement and/or further learning.	TVET Certificate 1
Level 4	Graduates with knowledge & skills for work in defined context and/or further learning.	TVET Certificate 2
Level 5	Graduates with theoretical & practical knowledge & skills for work and/or further learning	Senior secondary graduate certificate of education. TVET Certificate 3
Level 6	Graduates with specialised knowledge & skills for skilled para-professional work and/or further learning	TVET Diploma
Level 7	Graduates that have broad knowledge & skills for para-professional / highly skilled work and or further learning	TVET Advanced Diploma

University Level Training

Rwanda currently has one university. The University of Rwanda trains animal production specialist and veterinarians at degree level. The Umutara Polytechnic and Nyagatare Campus of the University of Rwanda have recently been merged to form the College of Agriculture, Animal Science and Veterinary Medicine.

The Collage currently runs the traditional curriculum similar to that of other East African region universities that train veterinarians and animal production scientists. The curriculum followed currently is the traditional one that would not necessarily address the changes envisaged in the future dairy subsector. The university produces general practitioners responsible for animal health and production who do not have dairy specialist training. The Faculty of Veterinary Medicine has embarked on the process of reviewing its curriculum to address the current and future workforce requirement of the country. This is preceded by preliminary labour force skills survey currently being undertaken in the various subsectors to inform the required change in the curriculum. The review process expected to start in 2015.

The major players in formal dairy training include:

- *University of Rwanda* provides training at degree level.
- *Institut Supérieur d'Agronomie et d'Elevage (ISAE)* provides training in animal management at diploma level. Currently being upgraded.

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- *Workforce Development of Rwanda (WDA)* – TVET training at diploma and advanced diploma levels. NB dairy related curriculum not yet developed.

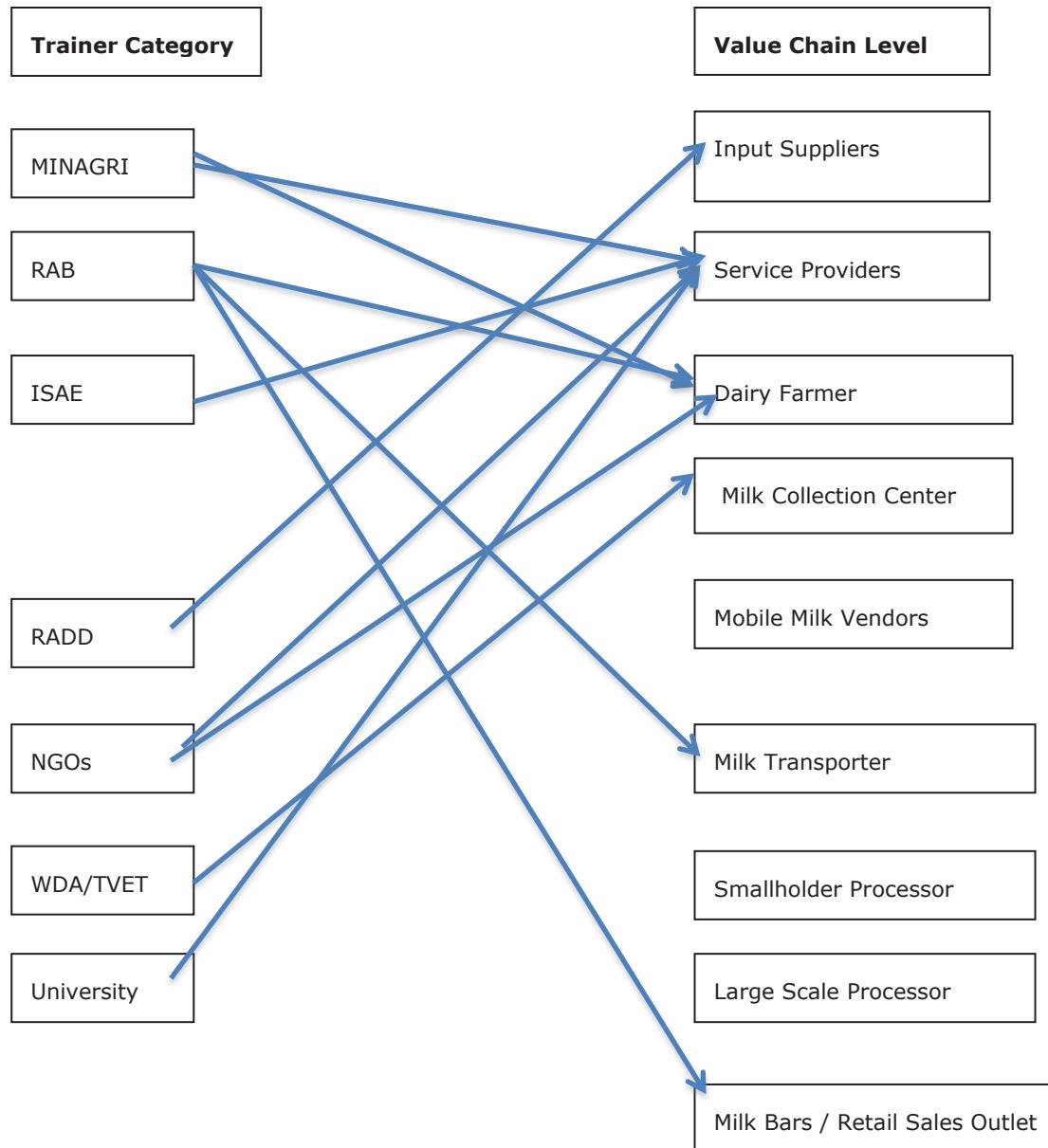


Figure 7 Training Providers for the Dairy Value Chain Stakeholders

As depicted in the Figure 1 above, most of the training in the dairy sector is informal and is mainly provided to the farmers at production level. The processing level receives no training currently from the local environment. The most important policy makers for dairy training and education at national level, both at government and at NGO level are the Ministry of Agriculture, Ministry of Education, and the Work Force Development Authority which hosts the Curriculum Development Unit.

B. Workshop report

Report of the Consultative Workshop on Dairy Training and Education in Rwanda. Held at SNV Office November 25th 2014 - Kigali

Official Opening Session

Mr. Ranjan Shrestha the Agriculture Sector Leader of SNV officially opened the half-day workshop. He stressed the importance of a needs assessment on dairy capacity building in the dairy subsector, which is the largest within the livestock sector. He noted that the dairy value chain in Rwanda was not very developed and there were very many stakeholders who needed assisting in the sector. He further noted that support in capacity building in the dairy value chain was timely. He wished participant good deliberations.

Background to the Workshop

Mr. Adriaan Vernooij of Wageningen University introduced participants to the background of the workshop. He noted that with the growing demand for animal protein, dairy production systems would change strongly in the coming decade. Training and education actors have to play their role to prepare present and future farmers for their role in a changing dairy sector. Curricula will need adaptation, as do training and education methodologies. The meeting was informed that international donor community had been discussing their role in strengthening dairy training and education in April and September 2014 and was looking for advice on strategies to support the required innovations.

Issues to be addressed include amongst others; growing population and increasing demand for animal protein, rural urban migration that has resulted in a growing market, the need to intensify agriculture and increase production, the changing production systems to more specialized production and commercialization and the need for competent and well-resourced farmers, good advisory services/specialists.

The Inter-Agency Donor Group (IADG) on livestock development dairy expert consultation in Uganda (April 2014) discussed collaboration and partnerships to better inform each other about investments to be made at country and regional level; to avoid both overlap and gaps, focus on joint learning and best practices. The selected themes included roughage, breeding, health, farmer organizations, data management and capacity building/competency development and biogas/nutrient cycle. The Netherlands was requested as a thematic leader on forage & capacity building. The Netherland government tasked Wageningen University to undertake the following:

- Analysis of current dairy support activities in the region
- Analysis of good practices in other sectors
- Inventory of present dairy and training (formal & informal) and education activities and its applicability for the future
- Formulate follow up activities for the Dutch government.

Objectives of the Workshop

The objective of the workshop was to formulate advice to donor community on strategies to support the required innovations in training and education in the dairy sector preparing the subsector for future changes in production systems.

It was noted the National Dairy Strategy Rwanda had also identified the "*lack of dairy knowledge to service an expanding industry that is becoming more sophisticated*" (p 21).

Brief Overview Current Dairy Policies, Development Activities and Training and Education for the Dairy Sector

Participants gave an overview of current policies and development activities in the country as follows:

- The Ministry of Agriculture (MINAGRI) through the Rwanda Agriculture Board (RAB) an institution responsible for implementing national policy of animal husbandry was implementing the National Dairy Strategy including genetic improvement through Artificial Insemination (AI) and importation of improved breeds. MINAGRI is also implementing the one cow per poor farmer policy.
- Efforts were being made to build capacity of the dairy farmers although advisory services providers were very limited in number.
- The Rwanda Development Authority (RDA) was engaged in building capacity of dairy cooperatives.
- Government of Rwanda had invested heavily in dairy infrastructure including Milk Collection Centers (MCC) with milk chilling facilities as well as installing milk-processing plants.
- Efforts were being made to control livestock disease and address the lack of animal feed for the increasing number of cattle. More work needed to be done in this area. There is need to invest in fodder production and animal feed plants to produce concentrate. So far there was only one animal feed manufacturer in the country.
- A public-private dairy platform existed. The Dairy Sector working group co-chaired by NGOs and government through the Ministry of Agriculture oversees this platform.

Plenary Discussion

Noted:

- Issues raised in the background were true of Rwanda.
- The country's animal feed industry was not well developed and yet the country is investing in high producing animals that require larger volumes of quality feed to reach maximum production potential.
- The dairy sector faced challenges in technical services – technical capacity was lacking at all levels of the dairy value chain. The existing vocational training institutions (TVET) are currently undergoing changes to become integrated polytechnics. However, the curricula for the polytechnics have not yet been developed and currently the TVET schools do not have trainers knowledgeable in dairy. The Curriculum Development Unit of the Workforce Development Authority (WDA) responsible for this is currently only receiving support from government. It is estimated that it will take four years to develop the dairy related curricula.
- The few veterinarians and para-veterinary professionals in the country were more into administration and not out in the field to provide the much-needed advisory services (of the 82 veterinarians 72 were in administrative jobs). Furthermore, the country has very few animal production specialist knowledgeable in animal nutrition to back stop the front line workers.
- Cost of production was very high - farmers don't break even
- There were challenges in marketing the dairy products in both the formal & informal sectors.
- In the formal market – issue of affordability curtailed development.
- Opportunities – limited products on the shelf – only liquid milk & *givuto* – no diversification. Processors therefore have opportunities to diversify products and enter niche markets locally and within the region.

Improvements Needed in Current Education and Training Activities:

- Development of dairy related curricula. Currently WDA has only developed curricula for general food processing and for milk reception. The meeting was informed that development of the other dairy related curricula would take about four years.
- Training of professional trainers in the various dairy related fields.
- Development of short term, practical hands on training for the various stakeholders in the dairy value chain.
- Development of vocational trainings for farmers, farm workers and mid-level professionals.
- There is only one technical institute the Kigali Institute of Science and Technology (KIST) that conducts training in Food Technology but the training is not geared to dairy. Grandparents from this school need to be re-trained to specialize in dairy. There is need to develop the dairy training curricula.
- There is need for more university level training BSc/MSc for advisors.
- School of Animal Science recently been merged with the veterinary faculty to form a college as part of the University of Rwanda. The College will produce more veterinarians and animal production specialists.
- Young veterinarians and animal production grandparents need hands on training in practical skills and specialize to be able to advise all stakeholders in the dairy value chain.
- Train animal nutritionists that can adequately backstop and advise the front line advisory service providers.
- Need university level training at MSc level to provide specialist in livestock, animal production, business development, dairy technology, marketing and quality control.
- Involvement of private sector in the training in the dairy subsector.

Role of various Stakeholders in Implementing Improvements

- Workforce Development Authority (WDA) is mandated to provide strategic response to the skills development challenge facing Rwanda across all sectors of the economy especially agriculture and agricultural value chains. WDA is responsible for Vocational Education and Training (TVET) and development of the various curricula for the vocational schools.
- Field Farmer Schools and the Girinka Program (one cow per household) conduct - Trainers of Trainers (TOTs) courses for participants drawn from committees at the district level. Farmer Field Schools have 44 technicians trained by government in basic animal husbandry including feeding and animal housing.
- There is a degree level veterinarian per district to support the Field Farmer Schools and the TOTs.
- NGOs train farmers in basic animal husbandry in areas where they operate although the number of farmers reached coverage and scope is limited.
- Government through the RAB & NGOs trains community based animal health workers (CBAHW) selected from farmers to assist in animal health issues.
- *Institut Supérieur d'Agronomie et d'Elevage* (ISAE) provides training in animal management at diploma level. Currently being upgraded.
- University of Rwanda trains animal production specialist and veterinarians at degree and masters levels to provide the backstopping. The Umutara Polytechnic and Nyagatare Campus of the University of Rwanda have been merged to form the College of Agriculture, Animal Science and Veterinary Medicine. The College had just embarked on a curriculum review that is aimed at addressing the skills gaps in the sector. Preliminary studies are currently being undertaken with the review process expected to start in 2015.

Role of the Donor Community

Note that Rwanda's dairy sector is still young compared to other countries in the region and therefore requires more support to develop.

- Support the development of dairy related curricula and development of dairy vocational training institutes.
- Support the institutional strengthening of the integrated polytechnics.
- Support the training of trainers for dairy at TVET level.

- Funding of short-term trainings to impart skills to stakeholders in the dairy value chain.
- Support exposure of dairy industry stakeholders including trainers, specialists and producers on how other countries are going about addressing the changes.
- Support the existing specialists to study in the Netherland and get to see how dairy sector is organized.
- Support the establishments engaged in dairy education and training.
- Funding of specialized training at university level.

List of Participants

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Appendix 2 Tanzania

A. A brief overview of current dairy training and education in Tanzania by Mayasa Simba & Deo Mlay

Presentation Outline

- Background
- National Livestock Policy
- Mapping of Dairy Training and Education Institutions
- Gaps of Dairy Training and Education

Background

- Dairying is one of the fast growing enterprises in the livestock industry.
- The industry grew at 3.4% and contributed about 1.2 % to the GDP (Economic Survey, 2010) and in general livestock contributed to about 4%
- Dairying is among the industry that contribute to human nutrition, economic growth, poverty eradication, employment generation
- Introduction
- The dairy sector is one of the critical sectors in Tanzania, with high potential for improving food security and poverty reduction.
- Recent analysis provides clear evidence of increasing demand for dairy products Sub Saharan Africa (SSA) in general and Tanzania in particular.
- The analysis estimated that between 1993 and 2020, the annual demand for milk and dairy products in developing countries would grow at between 3.2% and 3.5% annually, implying that the demand will more than double by 2020.

National Livestock Policy, 1996

- The vision of the livestock industry

"By year 2025, there should be a livestock sector, which to a large extent shall be commercially run, modern and sustainable, using improved and highly productive livestock to ensure food security, improved income for the household and the nation while conserving the environment."

- Constraints to Livestock Development in Tanzania

Livestock farmers' knowledge and skills

Inadequate livestock farmers' knowledge and skills is one of the limiting factors to the development of the industry. Knowledge and skills is important for quick adoption of appropriate technology, which has been developed and disseminated to livestock farmers.

Issues, Objectives and Statements

1. Livestock Extension Services

Issues

- Livestock extension service is constrained by weak collaboration amongst stakeholders, insufficient expertise, weak research-training-extension-farmer linkage and inadequate infrastructure and facilities.

Objective

To provide quality extension services that meets the needs of livestock farmers and other stakeholders.

2. Livestock Training

- The role of training is to develop, implement, coordinate, monitor and review training programme in order to produce well trained livestock personnel and other stakeholders for development of the livestock industry

. Issues

Livestock Training is constrained by

- inadequate infrastructure and training facilities,
- insufficient expertise,
- low participation of other stakeholders and
- weak research-training-extension-livestock farmers' linkage

Mapping of Dairy Training and Education Institutions

- Sokoine University of Agriculture, SUA
- Livestock Training Agency, LITA
- Vocational Education Training Authority (VETA)
- Agricultural and Livestock Training NECTA – Kaole in Bagamoyo, Ilolo in Mpwapwa etc.
- Ministry of Livestock and Fisheries Development under directorate of Research, Training and Extension, DRTE
- Tanzania Dairy Board
- Folks/Community Development Centre e.g. Sengerema,
- Farm Schools
- Dairy Development programme/ NGOs.

Sokoine University of Agriculture

- The department of Animal Science and Production (DASP) offer the following courses
 - Undergraduate: Animal Science and Range Management. The department is also offering
 - M.Sc. in Tropical Animal Production
 - M.Sc. in Livestock Production and Entrepreneurship
 - PhD on various areas related to dairy development
- Food science and Technology
 - BSc. in food Science and Technology
 - M.sc courses
 - Various areas related to dairy development

Livestock Training Agency, LITA

- There are six Livestock Training Institutes with the capacity of 970 students.
- These are LITA -Tengeru, Mpwapwa, Morogoro, Madaba, Buhuri and Temeke.
- Five of the LITAs offer long courses at certificate and diploma levels in addition to farmers training while LITI Buhuri is specifically for short course on dairy cattle husbandry.

Agricultural and Livestock Training

- There are training institutes approved by NECTA and run in private basis such
 - Kaole in Bagamoyo,
 - Ilolo in Mpwapwa etc.

Vocational Education Training Authority (VETA)

Mission

- Provision of quality vocational training that meets labour market needs.

Vision

- Provision of excellent vocational education and training that is capable of supporting national and social economic development.
- VETA courses adhere to Competence Basic Education and Training (CBET) Unit Standards. The CBET system integrates business entrepreneurial skills
- VETA has Dairy Modules based on work place competence such as
(1. Milking, 2Milk Collection and Handling, 3. Maintenance of cold Chain equipment, 4. Maintain a safe and hygienic working environment, 5. Storage)

Ministry of Livestock and Fisheries Development

- Directorate of Products and Marketing

National Artificial Insemination Centre, Arusha

This centre performs the following activities among others:

1. Production and distribution of Semen
 2. Liquid nitrogen production
 3. Training of inseminators
- Directorate of Research, Training and Extension

Section; Extension & Registration Section

This Section performs the following activities:-

- (i) Develop extension packages and methodologies;
- (ii) Establish demonstration farms and pilot initiatives;
- (iii) Provide farmer's education and publicity;
- (iv) Provide technical information on livestock development to general public;
- (v) Facilitate formation of livestock farmers groups;
- (vi) Promote private sector empowerment;
- (vii) Provide guidelines for pastoral social welfare and conflict management;
- (viii) Promote formation of pastoral and agro-pastoral ranching association;

-
- (ix) Promote establishment and strengthening of livestock farmers community based initiatives;
 - (x) Establish a funding mechanism for pastoralists willing to resettle to new homesteads and;
 - (xi) Coordinate Livestock infrastructure Development;
 - (xii) Promote environmental friendly fishing and processing technologies;
 - (xiii) Develop and review guidelines for extension services;
 - (xiv) Coordinate extension services;
 - (xv) Develop, implement and review public education programmes;
 - (xvi) Promote information dissemination in the Fisheries Sector;
 - (xvii) Monitor and evaluate extension services development;
 - (xviii) Provide technical information on fisheries development to the general public;
 - (xix) Promote private sector involvement and empowerment in the sector;
 - (xx) Promote sharing and exchange of skills and knowledge; and
 - (xxi) Promote formulation of sustainable livelihood projects and economic groups for community involvement in the management of fisheries resources.

- Livestock Research & Training Section

This Section performs the following activities:

- i. Upscale appropriate technologies for sustainable livestock productivity;
 - ii. Strengthen the capacity of livestock research and training institutes and centres to provide demand driven research and training through rehabilitation and retooling;
 - iii. Formulate, review and update training policies, rules and regulations;
 - iv. Evaluate the training programs offered by Livestock Training Institutes(LITA's) and review curricula to meet client demands;
-
- Livestock Research & Training Section
 - v. Facilitate short and long term training for livestock extension staff, researchers and trainers;
 - vi. Organize and conduct long and short courses for livestock keepers;
 - vii. Organize and conduct long and short courses on profitable livestock farming for youths;
 - viii. Develop training programs that will address special needs;
 - ix. Strengthen curriculum inspection and supervision for quality assurance of the training programs;
 - x. Develop competence based instructional materials for use by LITA, extension staff, farmers and other stakeholders;
 - xi. Strengthen linkages between extension – research – training and liaise with national, regional and international institutions; and
 - xii. Management and administration of Livestock Training Institutes.

Tanzania Dairy Board, TDB

TDB in collaboration with other Dairy Regulatory Institutions in EAC (Uganda, Kenya, Rwanda, Uganda)

- See the need for a structured training program to improve milk quality
- Development of a curriculum
- Development of training guides/manuals
- Setting up of a training and certification scheme

The BDS Approach

Comprises of;

- The Regulator
 - The BDS Providers
 - The Clients
 - The Training Guides
-
- Six Training module

Impart minimum levels of competences required to handle milk hygienically, provide assurance of quality and safety of milk and milk products to:

- ▶ Producer on hygienic milk handling on the farm
- ▶ Transporters on hygienic and profitable business practices
- ▶ Traders on hygienic, profitable milk handling & marketing
- ▶ Milk bar/milk parlour/kiosk on hygienic milk handling and profitable milk bar operation and retailing
- ▶ Processors on hygienic and profitable small-scale milk processing
- ▶ Dairy chain operators on procedures, standards and regulations governing the technical and business operations in the dairy industry (DIA)
- ▶ Small-scale dairy chain operators on milk marketing and business planning

Dairy Development Program/NGO

Program/NGO do provide training DVC actors depend on the TNA and the focus of the program

- Heifer International offers training on General Husbandry and has developed a Training manual
- Land O' Lakes
 - Train producers on cattle husbandry and linked them to the market.
 - Train producer on organizations
 - Training individuals key input suppliers mainly on Artificial insemination
 - Train on Dairy business management

CEFA, etc.

TAMPA etc.

TDCU etc.

Gaps of Dairy Training and Education

- Coordination of training and education activities ???
- Market Development approach is needed during the delivery of training most of the training is subsidized/ with no Commercial orientation
- Key areas such as Dairy technology, Dairy Processing Engineering are not covered adequately by training programme in Tanzania
- However, LITA in collaboration with SUA Professional Development Diploma (PDD) in Dairy Technology is to prepare Diploma holders in Animal production and Health, Degree holders in Animal Science, Veterinary Science and Food Science for a dairy industry career.
- The curriculum has been designed to give basic knowledge in dairy science, milk and dairy products processing technologies, and practical aspects of dairy products manufacture, quality assurance and marketing

B. Tanzania Workshop Report.

Benchmarking of current dairy training and education activities in Tanzania and possible improvements to address future changes in dairy production, processing and marketing systems.



**Tanzania Dairy Board, SNV and Wageningen University UR Livestock Research
November, 2014**

1.0 Introduction

The aim of the workshop among others were to benchmark the current dairy training and education activities in Tanzania and to discuss possible improvements in curricula etc. based on the needs of the growing demand of the dairy products that may be necessary to anticipate and prepare people for future changes in dairy production, processing and marketing systems. As in many countries, including Tanzania the demand for dairy products is rising and production, processing and marketing systems forced to follow the rise in demand by intensifying dairy activities.

Therefore training and education is crucial in imparting knowledge and experience to match with increasing demand for more intensive dairy production, processing and marketing systems

The main outcome of this workshop was to understand the current situation and brainstorm on issues that will guide the future interventions.

The workshop was conducted to gather the information on the current practices. The invitees of the workshop were from Institutions and program/NGO that delivered dairy training and education to the dairy value chain actors in Tanzania namely Sokoine University of Agriculture, SUA, Livestock Training Agency, LITA, Vocational Education Training Authority (VETA), Agricultural and Livestock Training NTA, Ministry of Livestock and Fisheries Development , Tanzania Dairy Board, Tanga Dairy Cooperative Union, TDCU, Folks/Community Development Centre and Dairy Development programme/ NGOs (see Annex 1 for list of workshop participants)

2.0 Workshop program

The workshop program was designed in such a way to be able to initiate discussion on future improvement for dairy training and education. There was an introductory presentation to set a scene of the workshop and to introduce the rationale of the workshop. This was followed by a brief presentation on the overview of current dairy training and education activities in Tanzania. These two presentations used as key documents for discussion to come up with future improvements.

In addition, representatives of institutions and program that deliver dairy training and education also presented the current practice and discussed in the plenary. These presentations were from LITA, Ministry of Livestock and Fisheries Development, Heifer International, FAIDA MaLi and Tanzania Dairy Board and

Heifer International. After these presentations it was followed by plenary discussion and come up with future recommendations by analyzing on what do have and what do we need for the future. The detailed programme is attached in Annex 2.



3.0 Brief overview current dairy policies, dairy development activities and training and education for the dairy sector

After the presentation of the key papers also institutions and programs presented their training and education activities and discussed in the plenary. These presentations benchmarked the current situation and described the long and short courses including dairy training at all levels from Specialist training, vocational and practical training that intended to impart skills. The presentation is attached in Annex 3.

3.1 Major findings

- There number of Institutions and programs available in Tanzania that delivered dairy training and education from university training, Diploma and certificate dairy training, vocational training and field and practical training
- Most of training is delivered by public institutions and dairy development programme. There are very few private institutions that delivered training. Most of the training is subsidized. Some cooperatives do offer training and education as part of service to their members such as Tanga Dairy Cooperative Union has employed full time extension staff for the purpose.
- The Ministry of Livestock and Fisheries Development has mandate to coordinate the Research, Training and extension. However, current situation showed that the ministry has little control of the training and education activities delivered by dairy development programs and the extension packages delivered by Extension officers at ward and village level employed by the Local Government Authority
- Dairy Value chain actors need more training on the dairy practical skills, entrepreneurship, group and organizational development, check off system, skill on how



to operate Dairy Marketing Hub, DMH and dairy processing. These are not well covered in the existing training and education curriculum.

- The dairy training offered at LITA and SUA focus support to large scale framing. Therefore, there is a need to modify the current curriculum to focus more on development of smallholder farming which is the more realistic in Tanzania. LITA and SUA training centres need to set small scale units to be used for training students and farmers.
- In the same subject, also the LITA, SUA and other training institutions need to forge partnership with the private operators to assist in offering practical skill and internship to students (on the job training) in order to strengthen their practical skills. The youths need to be a focal target in order to build their capacity for self-employment.
- The dairy training and education are delivered through various approaches such as village level training and residential training. The choice of the approach depends on type of skills and knowledge to be imparted, resource availability and logistical issues. The residential training is more moderated compared with the village training. However, the village training give room to more women and general public to attend and is more demand driven compared with residential training.
 - Dairy training in Tanzania is fragmented. There are obvious gaps. No dedicated certificate, Diploma and Degree level training on dairy technology. Dairy production is offered as part of animal production course at certificate, Diploma and Degree level. The level of coverage is somewhat superficial. We have 80 hrs. of dairy production and 80 hrs. of dairy science and technology at Degree level. It is not adequate to produce skilled and competent graduates. They would need a postgraduate diploma to reach adequate practical competency. If this is compared with Kenya, Netherlands and other dairying countries of the North, where you have more dedicated dairy training at all levels.
 - Farmers and Dairy Chain actors training is delivered at ad hoc though there are numbers of dairy development program do deliver training but no dedicated institution. Formerly LITA Buhuri in Tanga was specialized for framers training but now has reverted to Diploma training in Animal production.
 - Most practical dairy training offered in Tanzania only focusing Dairy Farmers very little practical training offered to other Dairy Value Chain actors.
 - Dairy farming needs to be transformed from subsistence to commercial. Therefore there is a need to sensitize farmers and other dairy value chain actors to change their mind sets and adopt improved technologies and transform their dairy farming to become commercial entity. This kind of transformation need a special training and extension approaches which in most cases are lacking in most of the dairy training curriculum.
 - Training and education institutions are supervised by number of fragmented bodies and different Ministries are involved namely ministry of Livestock and Fisheries Development, Ministry of Education and Vocational Training and Ministry of science and technology.. Universities are overseen by the Tanzania University Commission. Vocational Education Training institutes (VET) are overseen by the Vocational Education and Training Authority, VETA. Certificate and Diploma courses comply with NTA levels, LITA Training also comply with NTA levels and Directorate of Research, Training and Extension (DRTE) of the Ministry of Livestock and Fisheries Development is mandated to develop, implement, coordinate, monitor and review training programme under LITA in order to produce well trained dairy personnel and other stakeholders for development of the dairy industry. In addition DRTE roles are: Strengthen the capacity of livestock research and training institutes and centres to provide demand driven research and training through rehabilitation and retooling, formulate, review and update training policies, rules and regulations; Evaluate the training programs offered by Livestock Training Institutes(LITA's) and review curricula to meet client demands; Facilitate short and long term training for livestock extension staff, researchers and trainers; Organize and conduct long and short courses for livestock keepers; Organize and conduct long and short courses on profitable livestock farming for youths; Develop training programs that will address special needs; Strengthen curriculum inspection and supervision for quality assurance of the training programs; Develop competence based instructional materials

for use by LITA, extension staff, farmers and other stakeholders; Strengthen linkages between extension – research – training and liaise with national, regional and international institutions; and Management and administration of Livestock Training Institutes.

However, for the DRTE to perform these functions to LITA need capacity building

- It was learned that there some adoption studies have been done to assess effectiveness of the training. The recent study is the one done by LITA which aimed to assess on the effectiveness of the training in technology adoption.

4.0 Ways to improve dairy training and education in Tanzania

To support initiation of Professional Development Diploma (PDD) in Dairy Technology. The objective is to prepare Diploma holders in Animal production and Health as well Degree holders in Animal Science, Veterinary Science and Food Science for a dairy industry career. The curriculum has been designed to give basic knowledge in dairy science, milk and dairy products processing technologies, and practical aspects of dairy products manufacture, quality assurance and marketing. For more details on PDD see Annex 4.

This entails the following

- Improve teaching facilities in LITA Tengeru in Arusha
- Train tutors on dairy technology
- Support two consecutive intakes for the course.
- To support initiation of Diploma in Dairy Technology in SUA or and LITA Tengeru. This entails the following
 - Develop course curriculum to correspond with the demand of Tanzania dairy industry development
 - Improve training facilities to be able to accommodate for the diploma course
 - Train tutors/Lecturer to be able to conduct the course
 - Support two consecutive intakes
- To support initiation of Degree in Dairy Technology in SUA. This entails the following
 - Develop course curriculum to correspond with the demand of Tanzania dairy industry development
 - Improve training facilities to be able to accommodate for the Degree course
 - Train tutors/Lecturers to be able to conduct the Degree course
 - Support two consecutive intakes
- To support Tanzania Dairy Board, TDB to be able to deliver, coordinate dairy education and extension.
 - Specifically support TDB to be able to package dairy extension packages
 - To support TDB to establish and operate resource centres/ centre of excellence that will demonstrate best practices and impart practical skills in three milk sheds (Northern, Southern Highland and Eastern milk sheds)
 - To establish Dairy technology laboratory.
 - To strength dairy inspectors at the LGA levels to impart practical knowledge and skills
 - To training /carry out induction to DBS providers to be able to deliver dairy training on commercial basis
- To build capacity of Ministry of Livestock and Fisheries Development through the Directorate of Research, Training and Extension, DRTE to be able to perform its functions stipulate in policy and Ministerial Organizational Structure.

Direktorate of Research, Training and Extension

Section; Extension & Registration Section

This Section performs the following activities:-

- Develop extension packages and methodologies;
- Establish demonstration farms and pilot initiatives;
- Provide farmer's education and publicity;
- Provide technical information on livestock development to general public;
- Facilitate formation of livestock farmers groups;
- Promote private sector empowerment;
- Provide guidelines for pastoral social welfare and conflict management;
- Promote formation of pastoral and agro-pastoral ranching association;
- Promote establishment and strengthening of livestock farmers community based initiatives;
- Establish a funding mechanism for pastoralists willing to resettle to new homesteads and;
- Coordinate Livestock infrastructure Development;
- Promote environmental friendly fishing and processing technologies;
- Develop and review guidelines for extension services;
- Coordinate extension services;
- Develop, implement and review public education programmes;
- Promote information dissemination in the Fisheries Sector;
- Monitor and evaluate extension services development;
- Provide technical information on fisheries development to the general public;
- Promote private sector involvement and empowerment in the sector;
- Promote sharing and exchange of skills and knowledge; and
- Promote formulation of sustainable livelihood projects and economic groups for community involvement in the management of fisheries resources.

Livestock Research & Training Section

This Section performs the following activities:

- Upscale appropriate technologies for sustainable livestock productivity;
- Strengthen the capacity of livestock research and training institutes and centres to provide demand driven research and training through rehabilitation and retooling;
- Formulate, review and update training policies, rules and regulations;
- Evaluate the training programs offered by Livestock Training Institutes(LITA's) and review curricula to meet client demands;
- Livestock Research & Training Section
- Facilitate short and long term training for livestock extension staff, researchers and trainers;
- Organize and conduct long and short courses for livestock keepers;
- Organize and conduct long and short courses on profitable livestock farming for youths;
- Develop training programs that will address special needs;
- Strengthen curriculum inspection and supervision for quality assurance of the training programs;
- Develop competence based instructional materials for use by LITA, extension staff, farmers and other stakeholders;
- Strengthen linkages between extension – research – training and liaise with national, regional and international institutions; and
- Management and administration of Livestock Training Institutes.

For details please (see Annex 3.1)

- To build capacity of Ministry of Prime Minister's office Regional Administration and Local Government to be able to coordinate dairy education and extension activities to Local government Authorities and work in close collaboration with the Ministry of Livestock and fisheries (specifically DRTE)

- To support VETA to offer dairy practical training and education to dairy value chain actors. This entails to develop training curriculum based on work place
- To support National Artificial Insemination centre, NAIC Arusha to offer training to inseminators.
- To support all LITA to mainstream Inseminators module to all courses offered at certificate and Diploma level
- To support SUA to mainstream Inseminators module to all course offer in Department of Animal Science and production (Diploma and Degree courses)

Tanzania workshop: List of workshop participants

Name	Institution / programmer	Email	Telephone
1. Mayasa A. Simba	Tanzania Dairy Board, P.O Box 38456, Dar es Salaam	mayasasimba@gmail.com	0713324337
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4. Athuman Mahadhi	Tanga Dairy Cooperative Union	tdcutanda@gmail.com	0717693942
5. Hassan Ally Mrutu	Ministry of Livestock and Fisheries Development, Directorate of Research, Training and Extension P.O Box 9152, Dar es Salaam.	mruttuhassan@gmail.com	0659772837
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7. Adolf K. Mushi	Faida Market Link (Faida Mali)	Adolf.mushi@yahoo.com	0787355108
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9. Mary W. Yongolo	Ministry of Livestock and Fisheries Development, Directorate of Research, Training and Extension P.O Box 9152, Dar es Salaam.	yongolomary@yajoo.com	0754332929

10.	Bezia Rwongezibwa	Ministry of Livestock and Fisheries Development, Directorate of Research, Training and Extension P.O Box 9152, Dar es Salaam.	rwongebezia@gmail.com	0767435408
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12.	Alfred Futeh	International P.O Box 33814 Dar es Salaam	Alfred.futeh@heifer.org	0763447541
13	Corjan Van Der Jagt	SNV Dar es Salaam	cvanderjagt@snvworld.org	0789058536
14	Herman L. Shelembi	LITA		0718826104

Appendix 3 Kenya

Report on workshop on new approaches to dairy training and education

Nairobi 02-12-2014

Background

During the Inter Agency Donor Group meeting of April 2014 on dairy support to East Africa, it was decided to appoint thematic lead agencies on various topics related to dairy production. The Netherlands was appointed lead agency for training and education. Aim of the work of the lead agency is to strengthen donor coordination in order to better inform each other about investments to be made at country and regional level; to avoid both overlap and gaps and to focus on joint learning and best practices.

The Dutch government requested Wageningen University and Research to formulate advice to the Dutch government on how the donor objectives could best be achieved. The assignment consists of four different parts

- 1) Make overview of current dairy support activities in the region
- 2) Analyse good practices in other sectors
- 3) Make inventory of present dairy and training (formal, informal) and education activities and its applicability for the future
- 4) Formulate follow up activities to Dutch government.

A series of workshops was held in Rwanda, Tanzania, Kenya and Uganda in November and December 2014. A similar exercise had been carried out in Ethiopia already earlier in 2014.

Objective: formulate advice to donor community on appropriate training and education in the dairy sector preparing the sector for future changes in production systems.

Background: with the growing demand for animal protein, dairy production systems will change strongly in the coming decade. Training and education actors have to play their role to prepare present and future farmers for their role in a changing dairy sector. Curricula will need adaptation, as do training and education methodologies. The international donor community has been discussing their role in strengthening dairy training and education in April and September and is looking for advice on strategies to support the required innovations.

Programme:

- 1 Official opening, introduction on background of workshop
- 2 Introduction of all participants
- 3 Background to the workshop
- 4 Brief overview current dairy policies, dairy development activities and training and education for the dairy sector
- 5 Discussions on improvements necessary in training and education in anticipation on future changes in dairy production systems
- 6 Reporting back sessions and formulation of advice for improvements and role of donors
- 7 Conclusions and closing.

Discussion questions:

- what improvements are needed in current education and training activities to prepare for the future of dairying in Kenya.
- what is the role of the various stakeholders involved in implementing these improvements
- what role should the donor community play in this process

Summary of the discussions

The workshop started with some explanation from the participants on the role and challenges of their organisation in dairy training. DTI used to be involved in processing only at the initial

stages, but has gradually expanded its programme also including production. However not all the necessary facilities are available to handle "emerging issues"? Good thing is that the organisational set up is now arranged and the position of DTI clearer in the educational system. New modules such as on fodder production will be worked out.

Bukura carried out a survey amongst their (former) students, in which they specifically raised the point that they lacked practical skills. This will be addressed; the programme will become more skills based.

The Animal Science Department of the University of Eldoret was originally started with Dutch support. Dairy production can be spread wider geographically since the ECF problem was tackled and a research programme was started on research on appropriate breeds in marginal areas (Maasai Mara, Trans Mara) using Sahiwal. The introduction of new breeds and more intensive dairy production in such areas requires a lot of training to farmers who are not used to dairying this way. Training for dairying in Kenya is insufficient and poorly organised according to the University of Eldoret. There is a need for more coordinated training from practical farmers training up to specialist training at university level. In North Rift no practical training facilities, apart from Baraka Farms. There is need for Counties to chip in, as they have a stronger role to play after devolution. Some counties have invested too much in milk collection centres, of which many don't handle much milk. There used to be ATC's in all counties, why have they disappeared?

According to the expectations of the processors, there will be shortage of milk up to 2019.

According to the statistics, only 20% of the milk produced is processed in the formal channel. There is high doubt about the reliability of these statistics, making predictions on how markets will develop difficult, and thus also on what type of training is most needed, both for production as well as for processing. Processors see the need for good training of farmers, in order to raise production to meet the growing demand.

According to the MoA, the extension system needs to become more focussed for dairy and dairy incorporated throughout the whole educational system. Upcoming private extensionists also need guidance, as their training level are not always adequate enough. Private sector, e.g. the processors, sometimes provides resource persons for the formal education programmes.

The question was raised what the effect was of the farmers tour to the Netherlands last year. It was stressed that this discussion was long overdue. Current extension messages are still based on knowledge of production systems of the past or what extension officers learned themselves during their education. The "*Government is trailing behind the farmer*" as it was mentioned.

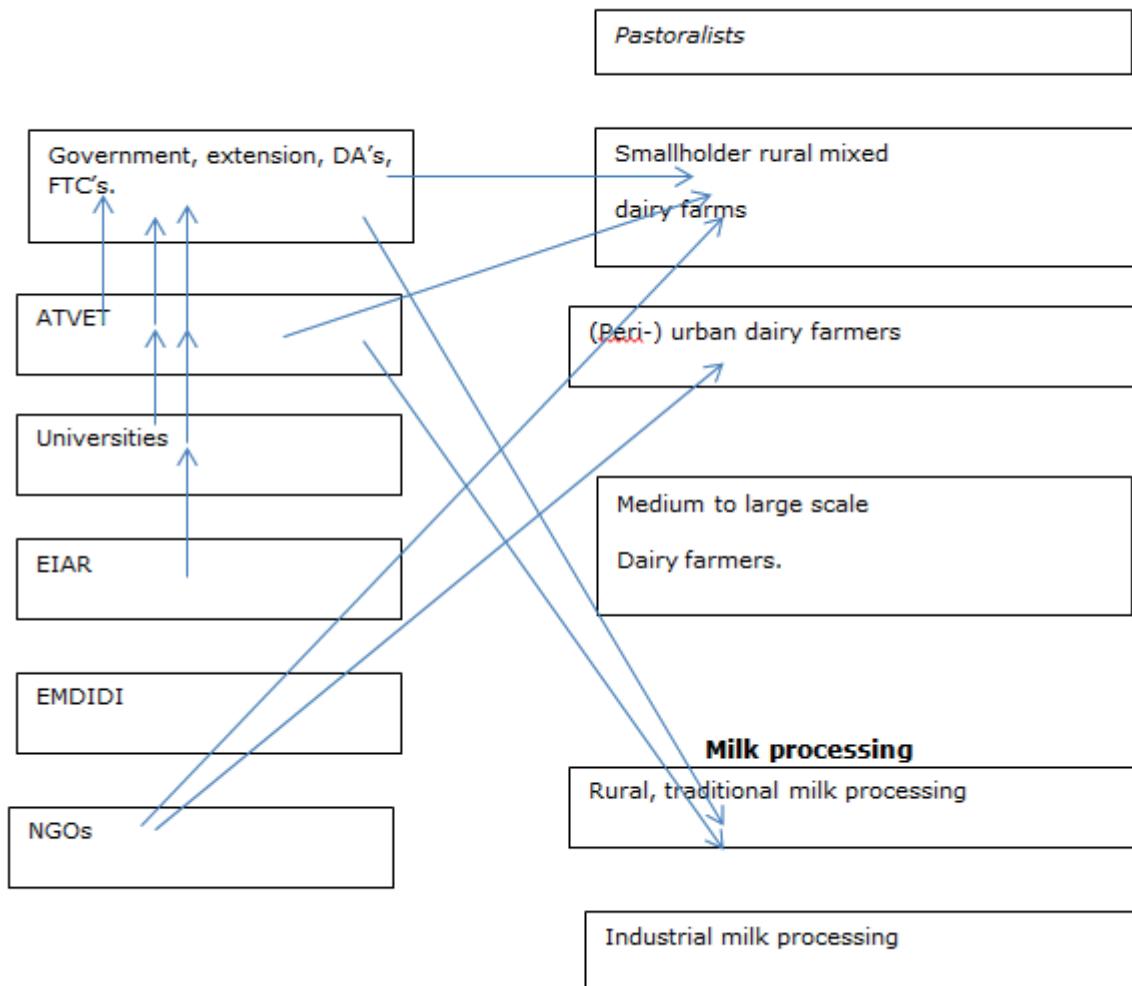
Devolution has not always led to the right investments, e.g. in some counties unproductive coolers have been installed.

To make production grow, quality of personnel need to improve:

- training should be practically oriented, less theoretical. The current ToT activities in the field do not have enough impact.
- there is a need for better service personnel, and more knowledge on equipment maintenance.
- training and education should be more oriented towards becoming farmers, not just workers in government or private sector. Also for e.g. retired government workers.
- more involvement of private practitioners in training and education. This often happens in other sectors, but not in agriculture/livestock.
- educational standards are not applied, therefore no good coordination of the various training programmes. Role for TVET Authority ???

Appendix 4 Ethiopia

Capacity building/training/education Dairy production/processing systems



General conclusion: knowledge flow is from research to universities. University graduates are the teachers at the ATVET colleges and find employment in government service. So do most of the ATVET graduates: most of them are still employed by the government extension service. Extension service only focusses on the existing majority of small scale rural mixed farms. The (peri) urban more specialised smallholder dairy producers receive some support in terms of training, advice, finances from development NGOs, which also focus on the smallholder.

<p>The current agriculture education system does not cater or the newly emerging specialized dairy farms and dairy plants. Training/education is implemented at four different levels: practical training, vocational training, higher vocational training or universities of applied science (BSc level) and universities (MSc, PhD).</p> <p>The case of Ethiopia looks as follows:</p>	
Practical training: done at FTC and ATVET level.	Observations. Farmers' extension service (DA's and AHA's): improvement does get attention from within MoA, but is not yet adequate enough. Farmers extension service often comes in "packages" (distribution of chickens, package attached to the synchronisation programme), which are supported by DA's with backstopping from universities and EIAR. Who is currently playing what supportive role and what role could there be for Dutch support?
Vocational level: ATVETs	Currently 5 ATVETs under federal government, others under regional (20 in total?). In the last couple of years new occupational standards set, in consultation with the private. TVETS are in a process of more practical orientation in the training programme, following a German funded restructuring. Alage ATVET used to be the leading ATVET, Holeta currently most promising. Options for NUFFIC support. ⁵
Universities	BSc, MSc and PhD level. Inventory required of who is giving what support to the universities and what role Dutch support could play. Options for NUFFIC support. It would be interesting to also strengthen the research capacity of universities. Universities in Ethiopia do teach, research and provide community services (usually in form of trainings, e.g. at the FTC, but they do have their own contact such as with women groups).
Ethiopian Meat and Dairy Industry Development Institute (EMIDI)	Could potentially support industrial processors, but do have very little training capacity. Support could be organised through e.g. G2G programme (?) Insight needed into what sort of external support they are currently getting.
EIAR	EIAR does have enough specialists, also with fairly good capability to organise and carry out trainings. What matters are the choices made: not enough geared towards applied research and the farmers' problems.
Lacking: advice to medium to large scale farmers	New private advisory service (?). Issue here is not so much the technical knowhow, which can be mobilised in Ethiopia with some external support, but problem is to find entrepreneurial specialists willing to start such an enterprise. Furthermore, willingness of farmers to pay for services is not known. Will need long start-off period. Form of organisation matters: fully private or service started jointly by farmers' association.

⁵ Both Holeta ATVET and Ambo University offering interesting cases (condensation points) for joint Dutch support (support from both knowledge institutes as well as from the private sector). Both institutes are actively improving their situation and planning to either build or extend current dairy training facilities. Design, building and providing equipment of houses can be done with support from commercial companies, training programmes can be supported from Dutch knowledge institutes.

Further issues of attention

Policy development

New livestock policies are currently drafted, who supports (FAO, World Bank, other donors??). Main question: how will production systems change in future, both in terms of structure as well as in geographical concentration?

Policy choices: the government invests large sums of money into the livestock sector but how? Holeta dairy research station's budget has sextupled over the last five years, but virtually all the increase has gone into the new biotechnology unit, very few improvements have taken place in farmer oriented research.

Quality control: introduction of quality based payment systems. With the expected boost of the dairy chain, this is an appropriate period to introduce. The responsibility for enforcement is not clear, could be either Drug and Feed Control Authority or a Dairy Board.

Feed and fodder.

- fodder and farm structure are strongly related: most farms do not have enough land to grow their own fodder. Fluctuations in the market prices for fodder can (and do!) influence cost price strongly.
- fodder: to be included in all training/education programmes.
- role for Ethiopian Animal Feed Industry Manufacturers Association in improving formula and quality standards? Who is providing support to the feed industry? Possibly a role for Dutch players such as Schothorst, WUR, GMP+International.
- basic knowledge on feeding to be included in all training/education.

Veterinary issues

Need to dealt with at two levels: national/government and on farm.

Government responsibilities are disease surveillance, diagnosis, monitoring and a national reference lab option (NAHDIC). These issues are addressed for the poultry sector (G2G as part of the 2g@there project) and a similar approach can be adopted for the dairy sector.

Veterinary knowledge needed at farm level must be built in the various training programme.

Bewket lists four different commercial options in the dairy sector (to be opened up by government)

- participation in NVI
- Marek vaccine production
- tsetse control (risk factor for 10 M cattle)
- anthelmintic supply.

Breeding

Three different aspects:

- genetic improvement, performance testing etc. Done by government, with Finnish assistance
- AI implementation: through government system and initial steps in privatisation. The privatised effort is getting USAID support. Who supports implementation of AI system of the government?
- semen import. Potential role for CRV.

Housing

Not really an issue in most tropical countries, but it is important in the highlands in Ethiopia, where virtually all barns lack adequate ventilation. Is to be addressed through input from research ("vrijloopstallen" in the Netherlands) and private companies (equipment).

What is lacking in the expansion of the dairy sector in Ethiopia is ownership of the development process. Currently several initiatives are working on uniting the sector, strengthening collaboration within the value chain etc.

But in reality creating more confusing than unity:

- SNV's involvement starting from the BOAM quarterly coordination meetings, now to be incorporated in EDGET
- ABFS dairy platform
- LMD initiating platforms
- Dairy Board
- newly established Ministry of Livestock.

Sector development requires a well-balanced, locally applicable combination of public and private roles. As long as there is no clarity about division of responsibilities and tasks, sector development will inevitably be negatively affected by friction between various parties involved.

Appendix 5 Opening presentation used during workshops

Workshop dairy training and education

Kigali, 25-11-2014

Workshop dairy capacity building. Kigali, 25-11-2014

- 1 Official opening, introduction on background of workshop
- 2 Introduction of all participants
- 3 Background to the workshop
- 4 Brief overview current dairy policies, dairy development activities and training and education for the dairy sector
- 5 Group discussions on improvements necessary in training and education in anticipation on future changes in dairy production systems
 - Tea break
- 6 Reporting back sessions and formulation of advice for improvements and role of donors
- 7 Conclusions and closing.

General background

- Changes in East Africa, and worldwide:
 - Growing populations, growing demand for animal proteins.
 - Rural-urban migration → growing markets
 - Need to intensify agriculture, increase production
 - Production systems changing →→more specialised production, commercialisation
 - Key: competent and well-resourced farmers, good advisory services/specialists.

Donor discussions:

- April 2014: IADG on livestock development
→dairy expert consultation in Uganda
- Discussions on collaboration and partnerships
- → to better inform each other about investments to be made – at country and regional level; to avoid both overlap and gaps; focus on joint learning and best practices
- Decision: thematic lead agencies.

Workshop dairy capacity building. Kigali, 25-11-2014

- Themes: roughage, breeding, health, farmer organizations, quality, data management, capacity building/competency development, biogas/nutrient cycle.
- Netherlands: thematic leader on forage and capacity building
- Wageningen University: requested to advise Dutch government on 2 themes

Workshop dairy capacity building. Kigali, 25-11-2014

- Assignment Wageningen University:
 - Analysis of current dairy support activities in the region
 - Analysis of good practices in other sectors
 - Inventory of present dairy and training (formal, informal) and education activities and its applicability for the future
 - Formulate follow up activities to Dutch government.

Workshop dairy capacity building. Kigali, 25-11-2014

- Today's workshop:
 - formulate advice to donor community on strategies to support the required innovations in training and education in the dairy sector preparing the sector for future changes in production systems.
 - National Dairy Strategy Rwanda: "*lack of dairy knowledge to service an expanding industry that is becoming more sophisticated*" (p. 21).

Workshop dairy capacity building. Kigali, 25-11-2014

- 1 Official opening, introduction on background of workshop
- 2 Introduction of all participants
- 3 Background to the workshop
- 4 Brief overview current dairy policies, dairy development activities and training and education for the dairy sector
- 5 Group discussions on improvements necessary in training and education in anticipation on future changes in dairy production systems
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- 6 Reporting back sessions and formulation of advice for improvements and role of donors
- 7 Conclusions and closing.

Workshop dairy capacity building. Kigali, 25-11-2014

- Context: dairy knowledge strengthened to support **sector** development, including:
 - Short term, practical hands-on training
 - Vocational training for farmers, farm workers, mid-level professionals
 - University level training BSc/MSc for advisors, specialists, researchers
 - Across the value chain.

Workshop dairy capacity building. Kigali, 25-11-2014

- **Discussion issues:**
 - -what improvements are needed in current education and training activities to prepare for the future of dairying in Rwanda
 - -what is the role of the various stakeholders involved in implementing these improvements
 - -what role for the donor community to play in this process

Appendix 6 Inspiring examples from other sectors

Improving training and education for the dairy sector, or any other sector for that matter, can also be based on inspiration of good practices in other sectors. As part of the project, examples of comparable training and education activities in other agricultural sectors have been sought after. This was done in consultation with AgriProFocus and through various other contacts.

(6.1) Inventory of AgriProFocus.

APF conducted an inventory through its extensive worldwide network. The following invitation was sent to all contacts.

Request

*AgriProFocus was asked by Adriaan Vernooy (adriaan.vernooy@wur.nl) to help identify innovative experiences in other agricultural (non-dairy) sectors. To be more precise, **the dairy sector would like to learn from other sectors about innovative experiences in capacity building. Do you know/have any experience in working with training institutes, both government and private, which could be useful for and are worth sharing with the dairy sector? Then we would like to learn from you.** Let us have your experiences of capacity building activities that go beyond the traditional theoretical textbooks, that incorporate inputs from sector representatives, that are hands-on practically oriented and future oriented.*

Background

One major issue in the East African dairy sector is the need to improve skills and knowledge of farmer families, staff and entrepreneurs along the chain. The dairy sector needs scalable models for capacity building along the chain and also lacks ideas and workable models to reach/involve large numbers of people, especially smallholder families, with capacity building services.

This issue was discussed, in more detail, during the recent IADG East Africa Dairy Expert Consultation (1-3 April, Uganda, along with 7 other issues).

At this meeting, the Netherlands volunteered to coordinate a process generating innovative approaches on scalable models for capacity building. The Netherlands is already playing a strong role in supporting dairy development in EastAfrica. Various projects are implemented by NGOs, educational institutes and increasingly in partnership with the private sector. The Netherlands now took on the responsibility to develop a new vision on use of innovative approaches towards capacity building at farm level, but also for input supply, processing and retail. Next, Wageningen UR was asked by Netherlands government to develop a paper on ways to reach dairy farmers in the region with farm advisory services; with attention given to gender & youth issues.

Please direct your response or further questions to me by reply to wgoris@agri-profocus.nl

*Wim Goris
Network facilitator*

*Agri-ProFocus
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E : wgoris@agri-profocus.nl
W: www.agri-profocus.nl*



MEMO

This resulted in the following overview:

Willem Heemskerk (KIT) refers to the Go4IT programme with RUFORUM on building capacity in multi-stakeholder settings, as well as building institutional capacity in Universities in agricultural innovation. They call this the Trojan Horse approach practice into training and education institutes through a short course for mid-career professionals.

<http://www.kit.nl/sed/project/graduate-opportunities-innovation-transformation-go4it> .
Willem also mentioned similar work in Mozambique on irrigation extension with national ATVET institutes and Universities. <https://www.wageningenur.nl/en/show/Wageningen-UR-wins-two-multimillion-euro-irrigation-projects-in-Mozambique.htm>

Thirdly Willem refers to the ISSD approach in Africa:

<https://www.wageningenur.nl/en/show/Integrated-seed-sector-development-in-Africa.htm>

Rian Fokker (Heifer) shared info from their PPP with SoilCares (BLGG), SNV funded by FDOV. This project introduces "easy to use and affordable (mobile) analytical technologies that could be operated by local entrepreneurs but assisted and controlled (quality) by a central support desk and knowledge centre." In this way advanced technological services for informed farming become available for smallholders without the need of large investments and extensive training. Ultimately, these locally offered services will help farmers improve crop yields and make more efficient use of inputs for a more sustainable growth, thereby improving food security and farmers livelihoods. In the project it is expected that at least 25.000 farmers will be advised on either their soil fertility leading to improved yields of on average 50% or improved feed/fodder quality and rations leading to increased milk production of 10%.

Jolanda Buter (MDF) suggested to look at new ways and new places for learning.

Reaching out to large groups of farmers may benefit from opportunities such as sports and cultural events (like tractor pulling in de Achterhoek). In her experience in Niger, she used games (checkers, lido) to package cooperative training.

Adding to this (**by Wim**),

- using gaming in training has been developed by Twijnstra Gudde
<http://www.twynstragudde.nl/boek/gaming-organisatieverandering-met-spelsimulaties>
- an example of online gaming that makes you learn
<http://3rdworldfarmer.com/> Note the lesson of this game is that small farmers cannot survive.
This game has a competition element, see the leader board with scores.

John Belt (KIT) refers to the Ethiopia Learning Alliance approach- where people actively searched for solutions to their own problems instead of hearing from 'the experts' – is a good example of a systematic, participatory, entrepreneurial way of boosting people's SKAs (skills, knowledge, and attitudes) in a value chain setting.

Wim: This approach was quite intensive (reaching max 5400 farmers with a € 225.000 budget + staff time) The ELA concluded with a farmer business competition which had € 75.000 prize money in 5 awards.

<http://www.agri-profocus.nl/2011/publications/learning-and-earning-ethiopian-learning-alliance-publication/>

Bertus Wennink (KIT) shared a publication from ASARECA and himself on the FEISA project.

Although with minor involvement of training institutes, FEISA worked on 'innovation triangles' between farmers, business and service providers. Built around case studies from 4 countries, this book presents the innovation triangle approach, as well as a self-assessment tool for service provision by apex farmer organizations to their members.

Gerrit Koeslag (PUM) shared a pig case he visited in Uganda. The ILRI runs the Smallholder Pig Value Chains Development programme.
https://cgspace.cgiar.org/bitstream/handle/10568/29010/SPVCD_ProjectProfile.pdf?sequence=5

On this request, there was no response from Agri-Hub coordinators.

LinkedIn groups

African Agri-Business

5 reactions: the discussion refers to roadshows and radios. But how to get a clear message in and how do you know farmers change their way of doing things?

Peter Ypma refers to roadshows in combination to an innovation fund. The results of the competition and the challenge fund then go back into the roadshow for dissemination in the next season. <http://www.cavackh.org/>

Sustainable Development Africa

4 reactions but without any substantial response (self-promotion of consultants)

Hierbij in ieder geval nog een paar nabranders □

- a) Collega Marjolein de Bruin verwijst naar een recente expert meeting die we op de HAS Den Bosch hielden.

The methods and (their experts) from the expert meeting Beyond Knowledge Sharing might be of use. You can share the 5 page report with Adrian which can be found through <http://www.agri-profocus.nl/2013/articles/beyond-knowledge-sharing-for-food-security-how-do-people-learn/>

- b) Op ons platform zag ik de organisatie Shamba Shape Up.

Zie <http://www.shambashapeup.com/search/?query=cow>

Dit is een TV programma in de "verbouw je huis" formule maar nu voor smallholder farmers.

- c) Hieronder een paar links uit het PAEPARD netwerk.

Van: François Stepman [<mailto:fstepman@gmail.com>]

Verzonden: vrijdag 21 november 2014 08:16

Aan: Work Package 5 Innovation partnerships

CC: Nicole Metz; Wim Goris

Onderwerp: Re: FW: Request Agri-ProFocus : share innovative experiences in capacity building to inspire dairy sector

Dear Julia, Richard,
cc. Steve

Ref: innovative experiences in capacity building

Which experience could we share from our capacity building review?

Here are already some useful references

<http://paepard.blogspot.com/2014/08/dairy-innovation-platform-experiences.html>

<http://paepard.blogspot.be/2014/09/evaluating-value-chain-interventions.html>

<http://paepard.blogspot.be/2014/03/assess-performance-of-innovation.html>

<http://paepard.blogspot.be/2013/06/innovation-for-fashion-or-action.html>

Francois Stepman

Platform for African - European Partnership in ARD

c/o CTA Brussels Office

39 rue Montoyer. 1000 Brussels.

Mobile: 00-32-474627686 (Belgium)

<http://paepard.blogspot.com>

(6.2) Soil Cares Kenya.

Providing Analytical Services for Informed Farming in Kenya

Project Summary

Background

By 2050 the world population will reach 9 billion and the demand for food is expected to increase by 70%. Arable land will only increase by 15%, water is not easily accessible and the climate is increasingly less predictable. Hence, a more effective and efficient food and feed production is essential. An important element in enabling an increase and efficiency in food production is providing (smallholder) farmers and other stakeholders in developing countries with relevant information on their soils and feed nutrient levels. The maturing of analytical sensor techniques and rapid adoption of mobile phones in developing countries has created new transmission mechanisms for reaching thousands of farmers in remote areas with targeted agricultural information.



Maturing sensor techniques, such as IR spectroscopy, offer new opportunities of affordable onsite data collection and recent pilot studies show this information can be used to create tailored online agricultural advices for informed farming decisions, resulting in higher crop yields.

Opportunity

The combination of matured sensor techniques and improved mobile connectivity offers the opportunity for the introduction of easy to use and affordable (mobile) analytical technologies that could be operated by local entrepreneurs but assisted and controlled (quality) by a central support desk and knowledge centre. In this way advanced technological services for informed farming become available for smallholders without the need of large investments and extensive training. Ultimately, these locally offered services will help farmers improve crop yields and make more efficient use of inputs for a more sustainable growth, thereby improving food security and farmers livelihoods.



Approach

Together with Tree of Knowledge BV (member of the BLGG Group), BLGG Research, Heifer, SNV and AgriQuest a consortium has been formed that is able to introduce the above mentioned services to a network of cooperative dairy farmers. In the course of the 4 year project 4 mobile soil fertility laboratories and a specialized feed testing laboratory will become operational as part of the SoilCares and Sampling franchise formula. The mobile laboratories (SoilCares) are supposed to be owned and operated by the dairy cooperatives or local entrepreneurs in the course of the project.

In the project it is expected that at least 25.000 farmers will be advised on either their soil fertility leading to improved yields of on average 50% or improved feed/fodder quality and rations leading to increased milk production of 10%.

The quality of all offered analyses will be controlled by a central database and a local support desk will offer backup support for the mobile laboratories. The soil fertility analyses will produce real-time crop specific fertilization recommendations. Links will be made with fertilizer companies and the agricultural officers to assure availability of recommended fertilizers.

Feed analyses will offer indicators for the nutritional value of feeds and fodder, thus providing the building blocks for a better balanced diet for cows and increased milk production.

(6.3) Thika Horticultural Practical Training Centre.

Thika Horticultural Practical Training Centre.

Source: Hortinews <http://www.hortinews.co.ke/article?id=597>



Pictured: With the launch of Practical Training Centre, growers and especially smallholder groups will benefit from training not just on affordable skills of production but also in the business ethics required to run horticultural enterprises.

Nairobi, Monday February 25, 2013: The launch of the horticulture Practical Training Centre is yet another important milestone in Kenya's agricultural sector.

The PTC was developed as a public-private partnership between the Fresh Produce Exporters Association of Kenya (FPEAK) and the Kenya Agricultural Research Institute (KARI). It seeks to provide practical skills in production, value addition and marketing to the entire horticultural sector. KARI will provide research backup, while FPEAK will handle the practical skills and business information aspects necessary for the efficient operation of enterprises involved in horticulture.

Established under the auspices of FPEAK with an initial grant of Ksh112 million (Euro 1 million) from the Netherlands government, the 200-hectare Centre is situated in Thika, where everything horticulture will be showcased.

The Centre, which has been in the works since 2010, is now ready to roll out a capacity building programme among farmers in East Africa.

The Dutch grant financed phase one of the Centre, which was completed in 2011. This mainly involved refurbishing and furnishing of training rooms, purchase of equipment and establishment of production units. Phase two is currently underway and has been funded by the United States

Agency for International Development (USAID) through the Kenya Horticulture Competitiveness Project to the tune of \$950,000. This funding seeks to build capacity through training of small-scale farmers at the PTC and associated field stations (mini-PTCs) as well as provision of basic facilities such as irrigation for practical training.

"Here, farmers will be exposed to the practical way of successfully growing all types of horticultural produce," said FPEAK chief executive Dr Stephen Mbithi, who has overseen the establishment of the Centre over the past three years.

The Centre was developed to fill the need for a central facility where farmers would learn practical skills in a real environment. It aims to become a central depository, one-stop-shop for horticulture information in Kenya cutting across the value chain, production, value addition, logistics and marketing aspects.

The project does not duplicate fundamental training provided by local universities. Rather, it seeks to add value by giving the practical skills necessary to work in modern horticulture production. At the moment, it takes two years for a fresh graduate to learn all the skills required to manage modern horticultural enterprises such as greenhouse farming, irrigation technologies and pest and disease management. It will now be possible for growers to send workers to a central facility to learn all the relevant skills in a real environment instead of spending valuable company time training new staff. Smallholder groups will also benefit from training not just on affordable skills of production but also in the business ethics required to run horticultural enterprises.

The Centre will accommodate the different categories of horticultural produce - flowers, fruits, vegetables, potatoes, herbs, mushrooms and nuts. Excellent but affordable boarding, conference and classroom facilities are available.

The Centre is poised to be a showcase of modern farming technology and will take into account the diverse ecology of the country, where data and information on produce for all altitudes and climatic zones will be on display.

To attest to its importance, long before its launch, the Centre is already hosting events and attracting partnerships and visitors from all over the world. From 2012 to date, the Centre has trained over 2,000 farmers, farm workers, agricultural extension officers and other industry players through various partnerships.

The Centre is divided into five units, namely, administration, fruits, vegetables, flowers and engineering.

Administration

The administration department is responsible for managing the facilities. It comprises the catering department, with a capacity of feeding 500 people per day, a maximum 52-bed farmer accommodation and two state-of-the-art conference rooms that can host up to 250 delegates. The classes can sit up to 20 trainees and are designed to maintain a good instructor-student ratio. These are supplemented with a boardroom and a serene open ground for public events, all available for PTC-organized trainings or for hiring out to stakeholders looking for facilities to train farmers, staff and field officers.

Fruits

The fruits unit consists of a nursery with a capacity of producing 1 million seedlings of various tropical fruits and nuts. Currently, it has 300,000 avocado, mango, macadamia papaya and TC banana seedlings. The unit is aimed at training commercial nursery managers and farmers across the country to ensure the fruit sub-sector has true to type disease-free planting

materials. Lack of clean planting materials and ignorance of varieties has remained a major impediment to the development of the fruits sector in the country. Currently, fruit farmers rely on roadside nurseries, which lack the necessary training to be able to guarantee not only volumes for serious commercial buyers but also the varieties and disease status of the seedlings. At the moment, demand for certified seedlings far exceeds supply. Within this unit is a 40-hectare orchard section where various fruits are to be planted in one-acre units for demonstration of good orchard management practices and business skills.

Vegetables

The vegetable unit consists of an irrigated field of 20 hectares divided into quarter-hectare units planted with various vegetables grown in Kenya for the export and domestic markets. Here, training on best practices in irrigation technology, safe use of agrochemicals and soil fertility management, among other agronomic applications, is conducted. This is in addition to smallholder greenhouse technology and the latest ideas on smallholder pest management systems, such as growing under nets. This unit is especially important for demonstrating to smallholders the practical compliance skills in international standards that are required for the domestic and export markets.

Flowers

At the moment, the unit comprises a one-hectare greenhouse with four varieties of fully grown T-hybrid roses and four hectares of summer flowers such as Arabicum on the outside. The unit aims at providing an accessible environment to prospective local investors, many of whom never get access to established farms, in order to see what it takes to establish a greenhouse farming, including sourcing of key technologies. The unit is important for capacity building of smallholder flower growers, who now number about 15,000.

The units are designed to be self-sustaining, with resources accruing from training fees and incidental produce sales channelled to meet running costs such as water, labour and power.

The Centre is managed by an oversight committee comprising a chairman appointed by industry, assisted by one representative each from KARI, FPEAK and the Horticultural Crops Development Authority (HCDA). The day-to-day running of the Centre is coordinated by FPEAK.

In the latest development, the PTC has benefited from a new grant of 1.6 million euros from the Netherlands under the NUFFIC project, which specifically finances capacity building in higher education (NICHE).

This is a joint project with the Jomo Kenyatta University of Agriculture and Technology (JKUAT) and KARI, with the PTC taking the lead in managing the project locally.

A consortium led by Wageningen University of the Netherlands is managing the funds and the project in collaboration with FPEAK.

This financing is limited to curriculum development and research capacity development, and is different from the current one that has been developing training facilities.

Under this project, all courses at the PTC and JKUAT on horticulture will be reviewed, and a detailed curriculum developed, including training materials/booklets.

There is also a plan to accredit the courses locally and internationally, and undertake a detailed Training of Trainers programme for the PTC and JKUAT.

This way, there will be an industry input into university training at JKUAT so as to improve relevance of to the sector, and also JKUAT input into what happens at PTC to enhance training skills.

(6.4) DLV Plant International

DLV Plant-GreenQ opent vestiging in Kenia

Op de Naivasha Horticultural fair in Kenia, een van de grootste tuinbouwbeurzen in Afrika, is op 20 september 2014 de vestiging van DLV Plant-GreenQ in Kenia gelanceerd.

DLV Plant-GreenQ Kenia richt zich op tuinbouwprojecten (ondersteuning bij ontwikkeling, financiering en implementatie van teelt en gerelateerde projecten), trainingen, (telers, train de trainer) en consultancy (teeltadvies, teeltontwikkeling, managementadvies) in de gehele tuinbouwsector. Door lokaal aanwezig te zijn levert DLV Plant-GreenQ een hoge servicest <http://www.dlvplant.nl/nl/nieuws/dlv-plant-greenq-opent-vestiging-in-kenia.html> andaard en wordt persoonlijk contact onderhouden met relaties.

Source: <http://www.dlvplant.nl/nl/nieuws/dlv-plant-greenq-opent-vestiging-in-kenia.html>

DLV Plant has been involved in providing training and advisory support to flower farms in Ethiopia and Kenya for several years now. They have bundled a lot of their technical advice in the *Handbook for Greenhouse Rose Production Ethiopia*, which is a publication also supported by WUR, Ethiopian Horticulture Development Agency and the Ethiopian Horticultural Producers and Exporters Association.

[http://www.dlvplant.nl/nl/core/media/file/Handbook_Rose_Ethiopia\(1\).pdf](http://www.dlvplant.nl/nl/core/media/file/Handbook_Rose_Ethiopia(1).pdf)

Appendix 7 Terms of reference

ToR for dairy capacity building East Africa - IADG Follow up. 28-05-2014

Introduction

Population in East Africa is growing, and so is the demand for animal products in the region. Dairy products are an essential part hereof. This growing demand will have to be met from dwindling resources: the available land for agricultural and livestock production is under pressure. Production per given area will have to intensify: the world will have to produce more from less.

Milk is the yield of varying but ever more complex dairy production systems, which operate in a dynamic context of economic, biophysical and socio political drivers. Dairy products are an essential part of diets in East Africa, and in various ways dairy cows are a crucial element of production systems. In order to prepare East Africa for the growing demand, the capacity at farm level to produce milk will have to be increased.

During the IADG East Africa Dairy Expert Consultation in April, it was agreed that the Netherlands would play a leading role in capacity development. The core challenge identified was 'how to reach large number of dairy families, or in other word how to come to scalable models for capacity building on the different aspects of dairying like production, collection, marketing, cooperatives etc. For addressing this core challenge it is of course needed to take a broad perspective from practical training to graduate level for all elements of the dairy sector: primary production, input supply, processing, retail,

Overall objective dairy capacity building in East Africa

The overall objective of a dairy capacity building programme can be formulated as follows:

Effectively and efficiently improve the technical and animal productivity and animal welfare and economic performance in dairy farms and other relevant stakeholders in the dairy chain through improving the competences of all working in the dairy sector.

To build an innovative programme for capacity building, the following step needs to be taken:
Developing a new vision on use of innovative approaches towards capacity building at farm level as part of the follow up activities under Dutch responsibility of the IADG East Africa Dairy Expert Consultation.

Education on dairy production is only poorly incorporated in current agricultural training and education. Where dairy education is provided, its content is often geared towards more traditional mixed smallholder farming systems. In all East African countries, specialisation and commercialisation of milk production is growing though, which requires new knowledge in training and education programmes and new approaches to prepare future farmers, farm managers and farm workers for the changes taking place in the production systems. Apart from adaptation to the contents of the training and education programmes, education needs to get a more flexible approach, be more labour market oriented, incorporate problem solving competences through which professionals in the dairy sector can successfully perform their duties within an increasingly changing world.

The main challenge (and probably paradox) of an innovative approach towards capacity building is that it inevitably will have to fit in the existing agricultural education system. For that matter, it is necessary to evaluate the current dairy knowledge system, analyse bottlenecks (e.g. poor attention for vocational training in many countries) and describe possible options for innovations and new approaches in the education system that is needed for a more future oriented dairy education.

Activities:

- map current formal and informal education/training activities and institutes in the agricultural knowledge system, with special focus on the dairy sector
- identify gaps in the agricultural knowledge system

-
- briefly describe current dairy production systems and expected changes in the future
 - list all relevant stakeholders in the dairy sector and their contribution towards dairy development
 - study and analyse approaches to training in other sectors (arable farming, horticulture, but also e.g. technical training) to stimulate out of the box thinking. Special attention should be given to the use of massive on-line education
 - describe possible options for innovations and new approaches in the dairy knowledge system
 - work out job profiles and competences of trainers and extension staff and define implications for their initial and continuing training and education

These activities can to a large extent be based upon using existing information, surveys, reports which have been carried out on dairy production systems and dairy training and education by various stakeholders in the area.

Where additional information is required, field visits will be made to relevant areas and discussions held with applicable stakeholders.

Planning and timeframe

The assignment will be carried out from 15th of June till 15th September 2014.

During this period deskwork will be carried out, one visit will be made to the region to discuss with relevant actors in dairy capacity building, one workshop will be organized in the Netherlands end of August/early September to synthesise findings and discuss further approaches with all stakeholders involved.

Deliverables

A Power Point Presentation will be prepared for use during consultative meetings, describing analysis of current production and training/education systems; the stakeholders active in dairy development; inspiring practices from other sectors; improvement options

ToR for Dutch regional dairy capacity building support in five East African countries.

28-05-2014

Introduction

Netherlands support is provided to the dairy sector in all East African countries, be it in different types of projects in each country. Production systems differ from country to country, as do training and education in dairying. Main aim of this assignment is to strengthen the capacity building aspects of the Dutch funded dairy programmes in the East African countries within the boundaries of the existing (Dutch funded) country programmes. Through better tuning of activities and innovations in the training programmes, the individual country programmes can be strengthened in their implementation of capacity building programmes, without compromising the project implementation at country level.

Implementation of this Dutch regional capacity building improvement programme will be based on the vision developed and direction taken as a result of the developed new vision for East Africa on use of innovative approaches towards capacity building at farm level.

Based on the analyses of existing training and education programmes and the strength of the stakeholders (both from public as well as from private sector) involved in implementation hereof, advice can be given on which elements can be introduced in all the Dutch funded dairy programmes in the region. Activities will have to be proposed and worked out with partners that can potentially reach a large audience.

Objective

This assignment will formulate advice on elements and approaches to be incorporated in a regional East African dairy capacity building programme to be implemented by the Netherlands in the five East African countries.

Activities

In order to achieve this stronger collaboration, the following activities will be undertaken:

-
- analysing Dutch funded programmes and compare them with the vision for East Africa on use of innovative approaches towards capacity building at farm level. Draw conclusions on which elements of the country programmes can be strengthened and present these in an accessible overview
 - highlight good examples
 - advice on strategies to stimulate collaboration between the different Dutch funded country programmes aimed at maximum sharing of information, e.g. through short regional workshops, video conferences etc.
 - advice on the most appropriate follow up actions to be undertaken, stakeholders to be involved, training locations to be used or developed.
 - advice on which use can be made of Dutch support programmes to realise the identified options.
 - monitor improvement of capacity building activities at country level as a result of the regional support activities.

Planning and timeframe

This assignment will be carried out between June 15th and October 15th 2014. During this period deskwork will be carried out, discussions will be held with relevant actors in dairy capacity building, one workshop will be organized in the Netherland end of August/early September to synthesise finding and discuss further approaches with all stakeholders involved. The implementation of this assignment will be linked to the consultancy on *dairy capacity building East Africa.-IADG Follow up*

Deliverables

A report will be written, summarizing current Dutch funded dairy programmes in the countries involved; review the good examples; advice on activities to be undertaken and on how to monitor progress made during the implementation period.

Appendix 8 Presentation

Dairy capacity building: Visions on policies and implementation.

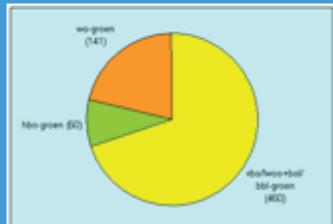


WAGENINGEN UR
For quality of life

Dairy capacity building East Africa

Toen ik in 1949 naar de middelbare landbouwschool ging, sloegen we het hoofdstuk machinaal melken over. Dat gebeurde alleen in Amerika, niet hier, zo was de gedachte.

Pieter Willem Blokland (84),
 gepensioneerd veehouder in
Veeteelt, December 2014.



Categorie	Budgetdeel (%)
mil-groen	14%
Mil-groen (60)	60%
veehouderij+bol'	26%
bil-green (40)	40%

Budget Dutch Agricultural Education

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Dairy capacity building East Africa

Inadequate livestock farmers' knowledge and skills is one of the limiting factors to the development of the industry. Knowledge and skills are important for quick adoption of appropriate technology, which has been developed and disseminated to livestock farmers.

Tanzania Dairy Development Board, 2014.



Dairy capacity building East Africa

Dairy production in transition:

- growing demand (quantity)
- growing demand (quality, product diversification)



Need for adjustment in dairy training and education

- more future oriented, new production systems (contents)
- new didactical approaches (theory vs. practice)



Sector development needs training and education at all levels:

- practical, hands-on courses
- Vocational level (Certificate, Diploma)
- Higher agricultural training (BSc)
- University level



Dairy capacity building East Africa

Current state of affairs countries East Africa:

- Rwanda: no formal dairy education, in preparation.
- Tanzania: changes ongoing, scattered, inadequate coordination
- Kenya: devolution, more demand-driven, PDCTs
- Ethiopia: fully government oriented.



Dairy capacity building East Africa

In general:

- education too much theory based, not enough practical exposure.
- curricula not consistent with:
 - changes in dairy production systems,
 - changes in demand profiles
 - changing rural-urban labour markets
 - changes from subsistence farming to commercial dairy enterprises
- graduates no longer automatically government employees.



Dairy capacity building East Africa

Challenges to educational system:

- learning methods and materials outdated
- no coordination within the system
- inadequate number of trained teachers and extension officers
- weak research-training/education linkages
- dairy processing technology inadequately covered.



Dairy capacity building East Africa

Concluding:

- (1) Dairy education outdated and insufficient
- (2) Resulting in insufficient trained people at all levels
- (3) For building up a sector, a sound knowledge base is necessary, based in a comprehensive agricultural education system
- (4) Without a good theoretical and practical knowledge base, limited success rates for innovations.

Knowledge and skills are important for quick adoption of appropriate technology



Dairy capacity building East Africa

Consequences for regional dairy capacity building:

- specific approach of agricultural educational system per country
- make choices for Dutch (and other donor?) interventions per country

Without education, no innovation



Dairy capacity building East Africa

Without education, no innovation.

Ways forward to strengthen dairy capacity building:

1. Developing TVET and Competence Based Education and Training at the cross-roads between formal education and workplace learning
2. Strengthening peer-to-peer learning in (experimental) workplaces and exemplary practices



Dairy capacity building East Africa

Ways forward to strengthen dairy capacity building

(3) Utilizing emerging ICT-based education and learning that bypasses the creation of formal education and training facilities and structures but taking advantage of farmer's increased access to cell-phones and other ICTs.

→ Identify existing education institutes willing to redesign their curriculum using iterative multi-stakeholder process



Dairy capacity building East Africa

Ways forward to strengthen dairy capacity building

(4) Focus less on numbers (of "farmers reached") more on quality of training and long term production change perspectives.

(5) Build stronger linkages between private sector and education in the Netherlands and East African countries.

(6) Stimulate education institutes to approach internationalisation from a sector development perspective which necessitates a joint approach from practical hands-on training up to university level



Dairy capacity building East Africa

Ways forward to strengthen dairy capacity building



- (7) Strengthen didactical skills and integration in education system of PDTCs
- (8) Challenge Dutch agriculture education to participate more intensively also as part their own internationalisation objectives and programmes, e.g. BTEC.
- (9) Distinguish between subsistence and market oriented dairy farming. Focus on potential dairy areas.
- (10) Experiment further with private extension and training.



To explore
the potential
of nature to
improve the
quality of life

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Livestock Research Report 867



Together with our clients, we integrate scientific know-how and practical experience to develop livestock concepts for the 21st century. With our expertise on innovative livestock systems, nutrition, welfare, genetics and environmental impact of livestock farming and our state-of-the art research facilities, such as Dairy Campus and Swine Innovation Centre Sterksel, we support our customers to find solutions for current and future challenges.

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