NETHERLANDS DEVELOPMENT ORGANISATION
THE KENYA MARKET-LED DAIRY PROGRAMME
(KMDP)

STATUS REPORT KMDP: TRAINING AND EXTENSION APPROACHES

"Integrate and connect: Recommendations for KMDP's approach and role in knowledge exchange and skills development in the Kenyan dairy industry"

An Advisory Report by:

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Introduction and Summary

The Kenya Market-led Dairy Programme (KMDP) is implemented by SNV Kenya and funded by the Netherlands Embassy in Nairobi. KMDP's Strategic Review mission (November 2015) recommended a thematic assessment on the various interventions put in place for knowledge exchange and skills development, with a view of informing KMDP on a more focused, coherent and embedded approach for scaling up in a potential phase II.

Between the period April to June 2016, Mr. Gerald Katothya (an independent consultant based in Nairobi) and Mr. Jan van der Lee (sustainable livestock systems advisor at Wageningen UR Livestock Research in the Netherlands) teamed up to undertake the assessment, relying mainly on document review and a rapid field survey.

KMDP's implementation period covers the period July 2012 – December 2016 and has seven agendas, i.e. i) smallholder dairy value chain, ii) vocational skills development, iii) quality based milk payment pilot, iv) fodder commercialization, v) medium scale commercial dairy farms model, vi) international linkages and partnerships, and vii) policy and sector support. Progress on most of these agenda areas is well documented in manifold status reports. However, considering that knowledge exchange aspects cut across all the seven agendas the agenda focused status reports, do not provide an integrated and connected documentation of KMDP's approaches to knowledge exchange and skills development, now brought together under the umbrella "Training & Extension" (T&E) approaches.

A review of T&E elements experimented by KMDP is presented in *section 2.0.* It distinguishes about ten[1] T&E elements. Compared to T&E elements traditionally applied by dairy programs in Kenya, this assessment finds most KMDP's elements unique and well-targeted to the conditions conducive for market led dairy T&E services. These elements are observed to have worked well, despite some having been introduced mid-way the program life (such as the Lead Farmer approach).

This assessment finds the overriding governance structure as a blend of private and third sectors led T&E systems. It also observes that the extensive and direct involvement of KMDP's intermediary role risks skewing it towards third sector led systems. Overall, for synergy and sustainability to be better exploited, integration of the different elements is requisite. For this to be realized, this assessment recommends KMDP to: (*see details in section 4.0*)

i. Adopt the most integrative T&E models (the processor-led or CBE-led models) *see appendix 3*

[1] They include: Lead farmer approach, PDTCs, LCBs/dairy advisories, international experts, linkages with ISPs, CBE T&E units, study groups for MSFs, international exposure, commercial fodder producers, and innovation fund and pilots aimed at stimulating viable T&E elements.

ii. Pay attention to the most integrative coordination mechanisms identified (markets, bilateral cooperation, multilateral cooperation-knowledge hub, redefining roles of intermediaries-KMDP, mobilizing social capital among different types of farmers, and addressing good corporate governance challenges in producer organizations) *see table 4.1*
iii. Adopt monitoring approaches that enables documentation, profiling of case studies and supports complementary learning across diverse T&E actors.
iv. Build competence and tools for connecting different types of farmers in mutual learning platforms, and enhancing the hypothesized business linkages between smallholders and medium scale commercial dairy farms.
v. Strengthen aggregation and (re-) articulation of T&E needs and demands of different types of farmers, by improving application of on-farm data and analytics.

In the review of T&E models applied by other players (*see section 2.4 and appendix 4 for detailed case studies*) in dairy and other agri-sectors (coffee and bananas), this assessment distinguishes three factors that influence demand and supply of T&E: i) the primary objective motivating the lead player (pro-poor development vs. shift from aid to trade, subsistence vs. commercialization), ii) types of farmers targeted, and iii) commodity and sector specific features such as requirement for large scale preliminary processing (coffee), applicability of quality based payments (coffee), susceptibility to free ridding in produce quality (coffee), ease to bundle production and marketing services (coffee), and extent of synchronized seasonal patterns (coffee). These factors seem to be instrumental in evolution of well-established private companies offering total farm advisory services (production, processing and marketing) in the coffee sector. Considering the evolving trends in the Kenyan dairy sector's supply chain development, this assessment suggests that this model in the coffee sector is ripe for adoption and adaptation in the dairy industry.

Regarding the skills gap problem experienced by T&E advisors, this assessment observes that this systemic issue has been widely acknowledged especially by third sector and private sector players in most agri-sectors. They seem to content that despite their slender and theory oriented educational preparations, Kenyan trained agricultural graduates are redeemable if put through a structured on the job training accompanied by coaching and mentorship. The private firms offering farm advisory in the coffee sector develop their coffee agronomists through in-house on the job graduate trainee programs.

There is equally a lot that other players can learn from the unique approaches piloted under the vocational skills development (VOSD), international partnerships and Innovation Fund agendas implemented by KMDP. This assessment finds KMDP's "promote-and-provoke" principle appropriate in contributing to skills development in the dairy industry and worth up scaling. It further advises expanding skills development beyond technical practical skills in dairy production to incorporate farm economics and other soft skills such as: i) client management, ii) facilitation of knowledge exchange and iii) on-farm learning and experimentation. The critical abilities for demand-led T&E advisors outlined in section 3.4 can be referred to for guidance.

Regarding incorporation of new knowledge in the industry, this assessment observes that: i) the industry lacks an agenda setting mechanisms for dairy knowledge content and prioritization of topics, and ii) the

dairy innovation system is dominated by private and third sector players, except perhaps in fodder seeds development sector which is highly regulated by the public sector. Various dairy exhibitions and fairs such as the annual ESADA conference and Brookside Breeders Show, provide platforms for local and regional exposure.

The scale of international exposure realized through hosting Dutch experts, exchange visits to Dutch dairy industry, and B2B linkages with Dutch private sector implemented by KMDP are quite unique and recent. Another observation is that cross learning within the various KMDP agendas can be improved, and that in general sharing across other third sector players is quite minimal.

In conclusion this assessment commends KMDP's out of the box approaches to knowledge exchange and skills development and makes overall recommendations for the future: i) adopt most integrative T&E models and coordination mechanisms, ii) develop competences in connecting different types of farmers in mutual learning and business linkages to enhance supply chain development, and iii) redefine the role that KMDP should play as an intermediary in a private sector driven T&E system.

List of abbreviations

AAS	Agricultural Advisory Services
B2B	Business to Business
BGKA	Banana Growers Association of Kenya
BMGF	Bill and Melinda Gates Foundation
CBE	Collection and Bulking Enterprise, governed by a DFCS or a private entity
CFP	Commercial Fodder Producer
CRI	Coffee Research Institute
DFB	Dairy Farm Benchmarking
DFCS	Dairy Farmers Cooperative Society
DTC	Dairy Training Centre
DVC	Dairy Value Chain
DTI	Dairy Training Institute Naivasha
EADD	East Africa Dairy Development programme
EDFA	Eldoret Dairy Farmers Association
ESF	Entrepreneurial Smallholder Farmer
GDFCS	Githunguri Dairy Farmers Cooperative Society
HC	Happy Cow (Milk processor)
ISP	Input and Service Providers
JC	Junior Consultant
KMDP	Kenya Market-led Dairy Programme
KNDMP	Kenya National Dairy Master Plan
LCB	Local Capacity Builder
LF	Lead Farmer
LSF	Large-scale farmer
MCCFCU	Meru Central Coffee Farmers' Cooperative Union
MCDFCU	Meru Central Dairy Farmers' Cooperative Union
MFF	Medium-scale Farmers' Forum
MSF	Medium-scale farmer
NKCC	New Kenya Cooperative Creameries
NGO	Non-Governmental Organization
PDA	Private Dairy Advisor
PDTC	Practical Dairy Training Centre
SNV	Netherlands Development Organization
SMS	Strategic Management Services Company
SPEN	Services Providers Enterprise Network
SWOT	Strengths, Weaknesses, Opportunities and Threats, analysis tool
TC	Tissue Culture
T&E	Training and Extension
TFM	Tropical Farm Management Company
TMRs	Total Mixed Rations
ToT	Training of Trainers
TVET	Technical and Vocational Education and Training
TTI	Technical Training Institutes
VOSD	Vocational Skills Development

1.0 Introduction

1.1 Provision of dairy advisory services in post-liberalization Kenya

The liberalization of livestock services in the early 1990s anticipated that private sector players would respond rapidly in provision of services on market-led approach, especially in high potential, market oriented milk production zones. Likewise Dairy Farmers Cooperative Societies (DFCSs) were expected to rapidly take up expanded and innovative roles in ensuring members' needs and demands are met. Some (older) studies report that the participation of DFCSs in milk marketing and provision of extension and input services seemed to have improved in the immediate liberalization period, before declining afterwards. They further find that the overall response of private sector was perceived to have been slow and weak, largely due to weak market environment (Morton and Miheso, 2000; Ombui, 1995; Owango, et al., 1998).

Twenty years into post-liberalization, recent operational data and reports (derived from dairy development programs) indicate a gradual improvement in DFCSs' and private sector's response to demand and supply of dairy support services (including training and extension services-T&E). Recent experiences indicate that innovative institutional arrangements have been evolving in response to accelerated demand for dairy advisory services. The push factors include a growing number of dairy entrepreneurs taking dairy farming as a commercial venture and a sustained agribusiness focus by dairy development programs. The pull factors include accelerated demand for milk and dairy products and increased investments in milk marketing and processing infrastructure.

The innovative institutional models for facilitating farmers' access to extension and input services that have evolved over the last decade include the milk shed approach, the Dairy Chilling Hubs and the milk Collection and Bulking Enterprises (CBE) models. They have tended to be anchored on partnerships between DFCSs and other value chain actors and support service providers, and have been facilitated by donor funded projects such as EADD (led by Heifer International) and KMDP (SNV). Their common features include in-house business units and outsourced arrangements for facilitating farmers' access to inputs and extension services.

As a result, the Kenyan dairy sector has recently been profiled as a smallholder-based, private-sector integrated, and commercially-oriented sector with wide pro-poor benefits (Ngigi, 2005). Others have argued that the value chain meets preconditions for private sector driven governance structures (Makoni, et al., 2014). Since it is commercially oriented and dependent on a range of interlocking advisory services and input provision, others have contended it meets a key precondition for demand driven advisory services (Morton and Miheso, 2000). However, other pro-poor voices have urged for a differentiated sector development strategy, viz. a dual strategy under which pro-poor oriented programs target subsistence oriented farmers, while private sector oriented programs target dairy entrepreneurs willing to invest in dairy production on a commercial mode (Staal et al., 2008; KNDMP, 2010; Makoni et al., 2014). These varying objectives or pathways on dairy development ultimately influence the design of T&E approaches promoted. KMDP seems to have deliberately chosen the pro-commercialization, private sector oriented pathway. This pathway is more amenable to a hybrid governance structure (as advanced by Birner et al. 2009) that blends private and third sector (farmer organizations, NGO and donor programs)

players' roles in financing and provision of dairy T&E services. Others have broadly defined this blend as 'private sector-driven governance structure' (Feder et al. 2011, KMDP 2012).

1.2 Brief on KMDP T&E and knowledge exchange approaches

The Kenya Market-led Dairy Programme (KMDP) is a donor funded dairy development intermediary influencing innovative institutional arrangements for delivery of dairy T&E services. It is a 4.5 year (July 2012-2016) programme funded by the Embassy of the Kingdom of the Netherlands and implemented by SNV-Netherlands Development Organization - in collaboration with stakeholders. The overall goal is to contribute to the development of a vibrant and competitive dairy sector. KMDP acknowledges that the dairy industry in Kenya is private sector driven. It is designed around two pillars:

i. Smallholder dairy value chain

The objective under this pillar is to increase efficiency, effectiveness and inclusiveness of the smallholder dominated dairy value chain, which is responsible for an estimated 80% of milk production in Kenya. KMDP works in a number of milksheds with processors and CBEs. Under this pillar, KMDP has partnered with two processors and nineteen CBEs in Eastern region (Meru and Tharaka Nithi), Central region (Kiambu, Nyeri, and Nyandarua-Kinangop) and North Rift region (Nakuru and Uasin Gishu). KMDP supports the design and implementation of more inclusive business models, with an emphasis on embedded Training and Extension and input services for CBE members/farmers. In addition, KMDP provides business development services to enhance management capacity and governance of CBEs.

ii. Sector issues

At this level KMDP promotes and support interventions and innovations that address systemic issues that cut across the sector. These are related to e.g. feed and fodder, milk quality (e.g. piloting quality based milk payment systems) and practical dairy skills development. These include:

- Support to the Dairy Training Institute in Naivasha to become a (semi) autonomous institution.
- Linking DTI, agricultural universities and colleges to DTC Oenkerk from the Netherlands (Electronic Information Platform or E-Learning Platform and franchising model).
- Support to Practical Dairy Training Centres or training farms to adopt good farm practices, training materials, training of trainers, and business development.
- Deployment of international experts to build capacity of local dairy advisors (LCBs).
- An internship program for local and Dutch students.

KMDP training and extension approaches and interventions

KMDP has piloted a number of different interventions in the area of knowledge exchange and training and extension (T&E), targeting different categories of clients, such as:

i. Work with 18 CBEs[2] in setting up CBE T&E units using local capacity builders (LCBs) and junior consultants (JCs).
ii. Work with CBEs and medium to large-scale farmers on fodder production, total dairy management, and linkages to dairy input suppliers.
iii. Link commercial fodder producers (CFPs) and medium-scale farmers (MSF) with PUM[3] experts and LCBs for training, coaching, and follow up support.
iv. Link LCBs to PUM and other international dairy experts to capacity build them and help them transition to private Dairy Advisories.
v. Promote B2B and international exposure as a tool or medium for behavioral changes, exchange of knowledge, technology and innovation.
vi. Work with the model of Practical Dairy Training Centres (PDTCs) and Training Farms (PDTCs: one week training with qualified trainers and training modules in place, Training Farms: one-day non-structured training and farm/exposure visits; some PDTCs offer both).
vii. Work with DTI and agricultural colleges and universities at the national level to support good farm practices and linkages with Dutch training institutes like DTC and CowSignals/Roodbont.

1.3 Scope of the assessment and methodology

Towards the end of 2015, KMDP management commissioned a strategic review (SR) of the program. The overall purpose of the 'mid-term review' was to focus on what has worked well, what has high potential for impact, and what has been less effective or warrants change or discontinuation. The review found that KMDP was implementing many interventions and approaches related to exchange of dairy knowledge and information. The SR further recommended a thematic assessment on the various interventions and models put in place for knowledge exchange and T&E activities, with a view of informing the program on a more focused, coherent and embedded T&E design for scaling up in a potential phase II of the program.

The scope of the assessment is detailed in the ToRs annexed in this report as Appendix 1. In summary the objectives of this assessment were:

i. To assess progress made in training/knowledge transfer[4] related interventions and in extension /advisory services improvements.
ii. To assess the strengths and weaknesses of the approaches used so far for the different clients categories - what have been the success factors?
iii. To make recommendations for a knowledge transfer and T&E approach(es) for KMDP II, that:
    a. Connects different types of farmers and/or client categories in an area for mutual learning (smallholders, smallholder lead farmers, medium and large scale farmers).
    b. Is essentially private sector-driven.

[2] The term Collection and Bulking Enterprise (CBE) is used to denote both dairy farmers cooperative societies and privately owned enterprises

[3] Dutch program seconding senior experts and managers for short-term assignments

[4] While the ToRs used the term 'knowledge transfer', we rather use the term 'knowledge exchange'. See also recommendation 4.2.3 (i)

c. Allows for pluriformity, with potential for various dairy value chain actors to take the lead in knowledge transfer and training: dairy processors, CBEs, input suppliers (like feed companies), or service providers (like financial institutions).
d. Addresses knowledge transfer, training, skills development and incorporation of new knowledge into the dairy innovation system, from Kenya and from abroad.

The study was conducted by Gerald Katothya, an independent external consultant from Nairobi, and Jan van der Lee, an expert in dairy sector development from Wageningen UR Livestock Research, The Netherlands. At SNV/KMDP level, the study was supervised by a steering team composed of:

i. Anton Jansen, KMDP team leader
ii. Reuben Koech, KMDP DVC coordinator
iii. Cosmas Muchina, KMDP monitoring and evaluation coordinator.

The approach and methodology included:

The assessment reviewed various KMDP documents. They included progress reports, specific reports detailing the status of different KMDP agendas (status reports), as well as the strategic review report. The fieldwork phase entailed Interviews and site visits to program target groups, clients and stakeholders. A total of 25 interviews were conducted. Three program regions were sampled (Nakuru, Uasin Gishu and Meru Counties) based on diversity of T&E elements, as well as in consideration of regions proposed for KMDP II. Moreover, participation in on-going relevant activities (such as the DTC workshop held on 28th April at Baraton University, and Bidii SPEN group silage making session in Meru) was applied to collect data through observations. The fieldwork program and list of respondents are provided as appendix 2.

Different types of qualitative analyses were carried out as deemed appropriate. They include an analysis of the T&E demands expressed by different types of farmers, mainly smallholders, entrepreneurial smallholders, medium and large scale, and aspiring dairy farming investors. Various forms of strategic analyses were conducted adapted from the SWOT analysis tool. Description of different roles played by different types of local capacity builders (LCBs) were also presented.

In order to explore the factors that have or can enhance the integration of the different T&E elements, this assessment analyzed the various coordination mechanisms governing the exchange of T&E services under each element. This was thought to not only aid in disentangling the success and constraining factors under each T&E element, but further to inform potential tools for enhancing the integration of the different elements in the design of a T&E model for KMDP-II. The governance/coordination mechanisms are derived from transactional costs and value chain coordination studies advanced by Birachi (2006), Bijman et al. (2012) and Farnworth (2011). Comparison with T&E models experimented by other actors and in other agri-sectors were also undertaken to derive lessons that can be learned. To illustrate the emergent most integrative T&E models, stakeholders' diagrams were visualized. Finally, a detailed draft report was presented to KMDP management team for comments and validation.

2.0 Findings

This section presents the findings of this assessment. The outline is guided by the key research questions. It covers a review of KMDP T&E elements/models and an analysis of T&E needs and demands by different types of farmers. An analysis of the coordination mechanisms governing the exchange of T&E services under each model is also presented. As explained above, this was thought to not only aid in disentangling the success and constraining factors under each T&E element, but further to inform potential tools for enhancing the integration of the different elements in the design of an overall T&E model for KMDP-II. Finally a description and comparison of T&E approaches applied by other actors in dairy and other agri sectors in Kenya is provided.

2.1 Review of KMDP's T&E approaches

KMDP has facilitated several T&E approaches and interventions aimed at facilitating exchange of practical technical dairy knowledge and targeting entrepreneurial dairy farmers. Indeed, T&E aspects cut across all the seven agenda's (see SNV, 2016) that KMDP has prioritized for interventions. This assessment finds most of the KMDP T&E elements quite unique compared to approaches traditionally applied by most dairy programs in Kenya. The unique ones include the facilitation of i) Practical Dairy Training Centers (PDTCs), ii) engaging and stimulating development of a cadre of LCBs to assume private dairy advisors roles as consultants, iii) farmer-led study groups for medium and large scale dairy farmers, iv) a deliberate approach to infuse international knowledge exchange mainly from advanced dairy industries such as the Netherlands, v) deliberate engagement with local and Dutch dairy training institutions such as DTI-Naivasha, local universities, and DTC and CowSignals/Roodbont in the Netherlands; vi) an innovation fund to stimulate innovative arrangements for delivery of T&E content and materials, vii) a processor-led T&E approach with Meru Central Dairy Farmers' Cooperative Union (MCDFCU), and viii) interventions targeting commercial fodder producers (CFPs) to stimulate growth of commercial fodder supply chains.

KMDP has also given impetus to existing T&E approaches commonly applied by other dairy programs (such as East Africa Dairy Development EADD). They include: ix) the lead/model farmers or farmer-to-farmer learning approach among smallholder dairy farmers; x) support to CBEs/dairy producer organizations (POs) to establish T&E units; xi) facilitating local and regional farmer study tours and exchange visits; and xii) facilitating T&E linkages between CBEs/processors and input and service providers (ISPs).

The subsequent sub sections below present detailed findings under each T&E element applied under KMDP.

2.1.1 Lead Farmer approach under CBEs

Current profile of lead farmers

Under the smallholder dairy value chain (DVC) component (KMDP pillar 1) KMDP implements a lead farmer approach. The lead farmers (LF), also described as *Pareto farmers,* are the top milk suppliers (30-100lts/day–depending on the CBE) in a CBE, and exhibit relatively best dairy practices that their peers can learn from. An additional criteria is their willingness to avail their farms for learning and sharing of dairy farming knowledge and information with other farmers from within and beyond the CBE's geographic coverage. Though a farm - and socio-economic analysis of the current group of LFs was not readily

available, field observations from the three CBEs sampled for this assessment (Ngorika, Olenguruone, Mbwinjeru, and Nkuene) indicate that they are likely to have better access to resources than the average dairy farmers in a CBE. They are therefore regarded as dairy entrepreneurs and they form the primary target group for KMDP under the DVC agenda. From the same data women constitute 20-30%, while youthful farmers were reported to be gradually emerging (interviews with LFs, CBE T&E staff and LCBs from Ngorika, Olenguruone, Mbwinjeru and Nkuene CBEs). Age and gender did not seem to be part of the criteria for eligibility to become a LF. According to project staff, preference was given to youth wherever available and meeting the set criteria. Overall, the LFs are not necessarily the best by national standards, but represent the best in the context of the different milksheds and "their" CBE. Targeted interactions and learning linkages with leading dairy farmers nationally and beyond is encouraged by KMDP. This is thought to not only provide them with a benchmark to base their dairy farming vision on, but also a peer support mechanism for exchange of dairy knowledge and information.

How lead farmers are performing in adoption and advising fellow farmers

This assessment observes that the LF approach has turned out to be among the most impressive elements under the DVC component in terms of knowledge exchange and adoption of farm level dairy innovations. This is despite the fact that the LF approach was introduced mid-way KMDP program life. LFs interviewed identified three major triggers of immediate change to pursue dairy as a commercial venture. These were; i) the participation in 5-days training offered at the PDTCs, or one-day exchange visits to PDTCs or model dairy farms, ii) follow up support offered by LCBs and to some extent by CBE T&E staff, and iii) support and inspiration sustained through peer learning and interactions. Though farm level quantitative analytical reports on LFs' performance in adoption and advising fellow farmers were not readily available (note that some quantitative farm level data-sets exists), qualitative observations based on field work and KMDP progress reports, reveal that they lead in adoption of on-farm innovations and in facilitating peer learning.

Several mechanisms are employed to enhance farmer-to-farmer learning and exchange of dairy knowledge and information. At the core is the regular (monthly) peer learning activity amongst LFs on a rotational basis across peers' farms; some LFs develop annual study group calendars. The rotations are based on topics of priority and the farm most depicting the desired aspects. They also host trainings in their farms organized by the CBEs, which also attracts farmers beyond the CBEs' membership base. Sometimes they play a co-training role when they host training, however, this seemed to depend on the conscious role assumed by LCB/JCs and CBE T&E staff involved in organizing such learning events. LFs also reported to host individual farmers or groups for learning visits in their farms-these are noted to come from within the CBE's catchment and beyond.

While some of the LFs are reported to have started charging a fee to visitors (KMDP reports), those interviewed indicated that they did not charge any fees for such visitors yet they reported to be incurring direct and indirect costs. Their sentiments could be interpreted to mean that they need guidance from KMDP or the CBEs on the matter. Interviewed LFs also indicated that all visitors sign-in in the visitors' book, this presents a cost effective source of monitoring data that KMDP and CBEs could tap into and with which they could analyze the relevance and performance of the LF approach in knowledge sharing.

Also on-farm data based on routine diagnostic tools such as the Dairy Farm Benchmark (DFB) is collected from LFs, analysis was reported to be limited to informing work plans and development of T&E products (Interview JC Nkuene CBE, Interview Perfometer). LCBs and SNV advisors report on progress at farm level this is a mixture of qualitative and output oriented quantitative data. There is however limited systematic data collection on farm economics, cost price of raw milk and profitability. This lack of hard data makes evidence based decision-making and learning difficult.

What hinders or facilitates peer learning under the LF approach

Several factors that hinder or facilitate LFs in sharing knowledge and peer learning were identified during this assessment. Table 2.1 below presents these factors.

Box 2.1. *Factors likely to hinder or facilitate peer learning under the LF approach*

Facilitative factors	**Hindering factors**
✓ Shared norms - drive culture and pride in sharing information among rural people ✓ Shared interests in improved dairy enterprise increase demand for peer learning ✓ Farmer interests in learning under practical farmer's farm conditions ✓ The power of peer to peer learning ✓ Linkages with CBE leadership and formal structures ✓ Presence of intermediaries (LCBs, CBE T&E staff) with expertise in facilitating farmer-to-farmer knowledge sharing	✓ Expansive terrain and uneven distribution of LFs across CBE catchments (10 LFs per CBE are few) ✓ Intensity of labour demand at LFs farms (especially for female LFs) constrain their availability to host or attend learning events ✓ Loose integration of LF approach into the CBE structures and operations (LF recognized as a formal program in CBE, popularized amongst farmers, represented T&E sub-committees) ✓ Weak linkages with other providers of T&E services (ISPs, CBE staff) ✓ Low level of willingness among farmers to pay for learning events ✓ Myths about bad omen associated with exposing farm to visitors ✓ Limited biosecurity measures at the farms ✓ Limited facilitation by CBE (access to newly demanded inputs - fodder seeds, limited experiences of CBE T&E staff, financial support to host learning events - meals, refreshments) ✓ Deterioration of farm practices at LF farms ✓ Poor farm level record keeping and analysis constrains profiling and recognition of the overall impact of farm improvements
Threats/Risks	**Opportunities**
✓ Fluctuation in milk prices depresses demand for peer learning ✓ Follow up visits by LCBs is prone to supply driven shortcomings reminiscent of the T&V model. ✓ The LF approach is likely to trigger leadership tensions within CBEs as LFs gain interest in leadership positions ✓ Side selling of milk undermines LF integration in CBE	✓ LF approach presents a platform to support farmer led farm level innovations and experimentation. Two case studies attest to this. One LF (Ngorika) experiencing good results after applying farm yard manure on Boma Rhodes plot was advising farmers and LCBs to ignore the popular advice about use of organic fertilizer. Another LF was reportedly discouraged by SPE for suggesting use of sunflower for silage making in Meru ✓ LF farms present potential partnerships with TTIs and research institutes for on-farm data generation, trials under farm conditions, internship placements and practical training sessions ✓ Provide an opportunity for pioneering member loyalty programs under CBEs (suggested branding 'Milkmiles' or '3 tons club').

Expectations of CBEs on lead farmers as T&E agents

According to interviews held with LFs and CBE leaders, the extent to which the LF approach is relied upon as strategy for enhancing T&E, depends on the level of awareness within the CBE's leadership on the potential role that LFs can play in boosting and sustaining milk supply, especially considering that the viability of the CBEs business model is highly depended on volume of milk bulked. Presence of LFs in the CBEs boards and especially T&E sub-committees seems to aid in integrating the LF approach in the CBEs. This can be demonstrated better in New Ngorika CBE, where most board members are also LFs, as compared to Olenguruone CBE. The role played by LCB/JCs also seems to increase the prominence and demand on LFs as key actors in knowledge sharing within the CBE. An observation that the LFs seemed more inclined to interact with LCB/JCs than with CBE' T&E staff should be a pointer to the low caliber of CBE T&E staff and therefore a sustainability concern. All in all, CBEs that have realized the business case of the LF approach expect LFs to lead in adoption of innovations even with limited CBE facilitation in accessing newly demanded inputs and technologies such as fodder seeds (where the supply side market is still thin while demand market has improved) and access to reliable milk markets. They are also expected to co-train and host farmer training and demonstrations in their farms even with limited facilitation. The three CBEs interviewed indicated that the respective boards have not made any resolution or recommendation on whether LFs should charge a fee or not for hosting learning events.

Lessons for an integrated LF approach

In conclusion, the LF approach is proving to be successful in stimulating a critical mass of dairy entrepreneurs, who are leading in adoption of on-farm dairy innovations, in peer learning and in milk production. From this assessment a couple of lessons can be distilled concerning how a LF approach can be integrated in a CBE business structure:

i. The approach should by design be part of the T&E approaches envisaged and the guidelines for implementation documented and widely shared among facilitating advisors.
ii. The design for such LF programs could be tailored around loyalty programs implemented by firms in the services industry, where the *pareto* clients are accorded personalized services.
iii. It is critical to formalize the approach within the CBE's organizational structures. Integration seems to be enhanced when a) some of the LFs are members to CBE committees and especially CBE T&E sub-committees, b) T&E unit work plans incorporate LF hosted learning events, c) the CBE leadership and management has acknowledged the business case of the LF approach.
iv. Explore direct linkages and synergies with other providers of advisory services and capacity (via the CBEs). Linkages with Practical Dairy Training Centers, Technical Training Institutes, input suppliers, research institutes, MSFs). Research institutes and TTIs could establish collaboration with such LF farms for mutual benefits, e.g. as farms for practical trainings, internships, longitudinal on-farm data collection, and trials. The farmers could benefit from incentives such as personalized advice, priority in accessing new dairy knowledge and information, as well as charging some fee for hosting students.
v. It is best coordinated by experienced facilitators/consultants. Desired skills are in brokering information and facilitation of knowledge sharing and learning (soft skills), and reasonable expertise in dairy production (technical knowledge).

vi. Qualifications to the LFs club should be made clear by the CBE leadership/management and thereafter marketed to the membership for buy-in. Mechanisms to make the approach transparent, dynamic and more inclusive (socio-economic and spatial distribution) should also be considered. Guidance can be drawn from the practical experiences emanating from different CBEs under KMDP-I, for example Mumberes (according to Julian - LCB Nakuru) and Nkuene (according to Judy - LCB Meru). Perhaps periodic evaluations of lead farms or interested farms should be conducted annually or biennially.

vii. To enhance demand orientation and program learning, the LF approach could be backed by robust on-farm data collection and analytics. Incentives for such farmers to maintain farm records and share data with T&E advisors could be pursued. Incentives could include the commitment that dairy advice will be individualized based on on-farm analysis. Some of the learning questions could include: how the LF approach is performing as a mechanism for transforming dairy into business, how peer learning influences farmers and LFs to improve on-farm practices, etc.

viii. Overall, it would be interesting to monitor the performance of different LF groups to gain deep seated insights. Of particular interest could be to reveal how similar or dissimilar the LF approach is from the commonly used farmer group approach in delivery of T&E.

2.1.2 Practical Dairy Training Centers (PDTCs)

Demand for trainings at PDTCs by different types of clients

Though a relatively new intervention, PDTCs have proven to be an important innovation in the KMDP T&E approaches. PDTCs are medium to large scale dairy farms that have invested in offering structured 1-day or 1-week training courses for practical skills and knowledge transfer. They are meeting and stimulating demand for technical practical skills in dairy production across a diverse clientele of dairy farmers/entrepreneurs. Based on this assessment, the table below presents an analysis on the type of clients and their training needs/demands that PDTCs have been stimulating and meeting.

Table 2.1. Analysis of training demands at PDTCs by different clients

Client/farmer type	T&E demands
Start-up dairy farmers	✓ Business people and professionals intending to invest in dairying business ✓ Could be in their mid-life phase or those planning to retire ✓ They seek basic but practical knowledge on how to get started ✓ Generally interested in a comprehensive package (all important topics) ✓ Mostly self-sponsored though cases of some expecting free services were reported, especially for those booking a few hours tour.
MSFs/LSFs	✓ Medium to large scale dairy farmers interested in improving productivity of their dairy farms ✓ May be interested in comprehensive package or specific topics/modules ✓ Could be as individuals or in groups - mostly self-sponsored

CBE based entrepreneurial smallholder dairy farmer	✓ Progressive and lead farmers interested in dairy farm improvements ✓ Most Lead farmers attribute the trigger for the changes in their farms to the 5-days training at PDTCs ✓ Mostly attend training in groups and sponsored by NGOs
Women dairy entrepreneurs	✓ Prefer shorter training sessions (such as one day) ✓ Interested in comprehensive package or specific topic
Youths intending to venture in dairy services (SPEN)	✓ Youth intending to venture into dairy production and services provisions ✓ Interested in practical skills in fodder establishment and preservation ✓ Bidii dairy promoters' enterprise self-help group in Meru is an example of six youth growing a services business in silage making after attending 5-days training in Mawingu PDTC ✓ Mostly attend training in groups and sponsored by NGOs
Dairy farm managers/ technicians and CBE T&E staff	✓ Dairy farm manager and technicians from medium to large scale farms ✓ Most have a background training in dairy/animal science related field ✓ Are interested in acquiring practical skills in dairy farm management routines and innovations such as in fodder and milking
Students from agricultural colleges	✓ Students and fresh graduates from agricultural training intending to develop practical skills ✓ Students intending to learn practical skills under real farm conditions.
Training firms/ institutions, dairy programs, processors, ISPs	✓ Dutch Training firms such as QPoint, CowSignals and DTC that wish to hire the farm and facilities as a training location and bring their own trainers and trainees ✓ Dairy programs like SNV, GIZ, Smart Dairy and processors and ISPs who book training courses/packages for their clients

The impact of PDTCs

As indicated, PDTCs as conceptualized under KMDP are quite a recent invention and therefore it is a bit early to evaluate their impact. However data from interviews held for this assessment indicate a number of positive outcomes highly attributed to PDTCs. First the two group interviews with a total of eight LFs were unanimous that their participation in a 5-days practical skills training at a PDTC, was a major trigger of the changes that most LFs are experiencing in their dairy farms. Second, the six youth (all males) running Bidii dairy promoter's enterprise interviewed in Meru attribute the successful startup of their silage making services business to the 5-days training at Mawingu PDTC. They further reported that the exposure triggered them to establish or/and improve their own dairy farming enterprises. Third, the CBE T&E staff interviewed spoke highly of the effects of the 5-days PDTC training to their roles of facilitating practical training to CBE farmers. Fourth, the real life farm conditions and the testimony on how the farm transformed into good practices connects better with visiting farmers, than say a visit to college or research institute's dairy farm. Fifth, the PDTC manager interviewed highlighted three indicators that signal the increasing realization of the relevance of PDTCs: i) an increase in number of enquiries and visitors to the PDTC, ii) the interests that technical training institutes (TTIs) have been expressing for partnerships (although not willing to pay for students internships and study visits, and iii) the high turnover of PDTC staff as a result of being poached by dairy entrepreneurs and ISPs associated. Besides

the practical skills orientation of the training at PDTCs, other positive factors identified were the incorporation of new knowledge and innovations through international experts from The Netherlands (ToTs). Overall, KMDP advisors observe that the three PDTCs are on average demonstrating the profitability of the concept.

Despite this positive feedback about the relevance and impact of PDTCs, their ability to operate optimally was rated as mixed but overall positive, as only one PDTC was observed to be operating below the breakeven mark. Business viability highly depends on ability to attract a quorum of clients in an evenly spread schedule throughout the year. Reasons advanced were that recent branding and marketing efforts are yet to pay dividends and low willingness to pay for T&E services among potential clients. Most clients are sponsored by dairy development projects, which are quite seasonal. The concept of the branding and marketing of PDTC services introduced by KMDP needs to be intensified and sustained. Without optimal and sustained intake of trainees the PDTCs cannot attract and retain B2B partnerships with experienced local and international dairy experts without subsidy.

How PDTCs can be linked structurally with clients

To overcome such challenges, PDTCs ought to be embedded/stimulated within a virtual hub of dairy information and knowledge exchange. This calls for strategic alliances in a network of sponsors, providers, and clients of dairy T&E services. Donor funded dairy programs can play intermediary roles in stimulating demand and supply of PDTC support services. The mapping for potential farms that can develop into PDTCs, would therefore consider the feasibility of mobilizing a network of diverse T&E players required for a functional dairy information and knowledge hub. Branding and marketing of the PDTCs support services could target more deliberately and systematically: i) other dairy development programs, ii) CBEs, iii) funders of T&E services such as input suppliers and milk processors who could enter into a partnership to establish demo centers, iv) county governments in dairy producing areas, and v) agricultural colleges and TTIs. Designing diverse training programs to target the different demands of targeted clients is another opportunity. Popularizing graduates of PDTCs for recognition in the dairy advisory profession/ market is key. This would besides other factors require that PDTCs meet the TVET regulatory requirements. Profiling case studies on the impact of the three PDTCs facilitated under KMDP would enhance marketability of the approach. The case studies should not only demonstrate the impact of the PDTCs as providers of support services to T&E, but also the potential impact as secondary business units for dairy farms. In conclusion the box below presents a SWOT analysis of the PDTC element:

Box 2.2 SWOT analysis on PDTC model

Strengths ✓ Demonstrated viability of the model by the three PDTCs supported by KMDP ✓ Positive feedback expressed by previous clients of PDTC services (LFs, SPEN) ✓ Standardized, hands-on curriculum, content and modules have been developed and shared. **Opportunities** ✓ Increasing demand for practical skills and knowledge in dairy across different types of clients (entrepreneurial farmers, dairy advisors, students) ✓ Latent potential for T&E partnerships with other actors (CBEs, TTIs, Research institutes, ISPs, processors, and dairy development programs) ✓ Existence of a regulatory framework on vocational skills development (TVET)	**Weaknesses** ✓ It's a relatively new model prone to challenges (delay in registering with TVET, turnover of trainers) ✓ Limitations in attracting regular and optimum intake of clients (significant no. are sponsored) ✓ Programs not suitable to mass intake of clients (optimum is 10-15 trainees) ✓ Establishment is capital and expertise intensive ✓ Demanding to sustain good practices, retain experienced trainers, develop diverse products **Risks/Threats** ✓ Limited willingness to pay for T&E services (farmers) ✓ Limited willingness to pay for practical skills compared to theoretical skills (colleges, students) ✓ T&E profession dominated by theory based certificates (PDTC certificates less recognized) ✓ Weak implementation of TVET regulatory framework

2.1.3 Local capacity builders (LCBs)

Roles currently played by different types of LCBs

Private dairy advisors (PDAs), popularly referred to in KMDP as LCBs, play a number of roles under different KMDP T&E approaches and agendas. Complemented by the roles played by international dairy experts and KMDP advisors, these dairy advisors seem to form a significant component in KMDP's T&E infrastructure. This is by design as KMDP acknowledges the importance of capacity building of local private dairy consultants and service providers to assume a vital role in delivery of demand driven, private sector led dairy advisory services. To understand the different roles played by these LCBs, this assessment identifies and categorizes the LCBs into three major tracks based on KMDP agenda's. They include:

a) LCBs predominantly serving under the DVC agenda
b) LCBs predominantly serving under the model for medium scale commercial farms (MSF) agenda and commercial fodder producers (CFP) agenda
c) LCBs predominantly serving under the vocational skills development (VOSD) agenda.

It also observes that LCBs in tracks b) and c) seem to have had a deeper involvement in commercial fodder production (CFP) and in the international linkages and partnerships agenda's compared to those under DVC. The box below presents an analysis of the current roles played by the different types of LCBs.

Box 2.3. Analysis of current roles played by different types of LCBs

Type of LBCs/Description of roles played
a. DVC component (work with entrepreneurial smallholder dairy farmers under CBEs)
Lead Consultants (experienced agribusiness professionals) ✓ Responsible for the overall T&E strategy delivery in their areas of operations ✓ Main link between KMDP advisors and other LCB/JCs in the field ✓ Coordinating DVC T&E activities at milkshed level (ensure T&E work plans and reports) ✓ Supervising and mentoring JCs on T&E approaches and skills ✓ Coaching and mentoring CBE T&E staff ✓ Brokering relationships between CBEs and private sector financiers and providers of T&E services (such as ISPs, milk processors) ✓ Articulating farmers needs and demands for T&E services ✓ Training and follow up of farmers (especially the LFs) ✓ Link to CBEs leadership and processors on T&E (attend CBE T&E sub-committee board meetings) **Junior Consultants (fresh graduates, most had an opportunity to first serve as interns under KMDP)** ✓ Coordinating T&E activities at CBE level (implement T&E work plan) ✓ Coaching and mentoring CBE T&E staff ✓ Aggregating and articulating farmers T&E needs and demands ✓ Follow up on LFs (monthly) ✓ Organizing farmer training, demos, and exchange visits ✓ Follow up on service provider enterprise network (SPEN) development
b. MSF model (main areas include fodder production and total farm management for medium scale farms)
Two consultancy firms ✓ Coordinating T&E programs that target MSFs and CFPs with significant involvement of international experts ✓ Coordinating study groups under medium scale farmer fora (MFFs) ✓ Advising MSFs/CFPs in specific areas/topics of specialization - individualized farm advice ✓ Facilitating linkages with services providers - inputs, machinery, financial ✓ Aggregating MSFs' needs and demands (through diagnostic tools like Dairy Farm Benchmarking (DFB) ✓ Translating MSFs' T&E demands into products such as Dairy Investors Conferences ✓ Facilitating local and international exchange tours ✓ Facilitating development of SPEN and mechanised agricultural contractor concept (Nundoroto, Dejirine). They have grown their consultancy companies and invested in staff, products/services for management support of MSFs and CFPs on commercial terms, including linkages with Dutch private sector.
c. VOSD Component (work with PDTCs, TTIs and medium scale farms)
This composes of consultants, junior consultants, interns and students on attachment programme who practice under the guidance of KMDP advisors and international experts on activities directed at 'training farms". Two types of training farms are visualized, PDTCs at the local level and TTIs (mid-level colleges with courses in practical dairy skills development) at the national level: **Support to PDTCs involves** adoption of the best farm practices, training of trainers and adaptation of training materials, and branding and marketing of PDTC services **Support to TTIs involves** improvements on dairy farm practices at the colleges' dairy farms, development of business plans to guide resource mobilization, and development of the colleges' dairy farms/firms; as well as the unfolding innovation to franchise DTC based e-platform training modules and content with local TTIs**;** most interns and students under attachment programs have been absorbed as junior consultants under various KMDP agenda's, especially DVC, VOSD and MSF, while others have pursued regular employment opportunities offered by industry players or opted to establish private dairy advisory businesses.

The LCBs are contracted by KMDP on part time basis (specific days per month) or on self-contained assignments governed by terms of references. This arrangement provides an entry strategy to establishing a portfolio of clients beyond KMDP. Though the LCBs might possess similar professional backgrounds, their areas of specialization and further capacity development are influenced by the roles defined under the different tracks, as well as by their primary target groups. Overall impressions this assessment observes the following:

i. That, the interactions across the LCB network can be improved to enhance cross learning, support infrastructure for dairy advisory and diffusion of innovations across the different categories of target groups.
ii. That capacity development for the LCBs was understandably oriented to practical technical skills and new knowledge related to dairy husbandry and farm economics. This seems to assume the LCBs have the requisite soft skills required to manage delivery of dairy advice as a service, broker dairy information, and facilitate farmer-to-farmer learning.
iii. Whereas commendable measures were pursued to ensure that LCBs under the DVC pillar mentor and coach CBE T&E staff, some challenges were noted, such as flexibility in harmonizing different work plans, impromptu redeployment of CBE T&E staff none core T&E tasks, and high turnover of CBE T&E staff.
iv. That coaching and mentoring of CBE T&E staff was achieved through multiple strategies, such as dedicated training sessions (on how to develop T&E work plans, training calendars) and non-training interventions like preparing and supporting them in an on-the-job setting, to not only develop technical expertise but also the confidence and trust from farmers.

Clients' willingness to pay for LCB services

Interviews with LCBs, PDTCs and farmers revealed that farmers' willingness to pay for private dairy advisory services is still low, though improving especially among the more entrepreneurial farmers. It was observed that after introductory intensive training and learning events supported by KMDP, some LFs have started requesting for additional personalized advice oriented towards actual farm level implementation and innovations. In these cases LCBs confirmed that such farmers are willing to facilitate the LCBs in terms of transport and a modest allowance. The LFs are also self-sponsoring their additional peer to peer learning events such as exchange visits that they organize collectively as a study group. The MSFs were noted to be demonstrating the most potential for paying for private dairy advisory services. However, that potential still needs to be stimulated through innovative incentive systems that can borrow from product development and marketing experiences in the corporate services industry. This will entail translating farmers' advisory needs and demands into solutions (products) and orienting the marketing of the products/solutions towards the impact that farmers are likely to realize. One LCB (Perfometer) seems to be taking this direction. Another aspect observed in Meru was that three MSFs had pooled resources to hire an animal health diploma holder to supervise and advice their farm managers and technicians on a rotational basis. The advisor develops a monthly schedule that accommodates visits to each farm at least once a week. This seems an option that can be exploited by entrepreneurial small scale farmers and MSFs. It was also observed that MSFs are often willing to pay for attractive learning events like study

tours, including international ones. Professionals and business people interested in investing in dairy enterprises were also reported as a category willing to pay for start-up advisory services.

A unique challenge faced by LCBs is that since most don't trade in tangible services such as dairy inputs, the option of embedding advice in other services is less feasible, as compared to the marketing of dairy inputs and technologies (like agro vet dealers) or tangible services such as hoof trimming, and silage making (like the SPEN group). However, with well-defined T&E products like in the emerging case of Perfometer, LCBs have an option to bundle intangible T&E services. For example, diagnostic products such as the DFB service can be highly discounted if conceptualized as business entry strategy that LCBs can apply to stimulate demand for other services/products aimed at addressing the needs/demands identified.

Leadership of CBEs finds it difficult to propose a direct levy for funding T&E on milk supplies, fearing negative reaction from members/milk suppliers who are very sensitive to milk prices offered by CBEs vis-a-vis other milk market outlets such as the itinerant milk traders who offer higher prices. As a result, CBEs prefer to finance T&E activities from the revenue retained (surplus) from milk bulking and marketing business. This source cannot raise significant amount of funds for T&E, and also does not raise the level of demand articulation and accountability for T&E among farmers as a direct levy would do.

KMDP has also noted that farmers use other non-monetary gestures that can be interpreted as expression of appreciation and sense of value for T&E services offered. According to Rademaker et al. (2016) these expressions include recognition in non-dairy related public meetings, powerful testimonies such as '*you are like a messiah*', '*you have opened our eyes*', '*we didn't know that we didn't know*', and offers for a meal or refreshment during farm visits or during impromptu meetings in market places.

Effective methodologies

Under the DVC component, the most effective T&E methodologies for dairy advisory services as identified by the LCBs and to some extent by LFs interviewed are: i) on-farm training with a strong demonstration orientation, ii) the lead farmer approach under CBEs, iii) study visits - local, regional and international, iv) learning events hosted at PDTCs, and v) input and service provider training that use presentations/ pictorials and incorporate international experts (though translation was noted as an issue for less educated farmers). Farm follow up visits were rated as both very effective in the sense that they afford individualized on-farm advice, but less cost efficient in the sense that only very few farmers can be reached. ISPs-driven advisory services were noted to be less effective because they tend to prefer presentation to a large number of farmers at one time and because they are driven by commercial interests. In addition to that most ISPs use these forums to push their products and advice may not always be objective.

Advisory services delivered by CBE T&E staff was also rated as less effective, especially when targeting LFs and other entrepreneurial farmers. Reasons mentioned related to a) low level of professional and practical experience among CBE T&E staff, b) low reputation as they tend to be young and locals who are well known by farmers. Mentorship and coaching opportunities offered by LCBs and JCs to the CBE T&E staff were noted to have a positive effect in boosting the T&E staffs' skills, confidence and acceptability.

Among the MSFs effective methodologies include i) diagnostic methods, such as dairy farm benchmarking sessions, as they act as trigger for demand for advice on dairy farm improvement, ii) training hosted at a peer's farm, depicting good and/or bad practices, iii) learning events facilitated by international experts, targeting to infuse new knowledge and innovations, and iv) international study visits.

Box 2.4. *SWOT analysis of the LCB element*

Strengths ✓ Life cases of emerging successful LCBs (in developing requisite skills and business portfolio) ✓ KMDP's positive experiences that local graduates can be mentored to pursue private advisory services ✓ The diverse network of LCBs (DVC, VOSD, MSF) mobilized ✓ Emerging cases of private advisors outside KMDP direct support (rotating farm managers and animal health worker in Meru) ✓ Changing attitude among agricultural and business graduates towards private practice **Opportunities** ✓ Increasing demand for T&E among entrepreneurial dairy farmers (with improving willingness to pay) ✓ Increasing practice of hiring dairy advisors by CBEs ✓ Potential for partnerships with international experts and firms to adapt T&E products ✓ Potential to profile successful case studies to be used by TTIs and dairy development programs ✓ Repositories of crucial dairy farm data that can be harnessed to not only (re) articulate demand but also to develop T&E products ✓ Increasing agribusiness focus of dairy development programs (poised to intermediate in bridging gap between supply and demand for services) ✓ Opportunity to bundle tangible and intangible T&E related service.	**Weaknesses** ✓ Limited capacity in product development and marketing impact of intangible T&E services ✓ Attracts fresh graduates with minimal practical skills and experience ✓ Limited soft skills (capacity) related to organization and management of advice as a service (client management) ✓ Challenges related to the intangible and public nature of T&E ✓ Significant influence from third sector facilitators (like KMDP) provide mixed signals between private and public sector attitudes (farmers willingness to pay, supply driven aspects, and output - vs. impact oriented work plans) **Threats/risks** ✓ Inability of clients (farmers) to express their needs and demands directly (need additional skills to interpret farmers' expressed concerns) ✓ Low willingness to pay for T&E services among farmers ✓ Instability of farmer milk prices negatively influences demand for T&E service ✓ Expanding bundle of tangible with intangible services risks conflict of interests - product pushing

2.1.4 International experts

KMDP has facilitated capacity building and businesses linkages between LCB and Dutch based international experts and private sector firms in the dairy industry. The burgeoning crop of LCBs has benefited from training (originally in technical dairy production and later in business skills) and in on-the-job coaching and mentorship opportunities, both locally and internationally - mainly from the Netherlands. However, this approach largely targeted LCBs serving under the VOSD and MSF components more than those under the DVC component of KMDP. According to KMDP advisors, this was by design as

it was hypothesized then that MSFs were likely to be more suited and receptive to international knowledge exchange. However, the emergence of dairy entrepreneurs under the LF approach made the international knowledge exchange approach equally applicable under the DVC component. As a result, some training activities and interactions were facilitated targeting DVC's LCBs and LFs. This case demonstrates adaptive management in the implementation of KMDP, which indeed is a prerequisite for a learning and innovation oriented program.

Interviews with LCBs who have benefitted from these programs were unanimous regarding the appropriateness and effectiveness of this approach in bridging the practical technical and new knowledge capacity gaps among LCBs. The exposure to the Dutch dairy industry was highly rated as a very impactful way of fast tracking the expertise of LCBs. Fodder establishment, management and conservation, calf rearing and management, cow housing and farm economics were rated highly in terms of topics. During the DTC workshop at Baraton University (April 2016), JCs present exuded confidence that the coaching and mentorship they have enjoyed had prepared them to gradually pursue private dairy advisory roles.
One MSF LCB firm (Perfometer) has significantly benefited from these linkages as witnessed by the ongoing broadening of T&E products largely adapted from the Dutch experiences. The firm also reported that with the linkages it has established with Dutch players it was confident that opportunities for direct partnership abound post KMDP support.

Overall, this assessment observes that the sustainability of the international experts' coaching and mentorship programs for local private dairy advisors, is less feasible without the subsidies afforded by intermediaries such as KMDP. The magnitude of the skills gap confronting the supply side of dairy T&E services is beyond the capacity and mandate of a single facilitator. Besides it will require both short term and long-term measures to address. Rightly, KMDP seems to have anticipated this through the adoption of the *'promote and provoke'* focus which justifies the piloting of good practices and innovations with the hope of triggering self-sustaining momentum. By design the international experts approach espouses an expert-driven exchange of practical dairy skills and - knowledge approach. Whereas this could be understandable and justifiable in the sense that the international knowledge exchange approach was targeted to address a specific need (new, advanced technical and practical knowledge) and target group (MSFs), measures to ensure adaptation to the local dairy industry contexts will require continuous consideration.

Equally, the capacity development efforts targeting LCBs seem to have emphasized technical and business skills for dairy T&E advisors and less on another crucial set of (soft) skills related to brokering of information and facilitation of knowledge sharing, experimentation (farmer-led innovations) and learning. Alternatively, two types of LCBs could be envisioned: i) the purely technical oriented ones (suitable to MSF model), and ii) facilitators of knowledge exchange and learning (more suitable to DVC component). The former would be more poised for direct delivery of T&E services and more on private terms (e.g. Perfometer, Eldosirikwa), while the latter could be brokers of information and facilitators of knowledge exchange, experimentation and learning. They too require some reasonable technical background in dairy, but not necessarily at the depth desired for the former. They would therefore be more suited to operate as intermediaries, third sector agents who are not purely private nor public. This seems to be more applicable to DVC LCBs as well as CBE T&E staff.

The KMDP strategic review mission observed that though Dutch dairy experts have highly specialized technical expertise, they may not always possess the training and facilitation skills, as well as the awareness on the differences between European and Kenyan dairy industry. Yet these capacities are critical in facilitating knowledge exchange (de Jong et al. 2015). The box below summarizes some of the measures KMDP has put in place to mitigate these challenges.

Box 2.5. Measures applied to contextualize international experts' knowledge exchange

Measures applied by KMDP to ensure international and new knowledge is contextualized:

- ✓ Ensuring selected experts have extensive practical experience in an international context
- ✓ An induction phase conducted by KMDP
- ✓ Ensuring experts have an opportunity to do follow up visits
- ✓ Pairing experts with LCBs
- ✓ In applicable cases, a trials phase preceded roll out, especially on fodder establishment (like the case of attempts to introduce Ryegrass which after poor performance during trials led to change of tactic by embarking on Kikuyu grass)
- ✓ Proper targeting - entrepreneurial smallholder farmers and medium scale dairy farmers who are likely to be triggered by new knowledge from advanced dairy industries.

2.1.5 CBE T&E Units

What a CBE T&E unit consists of as a minimum

This assessment finds that a T&E unit under a CBE should, as a minimum, address the following aspects: First, the T&E function should be formally recognized and located in the CBE's organizational structure. The core functions of the unit should be outlined and widely shared. The CBE leadership should be convinced of the business case of the unit, especially in cases where the idea for T&E units is externally promoted by an intermediary like KMDP or an agribusiness partner like a milk processor (MCDFCU, NKCC). Second, a contact person should be appointed; ideally this should be an experienced dairy knowledge advisor whose primary roles would be to coordinate T&E activities and facilitate knowledge sharing and learning as well as direct provision of dairy advice. However, depending on the status of a CBE, transitional measures could be adapted (to pursue organic growth), which could include: i) a CBE/board member with extensive experience in dairy - mostly on voluntary basis, ii) an intern with background in dairy production related training, iii) a staff member with dairy/livestock production training and experience in dairy advice. Such staff could be directly employed by the CBE or seconded by an agribusiness partner, like is the case in Meru (MCDFCU). However, even when seconded it is paramount that the function is well integrated in the CBE's structures. In all these scenarios, structured induction and capacity development opportunities should be exploited as this is a relatively new arrangement in the functioning of dairy CBEs. On the job coaching methodology is reported to have demonstrated positive results under the KMDP internship programs.

Third, resources for running T&E programs should be allocated from the CBE as well as from other partners. They include funds for administrative costs for the unit (salaries), operational costs (travels), and other facilitative resources such as motorbikes.

Fourth are tools and methods for the units, which include work plans, budgets, training materials, SOPs and training modules, content and aids, guidelines on T&E approaches, planning and performance

management frameworks - regular (monthly or quarterly) review and planning meetings, cost effective mechanisms for collecting and analyzing on-farm data, performance indicators and targets. Fifth, a CBE T&E should have formal or informal partnerships with other stakeholders involved in financing and/or provision of dairy advisory services.

Sustainability factors

One of the most important factors that determine the sustainability of a T&E unit in CBE is the ability of members to access reliable and stable market outlets for milk. This is because connecting dairy production to an economic (income) gain is a fundamental factor triggering and sustaining demand for dairy advisory services. Another factor is ability to demonstrate and sustain the impact (business case) of the T&E unit both to farmers (improved milk yields, reduced production costs, improved social capital) and to the CBE's collective businesses (milk bulking, in-house inputs and services business units). Establishing the tradition of allocating funds to support T&E activities, accompanied by ability to provide incentives and retain experienced T&E staff is another factor, as is adoption of knowledge sharing approaches that are cost effective and self-sustaining such as farmer-led study groups discussed under the LF approach. Experiences from CBEs interviewed in this assessment indicate that CBE top leadership and management play a key role in safeguarding progress made in entrenching T&E units.

Overall, in this evolving T&E landscape, defined by its pluralistic nature, sustaining partnerships and linkages with diverse financiers and providers of T&E services is paramount. When the T&E function is supported by other partners it is recommended that such support is integrated into the recipient organization's (CBE) structures and systems and phased on a graduated arrangement and that exit strategies are in-built.

The box below presents a brief description of a CBE that seems to have sustained and grown its T&E unit long after EADD withdrew initial external support. The influence of professional advice in decision making, adherence to a medium to long-term growth strategy, and longstanding relationship with a milk processor come out as key factor

Box 2.6 lessons from a CBE that has sustained and grown CBE unit after withdrawal of external support

Case study of a dairy chilling plant in Nyandarua County (formed in 2001 as a public limited company)
After a major investment boost in 2005 by Heifer International (as co-investor), the CBE has sustained capital mobilization through i) 14,000 private shareholders (dairy farmers and non-farmers), ii) loans-recently from Oiko Credit, and iii) partnerships with agribusiness partners-mostly milk processor-Daima the long-term major buyer of milk from the CBE.

Since the introduction of T&E unit in the CBE by EADD in 2010 the CBE has sustained provision of technical support and training to an estimated 6000 milk suppliers to help improve and maintain milk quality and quantity long after EADD withdrew support in 2013. The following features can be associated with this rare feat;

i. Non-farmers shareholders-professionals from the local community who though do not reside in the community have contributed equity to help develop the local economy. They exert professional influence in decision making and management of the CBE.
ii. Has developed a growth strategy that seems to have guided operational and strategic decisions
iii. Long term partnership with Daima (milk processor) as the major buyer of milk-the processor has invested in cold chain infrastructure in partnership with the CBE (e.g. refrigeration tank)
iv. Handles a significant amount of milk daily (estimated at 50,000liters in June 2016)

v. The CBE has been expanding its cold chain infrastructure through other financing models (recently got 945 M USD loan from Oiko credit)

After operating with 3-4 extension officers for some time, the CBE recently created an elevated position for an Extension Services Manager, whose duties are to:

i. Ensure delivery of a comprehensive and effective dairy farmers training and support services
ii. Ensure high quality raw milk collection and accountability to the stakeholders.
iii. Ensure the farmers have adequate and timely access to quality and competitive inputs
iv. Coordinate relationships with stakeholders identified as strategic to the vision of the company for improved service delivery to the dairy farmers working with the company.

Minimum Qualification, Experience, Knowledge & Skills

i. A degree in Animal Production, Dairy or other relevant degree,
ii. At least 8 years of practical working experience in smallholder dairy production and extension service provision, 3 of which should be at management level.
iii. Sound people management, communications and leadership skills
iv. Possess business skills training.

Effective ratios for number of T&E staff to dairy farmers

The considerations on the optimum ratio of T&E advisor to lead farmers and to farmers supplying milk depends on a number of factors:

i. The primary role of T&E staff, whether it is more to broker information, facilitate knowledge exchange mechanisms or more of being direct providers of dairy training and advice. According to the LCBs and MCDFCU staff interviewed, the primary role under the current T&E units is more on direct provision (60-70%) and lesser on facilitating knowledge sharing.
ii. The density of farmers/milk suppliers within the CBEs catchment area as well as the nature of terrain and communication infrastructure.
iii. The predominant methods for delivering advice (group, individualized, mass methods, or blends of the three), advancement in ICT can provide innovative platforms that can achieve mass outreach effectively.
iv. The degree to which the T&E staff time is diverted to other non-core T&E related activities such as milk collection and manning the agrovet stores.
v. The monitoring indicators used to appraise performance of T&E advisors.
vi. The extent to which the T&E advisors are facilitated in terms of transport and communication facilities.
vii. Insufficient on-farm data at the CBE level such as herd holding and other farm and farmer characteristics hinders the ability to rely on robust analytics to determine more informed models on effective T&E advisors: farmers' ratios.

This assessment recommends that this question requires further research. However, at the current mode of T&E advisors providing dairy advice directly, the current average ratio of 1-3 T&E staff per CBE of 500-2,600 farmers or members is evidently overstretched. Even though not all CBE members may be active milk suppliers and practice dairy a core business.

Especially considering that the demand for T&E has been aroused through various initial learning events. For instance Olenguruone has three staff who cover 2,600 active milk suppliers spread over seven administrative wards; CBEs under MCDFCU have one T&E serving an average of 500 to 1,700 active milk suppliers. Further, LCBs interviewed observed that the ratio of one LCB supporting three CBEs limits individualized (on-farm) follow up visits to the 30 lead farmers. They instead resort to organizing group based meetings at different LFs farms under each CBE.

Role of processors in T&E units

The table below summarizes the role of milk processors in T&E units in CBEs supported under KMDP.

Table 2.2. Role of milk processors in CBE T&E units supported under KMDP

Roles	Milk Processors
Provide market outlet for milk, making milk production an economic activity, a prerequisite for stimulating and sustaining demand for T&E	HC, NKCC, MCDFCU
Use the T&E units to monitor and secure supply base for raw milk	HC, NKCC, MCDFCU
Provide short term (annual) financial support to T&E units (salaries)	NKCC, MCDFCU
Finance some field activities - training, demonstrations	NKCC, MCDFCU, HC
Attach own T&E staff to CBEs (milk quality advisors)	HC
Support linkages between input dealers and farmers	NKCC, MCDFCU
Promote transparency and accountability in multi-actor T&E partnerships	NKCC

Box 2.7. SWOT analysis on CBE T&E units

Strengths ✓ Increasing recognition of the role and impact of T&E units by CBEs (case studies of CBEs sustaining units beyond external support) ✓ Basic institutional T&E structures are in place in most CBEs (units, staff, T&E sub-committees) ✓ Most CBEs have experienced the benefits and experiences of T&E partnerships (with ISPs and intermediaries) ✓ Increasing demand for T&E services by emerging entrepreneurial farmers **Opportunities** ✓ Case studies of CBE that have sustained T&E units beyond external support ✓ Latent potential for bilateral partnerships with ISPs (e.g. models such as processor-led approach) ✓ Changing attitude among agricultural graduates towards private practice and CBEs as potential clients/employers ✓ Growing agri-business focus /commercialization of dairy production in Kenya	**Weaknesses** ✓ Governance challenges impend operations and growth of the units (financing, working conditions, deployment to non T& tasks) ✓ Limited capacity of T&E advisors (technical skills, work experience, soft skills, advisor to farmers ratio) ✓ High turnover of CBE T&E staff (low pay and working conditions) ✓ Inadequate on-farm data recording and analysis at CBE level limit demand (re) articulation and T&E learning and planning ✓ Inadequate tools for managing and evaluating performance of T&E units (how to demonstrate impact of T&E) **Threats/Risks** ✓ Instability and decline in farm level milk prices stifles demand for T&E ✓ T&E partnerships with ISPs prone to pursuing unilateral commercial interests ✓ Lack of standardized and updated T&E content and materials

✓ Presence of dairy development intermediaries targeting support via CBEs ✓ Latent potential as one of the most integrative T&E models (according to this assessment)	✓ Weak regulatory framework on agricultural extension services ✓ Negative attitude among agricultural graduates towards CBEs as clients/employers

2.1.6 T&E linkages with input services providers

How linkages are made

Although Input and Services Providers (ISPs) make several linkages with CBEs, the ultimate goal is establishing a market for their inputs and services. According to the ISPs interviewed the market linkage is actualized in a number of ways. Where feasible, they target the CBE as a bulk client of inputs to stock in their in-house agro-vet stores. Alternatively, they target the farmers so as to stimulate demand for the inputs, often through training events, in which case the CBEs provide a cost effective platform for mobilizing farmers. Through CBEs some ISPs establish/sponsor demonstration units in selected farms.

The ISPs interviewed identified the attitude and openness of CBE's leaders and managers as a key factor on how their expression for partnership is likely to be accommodated. They noted that CBE leaders and managers who are unreceptive to new ISPs exploring partnerships are suspected to have been compromised by other ISPs and therefore of questionable integrity. The contacts are made either directly to the CBE managers/leaders and/or T&E staff. They are also made indirectly through intermediaries such as NGOs and LCBs, and through learning and exhibition events such as field days and trade fairs.

KMDP's experiences in brokering these linkages appears to be mixed. On the one hand CBE leaders and LFs interviewed reported to trust more the ISPs introduced by KMDP via LCBs, as they believe that KMDP has no commercial interests and therefore has done due diligence on their behalf. On the other hand LCBs reported that their direct involvement in introducing new IPS to CBEs can be misconstrued to be motivated by vested interests.

MCDFCU also reported to be approached by ISPs prospecting to establish linkages with dairy cooperatives affiliated to the Union. However, MCDFCU did not have guidelines on how to go about such ideas. This assessment advances that there is latent potential for MCDFCU to play quality control roles by vetting and prequalifying ISPs interested in being endorsed to establish linkages with affiliated CBEs.
Periodic (annual) evaluation of the ISPs in terms of pricing and quality of inputs and services offered to CBEs and farmers would provide market based mechanisms for T&E partnerships. The MCDFCU extension manager was receptive of this idea, it is therefore a new practice that KMDP could support (pilot) and replicate if successful.

The interests, opportunities and limitations faced by parties involved in ISP/CBE linkages

The table below presents an analysis on the interests, opportunities and limitations for parties involved in establishment of T&E linkages between ISPs and CBEs.

Table 2.3. Interests, opportunities and limitations faced by parties involved in ISP/CBE linkages

Interests	Opportunities	Limitations
Player: KMDP		
✓ Economic empowerment for dairy producers ✓ Competitive and sustainable value chain ✓ B2B linkages with Dutch private sector (stimulating the shift from aid to trade modalities of Dutch Development Corporation)	✓ Potential to broker trust between CBEs and ISPs ✓ Potential to provide analytical information about the industry ✓ Experience in facilitating CBEs to establish and run T&E units ✓ Potential to link ISPs and CBEs with international partners and Dutch private sector for B2B partnerships	✓ Intermediary role is by nature limiting (not an actor but an enabler, can only advise, provide information but can't make decisions) ✓ Inability to guarantee terms and quality of T&E services ✓ Direct involvement of county governments in subsidized inputs risks crowding out the private sector
ISPs		
✓ Popularize own products or services ✓ Secure markets for products or services	✓ Platform to demonstrate impact of products (inputs) ✓ To market the impact of their products rather than mere products ✓ Avenue for collecting feedback about products ✓ Avenue for embedding T&E in marketing of inputs and services	✓ Interested in number of farmers attending T&E activities more than effectiveness of T&E method ✓ T&E likely to be driven by commercial interests more than farmers' needs ✓ Outcomes of T&E activities evaluated on uptake of inputs rather than on-farm impact
CBEs/Farmers		
CBEs and farmers ✓ Access to dairy information ✓ Eased access to inputs for farmers ✓ Increased milk production and intake by CBE ✓ Additional bag of services to farmers to increase member loyalty and patronage	✓ Partnerships for financing or providing T&E services ✓ Potential to prequalify and monitor ISPs that supply inputs to farmers (a B2B regulation mechanisms to safeguard quality) ✓ Potential to regulate the content of T&E information shared via experienced CBE T&E staff, to check *product pushing*	✓ Inability to guarantee objectivity of information and messages passed by ISPs ✓ Integrity issues among CBE leaders/managers jeopardize potential partnerships (seeking kickbacks to approve transactions, delaying payments)

According to ISPs and CBE staff interviewed, there are several factors that facilitate and/or hinder the establishment or sustainability of these T&E linkages. The box below presents the identified factors.

Box 2.8. Factors facilitating or hindering CBE-ISPs T&E linkages

Facilitative factors	Hindering factors
✓ Potential for demand for ISP products ✓ Longstanding business relationship between the CBE and ISP ✓ The pro-activeness and cooperation maintained by CBE's main contact person (mainly the manager as T&E staff tend to be less empowered in making decisions) ✓ Ability of the CBE to mobilize farmers to attend T&E events ✓ Ability of CBE to articulate farmers' T&E demands ✓ Activities of intermediaries who facilitate stakeholder platforms such as KMDP.	✓ Competition and business rivalry among ISPs ✓ Negative perceptions about quality of products or (commercial) interests of ISPs ✓ Negative perceptions about CBEs managers and leaders (demand for kickbacks, delay in payments) ✓ Absence of a dedicated contact person at CBE level (T&E unit staff) ✓ Intermediaries' tendency to organize stakeholder platforms in hotels rather than in farms ✓ Increasing role of governments in provision of subsidized inputs.

Overall, this assessment observes that these linkages are best anchored in a B2B relationship between CBEs and ISPs. They could be brokered on bilateral or tripartite partnerships. The former entails a CBE to an ISP, while the latter may involve a milk processor, a CBE and an ISP as is the case with NKCC's newly launched extension model.

2.1.7 T&E elements for MSFs/LSFs and CFPs

KMDP's knowledge exchange approaches targeting medium/large scale farmers and commercial fodder producers can be categorized into:

i. Farmer study groups (Medium scale farmers' forums- MFFs)
ii. On-farm advice by international dairy experts in-team with LCBs under international partner-ships and linkages (such as PUM)
iii. Interventions on fodder commercialization and contracting of services
iv. International knowledge exchange with advanced dairy industries such as the Netherlands and South Africa, realized through MSFs' exchange visits.

Informed by extensive sector analysis, KMDP considers the transitioning of the Kenyan dairy sector from a smallholder, semi-subsistence orientation to fully commercial production systems as critical for long term sustainability of the dairy industry. To accelerate this transition, KMDP recognizes the relevance of medium and large scale dairy farmers (MSFs). KMDP identifies MSFs as capable of playing five crucial roles: i) they can lead in on-farm innovations as they are willing and able to invest in dairy farming as a core business; ii) their ability to fast-track development of a professional dairy support infrastructure if well self-organized; iii), their ability to push for desired policy reforms based on their political networks; iv) their tendency to fill the gap in practical dairy knowledge and skills through demonstration and training roles often fulfilled by their farms; and v) the latent value chain synergies that can be achieved by integrating with smallholder dairy farmers (Ettema, Frans, 2015).

To fast track the evolution of a critical mass of MSFs and CFPs with abilities to assume these crucial roles, KMDP devised knowledge exchange approaches that best suit the characteristics of these types of farmers. Considering that the MSFs are rarely organized under the dominant smallholder-led CBEs and also that their T&E needs and demands are likely to differ from those of smallholders, KMDP adapted T&E approaches and delivery mechanisms tailored to these realities. The delivery mechanisms are summarized in the table below.

Table 2.4. Delivery mechanisms for T&E services under the MSF/CFP models

Delivery mechanisms	Description
KMDP design and expertise on MSF/CFPs models	**Design:** Prioritizing MSF and CFP models as two of the systemic issues that need to be addressed in order to accelerate the transition of the dairy industry into competitiveness and sustainability.
	Capacity: Two KMDP advisors (Team leader and senior VOSD Advisor) deployed to dedicate significant time in development and implementation of this model.
International experts and exposure	Placing three PUM experts sustained under the SNV-PUM MOU. Attached to LCBs and MSFs/CFPs, the experts have made several follow up missions (each mission lasting 2-3 weeks)
	Sponsoring international study tours under co-funding mechanism with MSFs
	Placing Dutch students for 3-4 months internships in MSF farms
	Contracting international dairy consultants and trainers (such as from The Friesian, CowSignals, QPoint and DTC)
Local dairy consultants	Capacity development of two local dairy consultancy companies (Perfometer agribusiness ltd and Eldosirikwa Consultants ltd) and one youth-based service provider network (SPEN). Capacity development entailed: i. Targeted trainings and exposure visits to the Netherlands (for LCBs) and in PDTCs for SPEN ii. Hosting and pairing LCBs with Dutch dairy experts for on the job learning and coaching. iii. LCBs tasked to undertake follow up responsibilities in between experts' missions iv. Providing upfront contract for a certain number of days per month as a mechanism for establishing business portfolio (for LCBs). v. Support to develop T&E products targeting MSFs
Innovation Fund	Dedicating significant funds under the innovation fund to co-finance and stimulate T&E products that address MSFs' needs and demands (e.g. MSF and SH modular cow house design, Cow Signals Handbook for East Africa, Uniform Agri dairy herd management software, feasibility studies and pilots on fodder establishment, preservation and commercialization, and international study tours)
Business to Business linkages	Facilitating linkages with locally based ISPs such as Nundoroto Farm Company Ltd, SPEN (Service Provider Network), CRV/Coopers, Vital, SoilCares, Chase Bank, Kenya Seeds, as well as PDTCs for training of farm managers etc.
	Facilitating B2B linkages with the Dutch private sector
Facilitating self-organization among MSFs	MSFs within the Central and Eastern Regions were organized into medium scale farmers' fora (MFFs). These are loose and less formal farmer groups guided by the primary aim of acquiring and exchanging dairy information and knowledge
	MSFs spread in the Rift Valley region were organized under Eldoret Dairy Farmers Association (EDFA) established in 2013.

Overall, KMDP has supported T&E approaches targeting an estimated 279 MSFs, 226 organized under eight MFFs and 53 under Eldoret Dairy Farmers Association - EDFA (Ettema, Frans, 2015), spread in the Central, Eastern, and Rift Valley regions of Kenya. They include farmer study groups (MFFs) facilitated by one of the LCBs (Perfometer ltd), trainings and on-farm advice and demonstrations facilitated by international dairy experts and shadowed by local dairy consultants, as well as international exchange visits to advanced dairy industries such as the Netherlands and South Africa. In general, T&E services for MSFs have focused on:

- ✓ Record keeping - embracing digital recording tools to not only be able to generate farm level analytics on efficiency and profitability but also to guide individualized professional farm advice.
- ✓ *DairyNomics*: a tool to record and analyse cost/revenues and profitability of dairy farm enterprises was recently developed by a Dutch intern in collaboration with SNV Advisors and LCBs.
- ✓ Total farm management - targeting total dairy farm improvements, adoption of farm level innovations and demonstration of best farm practices.
- ✓ Modular cow house pilot and handbook - a handbook has been developed to guide MSFs interested in establishing new dairy farm enterprises or upgrading/expanding existing ones.
- ✓ Feed and fodder - targeting to improve production and optimization of hay, pastures, grass and maize silage through improving management practices (establishment, handling, preservation, storage, mechanization)
- ✓ Agricultural machinery contracting services - piloting a machinery contracting concept aimed at addressing feed and fodder challenges associated with low capacity of predominant machinery used in fodder harvesting and processing.
- ✓ Commercialization of packaged maize silage and total mixed rations (TMRs).

2.1.8 Other T&E elements experimented: Innovation Fund and other pilots

This section presents other notable T&E elements experimented by KMDP under the Innovation Fund and other pilots. They are categorized into:

i. Engagement with dairy related technical training institutions (TTIs) at the national level
ii. T&E interventions piloted under KMDP's Innovation Fund (CowSignals, modular cow barn design handbooks, DTC E-Learning Platform and franchise model, Uniform Agri dairy herd software)
iii. SPEN – The service provider enterprise network targeting youth who are interested in providing support services to entrepreneurial farmers (such silage making, hoof trimming, fodder establishment)
iv. CowSoko - a website meant to act as a market place and information exchange for ISPs including SPEN, PDTCs, LCBs/dairy advisors, and also containing a repository of KMDP publications and reports.

Work with dairy technical training institutions (TTIs)

Under this element, KMDP's initial strategy was to facilitate the transformation of the Dairy Training Institute (DTI) in Naivasha into a semi-autonomous, private sector driven, commercially oriented, practical dairy training center of excellence for the East Africa region.

This saw KMDP assist DTI with a labour needs assessment for the dairy sector, a road map to semi-autonomous status, setting up a steering committee to oversee the transitions and developing a business and investment plan. Though the privatization agenda proved cumbersome and KMDP stepped back from supporting the process, notable positive outcomes have been realized. DTI managed to update its curriculum based on a dairy sector labour market needs assessment and collaboration with NUFFIC NICHE projects and GIZ. DTI also attracted financial and technical support from government and other stakeholders based on the business and investment plans developed with KMDP support.

As an indication of its adaptive management style, KMDP broadened the scope and strategy under the VOSD agenda to work with additional dairy training institutes at the national level (Egerton, Baraton, Baraka Molo, University of Eldoret and Eldoret Polytechnic), also in an attempt to linking them to DTC from the Netherlands. Work with national TTIs aims at improving the learning environment by improving practices at the TTI farms so as to adapt to the capacity building demands of the industry. The partnership with DTC aims at improving and adapting learning content in a bid to contribute to bridging the skills and knowledge gaps experienced in the industry. With partial support from KMDP's innovation fund, DTC is implementing a pilot to create and franchise a comprehensive on-line dairy training curriculum and content via an electronic information platform. As per the DTC workshop held in April 2016, one PDTC and two TTIs have signed up for the first phase of this E-learning franchise model (SNV - DTC 2016).

Innovation Fund

The KMDP Innovation Fund has played a key role in stimulating innovative T&E approaches. An innovation fund charter provides guidelines on the use and management of the fund. Under this fund, KMDP has managed to broker B2B linkages and partnerships between Kenyan and Dutch parties for enhanced access to T&E materials. They include amongst others:

- ✓ DTC E-learning franchise model under pilot as described above.
- ✓ Roodbont/Cow Signals and a Kenyan publisher (Olive Marketing and Publishing) partnership to publish a basic and advanced Cow Signals handbook customized for the East African dairy context.
- ✓ Uniform Agri dairy herd management software (UA) for a farm record keeping system piloted under the MSF model and at CBE level in Cheptiret.
- ✓ Modular cow house design handbooks, one for MSFs and one smallholder dairy entrepreneurs.

SPEN - Service provider enterprise network

In KMDP, the SPE groups under SPEN refers to commercial dairy support services offered to entrepreneurial smallholders and MSFs, by young men and women mobilized and trained under KMDP support. The groups are strategically located in major milksheds amidst dairy farmers. The SPEN model was initiated and supported by Perfometer (2010). Unlike most private dairy advisories SPE groups offer tangible dairy support services, mainly in on-farm fodder establishment and preservation (e.g. silage

making). The strategic review report and the KMDP Team see opportunities to widen the scope of the SPE group services and include for examples hoof trimming, cow house construction, ultrasound scanning (cow pregnancy diagnosis). According to a SPEN progress report (SPEN Limited, 2015) the network had served 1,399 farmers and 3,136 tons of silage across 18 Counties of Kenya in 2015. The report further identifies product development and branding, and access to more efficient farm machinery as major challenges constraining business growth.

CowSoko: a market place for ISPs, dairy information and knowledge

Cowsoko is an online platform (www.cowsoko.com) for ISPs and dairy information and knowledge sharing. It also contains a page with KMDP publications and reports. The website developer and owner is a junior consultant or LCB under KMDP. He operates the website independently and KMDP – like others who wish to market their services and products hires web space. It provides information related to:

- ✓ Dairy cows for sale
- ✓ Contacts and profiles of dairy experts (private advisors and service providers, incl. SPE groups)
- ✓ Advertisements for services and events organized by dairy players/stakeholders
- ✓ Training calendar (targeting promotion of PDTCs and other dairy farms offering learning services)
- ✓ Contacts and profiles of dairy inputs, equipment and machinery suppliers
- ✓ Resources and publications on dairy – study reports, handbooks.

2.2 Needs and demands for advisory services by different types of farmers and farm staff

This assessment finds that though attempts have been made under KMDP to support aggregation and (re)articulation of the advisory needs and demands for different types of farmers and farm staff, the methodologies used do not yet seem robust enough. For example, farm level data collection and analytics is weak, and analysis of readily available on-farm data is sluggish (such as data from LFs farms, visitors books held by PDTCs and LFs/MSFs, diagnostic tools such as the DFB). In 2016 KMDP has made a step to address this amongst others by engaging a Dutch intern to develop a tool for cost/revenue recording and analysis of farm profitability at farm level (DairyNomics).

The table below presents an analysis of needs and demands of farmers and T&E staff as identified during interviews for this assessment.

Table 2.5. Analysis of advisory services needs and demands of different types of farmers and farm staff

Farmers type	Needs and demands for advisory services
Entrepreneurial smallholder farmers (ESF)	ESFs prefer practical based training and advice: ✓ Offered in PDTCs or on MSF/LSF farms ✓ Offered by a fellow lead farmer through farm - peer learning mechanisms ✓ Discussing their dairy problems with LCBs rather than with CBE T&E staff ✓ Individualized follow up advice offered at the farm (but caution on likely burn out on ESFs if frequency is influenced by KMDP results indicators and targets) At MSF/LSF farms entrepreneurial dairy smallholders seek to ✓ Learn/see how such farms have overcome typical challenges such as fodder management and breeding (choice of semen)

	✓ Learn/see new innovations in practice e.g. use of milking machines and maize silage. Overall, limited on-farm data recording and analytics is a major challenge to articulation of, and ability of advisors to respond to ESFs' needs and demands. Feeding and fodder management seems to be persistent priority topics across most farmers
Medium and large scale farmers	✓ In general they seek advice regarding total farm improvement and management, with a high demand for advice on feeding and fodder. ✓ From time to time they may seek intensified advice on specific aspects depending on needs (e.g. cow barn improvement, fertility/herd management, hoof trimming) ✓ Compared to ESFs most MSF/LSFs prefer advisory services: o offered by high calibre experts - local and international o offered under very practical conditions - PDTCs, study visits, at peers' farms- and geared towards innovations to solve their challenges - mechanization, structures, and practices ✓ Seem keen on learning from own experimentation and likely to question some dominant T&E messages. E.g. application of organic fertilizer instead of farm yard manure on forage (New Ngorika), narrow list on recommended forage materials for silage making (e.g. advice by SPEN to farmers that sunflower is not suitable for silage making) ✓ Limited farm data recording and/or analysis constrains articulation of MSFs' T&E needs
Start-up farmers/dairy investors	✓ Are mostly professional and business people interested in investing in dairy production as a business ✓ Demand basic but comprehensive advise on dairy farming ✓ Likely to gain confidence from well-developed professional PDAs with developed T&E products (like at PDTCs, some LCBs - Perfometer) ✓ Demand practical oriented settings such as PDTCs, MSF/LSF farm, experienced private dairy consultants ✓ Demand advice on capital and inputs related to start-up, such as dairy herd, farm managers/advisors ✓ Ask the hard questions about projections on dairy business performance (return on investments) ✓ Seek reading materials on dairy production, prefer materials tailored to self-directed learning
CBE extension staff	✓ Are mostly sponsored by their CBEs, often under support and influence from a partnering dairy development program, so their needs are as perceived by these intermediaries ✓ Since most have a certificate or diploma in agricultural science – what they often need is to improve their practical skills at PDTCs ✓ Require guidance and support to learn by doing (mentorship, coaching) ✓ Other soft skills seem to be rarely prioritized –such as information brokerage and facilitation skills
Farm managers/ farm technicians	✓ Need practical skills on all aspects of dairy production ✓ Deepening hands-on skills and internalizing farm routines ✓ Need structured farm orientation especially in their initial posting.

2.3 Tools to integrate T&E elements: Making reference to the coordination mechanisms

A focused review on the coordination mechanisms governing the functioning of the various T&E elements, identifies four major coordination mechanisms. These mechanisms are both intra and inter-organizational and are therefore instrumental in identifying tools that can be applied to enhance performance of individual T&E elements, as well as in strengthening the integration of the different elements in a variant of T&E models.

These are:

i) ***Markets*** - based on pricing of T&E services, willingness to pay, and suitability and marketing of services/products among different types of farmers
ii) ***Hierarchy*** - pre-agreed exchanges based on mutual interests in bi- or multilateral partnerships
iii) ***Community*** - social capital and social norms
iv) ***Democracy*** - participation and joint decision making.

The latter two are intra-organizational mechanisms applicable to collective action based entities such as dairy producer organizations' (CBEs, LFs, MFFs, EDFA, and MCDFCU):

i. **Market mechanisms** (tend to be ad hoc relationships) - governed by ability to market/popularize services, pricing and willingness to pay. Under KMDP T&E approaches they include the following:
    a. One-off T&E services offered at LF/MSF farms to visiting farmers/groups at a fee
    b. One-off T&E services offered to farmers/groups by LCBs outside KMDP support
    c. One-off PDTC training offered to farmers outside KMDP's sponsorships
    d. T&E staff hired by CBEs/MCDFCU/NKCC - though the relationship is not ad hoc, the ability to attract and retain experienced T&E advisors is governed by ability to pay well and offer good working conditions (therefore market mechanisms).
    e. Private farm advisors hired to advice one or several MSF/LSF farms
ii. **Hierarchy mechanisms -** Coordination mechanisms operationalized through prior agreements, they are based on interdependencies and mutual interests which could be intra or inter-organizational. Under KMDP T&E approaches they include:
    a. KMDP's role as an intermediary - facilitating and catalyzing the evolution of innovative institutional arrangements for demand-led T&E services, operationalized through MOUs, innovation fund proposals, contracts, workplans with CBEs, MCDFCU, EDFA, LCBs, PDTCs, processors, ISPs etc.
    b. Strategic alliances between different organizations involved in the dairy value chain - CBEs with milk processors, CBEs with ISPs/PDTCs, contracts between KMDP and LCBs (especially when you consider the capacity development goal for building a human resource base to drive the industry)
    c. Formal cooperation - internal rules governing functioning of farmer-led study groups (e.g. attendance to and hosting of group learning events, financial contributions to support group activities).

iii. **Community (shared norms and social capital**) - the culture and the tradition among rural people to share information informally and the desire to develop dairy as a dependable source of income and employment. This is the mechanism which facilitates the i) farmer study group approaches, ii) CBE formation and likelihood of appreciating the importance of investing in T&E units.

iv. **Democracy (participation and joint decision making)** - this is the mechanism governing dairy groups' (CBEs, EDFA, MFFs, MCDFCU) ability to make decisions on how to structure and finance T&E functions. Membership size and extent of heterogeneity affect ease of making such collective decisions, especially when the decisions involve innovations and adjustments to do things differently, like is the case with the concept of embedding T&E function in CBEs. This assessment finds that since most dairy farmers are conservative and are yet to embrace dairy production as a core business, CBEs relying on this coordination mechanism to structure and resource/finance T&E functions are unlikely to be successful compared to small sized, more homogenous farmer-led study groups such as the LF/MSFs who are self-driven dairy entrepreneurs.

This analysis is further advanced in section 3.2 to identify options that KMDP can consider pursuing in order to enhance pluriformity within the T&E design.

2.4 A review of other T&E models experimented by other players and agri-sectors

This assessment reviewed alternative T&E models applied by other players, both in dairy and other commodities/supply chains. Under the dairy supply chain, it reviewed T&E approaches applied by NKCC and EADD. Under coffee supply chains it reviewed models applied by Meru Central Coffee Farmers' Cooperative Union (MCCFCU), and by private companies (Tropical Farm Management and Strategic Coffee Management Services Limited) that are contracted by large scale coffee farms, cooperatives and coffee certification programs in Kenya. Under tropical fruits value chains it reviewed the introduction of tissue culture banana production as a new technology in Muranga County. A detailed description and analysis of the case studies are provided as appendix 4.

The case studies provide some lessons that could inform the design of KMDP T&E approaches in the future. Several factors seem to influence the T&E models adopted or adapted. First, the overriding interests or objective of the lead player, second is the type of farmers targeted (smallholders, medium scale, large scale), and third is that agri-sector and/or commodity specific characteristics seem to influence demand of T&E services as well feasibility for private sector involvement.

The extent to which the lead player is pro-commercialization or pro-poor seems to determine the overall orientation of T&E models. EADD's pro-poor focus seems to influence the applied T&E models towards a blend of technical and social orientation, compared to KMDP's and NKCC's commercialization focus which seem to yield technical oriented T&E models. The *community facilitators* under EADD model are T&E advisors specializing in social capital building farmer mobilization, formation and support to dairy farmer groups, and intra-household relations - while *extension staff* specialize in facilitating technical knowledge on dairy production (dairy husbandry and farm economics). By targeting medium to large scale dairy producers, KMDP is compelled to adapt T&E models that align to the needs, demands and realities of this category of dairy farmers. For donor funded dairy programs, the development philosophy adopted by the main donor appears to influence the focus. The Bill and Melinda Gates Foundation's (BMGF) pro-poor

focus appears to have influenced EADD's approach, while the shift of Dutch international development cooperation focus from aid to trade has fundamentally influenced KMDP's approach.

Table 2.6 below lists agri-sector and commodity characteristics that influence T&E models. It further provides an analysis on how the characteristics influence demand and supply of T&E services and the extent to which the listed factors are applicable in the three agri sectors featured in the case studies.

Table 2.6. Analysis on how agri-sector and commodity characteristics influence T&E models

Characteristics	**Influence on demand and supply of T&E**	**Extent to which characteristics are applicable to different agri-sectors**		
		Dairy	**Coffee**	**TC Bananas**
Uniform (synchronized) seasonal patterns	Ease to schedule T&E services based on seasons (annual T&E calendars)	**Low** - can apply in fodder production and under induced mass synchronization - inseminations	**High**	**Average –** group-led plantation establishment
Susceptibility to free riding problem in terms of quality of produce	Mobilizes peer pressure to enforce internal rules on recommended good farm practices	**Mixed**- it is easier to determine milk quality at bulking stages - various technologies for testing milk exist compared to coffee). However, in practice bulking is driven by quantity more than quality as quality based payments are rare.	**High** -difficulty to determine quality of cherry (rely on visuals)	**Average** - uses visual measures to determine quality
Extent to which quality based payments is relied on	Determines incentives for demand for T&E services	**Low** - pricing rarely based on quality parameters	**High** - pricing dependent on quality	**Average -** pricing on rudimentary measures - weight, visual
Requires large scale (preliminary) processing	Commands producers to collective rules on expected farm practices and produce quality	**Low** - amenable to micro, small and large scale processing or no processing at all as marketing outlets are diverse)	**High** - pulping technologies not affordable to individual small farms)	**Low** - limited processing
Feasibility to bundle production and marketing services	Creates opportunities for subcontracting farm advisory on all aspects (growing, processing and marketing)	**Low -** though latent potentials are manifest under federated vertically integrated Coops-like MCDCFU and commercial dairy farms hiring professional farm advisors	**High**-very common cases studies like TFM ltd, SMS ltd)	**Low** -it is a relatively new enterprise
Development of premium markets (specialty, certified markets)	Creates incentives for improved farm practices. Creates opportunities for subcontracting total farm management advisory.	**Low** - but potential is feasible as the dairy supply chain transitions towards competitiveness and long term sustainability	**High** -common certification programs - Rainforest alliance, UTZ, FLO Fairtrade, 4C	**Low** - it is a relatively new enterprise

In all the cases, efforts to develop human resource capacity for farm advisory are evident. A common feature is the tendency to invest in "in-house/on-the-job" upgrading the capacity of recruited graduates

using a mixture of short term (3-5 days) intensive training followed with on the job learning and coaching support. Providing opportunities for practical working environment for fresh graduates and students on internship seems a common thread, to assist them in integrating the theory learned into practice. This, interestingly, applies to both third sector players as well as private sector players.

Technoserve's regional coffee initiative (http://www.technoserve.org/files/downloads/coffee-initiative-lessons-learned.pdf) and WUR's Ethiopia DairyBISS project (www.dairyethiopia.com) share similar lessons. Private companies providing farm advice in the coffee sector in Kenya also seem to share similar approaches such as Tropical Farm Management - TFM - (www.tropicalke.co.ke) and Strategic Coffee Management limited - SMS.

However, farmer-led learning capacity development seems to be more common with third sector players than with private sector actors. Externally supported third sector-led T&E programs face sustainability risks more than private sector or farmer-led approaches. Their success seems to depend on ability to facilitate self-sustaining T&E linkages between farmers and private sector players. Limited availability of updated and tailored T&E content/materials cuts across most of the case studies.

3.0 Discussion and Conclusions

Guided by the ToR for this assignment, this section presents a discussion and conclusions aligned with objective number 3 of this assessment. The presentation therefore relates to key areas earmarked for recommendations, namely the extent to which the current T&E model:

i. Is private sector-driven
ii. Allows for pluriformity
iii. Connects different types of farmers in mutual learning
iv. Addresses knowledge exchange, skills development and incorporation of new (local and international) knowledge into the dairy innovation system.

3.1 To what extent is the current T&E model private sector-driven?

3.1.1 Overriding governance structure: Towards a private sector or a hybrid structure?

Birner et al. (2009) identify 3-4 dominant institutional set ups governing the design of Agricultural Advisory Services (AAS). They are based on the leading roles taken by public, private, and third sector organizations (NGOs, farmer organizations) in financing and providing AAS. On this basis four governance structures can be distinguished.

i. Public sector driven
ii. Private sector driven
iii. Third sector driven
iv. Hybrid structures which blend i, ii, iii above in various mixes.

Others, like Feder et al. (2011) have lumped private and third sectors together to broadly define the private sector driven governance structure. In addition to leading roles in financing and provision of AAS, administrative and organizational processes within a T&E system are also considered influential in defining the overriding governance structures. They address questions related to how decisions are made (MOUs, work plans/budgets, approval of T&E pilots, management of innovation funds) and how authority is exercised, which determine how T&E services are organized and steered. The choice of governance structure is therefore fundamental in the design of a suitable AAS/T&E system.

A review of the institutional, organizational and administrative structures and processes defining KMDP's T&E approaches points to a hybrid governance structure that blends mainly private and third sector roles. Some aspects of public sector roles are also evident, though they are minimal and related to regulatory and skills development for T&E professionals via TTIs, most of which are public institutions. The new County government structure also provides an opportunity for public sector funded third/private sectors implemented T&E services via dairy farmer groups, as witnessed with Meru MSF study group. However, this assessment finds the current trend of County governments to engage in direct provision of subsidized agricultural inputs and equipment as likely to crowd out the emerging private sector.

In conclusion: if we consider the broadened definition by Feder et al. (2011), which combines third and private sectors, and also the KMDP's operational definitions of private sector-led and market-led approaches as defined in KMDP's principles, this assessment concludes that KMDP's T&E approach

reflects an attempt towards the private sector driven governance structure. It also observes that the intermediary role of KMDP has been crucial in initiating and connecting different T&E elements and players. However, in light of the aspirations for a more private sector driven T&E models, this assessment further observes that KMDP ought to consider minimizing such direct involvement in implementation.

3.1.2 Targeting and facilitating conditions under which demand-led T&E approaches can work

According to Birner et al. (2009) some of the factors that should influence the choice of governance structure and design of T&E approaches include:

i. The farm household characters of targeted clients/farmers (especially ability to formulate demand, to finance and to hold T&E providers accountable)
ii. The overarching policy environment on agriculture and trends in AAS at the macro level
iii. The capacity, management and organizational abilities of potential T&E service providers (private sector involvement depends on feasibility of economic opportunities)
iv. The advisory methods applied in the interaction with different types of farmers
v. The types of farming systems and degree of market access (access to reliable output markets is particularly a prerequisite for demand driven T&E services)
vi. The characteristics of the local communities, which determine the extent to which social capital and collective action are established or can be strengthened.

This implies that a successful facilitator of demand-led T&E models ought to target and stimulate conditions under which such models can best work. By choosing to pursue the pro-commercialization pathway compared to the pro-poor/subsistence focus in dairy development, KMDP by design aligns with conditions under which demand or market-led dairy advisory models are likely to work. The table 3.1 below presents a synthesis of how KMDP has considered the six factors above to configure demand driven T&E elements and their implementation arrangements. It also presents notable outstanding challenges faced, as observed in this assessment.

In conclusion: KMDP has to a great extent not only targeted conditions under which demand-led T&E models can work best in the Kenyan dairy industry, but also gone further to stimulate factors that can enhance the demand-led T&E models. For greater success in a potential phase 2, KMDP ought to incorporate these factors in selection of milksheds, target groups, and approaches and interventions. Most important for integrative T&E models, KMDP should scout for milksheds where feasibility for strategic partnerships between milk supply chain actors (farmers, CBEs, and processors) is most promising.

Table 3.1. Analysis on how KMDP has targeted and facilitated conditions suitable for demand-led T&E models

Factor	Considerations made by KMDP
Farm household characteristics (demand side of T&E services)	Targeting smallholders with demonstrated entrepreneurial attitude to dairy farming as a core business - *pareto* farmers/LFs under CBEs; as well as targeting often excluded medium scale farmers, the "missing middle", who are commercial oriented, self-driven and likely to adopt dairy innovations; these categories of farmers presents a likelihood of higher ability and willingness to seek and pay for T&E services
Notable challenges i) Willingness to pay for T&E services is still low but evolving even among entrepreneurial smallholders**,** ii) Limited on-farm data weakens KMDP and partners' ability to (re)articulate farmers' needs and demands for T&E services	
Overarching policy environment on agriculture and trends in AAS	By choosing the pro-commercialization pathway over the pro-poor pathway, KMDP aligns with the school of thought that the dairy sector in Kenya is private sector integrated, commercially oriented and therefore meeting the preconditions for demand-led T&E approaches (especially in the wake of Liberalization of livestock services). Other policy issues that directly or indirectly affect demand and supply of demand-led T&E services include: unconducive environment for quality based milk payments, skills development infrastructure that is thought to be theory based, limited institutional and regulatory framework on T&E and related services.
Notable challenges i) competition among dairy programs and milk processors for milk supply bases (farmers and CBEs) and ISPs, ii) increasing involvement of county governments in provision of subsidized dairy services, iii) limited enforcement of laws on milk quality, quality of dairy inputs	
Capacity, management and organization abilities of T&E providers	The shift from supply to demand-led T&E services poses competence challenges to T&E advisors (the supply side); KMDP addresses the competence issues through various innovative approaches i) the LCBs/interns coaching and learning on the job, ii) linkages with international experts and exposure, iii) stimulating evolution of private dairy advisors - LCBs - and service providers like SPEN and PDTCs, iv) supporting CBE T&E units and linkages with input suppliers, processors, and v) innovation fund to stimulate partnerships and linkages related to T&E services.
Notable challenges i) The capacity gap challenge is beyond KMDP's mandate in terms of the resources, institutional backing and timeframe required. KMDP's ***promote and provoke*** approach o is therefore justifiable.	
Advisory methods	KMDP T&E approaches recognize and address practical skill gap challenges through a number of elements: VOSD unit, PDTCs, farmer study groups, on-farm peer learning and demonstrations, international experts, as well as local and international study tours.
Notable Challenges i) Practical skills gap is a systemic issue that cannot be addressed comprehensively through short-term programs and by a single third sector actor like KMDP; particularly; public sector is the biggest player in the dairy skills development, ii) the international experts approach requires orientation and adaptation to the local contexts, iii) Limited capacity of T&E advisors also constrains methods of delivery (practical skills aspects and particularly softer skills related to facilitation of knowledge sharing).	
Farming systems and market access	KMDP maps milksheds to identify sites that present the based feasibility for demand-led dairy services and potential for strategic partnerships with agri-business partners such as processors, CBEs, and ISPs
Notable challenges i) Corporate governance challenges at CBEs and producer groups constrain KMDP's T&E approaches, ii) The MSFs seem to be peri-urban oriented and benefiting from lucrative informal milk markets, which – at short term - contradicts KMDP's principle on supporting the formal milk value chain, iii) Seasonality and fodder chain interventions have not been evaluated on applicability to different farming systems and market situations.	
Local dairying communities - social capital, collective action	KMDP addresses corporate governance at CBE and farmer group levels to strengthen social capital and collective action. Farmer study groups are built on bonding social capital aspects such as shared norms, goal congruency among different types of farmers (entrepreneurial smallholders under LFs, and MSFs under MFFs).
Notable challenges i) persistent corporate governance challenges facing dairy POs, ii) Free rider behavior among farmers and the public good nature of dairy knowledge, iii) Processors like NKCC prefer working with less formal producer groups over cooperative societies, which side-lines CBEs.	

3.2 Enabling pluriformity: Most integrative coordination mechanisms

KMDP's T&E approach configures different elements, which are led by different value chain players (actors, support services providers, and facilitators). This is in line with the current trend of reforming institutional arrangements involved in provision and financing of T&E services towards a pluralistic system. The incorporation of different T&E elements backed by respective lead players demonstrates KMDP's deliberate efforts to broker the configuration of diverse but complementary T&E elements and models (pluriformity). However, the extent to which complementarity is realized is dependent on the ability of the diverse elements to integrate into a coherent and embedded T&E model(s). KMDP-II needs to pay attention not only to factors influencing the functioning of each T&E element but also to factors that influence the integration of the different elements. Based on the analysis on coordination mechanisms governing the exchange of T&E services under each element (a summary is presented under subsection 2.3) this assessment identifies six factors that do influence integration. These are:

i. Market mechanisms - willingness to pay for T&E services, as well as development and marketing of T&E products
ii. Hierarchy mechanisms - the immense role and influence of KMDP as an intermediary (third sector player)
iii. Hierarchy mechanisms - strategic alliances that govern horizontal coordination of multiple T&E players into a virtual dairy information and knowledge hub model
iv. Hierarchy mechanisms - formal bilateral cooperation between (two or more) lead T&E players to govern arrangements such the processor-led T&E model in Meru
v. Social capital mechanisms - to govern collective action and peer-to-peer interactions driving farmer-led study groups
vi. Democratic mechanisms - corporate governance as a mechanism that governs participation and decision making in producer groups; such a mechanism determines decisions regarding investments in T&E.

The table below presents an analysis on the application of the six integration factors in current and future the KMDP T&E approaches. The analysis identifies the positive and negative factors that were observed to facilitate or hinder the respective integration factors under the current conditions.

In conclusion: this assessment observes that the six integration factors present KMDP with adequate tools to stimulate functioning of individual T&E elements as well as streamline integration of different elements into most promising T&E models. Future KMDP's T&E approaches should be designed to exploit the existing supportive factors, while addressing the associated hindering factors.

Table 3.2. Integration factors for different T&E elements

Supportive/facilitative factors	Hindering factors
Integration factor 1. Market mechanisms - demand and supply of private dairy advisory services (suitable, affordable and accessible dairy advisory products); the factors can be categorized as a demand or supply aspect.	
✓ Overall, the growing demand for dairy is a pull factor ✓ Growing demand for individualized advice among dairy entrepreneurs - LFs, LSFs/MSFs ✓ Growing demand for practical training bridged by growing no. of potential providers (suppliers - PDTCs, PDAs, TTIs, LFs, MSFs) ✓ Successful introduction of the PDTC model (with impacts on LFs, SPEN) ✓ Upcoming private dairy consultants attempting to keep pace with demand and competence ✓ Growing realization on the business case of T&E units in CBEs	✓ Low willingness to pay especially among entrepreneurial smallholders ✓ Public good nature of T&E and practice of peer learning ✓ The difficulty in measuring impact of T&E services (advice perceived as intangible service) ✓ Limited number of private dairy consultants with requisite competences ✓ Inadequate number and unevenly located PDTCs ✓ Inadequate marketing of PDTCs and MSFs farms offering practical training ✓ LSFs/MSFs that start offering training due to demand from farmers lack capacity to structure this function ✓ CBEs' unwillingness to hire and retain adequately experienced T&E staff
Integration factor 2. The role of intermediaries (KMDP and PDAs-local and international)	
✓ Experience with piloting different innovative T&E elements (PDTCs, MFFs, international exchange) ✓ Clearly defined focus on support to dairy development – commercialization-KMDP ✓ A repository of updated information and analysis about the dairy industry (articulation of T&E needs, and demand and supply issues)-KMDP ✓ Enjoys good reputation and trust from value chain players (qualifies as a neutral player and network facilitator)-KMDP ✓ Experienced team of dairy expertise-local and international advisors-potential for sustainable delivery mechanisms	✓ Limited interactions between the different agenda's/teams (internal coordination) hinder learning and innovation in T&E ✓ Limited interactions between KMDP advisors and LCBs, and between LCBs active in the DVC and MSF models ✓ Overreliance on LCBs to facilitate interactions at the last mile, who: o Mostly are fresh graduates with limited experience o Lack institutional backing to play network facilitation and coordination role o Have limited/irregular interactions with KMDP core advisors to remain aligned ✓ Extensive direct involvement of KMDP hinders development of a sustainable intermediary mechanism ✓ Limited timeline compared to size and complexity of task
Integration factor 3. Exploiting horizontal coordination through strategic alliances (the case for dairy information and knowledge exchange hubs)	
✓ Most of the potential and diverse players have been mobilized and somehow linked (PDTCs, TTIs, CBEs, Processors, ISPs, LFs, MSFs/MFFs) ✓ Many players are already in formal bilateral cooperation on T&E (MCDFCU/CBEs, NKCC/CBEs and FGs, HC/CBEs ✓ Others have experienced one-off T&E Linkages (CBEs/ISPs, PDTCs/CBEs, LFs/MSFs and other farmers ✓ Opportunity to build on the annual T&E calendars between CBE and ISPs negotiated/coordinated by LCBs	✓ Absence of a resourced network/hub facilitator able to: o Overcome the input-output framework of measuring development results o Assemble requisite expertise and skills sets o Sustain trust and manage conflicts among hub players o Make adjustments without laborious approval processes o Perform networking and facilitation roles on a long-term perspective

✓ Awareness and resources for establishing a hub facilitator conceived in KMDP-II proposal	✓ Limited experience and exchange between facilitators like KMDP, Agriterra, We Effect ✓ Sustainability of initiative post the tenure of facilitator
Integration factor 4. Exploiting formal cooperation (the case for bilateral partnerships such as processor-led T&E approaches - MCDFCU, NKCC)	
✓ Building on the existing promising examples (MCDFU, NKCC, HC) ✓ Most of the potential and diverse players have been mobilized and somehow linked (PDTCs, TTIs, CBEs, Processors, ISPs, LFs, MSFs/MFFs) ✓ Others have experienced one off T&E Linkages (CBEs/ISPs, PDTCs/CBEs, LFs/MSFs and other farmers	✓ Professional support needed to improve the emerging promising T&E models (e.g. MCDFCU model needs to be nurtured) ✓ Addressing transparency and accountability challenges ✓ Mapping and targeting feasible partners (processors' reluctant to invest in T&E) ✓ Managing conflicting interest
Integration factor 5. Capitalizing on social capital (in targeting milksheds, dairying communities and interventions)	
✓ Build on a critical mass of entrepreneurial smallholder dairy farmers that is emerging ✓ build on positive experiences with farmer study groups (LFs, MFFs) in phase I ✓ Build on emerging competences among T&E advisors related to facilitating farmer-led experimentation and learning ✓ Project emerging image and reputation of CBEs/Unions as dependable players in T&E service delivery (this can be stimulated by documenting and sharing widely their successes and experiences on T&E partnerships)	✓ Mitigating dairy farmers heterogeneity challenges e.g. through differentiated targeting-ESFs, MSF,LSFs ✓ Strengthening aggregation and (re)articulation of T&E demands for different types of dairy farmers ✓ Addressing corporate governance and management challenges ✓ Developing competences and tools for facilitating farmer study groups for ESFs and MSFs
Integration factor 6. Strengthening corporate governance in dairy producer organizations	
✓ Build on successful case studies of CBEs that have realized business case of T&E partnerships ✓ Opportunity to exploit alternative mechanisms to democratic decision making (seeking professional advice, enforcing internal rules, management tactics in allocation of resources to T&E, entering into strategic partnerships with processors on financing T&E)	✓ Ability of CBEs and Meru union to; o package and communicate the impact of T&E to members o Innovate mechanisms for financing T&E ✓ Addressing transparency and accountability challenges

3.3 Connecting different types of farmers

The farmer study groups approach has been rated as one of the most effective T&E elements under KMDP for both smallholder entrepreneurial farmers as well as the medium and large scale farms. Key lessons on how to integrate the LF approach have been outlined under section 2.1.1. The gist of these lessons is to scale out the LF approach under CBEs in a manner that ensures that the methodology is stable but dynamic. Tailoring it on loyalty programs implemented by corporates in the services industry is worth considering.

The farmer study groups under the MSF model (MFFs) form a relatively new approach. Though they are rated to be well functioning and performing, pertinent organizational issues ought to be reflected upon.

Under the MFFs the loose nature of the self-organizing groups exudes features of short term-ness, while the organizational challenges faced by EDFA pose sustainability challenges to study groups in North Rift.

In conclusion: this assessment observes that the objective of connecting different types of farmers in mutual learning platforms is a relatively new approach, especially in third sector programs targeting commercial oriented farmers. A lot of learning and competence development will be required. In this light, and in conformity with the SR's recommendation to adopt an inverted pyramid approach to milk supply chain development, KMDP should consider paying attention to:

i) increasing interactions between LFs and MSFs
ii) increasing capacity of LCBs to facilitate functioning of farmer study groups
iii) concerns related to future and growth opportunities of MSFs when they are not connected with milk processors
iv) the hypothesis that MSFs harbor a potential to supply smallholders with inputs and services (especially in fodder supply, mechanization, breed improvement (heifers), and access to stable milk markets)

3.4 Skills development, new knowledge and interactions within dairy innovation system

Skills development for demand-led T&E advisors

Another trend pervading the T&E landscape is the broadening role of extension from the traditional technology transfer role to facilitation of knowledge sharing and problem solving. This shift poses hitherto unanticipated challenges to T&E advisors. Feder et al. (2011) observe that the skills of extension staff have been built on a slender educational preparation and are oriented towards generic technology messages rather than on problem solving of more practical, specific and local farmers' issues. Moreover KMDP studies (SNV/DTC, 2016; PKF, 2013) conclude that graduates from Kenyan dairy training institutions tend to be heavily grounded on theoretical aspects but weak on practical aspects.
KMDP experiences confirm these impressions. They further demonstrate that given opportunity and guidance in a learning-by-doing environment, interns and fresh graduates are able to rapidly develop desired practical and professional expertise.

Other programs seem to have adopted similar approaches. Technoserve's regional coffee initiative (Kenya, Uganda, Ethiopia and Tanzania) and Wageningen UR's DairyBISS project in Ethiopia all exude similar approaches. They are characterized by recruiting locally available graduates and providing intensive professional training, backed by post training follow up coaching and learning by doing.

A similar approach is adopted by private companies contracted to provide farm advisory services in the coffee sector. Tropical Farm Management Limited (TFM) provides farm advisory in all aspects of coffee growing, processing and marketing in Kenya (www.tropicalke.co.ke). The company invests in training and professional development of its staff. TFM prides in the fact that most of its agronomists started as graduate trainees taken through a program characterized by intensive internal training, provision of a practical working environment, and opportunities to apply theory learned in college under guidance from experienced agronomists.

Box 3.1. Build human capacity for the industry not for the project - lessons from TechnoServe (2013)

Develop skills for the industry, not for the project - lessons from TechnoServe's coffee initiative

Following the new opportunities for smallholder farmers' to tap into premium markets occasioned by emergence and rapid growth of the specialty coffee market around the world, TechnoServe received a four-year (2008-2011) $47 million grant from the Bill and Melinda Gates Foundation to help smallholders benefit from this rising demand The Coffee Initiative was aimed to increase the incomes of East African coffee farmers by improving both the yield and quality of their coffee. In a lessons learnt documentation, TechnoServe offers the following succinct lessons on how to build human capacity for industry development:

1. Get out of the cities and recruit locally
2. Go beyond interviews—observe candidates in training and hire the top performers
3. Invest in high-quality training and professional development, not only to support the project but to supply the industry with skilled talent.

According to Kibwika et al. (2009) the shift to a demand-led T&E approach imposes seven critical abilities (attitudes and skills) that T&E advisors need to build competence around:

i. Facilitating action learning and experimentation processes among farmers
ii. Brokering information and knowledge
iii. Developing local organizations and facilitating farmers' empowerment
iv. Applying systems thinking - seeing beyond the output of T&E to impacts of T&E
v. Developing teams and working in teams
vi. Developing and managing partnerships
vii. Supporting enterprise development.

From the review of the T&E approaches (see section 2.1) it is observable that the seven generic critical abilities identified above are manifest in the KMDP set up, though at varying levels.

KMDP identifies the gap in practical skills and knowledge as a systemic issue constraining the competitiveness of the Kenyan dairy sector. Innovative initiatives to contribute to addressing these systemic issues have been attempted under KMDP as outlined in section 2.1.8. KMDP realistically acknowledges that such issues are beyond an intermediary's capacity and mandate, hence the "*promote and provoke*" approach to these innovative initiatives. This assessment finds some of these initiatives quite unique. They include establishment of PDTCs, support to evolution of a pool of private dairy advisors (PDAs/LCBs), facilitating interactions with Dutch's dairy industry experts, promoting and facilitating international B2B relations and business models (e.g. Uniform Agri local dealership, Roodbont and Olive partnership, Bles Dairy East Africa Ltd, etc.), as well as work with agricultural training colleges to improve the training environment, and the e-learning being platform piloted with DTC Oenkerk.

However, this assessment observes that the skills development initiatives seem to have taken more of an expert-oriented, transfer of technical knowledge and practical skills. Whereas such an approach is justifiable as an entry strategy to fast-track acquisition of basic practical skills as well as new knowledge and also can trigger change among entrepreneurial farmers, it is very unlikely that the intensity can be sustained in the short to medium term as farmers' needs and demands for T&E would change during and following implementation and adoption of new knowledge and practices. Needs and demands would shift towards support for localized farm level experimentation and action learning. Two cases were observed during the field work phase of this assessment (*see table 2.1 under opportunities*). One way KMDP seeks

to addresses this is through the '*promote and provoke'* strategy. The B2B relations and linkages between Kenyan and Dutch dairy sector stakeholders, in form of dealerships and franchises, including linkages and cooperation models between local and international private dairy advisory services are envisaged to contribute in bridging such gaps.

Overall, the skills development challenge will require not only a long term approach, but also concerted efforts among public, private and third sector players to address. This is because the generic competences identified will need to be integrated in the professional training of agricultural professionals. This assessment found that agricultural colleges are still slow in reviewing curricula to respond to changing needs for demand-led T&E. Harmonization of curricula is another gap.

Incorporation of new knowledge and the dairy innovation system

The agenda setting on topics of interest and content of advisory services moreover is influenced by both predictable and unpredictable trends. Most recently the issue of feeds and fodder has dominated T&E in dairy production in Kenya. There might not be unanimity on the next top priority topic in the coming years and there seems to be no mechanisms for agenda setting. A professional body for agricultural T&E advisors could be considered as a central idea in establishing agenda setting mechanisms. It could be mirrored on other professional bodies such as those for engineers, lawyers and doctors, which provide a more organized feedback loop between training institutions and the practice.

Another area of interest is the interaction of players within the dairy innovation system, and particularly the infusion of new knowledge. Under the coffee sector and to some extent the TC banana sector, linkages with research institutions seem more common than in the dairy sector. However, the linkages tend to be inclined towards breeding technologies and new varieties of coffee and TC bananas. TC banana seedlings are developed through biotechnology and some private companies have invested in such technologies and services, while coffee breeding is largely public sector-led, with the Coffee Research Institute (CRI) playing a central role. In dairy two scenarios are manifest, cattle breeding is highly privatized while breeding for fodder varieties is highly regulated and dominated by public sector and international donor funded research institutes. For coffee, premium and specialty markets are sources of new knowledge as the certification programs come with a package of recommended practices. The dairy sector doesn't seem to share some of these features facilitating infusion of new knowledge and innovation in coffee and TC bananas. This assessment observes that new knowledge and innovation in the dairy sector is largely driven by the private and third sector players. This is through adaptation and introduction of new dairying technologies into the Kenyan markets by private sector players (sometimes in collaboration with third sector players like the case of the Mazzicans milk transportation containers); the annual ESADA dairy fairs and Brookside Breeders show are but some of the avenues of exposure. Regional and international exposure visits have also been another source of new knowledge and innovation. These international exposures and interactions have mostly been ad hoc, short termed and loosely structured. This assessment finds KMDP's approach to international knowledge exchange as one of the most structured and well-targeted programs.

4.0 Recommendations

4.1 Overall recommendations

Adopt the most integrative T&E models

To be able to promote and provoke effectively it is recommended that KMDP-II adopts T&E models that best integrate most of the T&E elements experimented in phase I. This report identifies and recommends two such models - the processors-led and CBEs-led models.

This means that selection of milksheds, target groups, and partners for KMDP-II targets conditions that are most promising for processors and/or CBE-led T&E models. Key to this conditions is willingness to invest in T&E as a prerequisite for supply chain development. MCDFCU, Githunguri DFCS and NKCC provide some of the promising processor-led T&E models.

In implementing the inverted pyramid approach, connect different farmers for peer learning

In implementing the *Pareto* principle to stimulate the development of milk supply chain, this assessment commends the role played by the farmer study groups piloted under the LFs and MSFs approaches. It recommends that in scaling up these approaches attention is paid to: i) refining the approaches to achieve stability in their implementation while retaining dynamism in their evolution, ii) strengthening capacity of study group facilitators - PDAs, iii) facilitating cascaded interactions across different types of farmers (MSF to LFs to SFs) and strengthening social capital within farmer categories, iv) addressing organizational challenges faced by host producer organizations.

Redefine the role of KMDP in facilitating private sector-led, market driven T&E models

In fostering private sector-led, market driven T&E models, it is suggested that KMDP redefines it role in phase-II. As an intermediary KMDP could consider disentangling itself from direct implementation of T&E interventions and rather take a backstage position, playing catalytic and brokerage roles. This means that most of the LCBs (especially those involved in MSF and MCDFCU models) could be transitioned into private firms contracted directly by the producer organizations or individual farms, with KMDP playing a third party brokerage role. Opportunities to blend the local private dairy advisory firms with international Dutch expertise seem feasible. These configurations can borrow from the private advisory companies in the coffee sector such as Strategic Management Services and Tropical Farm Management limited.

KMDP also ought to consider minimizing cases of supply driven support on T&E. This means:

- ✓ improving the capacity of T&E actors to aggregate and articulate needs and demands
- ✓ enhancing pro-activeness of T&E actors in seeking partnership and support from KMDP
- ✓ mechanism for guiding decisions to disengage from T&E actors experiencing systemic challenges

4.2. Specific recommendations

4.2.1. Towards private sector-driven, demand-led dairy T&E approaches

KMDP T&E approaches mirror a hybrid system which predominantly blends private sector and third sector players and roles. It is KMDP's aspiration that the T&E models shift further towards a purely private sector-led mode. To enhance and sustain this configuration, the following is recommended:

Monitor and quantify contributions and outputs of different players in T&E models

Measures to monitor and quantify the contributions (financial, roles, impact) of different players within a T&E model are desirable, in order to enhance evolution of complementary views among diverse value chain players on the importance of investing in T&E. They are also critical in monitoring how and learning why T&E models are shifting towards private sector driven approaches. These are learning questions which could be of utmost interest to an intermediary like KMDP. It is therefore desirable that KMDP-II supports action-oriented monitoring approaches that are capable of monitoring, quantifying and documenting the contributions of different players under different T&E models. Evidently, such approaches require both quantitative and qualitative approaches.

Improve internal coordination within KMDP teams

Arguably, T&E aspects cut across all seven areas that KMDP has identified as strategic intervention agendas. KMDP advisors, LCBs as well as international experts are deployed based on these agendas. This assessment observes that interactions among the teams across the agendas can be improved. Enhancing team work and interactions are recommended as they are prerequisites for pluralistic systems as well as for innovation-oriented work environments. A focal person for T&E approaches could be appointed within the team to provide overall coordination and learning around T&E experiences across all agendas.

Improve the robustness of (re)articulation of farmers' T&E needs and demands

Whereas attempts to aggregate and (re)articulate the T&E needs and demands of different types of dairy farmers have been undertaken, this assessment has identified some weaknesses regarding the robustness of the needs assessment methods and feedback loops. It recommends attention to i) on-farm data collection and analytics, ii) analysis of readily available data to inform trends in farmers' needs. A visitors' book managed by LFs, PDTCs, MSFs would be a very practical tool. Dairy farm benchmarking data is another, but one does not need to stop there.

Targeting milksheds and dairy entrepreneurs - the demand side for T&E

KMDP has done a good job in terms of targeting milksheds and clients that depict conditions that are favorable to demand-led dairy T&E services. This is commendable and highly recommended. Efforts to sharpen such targeting are recommended. They could include documenting the selection criteria, application of more analytical tools (GPS, on-farm data), and mapping of other value chain players who present potential for T&E partnerships - such as processors. The LF approach under CBEs needs to be well documented, made more dynamic and inclusive, and be shared widely within the CBE's membership to mitigate resentment based on perceived exclusiveness, and instead act as a trigger for improvements

among farmers. It is suggested that the LF approach is tailored on loyalty programs adopted by corporates in the services industry.

Enhancing capacity of T&E advisors: the supply side of T&E services

Issues to address include:

i. Overreliance on JCs and CBE T&E staff in last mile provision of T&E services under the DVC component, who tend to be fresh graduates with limited experiences
ii. That capacity development for T&E advisors has focused on technical aspects in dairy production and lesser on farm economics and other softer skills that are required to act as a broker of dairy information and knowledge and facilitation of knowledge sharing, experimentation and learning.
iii. Envision two types of LCBs: those suited to play more of facilitation roles in T&E and those suited to act as private dairy advisors. The former require skills in information brokerage and facilitation of learning and require the seven critical attitudes and skills outlined in section 3.4. They are more of intermediaries or innovation brokers and therefore best retained as staff or consultants of KMDP. The latter reflects T&E advisors who have built solid practical skills and experiences in core dairy husbandry areas such as fodder, breeding, animal health, who can be retained on a purely B2B relationship.
iv. How the LCBs can partner with Dutch dairy advisory experts and firms to establish dairy advisory companies akin to the one in the coffee sector (such as SMS, TFM).

4.2.2 Exploiting Integration factors for pluriformity

Most integrative T&E models: Processor-led and CBE-led models

This assessment recommends two T&E models that are thought to be the most promising in integrating the different T&E elements experimented under KMDP-I (see attached as appendix 3). They are processor-led and/or CBE-led T&E models. They are the most promising since they provide a platform within which other T&E support services providers or elements (such as ISPs, PDTCs, PDAs, ATVETs, LFs) can easily be plugged-in.

Most integrative coordination mechanisms

Further, this assessment recommends six coordination mechanisms that are found to be most instrumental in facilitating the functioning and performance of the two identified T&E models. They include:

i. Markets mechanisms (such as farmers' willingness to pay for T&E, capacity of PDAs to develop and market T&E services as products)
ii. Role of intermediaries (such as KMDP's role catalyzing private sector-led T&E models)
iii. Bilateral partnerships (mutual interests between 2 T&E actors, such as an MOU between a CBE and a PDTC)
iv. Strategic alliances (horizontal coordination of more than two T&E actors that mirror a dairy information and knowledge hub)
v. Social capital (determines success in mobilizing farmers into producer and farmer study groups)

vi. Democracy (determines decision making and participation in producer organizations - investments in CBE T&E units and functioning of MSF study groups rely a lot on this mechanism).

The table below presents a detailed presentation on the key issues that ought to be addressed under each mechanism.

Table 4.1. Issues to be considered under each integration mechanism

Integration factor	Elements it is applicable for	Priority issues to be addressed
Market mechanism	PDTCs, learning visits to LFs/MSFs farms, CBE T&E staff, PDAs/LCBs, study tours, ISPs	✓ Capacity to translate farmers T&E needs into products/solutions and market development (PDTCs, PDAs/LCBs) ✓ Capacity of ISPs, PDAs/LCBs to market the impact of their services/products (packaging of information) ✓ Improving training/learning component in LF/MSF farms ✓ Improving terms and conditions for CBE T&E staff ✓ Improving willingness to pay for T&E services among farmers (or targeting farmers with higher likelihood) ✓ Up scaling number and distribution of PDTCs across the milksheds
Role of an intermediary - Case of KMDP	All elements	✓ Requisite skills-set to catalyse T&E relationships and linkages while playing an indirect and catalytic role ✓ Ability to contextualize current conditions and trends shaping T&E models (thematic studies to inform approaches that are compatible to realities and limitations on the ground) ✓ Space (flexibility, skills, resources) to support adaption of T&E models based on experimentation and learning (piloting, innovation funds, international exposure, M and E system tailored for learning) ✓ Sustained reputation and trust by diverse players so as to play network coordination roles
Strategic alliances (dairy knowledge hub)	Multiple elements in a combination	✓ How to operationalize a dairy information and knowledge hub within a milkshed ✓ Conceptualized as a network assembling diverse players involved in creation, diffusion, adaptation and use of dairy knowledge ✓ This requires generic guidelines that can permit high level of localization based on mapping of potential partners ✓ A reputable hub facilitator and network coordinator – often a trusted intermediary. ✓ Can JCs play the leading role here? Questions of i) level of expertise and experience required, ii) and institutional attributes desired for a facilitator
Bilateral partnerships	Any two elements	✓ Identify and strengthen existing/promising partnerships (e.g. CBE vs. ISPs, CBE vs. PDTCs) ✓ Annual T&E calendars between CBE and ISPs - a good start that need to be strengthened ✓ B2B linkages are the underlying factors of success ✓ MCDFCU processor-led model presents room for improvements

		✓ NKCC model can provide prospects for partnership with KMDP
Enhancing social capital: improving the farmer study groups approach	Study groups, Producer organizations	The farmer-led study groups - the LFs and MFF approaches have been rated as one of the most successful T&E methodologies. To enhance this approach in KMDP II, the following is recommended: ✓ Based on KMDP I experiences, refine and document KMDP guidelines on the different types of farmer study groups ✓ Apply lessons learned under the LF approach as outline in 2.1.1 in this report. ✓ Build capacity of KMDP advisors/LCBs on facilitation of farmer study groups, facilitation of dairy farmer-led experimentation and learning processes
Enhancing corporate governance in CBEs and dairy producer organizations	Study groups, Producer organizations	KMDP I has devoted commendable efforts in addressing governance issues in CBEs under the DVC component of the program with mixed results. This assessment makes the following recommendations; ✓ Retain an experienced expertise (team/firm) with conceptual and practical experiences of governance in producer organizations ✓ Build capacity of T&E advisors on corporate governance, as part of the critical abilities required by T&E advisors ✓ Pair the producer organization governance expert team with the T&E advisors to implement on going interventions tailored to the contexts of each CBE. Non training interventions and organizational development (OD) skills will be required to ensure a strong orientation towards ensuring CBE leaders and managers are supported in learning by doing ✓ Apply other tactics to get CBEs allocate more investments to T&E such as supporting, such as: o Culture of seeking and embracing independent professional advise generally and in particular on T&E o Management tactics - setting informed targets on budget allocation to T&E activities from CBEs/Union's revenue o Operationalizing internal rules governing i) recruitment and conditions for T&E advisors, ii) LF approach, iii) minimum no. of training events per year o Strategic partnerships with milk processors to work out arrangements for levying T&E fees from milk supplies upfront (as in the case with NKCC, MCDFCU).

4.2.3 Skills development, international knowledge exchange, and innovation

Skills development of agricultural advisors

Given this is a systemic issue, KMDP efforts can only make a contribution in addressing the challenge of competences desired for demand-led advisor services (see section 3.4). Under the "*promote and provoke*" mode KMDP could sustain or upscale the interventions under the VOSD component. They include:

i. The internship program (incl. opportunities for local students' internship in Dutch dairy industry)
ii. Broaden areas for skills development beyond the technical aspects of dairy production to address other critical abilities (see section 3.4)

iii. Continue with the intermediary role around the DTC E-Platform franchise model
iv. Upscale and support development, branding and marketing of the PDTC model.
v. Sustain and broaden skills development for a critical mass of PDAs.

A professional body for agricultural advisors in Kenya does not sound as an overstretched idea. It could be the beginning point for establishing mechanisms for predicting agenda setting on priority topics and content of dairy advice.

New knowledge and innovation

To contribute to infusion of new knowledge and innovation in the dairy T&E system, the following interventions are recommended:

i. Promote interactions with international dairy experiences, especially from advanced dairy industries such as the Netherlands and South Africa. The international experts' arrangements under PUM and other Dutch dairy businesses are worth sustaining without undue/unrealistic pressure from the *aid to trade agenda*. However, the exchange needs – as is the case - to be moderated through induction of experts on the Kenyan context, vetting ability of experts to facilitate exchange of knowledge, and also toning down from the concept of knowledge transfer to knowledge exchange.
ii. Adopting a farmer experimentation and learning approach to advisory services will be critical in a post entry phase; after farmers have acquired considerable knowledge on dairy, as is likely to be the case in KMDP II, their T&E demands will shift to the needs for support in experimenting with the locally available resources and learning in real life management of their dairy farms. This will be an opportunity for generating new local knowledge and farm level innovations.
iii. The Innovation Fund is recommended as a good mechanism for stimulating introduction and sharing of new knowledge, technology and business models. It is recommended that KMDP-II identifies T&E approaches as one of the areas/categories to invite novel ideas for consideration of support.
iv. A monitoring framework that is oriented towards learning is advisable. Such a system should be able to discern process-oriented outcomes and be able to encourage documentation and sharing of program experiences within and beyond SNV/KMDP.
v. Conferences are also commendable mechanisms for sharing and learning about new ideas and innovations evolving in the dairy industry. KMDP II could plan to i) organize similar conferences in partnership with other players and ensure T&E approaches is identified as a category, ii) have staff participate in externally organized learning and sharing events.

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Appendix 1 – Terms of Reference

SNV KENYA/KENYA MARKET-LED DAIRY PROGRAMME

TERMS OF REFERENCE

ASSESSMENT OF KMDP's KNOWLEDGE TRANSFER AND T&E APPROACH

1. PREAMBLE

SNV Netherlands Development Organisation (SNV) is an international not-for-profit development organisation that provides capacity development services to nearly 2,500 organisations in 36 countries worldwide. SNV engages with stakeholders at different levels in local economies and agricultural value chains, with the objective to help enhance competitiveness, incomes and employment by inclusion of small and medium sized farmers and SMEs. In the East & Southern African region, SNV has offices and programs in Ethiopia, Kenya, South Sudan, Uganda, Tanzania, Rwanda, Zambia, Zimbabwe and Mozambique. In Kenya, SNV focuses on horticulture, dairy and extensive livestock, water and sanitation and renewable energy (biogas). In the dairy sector SNV Kenya is implementing the Kenya Market-led Dairy Programme (KMDP). This Terms of Reference concerns an assessment of and recommendations for the Knowledge Transfer and Training & Extension approach of KMDP.

2. KENYA MARKET-LED DAIRY PROGRAMME (KMDP)

The Kenya Market-led Dairy Programme (KMDP) is a 4.5 year programme funded by the Embassy of the Kingdom of the Netherlands. The programme started 1st July 2012 and is implemented by SNV Netherlands Development Organisation in collaboration with stake-holders in the dairy industry. The overall goal of KMDP as stated in the project document is to contribute to the development of a vibrant and competitive dairy sector with beneficiaries across the value chain. KMDP acknowledges and appreciates that the dairy industry in Kenya is private sector driven and has two pillars or strategic intervention levels:

I. Smallholder Dairy Value Chain

The objective here is to increase efficiency, effectiveness & inclusiveness of the smallholder dominated dairy value chain, which is responsible for an estimated 80% of milk production in the country. KMDP works in a number of milk sheds with processors and – predominantly - dairy societies (also referred to as milk Collection and Bulking Enterprises or CBEs). Currently SNV/KMDP collaborates with 2 processors and 19 dairy societies in Eastern (Meru), Central (Kiambu, Nyandarua-Kinangop and North Rift regions. KMDP supports the design and implementation of more inclusive business models, with an emphasis on embedded Training & Extension and input supply services for CBE members/farmers. In addition to that SNV/KMDP provides business development services to enhance management capacity and governance of CBEs at their level.

II. Sector issues

At this level KMDP promotes and support interventions and innovations that address systemic issues that cut across the sector. These are related to e.g. feed & fodder, milk quality (e.g. piloting Quality Based Milk Payment systems) and practical dairy skills development. This includes:

- support to the Dairy Training Institute in Naivasha to become a (semi-) autonomous institution, the programme aims to link DTI, agricultural universities and colleges to DTC Oenkerk from the Netherlands (Electronic Information Platform and franchising model)
- support to Practical Dairy Training Centres or training farms with adopting good farm practices, training materials, training of trainers, and business development
- deployment of international experts to build capacity of local dairy advisors (also referred to as Local Capacity Builders)
- an internship program for local and Dutch students.

3. KMDP's TRAINING & EXTENSION APPROACH AND INTERVENTIONS

KMDP has piloted a number of different interventions in the area of knowledge transfer and training and extension (T&E), targeting different categories of clients:

a) Work with 18 smallholder dairy cooperative societies (or CBEs) in setting up T&E units using a lead farmer approach and local capacity builders (LCBs).
b) Work with medium scale dairy farmer organizations in three areas: North Rift, Central, and Meru regions. Work with CBEs and medium-scale farmers, both focus on fodder production, total dairy management, and linkages to dairy input suppliers.
c) In the work with commercial fodder producers and MSF farmers, KMDP has worked with PUM experts who train and coach CFPs /MSFs and (LCBs) that give follow up support in between these missions. These MSFs in turn organized themselves in EDFA (North Rift) and study groups in Central and Eastern and engage in demos and field days for other farmers (MSF and Smallholders).
d) KMDP also works with the model of Practical Dairy Training Centres (PDTCs) and Training Farms, which are MSFs farms that have gone into training in more and less structured manners (PDTCs: one week training with qualified trainers and training modules in place, Training Farms: one-day non-structured trainings and farm/exposure visits.
e) At the national level, KMDP works with DTI and agricultural colleges and Universities, whereby the project gives support to good farm practices and linkages with Dutch training institutes like DTC Oenkerk.

4. DOCUMENTATION AND LEARNING FOR IMPROVED DESIGN

KMDP's Management Team has suggested that now that the program is 3.5 years old, with less than 1 year to go, it is time to review the various interventions and models put in place for knowledge transfer

and T&E activities, and to advise the program on a coherent design or scaling up for a T&E approach that could be implemented in a next phase of the program.

This review will have the following objectives:

I. To assess progress made in training/knowledge transfer related interventions and in extension/advisory services improvements (see planned outcomes)
II. To assess the strengths and weaknesses of the approaches used so far for the different client categories- why has there been success or not?
III. To make recommendations for a knowledge transfer and T&E approach (or approaches) for KMDP II, that:
   - ✓ Connects different types of farmers and/or client categories in an area for mutual learning (smallholders, smallholder lead farmers, medium and large scale farmers)
   - ✓ Is essentially private sector-driven.
   - ✓ Allows for pluriformity, with potential for various dairy value chain actors to take the lead in knowledge transfer and training: dairy processors, dairy cooperative societies/CBEs, input suppliers (like feed companies), or service providers (like financial institutions)
   - ✓ Addresses knowledge transfer, training, skill development, and incorporation of new knowledge into the dairy innovation system, from Kenya and from abroad.

The following preliminary research questions will structure the assignment:

a. What are key elements and integrating factors for a T&E system that targets smallholder dairy farmers (SDFs), medium & large scale farmers? – What T&E elements are currently being used? What are the demands/needs with regard to advisory services for the different types of farmers? What can different types of farmers learn from each other? What tools can be developed to integrate the different elements into a T&E system and to make it sustainable?

b. What can be learned from the lead farmer approach used by CBE T&E units? What is the current profile of lead farmers? How are lead farmers doing in terms of adoption of innovation and in terms of advising fellow farmers? How does sharing/spill-over happen? What hinders and what facilitates this? What are expectations from the CBE as supplier of T&E? What is the willingness to pay for advisory services? What lessons can be drawn as input for an integrated lead farmer approach?

c. Which elements of a Practical Dairy Training Centre and its context contribute to the development of a sustained supply of extension support? Which farmers demand for training at a PDTC? What is the impact of PDTCs? What demands do farmers have/opportunities are there for other ToT? How can the PDTCs be linked more structurally to (i) CBEs and processors, (ii) LCBs and (iii) formal training institutions?

d. What roles do private dairy advisory services (LCBs) play in T&E? What roles are LCBs/local advisory firms currently playing? What clients are willing to pay for their services? What are effective methodologies? What are the (potential) roles and opportunities for international

advisory services to link up with LCB entities (e.g. what are opportunities for linking LCB to PUM, farmers' organisations, agricultural colleges (for internship programs), input suppliers from the Netherlands?)? What are possible cost-effective ways to engage them long-term?

e. What are critical conditions for success of T&E units for different types of CBEs (stand-alone, part of union)? What does a T&E unit consist of (minimum)? What are key characteristics and sustainability factors of a T&E unit? What are effective ratios for # of T&E officers: # of lead farmers : # of supplying farmers? What role do processors have in a T&E unit? What are the benefits of a T&E unit for every stakeholder in the smallholder DVC?

f. What are success factors in linking input suppliers and (the T&E units of) cooperatives? Which linkages are made? How are these linkages made? What are the interests, opportunities and limitations of the parties involved (SNV/input suppliers/CBE/farmers)?

g. What can be learned from T&E models in other commodities (i.e. horticulture, tea, coffee) and in other dairy initiatives (KAVES, GIZ, Land O' Lakes, EADD etc.)? What T&E models are used in other value chains? What T&E models do other stakeholders in the dairy chain experiment with (e.g. Equity group, NKCC, Counties, colleges)? What could be useful elements for T&E in KMDP? What are success factors and sustainability characteristics?

5. DELIVERABLE(S) FOR THE DOCUMENTATION AND DESIGN EXERCISE

The deliverable(s) for this documentation and design exercise would consist of:

I. A report that addresses and captures the objectives spelled out above, using the research questions as outline.
II. A presentation on the recommended T&E approach or approaches for KMDP II (which will need to be described in detail in the report)
III. Input in case studies that are being drawn up on subjects addressed in the research.

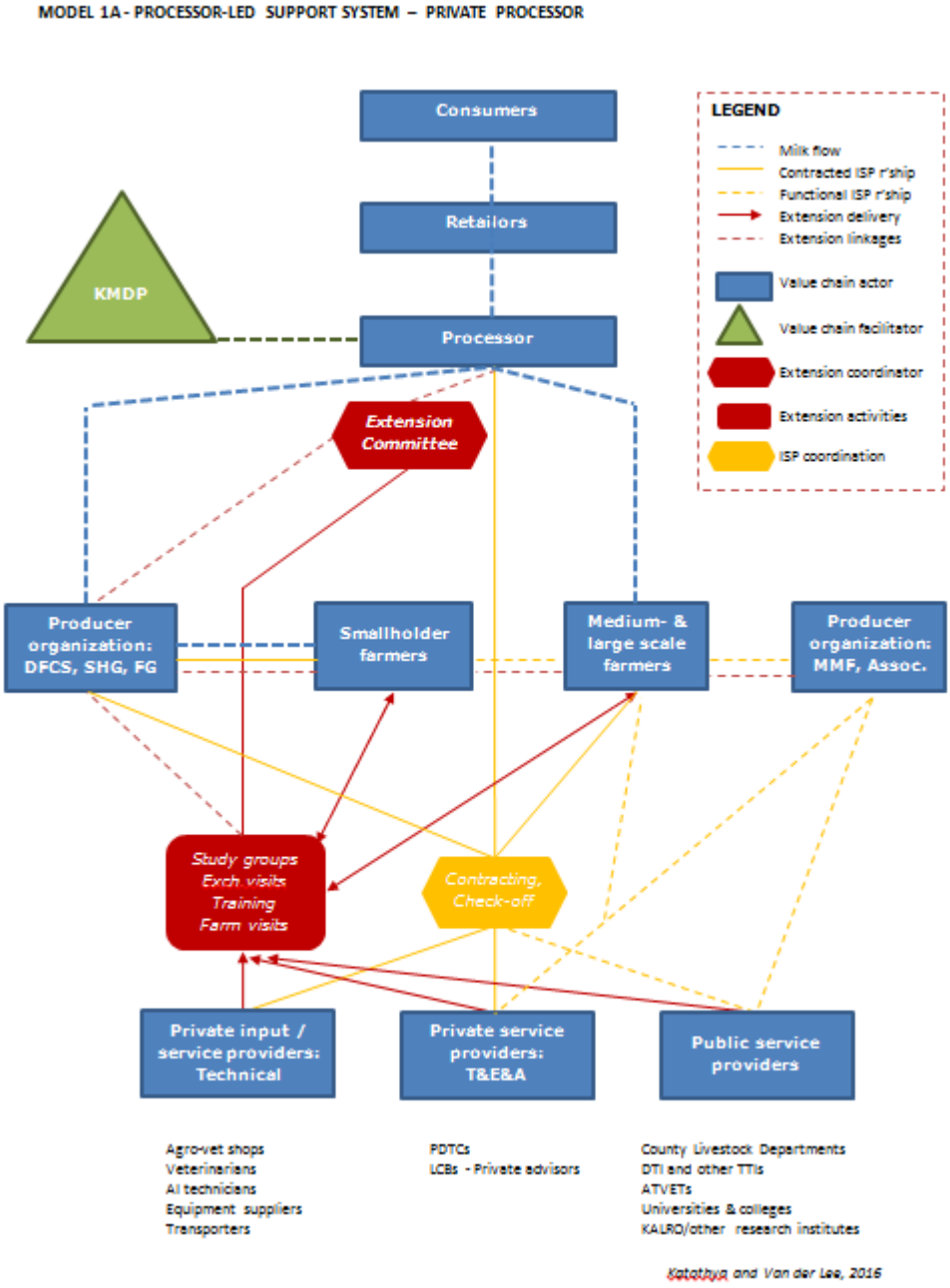
Appendix 2 - Work plan, respondents and sites visited

Dates	Activity	People interviewed and sites visited
12th April	Induction meeting on KMDP	Reuben Koech (DVC Coordinator)
12th - 17th	Document Review, Development of data collection guides	
18th April	Field work - New Ngorika CBE (12pm)	Lead farmers interview and farm visit (Simon Nduati's farm) 1. Richard Wahome, 2 David Kabiru, 3 Simon Nduati, 4 Regina Gathogo
	Key informant (3pm)	1. Prof. Bebe Egerton University (Seed of gold coordinator)
19th April	Group interview - Olenguruone CBE (9am)	CBE Board representatives 1. Joseph Ngerech - chair of board 2. Ezekiel Rop - chair T&E sub-committee 3. Rose Chebet - member T&E sub-committee 4. Langat - CBE Manager
	Key informant interview (10.30am)	1. Joseph Ngerech - as chair of Extension Committee/NKCC Molo cooling plant
	Group interview (11.30am)	T&E Staff Olenguruone CBE 1. Ambert Bett 2. Daniel Kolongoi 3. Emily Kirui
	Group interview (2pm)	Lead farmers representatives - Olenguruone 1. David Rotich 2. Eric Mitei 3. Eddah Chemutai
20th April	Group interview (9am)	ISP representatives Midland Hotel 1. Charles Njenga - Vital Animal Health ltd 2. Daniel Gichuki - Vital Animal Health ltd 3. Erick Koech - Coopers - K Brands ltd 4. Tobias Maina - Twiga Chemicals
	Interview (11am)	LCBs - Midland Hotel 1. Julian Chepchoge - Consultant 2. Kennedy Khisa - Junior Consultant
26th April	Key informant interview (10am)	VOSD Junior consultant (feed and fodder) 1. Misoi Solomon
	Key informant interview (11.30am)	NKCC - Eldoret Factory 1. Richard Chumba - Field services coordinator 2. David Sang - Extension Coordinator
	Key informant interview (1pm)	Kenya Dairy Farmers Federation (KDFF) partner in EADD implementation (Eldoret) 1. David Bett - CEO
	Key informant interview (3pm)	International dairy consultant –SVN/Friesian 1. Wytze Heida - Senior dairy husbandry project advisor (Eldoret based)
27th April	Key informant interview and site visit (PDTC) (9am)	Baraka (Lewa) PDTC, Eldoret 1. Jos Creemers - Manager

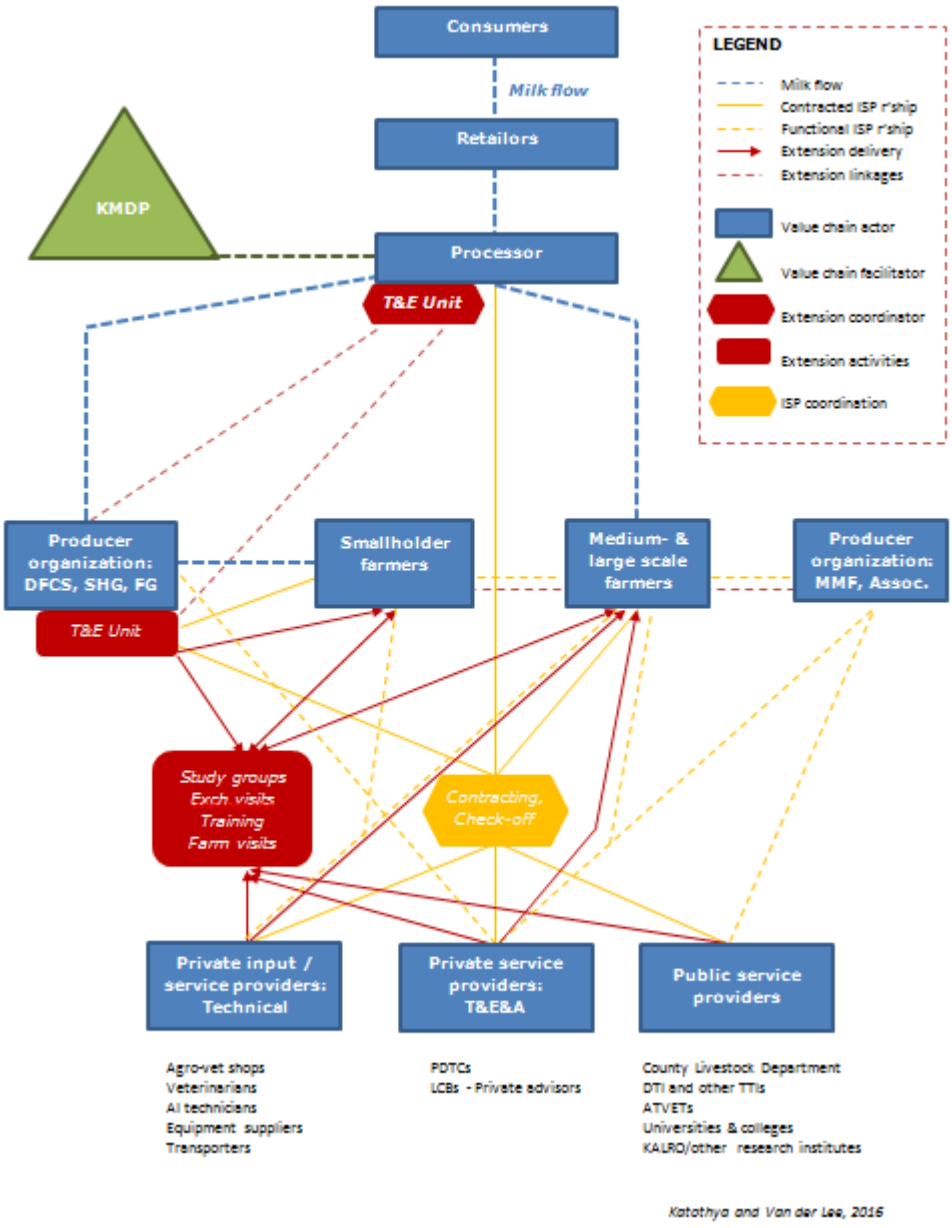
	Interview and MSF farm visit (11am)	1. Jeffrey Samoei - farm manager (youth) and EDFA member 2. Hendrik Galema - Dutch intern on placement by The Friesian 3. Joyce Serem - CEO EDFA
28th April	Conference participant observer (8am - 4 pm)	SNV/DTC E-learning conference, Baraton university ✓ Farm tour - Baraton dairy farm (theme good farm practices) ✓ Proceedings (presentations) o About DTC and E learning pilot o Dutch consultancy services - case study of Q-point o Innovation fund/B2B linkages - case of Cow Signals/ Roodbont and Olive publishing (Cow Signals handbook)
	Key informant interview (4pm)	VOSD agenda 1. Joseph Langat - Senior Advisor KMDP
06th May	Key informant interview (10am)	LCB Firm - Perfometer agribusiness solutions ltd 1. David Maina – CEO and Founder
10th May	Interviews and MSF farm visits - Meru MFFs (11am-2pm)	1. Mutwiri - Gakurine farm (chairperson MESLOP Farmers group) 2. Godfrey Bundi Marete - Private visiting farm manager 3. Zipporah - Briaton Dairy Farm (female managed newly established medium scale commercial dairy farm)
11th May	Interviews –Meru, MCDFCU (9am)	1. Dorcas Kigetu - coordinator donor projects 2. Dr. Omenda Nyamoma - Head Extension Unit
	Key informant interview (11am)	ISP provider Meru 1. Gitonga Ephantus - Territory Manager - Twiga Chemicals
	Group interview and site visit (silage making for Mbwinjeru farmer)	Bidii dairy promoters enterprise SPEN group members 1. Timothy Mwirigi 2. Patrick Murithi 3. Paul Magaju
12th May	Key informant interview (T&E in coffee sector) 9am	Meru Central Coffee Cooperative union 1. Erick Munene - Union agronomist
	Group interview (11am)	CBE T&E Staff 1. Charles Nkanata - Nkuene CBE, 2 Arthur Murithi - Uruku CBE
	Group Interview (12pm)	Nkuene CBE Board representatives 1. Kiogora Patrick – Manager, 2 Henry Kirima, 3 Linus Kirimi, 4 Elias Kinyua, 5 Shadrack
	Key informant interview (2pm)	LCB - Markets and Policy options 1. Fred, Junior Consultant
13th May to 12 June	Analysis of data, Consultations with co-author - Jan van der Lee, WUR Drafting of first draft report, Submission of first draft report to KMDP Team	
29th June	Feedback and validation meeting with KMDP Team	1. Anton Jansen-Team leader 2. Reuben Koech - DVC coordinator 3. Cosmas Muchina - M&E Coordinator 4. Judy Kithinji - Milkshed coordinator
19th July	Key informant interview	1. Anton Jansen - KMDP Team leader

Appendix 3 - Most integrative T&E models

Model 1A- Processor-Led support system- Private processor

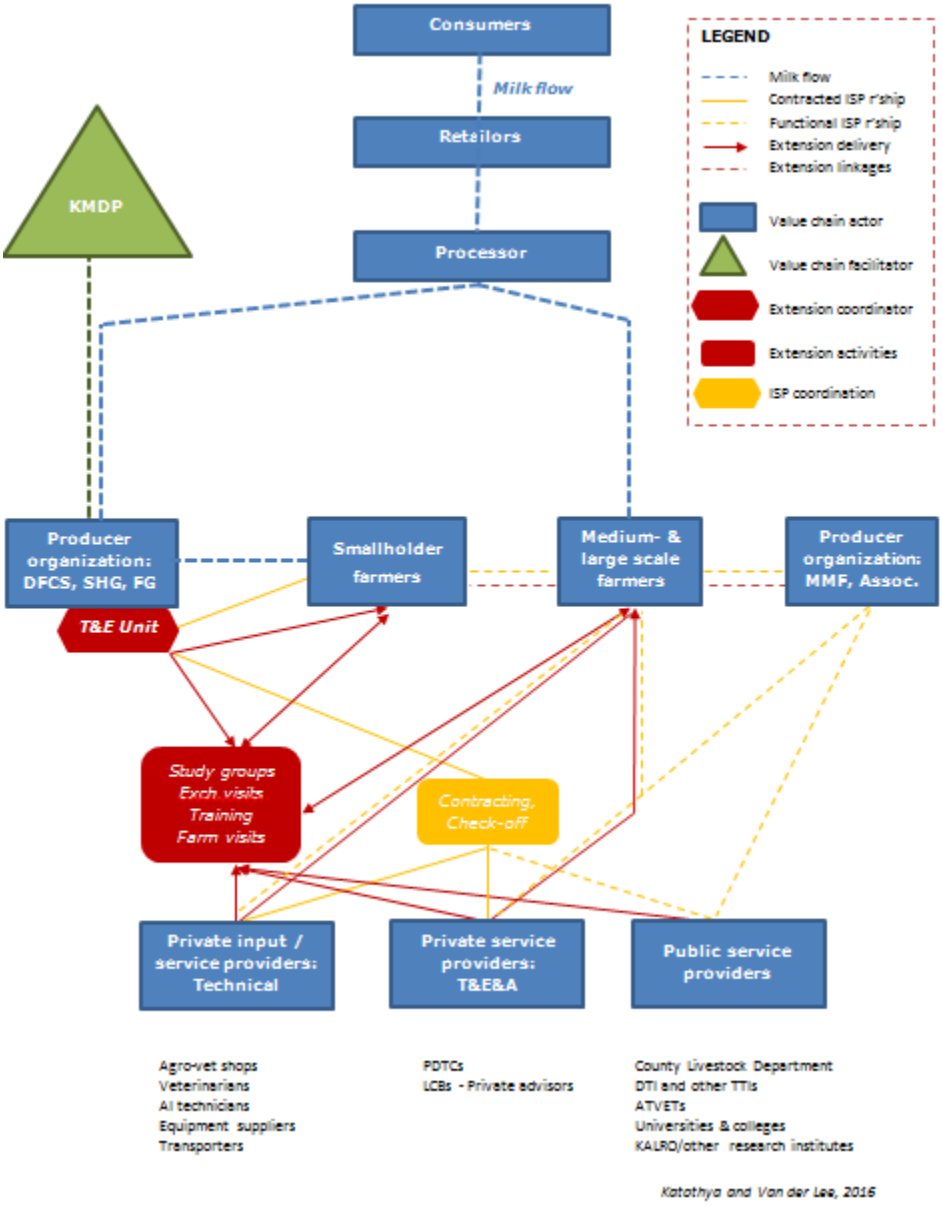


Model 1B- Processor-Led support system- Cooperative Union processor



Katothya and Van der Lee, 2016

Model 2-CBE-Led support system



Appendix 4 – Description of T&E models experimented by other players and agri-sectors

Value chain and players	Description of T&E approaches
Dairy - NKCC (new extension services model launched in January 2016)	**Primary objective** - to secure a reliable supply base for raw milk (technical oriented T&E) **Target groups** - dairy farmers (small, medium to large scale), dairy farmer groups **Governance structure** - processor-led, though accountability mechanisms are broad based through all-inclusive field level extension committees, where the representative of the leading supplier of milk is made the automatic chair (which in most cases is a dairy cooperative). **Financing** - largely financed from the 50 cents per litre of milk fee levied from consenting milk suppliers (individuals, dairy groups). **Main coordination mechanisms** - strategic alliances driven by mutual business interests and actualized through formal cooperation (involving dairy farmers, dairy groups, locally based ISPs, and NKCC's milk collection centres and factories). **Organization and administration** ✓ The field extension committees (FEC) are mandated to manage the extension fund and supervise implementation of T&E services (approve work plans, review progress reports, and meets monthly). ✓ To execute their mandate the FECs are registered under less formal organizational models such as community based organizations (CBOs) ✓ A livestock and veterinary officer from the county government sits in the FECs ✓ NKCC staff led by an extension coordinator plays secretariat role (draws work plans, consolidates progress reports, hires and supervises T&E agents) ✓ NKCC field services team performance appraisal is based on change in milk intake, number of T&E activities organized, number of dairy farmers reached out to ✓ The CBO hires the extension agents based on milk bulking routes (although some agents are seconded to a CBE like is the case in Olenguruone dairy cooperative) **Key T&E elements** ✓ T&E agents are hired to organize and provide training, exchange visits, and farm visits ✓ Each extension agent is challenged to establish linkages with at least five local ISPs who are supported to embed dairy advice in the marketing of their services and inputs (the target is for each extension agent to leverage on the five ISPs to reach out to 400 farmers) ✓ NKCC establishes contracts with identified ISPs so as to facilitate check off arrangements for farmer access to inputs and services ✓ County Government Livestock and Veterinary Department plays supervisory role **Challenges** (though the model is just at inception stages) ✓ Inadequate pool of multi-skilled cadre of dairy extension agents ✓ Limited availability of tailored dairy T&E content - manuals, guidelines ✓ Limited capacity among ISPs in marketing the impact of their dairy products or services (especially locally based ISPs) ✓ Free riding especially among farmers nested under dairy cooperatives ✓ Limited partnerships especially with donor funded dairy programs.

Dairy - EADD/Heifer International	**Primary objective** - pro-poor dairy development (social and technical oriented T&E) **Target groups** - smallholder dairy farmers, dairy producer organizations **Governance structure** - third sector-led (EADD, dairy producer organizations - POs), with attempts to stimulate private sector involvement through linkages with locally based ISPs **Financing** - largely through donor funds (BMGF-private foundation) complemented with a mix of farmers' contributions and private sector contributions, realized through embedding of T&E services in marketing of inputs and services. **Main coordination mechanisms** - intermediary influence of EADD, social capital and corporate governance mechanisms overriding the performance of collective action and dairy producer organizations. **Organization and administration** ✓ Dairy POs are supported to establish T&E units (financial and technical support is organized on a graduated basis) ✓ Financial support caters for salaries for T&E staff and stipend or token of appreciation offered to community facilitators. It also caters for motorbikes, kits for animal health and artificial insemination technicians ✓ The community facilitators are dairy farmers who serve on voluntary basis and are trained on Heifer's social capital model (popularly referred as 'The 12 cornerstones') ✓ A tool for assessing the performance and sustainability likelihood of the dairy POs' collective business and services (including T&E) determines scope and magnitude of technical and financial support from EADD as well as program decisions on graduation and exit. **Key T&E elements** ✓ T&E units established at the dairy PO level composed of: o At least one qualified T&E advisor - organizes training, exchange visits, field days, demonstration units o Community facilitators - provide training and follow up support to the dairy interest groups (social capital mobilization) ✓ Dairy interest groups (DIGs) are groups of about 15-25 farmers that serve as units for organizing and delivering training and peer-to-peer learning ✓ Private dairy service providers - at least an AI provider and an animal health technician who operate privately but have an MoU with the dairy PO to serve members on a check off arrangement; they embed T&E in their services ✓ Input services providers - each dairy PO establishes an MOU with at least one agro-vet store that embeds T&E services in the provision of dairy inputs. **Challenges** ✓ High turnover of Extensionists (massively poached by county governments in some counties establishing an extensive parallel extension infrastructure, like Bomet) ✓ Sustainability of T&E unit post-EADD as dairy POs exhibit reluctance to increase and sustain financing of T&E activities.
Coffee - Meru Central Coffee Cooperative Union (MCCFCU)	**Primary objective -** improved quality and quantity of cherry (coffee) delivered to affiliated primary coffee cooperatives (technical oriented T&E) **Target groups** - coffee farmers, primary coffee cooperatives **Governance structure** - processor-led (MCCFCU mills, roasts and markets coffee from affiliate primary coffee cooperatives) **Financing** – processor-led with support from donor programs such as We Effect and public institutions such as the Coffee Research Institute (CRI)

	Main coordination mechanisms - formal cooperation expressed through enforcement of internal rules (command and control) on quality standards, so as to mitigate the harmful effects of free riding behaviour amongst some farmers who produce poor quality coffee **Organization and administration** ✓ The union has a T&E unit headed by an agronomist ✓ The affiliated primary coffee cooperatives have factory managers and field committees responsible for ensuring farmer training and advice on coffee husbandry ✓ Each primary coffee cooperative has at least one coffee factory where coffee (known as cherry beans at this stage) is delivered for primary processing (pulping) into a product called coffee parchment ✓ The field committee is composed of model farmers who are selected to represent different zones and to act as peer trainers/advisors who also monitor adoption of recommended farm practices so as to minimize free riding behaviour among farmers **Key T&E elements** ✓ Factory level meetings where all farmers are invited for mass trainings ✓ Smaller farmer groups organized according to villages where more intense training and learning is organized. They entail peer learning and learning-by-doing, e.g. learning pruning in a peer's farm ✓ A standard training module and materials have been developed for UTZ certification program (all farmers whose coffee is marketed through the certification program must undergo this standard training module). Under this program the following features are in place: o An UTZ champion (ToT) in each primary cooperative, who is either an employee or a farmer volunteer. They are extensively trained and certified as UTZ trainers, they must have a minimum of form 4 certificate and be a model coffee farmer. o Promoter farmers-these are the leaders of the smaller village-based farmer groups. They are trained by the UTZ champions and equipped with learning materials. Their role is to facilitate peer training amongst the members of their smaller groups. They are expected to be proficient in English as the learning materials have not been translated. ✓ CRI - as a public research institute it is the main source of new knowledge and it: o Organizes and manages demonstrations and trials in cooperatives coffee farms o Develops training materials on Good Agricultural Practices (GAPs) o Trains farmers, conducts ToTs trainings ✓ Field committees - most of them also serve as promoter farmers and leaders of village based farmer groups. Their role is to: o Facilitate farmer-to-farmer learning (including practical training in host farms) o Monitor farm practices in the farms of group members and offer advice as required o Report to the factory committees any farms that have been observed as not adhering to recommended farm practices o Recommend non-compliant farms for suspension, so as to minimize free riding behaviour on quality of coffee among members

	✓ Annual general meetings (AGM) - rules on recommended farm practices are discussed and agreed upon during AGMs. They are only documented as AGM minutes and shared verbally across the membership during the implementation year ✓ Linkages with ISPs who embed advice on coffee production in the marketing of their inputs and services **Challenges** ✓ Most factories are not willing or able to employ experienced agronomists ✓ T&E materials are in English and in need of translation and simplification ✓ ISPs' training and advice is overly driven by commercial interests ✓ Over-reliance on community resource persons who operate on a voluntary basis.
Tissue culture Banana (Gacharo producer business group - Murang'a County)	**Primary objective** - adoption of (new technology) tissue culture banana production on a commercial mode among smallholder farmers in Murang'a **Target groups** - Farmers within Gacharo irrigation project catchment area in Murang'a **Governance structure** - mainly social capital expressed through shared norms and goal congruency among farmers interested in adopting the new banana production technology **Financing** - cumulative support from various third sector players (Africa Harvest, AGRA, Technoserve, Agriterra, Banana Growers Association of Kenya - BGAK, Kenya National Federation of Farmers - KENAFF), and farmers through voluntary principle and peer-to-peer learning **Main coordination mechanisms -** social capital (shared norms) and democratic decision making **Organization and administration** ✓ Members self-organized in a community based organization (self-help group) of 214 farmers whose main objectives are to install water for irrigation at each members' farm and advance adoption of the new tissue culture banana technology ✓ Tissue culture (TC) bananas requires more watering compared to traditional bananas, so irrigation is thought to be a key technology ✓ The group has a member designated as TC technician who trains and advices fellow members on voluntary basis ✓ The TC technician has benefitted from extensive training and exposure organized by intermediaries that were involved in introducing the technology (Africa Harvest, Technoserve, AGRA) **Key T&E elements** ✓ Linkages with producers (private and public) of TC seedling (Aberdare's technologies ltd. and Jomo Kenyatta University of Agriculture and Technology) who embed T&E services while marketing TC seedlings ✓ Peer-to-peer learning events within the farmer group ✓ TC technician trains and advices fellow farmers (including farm visits on request) ✓ Farmer training by experts in TC banana, sourced by KENAFF through an Agriterra funded project ✓ Demonstration centres set by the TC seedling suppliers and some individual farms ✓ Exchange visits across Kenya organized by BGAK ✓ BGAK has also championed a shift to weighing banana bunches to determine price as opposed to the tradition of using visuals (popular referred to as EYE ball pricing)

	✓ Members felt the county government agricultural department was too much inclined towards supporting dairy at the expense of other alternative enterprises like TC bananas **Observations** ✓ By the time (December 2014) of this interview the group members' TC banana plantations had not yet matured so the challenge of marketing had not been felt, though it was anticipated as it was dominated group deliberations.
Private companies contracted to provide farm advisory services in the coffee sector (Strategic management services - SMS, Tropical farm management - TFM)	**Primary objective -** to be subcontracted to provide total farm advisory services in all aspects of coffee growing, processing and marketing (including supporting certification programs) **Target groups** - Large scale coffee estates, coffee cooperatives, donor funded smallholder coffee improvement programs, coffee certification programs **Governance structure** - private sector-led (private service provider-led) **Financing -** clients (farmers, cooperatives, certification programs) and third sector players (development actors supporting smallholder coffee improvement programs) **Main coordination mechanisms** - markets and strategic alliances **Organization and administration** ✓ Private companies - some are spin-offs of large coffee estate management structures, relying on many years of experience to establish the new firms ✓ Tend to have international expertise in their establishment and ownership structure ✓ Recruit and develop own cadre of local graduate trainees into coffee specialists (skilled agronomists etc.) ✓ Some are ISO certified **T&E elements** ✓ Develop and market an annual T&E calendar based on needs and demands induced by seasonal patterns - coffee farming calendar (which is well-synchronized in rain-fed crop production, as compared to livestock); calendars are also publicity and promotional materials ✓ Bundle advice with other services (coffee marketing, certification program management, agro-input supply) ✓ Organize farmer training on GAPs facilitated by experienced coffee agronomists ✓ Some have own farms that serve as demo plots for practical farmer training ✓ Some develop and update handbooks as comprehensive guide to best coffee management ✓ T&E products include full estate management, coffee estate rehabilitation package, attaching farm advisors (akin to visiting dairy managers), tools and advice on estate financial and administrative systems, farm/estate diagnosis (akin to DFB) ✓ Run student internship programs for practical working exposure in coffee agronomy and technology (TFM has an agreement with Dedan Kimathi University of Technology for internship placement for certificate and diploma students in coffee technology.