Best practice guide to socially and gender-inclusive development in the Kenyan intensive dairy sector

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Acronyms

AI	Artificial insemination
CBD	Central business district
EADD	East African Dairy Development
FHH	Female-headed household
GALS	Gender action learning systems
IEC	Informal education communication
KALRO	Kenya Agricultural and Livestock Research Organization
MHHs	Male-headed household
MRV	Monitoring, reporting and verification
NAMA	Nationally Appropriate Mitigation Action
SNV	Netherlands Development Organization
SWOT	Strengths, weaknesses, opportunities and threats
ToC	Theory of change
WEAI	Women's empowerment in agriculture index
WEEI	Women's economic empowerment index
WELI	Women's in livestock empowerment index

Abstract

This report is a guide to best practices for gender and social inclusion in Kenyan intensive dairy sector. This guide is meant as a practical resource to inform the development of Kenya's Nationally Appropriate Mitigation Action (NAMA) strategy. Kenya's NAMA will provide climate finance mechanisms to a number of stakeholders in the livestock sector who are currently practising or interested in low-emissions development. Although development interventions in Kenya's dairy industry have begun to recognize gender and social differentiation issues, there is a critical need to fill the knowledge gaps that exist in the practical application of gender mainstreaming from policy to field level. This guide provides a synthesis of lessons learned and recommendations for gender-equitable low-emissions development. The guide draws upon both extant literature and project experiences revealed by industry experts (n=12). To safeguard the anonymity of participants, no personal names or official positions are mentioned. This guide solely focuses on high-potential dairy development areas, as these are the priority sites for Kenya's NAMA.

Keywords
NAMA; gender; climate change mitigation; low-emissions development; dairy; Kenya

1 Introduction

Although gender mainstreaming has been a rising issue in development since the 1990s, significant challenges remain to intervention-level provisioning of gender-equitable and socially inclusive development. Much of the extant literature on gender and climate change used for informing mitigation policy focuses on the broad imperative of including gender issues in development, but offers little in the way of operationalizing these concepts for field-level practices. It is likely that the lack of practical tools at field level, coupled with a serious lack of gender expertise in many projects, will continue to make it difficult for interventions to reach their technological adoption goals. Thus, it is necessary for interventions to effectively build *gender capacity*, defined here as the understanding and application of the core concepts of *gender equity* and *social inclusion.*

Recent reviews by Galina (2015) and Farnworth (2015) indicate that gender roles and dynamics greatly influence dairy production practices in Kenya. Women tend to be responsible for most management tasks around dairy animal husbandry, including fodder and water provisioning, veterinary health, knowing when a cow is in heat and requires mating or artificial insemination (AI), manure removal, and milking the cow (Farnworth 2015: 7). Yet, despite their contributions to dairy labour, women are often marginalized in the control of the resource (e.g. cow ownership), decision-making associated with the animals (buying/selling), and do not receive commensurate income from the sale of milk. It makes sense, then, that because the burden of dairy work falls predominantly on the woman/women of the household, any mitigation intervention must take into account the impacts that a new technology may have on women. Furthermore, consideration must be given to the gender roles and relationships that exist at household and community level to achieve mitigation project outcomes. This means actively engaging both women and men in the intervention process.

Addressing gender issues in dairy development goes hand-in-hand with recognizing social differentiation and positioning at varying scales. It is well noted (Njuki and Sanginga 2013; Worrall 2015) that women and men occupy different social positions that influence their capacities to uptake new technologies and affect change. The intersections of identity people occupy—including wealth status, educational background, experience dairying, and even religious affiliation—can indeed influence the amount of resources and capital one has to effectively engage with mitigation interventions. Thus, incorporating social issues into a gender strategy is necessary to prevent the further marginalization of certain populations and provide safeguard support for those in less-advantaged positions.

The purpose of this report is to provide concrete examples of how gender equity and social inclusion issues can or have been integrated into low-emissions interventions, specifically for Kenyan intensive dairy sector. Information on this topic has been gathered through two methodologies. The first is a review of 10 publications that focus on gendered dimensions of intensive dairy development interventions in Kenya, with particular attention to areas in which the NAMA will be implemented. These 10 publications represent the extent of the relevant literature identified within these specific search parameters. Following on this, interviews were conducted with 12 experts in gender and dairy development in Kenya with the purpose of eliciting their personal and experiential insights into how effective gender-inclusive development is best done. This report concludes with a synthesis of findings from these two aspects of research.

2 Annotated bibliography[1]

Nyongesa D., Mwiringi M.K., Yongo D. and Makokha S. 2016. Gender-concerns: Do they matter in smallholder dairy groups in Kenya? *International Journal of Agricultural Resources, Governance, and Ecology***, 12(1):1–17.**

Nyongesa *et al.* (2016) reported on six smallholder dairy groups and evaluated the importance of gender concerns—equitable resource allocation, division of labour (productive and reproductive roles), inequalities (in socioeconomic activities, benefits, decision-making, access to and control of resources, their utilization and management) in the dairy value chain. The gender concerns were studied in relation to milk production, value addition and marketing. Groups were chosen from Uasin Gishu, Meru and Tharaka-Nithi (formerly Meru-South) counties in Kenya as they exhibited good characteristics of having competitive dairy production enterprises. Focus group discussions (male only, female only, youth only and one mixed group) were held with each of the six groups with an average of 12 participants per discussion.

For the six smallholder dairy groups, the average percentage of membership by gender was 34.7% male, 42.8% female and 22.5% youth, respectively. An activity profile for dairy farming activities was presented, comparing results for Meru and Tharaka-Nithi groups and Uasin Gishu groups. Across both regions, women were reported to do the majority of labour related to feeding, shed cleaning, milking, milk value addition, milk equipment cleaning and milk delivery. Men did the majority of activities for veterinary services and collection of milk payments in both regions. More importantly, decisions on access, resource control and use of fairy proceeds were made by men (86% in Meru and Tharaka-Nithi, and 83% in Uasin Gishu).

Using the strengths, weaknesses, opportunities and threats (SWOT) framework, the study identified that in all of the groups, women shied away from taking on leadership roles due to cultural norms. For example, in a group in Uasin Gishu, it was revealed that traditionally women were not supposed to talk in meetings where men were present; hence issues related to women could not be aired publicly. Women were systematically denied the opportunity to contribute ideas through the existing channels of decision-making.

The authors make three key policy recommendations. The first is for organizations that work to uplift the performance of dairy groups to adequately understand the gender dynamics of the group. The second is that national governments and non-governmental organizations should invest in dairy improvement programs, particularly the improvement of delivery of gender-sensitive extension services (value addition, marketing and group dynamics) to the dairy groups. Lastly, dairy groups should ensure gender considerations are taken on board by their management structures.

Farnworth, C. 2015. *Recommendations for a gender-responsive Dairy Nama in Kenya***, prepared for lead and implementing partners to the Kenyan Dairy NAMA, 1–35.**

The fieldwork component of this report focused on dairy producers and their producer organizations in the Mount Elgon region in western Kenya. The study addressed gender norms around ownership and management of dairy cattle, intra-household decision-making around milk and other products, the role of men, women and youth in dairy production and the position of female-headed households (FHHs).

1. Publications are presented in chronological order.

The study emphasized the issue of male ownership over assets, including labour of women and children living in 'his household and on his land'. In this region of Kenya, men own the cattle; even in cases when women have the means to purchase them, the cow is owned by the husband. According to Farnworth, 'this is logical within the system because the resources a woman uses, including the land itself, are thought to belong to the governing male'. Women spend up to six hours a day managing cows, including procuring fodder and water and bringing this to them or taking them directly to the source, caring for animals and noticing when the cows are in heat.

As compensation for their labour, married women are entitled to manage (rather than 'own') the evening milk. This includes giving milk to children or neighbours, often in payment for services rendered. Farnworth reports that the income generated by the sale of evening milk is often monitored by male household heads, though women may report selling fewer cups than are really sold to protect their income. The profits from morning milk sales are more complicated—in the study, women expect to receive 50% of the proceeds. A key finding was that 'without exception, married women said they did all the work and took the milk to the cooperative, but delivered the money to their husbands'.

The female heads of households involved in the study were strongly motivated to start selling milk in formal markets. The author recommends that this target group may need specific forms of support in addition to the support provided to all farmers in acknowledgement of their lower economic position. Young men requested that the dairy NAMA intervene with their parents to allow them to take on a more active role in dairy farming, and that they be provided with technical training on fodder and exchange visits with farmers practicing low-emissions development. Young women are trending towards building up small numbers of dairy cows and then selling them, rather than focusing on selling the milk, in order to meet school fees and other expenses. Their 'relative lack of control over the proceeds from milk appears to militate against their serious engagement in the dairy value chain'.

Findings show that the proposed catchment area for the dairy NAMA remains strongly dominated by patriarchal and patrilineal traditions. However, these traditions are being challenged by urbanization, a strong willingness by younger women to live differently and the provisions of the constitution that proclaim equal rights for women, including land.

Mulu-Mutuku, M., Odero-Wanga,D. and Ali-Olubandwa, A. 2015. Female entrepreneurship in Kenya: How do female micro-entrepreneurs learn to be entrepreneurial? Case Studies in *Business and Management***, 2(1):11–26.**

This study interviewed 106 women micro-entrepreneurs in the Kenyan dairy processing industry in Nakuru, Nairobi and Kiambu districts. The majority of micro-enterprises surveyed (73.2%) were within their first three years of opening, while only 5.4% of businesses were 10 years or older. Most of the businesses were family businesses (48.2%), while sole proprietorship represented 45.5% and partnership 6.3%, respectively. 99.1% of the businesses sold fresh milk, 88% sold *maziwa mala* sour milk, and 36.1% sold yoghurt, while smaller numbers sold ice cream (3.7%), ghee (2.8%) or butter (0.9%).

The study found that female entrepreneurship is preceded by little preparation, despite the fact that most women entrepreneurs had high levels of education (75% of participants received secondary education or higher). Factors motivating entrepreneurs to start dairy enterprises were lack of employment (71%), perceived market opportunity (14%), provision of market for own milk (13.2%) and need to accommodate their reproductive roles within their work schedules by operating a dairy enterprise from within their homes or nearby (1.8%).

When asked how they learned the skills and knowledge they use when running their businesses, 76.9% of respondents said they learned on-the-job through trial and error. Only 5.5% of respondents had training in business-related fields such as marketing or business management before start-up, and 17.6% learned some business skills from previous employment. Entrepreneurs were able to upgrade their knowledge of dairy production through family and friends (39.1%), self-help group (29.6%), consultants (16.5%), competitors and customers (16.5%), reading (6.1%) and shows and exhibitions (0.9%). Remarkably, 18.5% of female entrepreneurs rely solely on their husbands to provide business knowledge and skills.

Over 70% of female entrepreneurs believed that the success of their enterprises, in terms of business growth, was mainly determined by factors beyond their control and no matter what they did they would never succeed. Factors blamed for lack of success were 'poor legislation, climatic conditions that affected the supply of milk, and vending of milk by unlicensed individuals (thus creating unfair competition and unscrupulous local authority law enforcers)'. In order to develop capacity of women so that they feel self-confident as entrepreneurs and to enhance their knowledge of dairy production business practices, the authors suggest supporting innovative entrepreneurial learning networks for women to succeed in business.

Njuki, J., Wyatt, A., Baltenweck, I., Yount, K., Null, C., Ramakrishnan, U., Girard, A. and Sreenath, S. 2015. An exploratory study of dairy intensification, women's decision making, and time use and implications for child nutrition in Kenya. *European Journal of Development Research***, 1–19.**

This study examined how women's time use and decision-making patterns related to dairy income and consumption are associated with dairy intensification. The study used mixed methods to represent households that are using low, medium and high levels of dairy intensification in three sites in Rift Valley province in Kenya. Low-intensity households were those without cows or whose cows have not produced any milk in the past 30 days; medium intensity were those whose best cows produce up to 6 litres/day, and high intensity were those whose best cows produced more than 6 litres/day. Qualitative data was collected in 27 focus group discussions, with 324 people participating across all sites (an average of 12 participants per group). Quantitative data was collected using household survey questionnaires for 92 households.

Findings were that the diversity of household diets improved with the level of intensification, and children in high-intensity households received more milk than children in medium-intensity households. There was more joint decision-making in high-intensity households compared to medium-intensity households (35% versus 17%). The complexities of the joint decision-making process were not captured by this data, so it's difficult to know where each spouse has the same voice in the decision.

The authors suggest that studies on joint decision-making should use a decision-making scale that could range from unilateral/singular decision by one spouse to equal voice and agreement on the decision by both spouses. While women seemed to be gaining control over evening milk sales decisions, men seemed to be increasingly controlling total dairy income.

Eighty four per cent (n=26) of primary caretakers in the medium-intensity households reported spending time on dairy activities compared to 48% (n=15) of primary caretakers in high-intensity households. High-intensity households reported slightly higher rates of hiring labour to help with activities than medium-intensity households (22.6% to 19.4%). These findings suggest that while dairy workload may be higher for high-intensity households, they may be able to compensate by hiring additional labour. Medium-intensity households spent approximately 30 more minutes a day on dairy activities than women from high-intensity households, although amount of time allocated to child care activities and income-generating activities was relatively similar across levels of intensification. The additional labour demands of dairy intensification may make it harder for women to breastfeed, lead to earlier weaning and the introduction of complementary food. The authors conclude that medium-intensity households in particular should be monitored to ensure interventions don't harm the nutrition and well-being of women and children.

Omondi, I., Zander, K., Bauer, S. and Baltenweck, I. 2014. *Using dairy hubs to improve farmers' access to milk markets: Gender and its implications, 1–22***.**

This study used interview data (key informant surveys and focus group discussions) from 300 dairy farmers in western Kenya to identify what factors affect participation in dairy hubs. Findings indicated that there are a relatively low number of women participating in dairy hubs—of the 251 male-headed households (MHHs) in the study, 143 households (57%) were registered members of the East African Dairy Development (EADD) dairy hubs compared to just 23 FHHs (46%).

The authors note that 'while household participation in group marketing is important, the actual household member who is registered as a member of the group reflects on household decision-making, on the use of the services offered, and also the control of income generated from the group activity, in this case, the sale of milk'. For the data collected, the actual household member registered as the hub member was mainly the head of the household. Only 33% of MHHs had spouses registered as the hub member, either on their own (26%) or jointly with the head (7%). In FHHs, 4% had other household members registered accounts.

Study results reveal the disadvantaged position of FHHs in that they are less educated, have smaller household sizes and less sources of household income than MHHs. With regard to dairy production, FHHs have lower annual per capita cash income, produce less milk and are relatively more dependent on dairy compared to MHHs. Education had a positive and significant influence on the level of hub participation, and household heads' years of farming experience on selling milk through the dairy hubs had a negative a significant influence, implying that younger and more educated household heads were quicker to adopt technologies and innovations.

Logit and Tobit regression model results indicated that a strong underlying factor in determining women's hub participation was the issue of control of milk income, and that women's reluctance to participate in hubs stems from perceived loss of control of income from milk sales. On the one hand, FHHs had a higher probability of intensively participating in hubs where they would have full control of milk income. On the other hand, females in joint households typically control minor income sources (for instance, daily milk sales to hawkers and direct consumers), with the major incomes controlled by the male household heads. Under the hub approach, where milk is centrally marketed and the proceeds bulked in larger payments, women could lose out on their independent income stream, regardless of whether or not they are the ones registered for hub membership. Understanding this 'gender puzzle' of intra-household distribution of dairy income is critical in interventions to achieving gender equity. The authors conclude that the remaining challenge is to identify strategies that help women enter into and benefit from livestock markets.

Odero-Wanga, D.A., Mulu-Mutuku, M.W. and Ali-Olubandwa, A. 2013. Overcoming the odds: Strategies used by women entrepreneurs in milk microenterprise in Kenya. *American Journal of Human Ecology***, 2(2):60–66.**

This study interviewed 108 women milk entrepreneurs in Nairobi, Kiambu and Nakuru districts to identify what strategies they use to survive in the industry. The first strategy women entrepreneurs used was related to accessing credit facilities. The vast majority of entrepreneurs (76%) did not go through formal financial institutions to get credit loans. Eighty one per cent relied on family and friends to provide them with financial assistance, due to the more flexible lending policies of family and friends that didn't require collateral or come with high-interest and strict payment schedules. However, this type of borrowing is generally small, unreliable, and not sustainable for long-term growth of their businesses.

The second strategy involved is the use of low level technologies. Sources of technical information for these women were from family and friends (60%), 17% from previous employment, 16% from short courses and 9% from training in college. Despite this, women were unable to use new technologies due to lack of credit and training, and chose to use simple technologies for the preservation of milk, where (65%) used refrigerators as their cooling equipment and 10% put milk in a basin of cold water, 70% boiled milk using paraffin or charcoal kitchen stoves to preserve the milk. Packaging and sealing of milk was also done using simple technologies, 78% did not package their products but used customers' packaging materials like plastic containers, or simple polythene bags sealed by candle wax.

The third strategy was operating their businesses illegally to avoid heavy licensing costs, 90% of women in this study had not obtained licenses for their enterprises. This exposed them to constant harassment from local authorities. This led women to either operate away from central business districts (CBDs) or to close their businesses down while under inspection, leading to loss of income for days or weeks at a time. Regulations created problems for suppliers as well. The majority of entrepreneurs got their milk from individual farmers who transported the milk to the enterprise daily (60%), while 20.9% got the milk from their own farm, 18.3% got milk from cooperative milk societies, 12.2% got

milk from milk peddlers and 7.8% got their milk from large dairies. Over 17% of entrepreneurs used more than one source of milk supply. However, since these suppliers often didn't meet the necessary requirements for transporting milk or had failed to pay a certain fee, this resulted in their milk being impounded by authorities, leaving entrepreneurs without a milk supply.

The fourth strategy was managing their enterprises close to home to balance their reproductive and productive roles. For example, women in the study would complete domestic chores at the same time as bargaining with customers. In their best attempts to 'juggle' their limited time, women are losing out by not attending training sessions or looking for markets that would increase their incomes. Below is an example.

The heavy workload prevented women from operating their businesses in the CBDs where markets are more lucrative. As a result they concentrated on local markets where customer's purchasing power were lower, sometimes forcing them to use strategies such as reducing the prices of their commodities even though this means loss of profit. The heavy workload also prevented women from participating in social networks beyond their homes thus limited their opportunities to access market information and financial support.

This study highlights the need for policy approaches that focus on women's productive and reproductive roles and constraints. The authors surmise that policy interventions are needed to make technological input more accessible and affordable, and that efforts should be made to strengthen business extension services that could provide relevant information to women entrepreneurs.

Njauri,D.M.G., Kabirizi, J.M., Itabari, J.K., Gatheru, M., Nakiganda, A., and Mugerwa,S. 2012. Production characteristics and gender roles in dairy farming in peri-urban areas of Eastern and Central Africa. *Livestock Research for Development***, 24(7):1–9.**

Njuari *et al.* (2012) conducted household surveys with dairy cattle farmers in Kenya and Uganda to understand the gendered division of labour in dairy enterprise. For the two peri-urban sites in Kenya, Machakos (n=60) and Wote (n=56) towns, the authors found variability in labour contribution for different members of the household for dairy-related tasks. For dairy activities including land preparation, planting forage, weeding of forages, cutting forage, cleaning shed, milking, herding/feeding, spraying, watering animals, and selling milk, hired labour was the dominant labour force accounting for 65% of total labour in Machakos and 66% of total labour in Wote. Looking at labour differences between men and women household members, overall, men contributed more labour in weekly or monthly tasks (e.g. spraying animals against ticks, planting fodder crops, preparing the land), while women contributed more labour in milking (32% in Machakos and 34% in Wote), than in any other individual activity. Labour appeared to be more evenly distributed for cutting forage, herding/feeding, and selling milk, and varied between the two Kenyan sites. Children accounted for less than 10% of labour requirements in most activities for both countries, with the exception of herding/feeding in Wote (11%).

For this study, the household head or the most senior member available was interviewed using structured questionnaires—in Machakos, 96.7% of households were headed by men and in Wote 91.1% of households were headed by men. So although gender of survey respondent was not listed, it is likely that most of them were men. The study cited that husbands were largely the decision-makers on how the dairy unit should be managed, but no additional support was provided to show whether/how gender disaggregated intra-household decision-making data had been collected.

EADD. 2009. *Baseline survey report 6: Gender, dairy production, and marketing, 1–33***.**

This report uses East African Dairy baseline data from a survey implemented in Kenya, Uganda and Rwanda to analyse gender patterns of livestock ownership, access to technologies and services, labour patterns and decision-making and women's participation in marketing. Three gender variables were collected: (1) by defining household headship; (2) by defining who manages the farm; and (3) by collecting data on individual women and men with regard to labour and decision-making.

For Kenya there were 41 FHHs and 212 MHHs. FHHs had on average more years of farming experiences (27.9–18.4 years) but half the years of school (4.0–8.3 years). The average total land size (in acres) for FHHs was 7.5 to 12.5 for MHHs.

In terms of ownership of exotic cattle, 48.8% were female headed, some of whom owned exotic cattle compared to 63.2% that were MHHs. More FHHs (53.7%) than MHHs (40.6%) owned local cattle. FHHs owned an average of 4.5 exotic cattle and 2.4 local cattle compared to MHHs who owned an average of 5.5 local and exotic cattle.

For access to services, 10.6% of FHHs applied for loans compared to 18.1% of MHHs. Over 9% of FHHs obtained loans compared to 16.0% of MHHs. Thirty five per cent of FHHs received credit for dairy activities compared to 65% of MHHs. Cooperatives were an important source of credit for farmers, with 27.3% of the men and 16.7% of the women who received credit from them. Over 65% of FHHs reported a fear of not being able to pay back a loan as a reason for not obtaining credit compared to just 36.5% of MHHs.

Controlled mating was the most popular form of improved breeding strategy, with 39% of FHHs and 33% of MHHs used controlled mating as a breeding strategy. Just 4.9% of FHHs used AI services, compared to 6.1% of MHHs. FHHs practiced higher rates of castration (24.4%–19.3%), crossbreeding (14.6%–9%) and culling poor animals (22%–18.4%). FHHs used a gift, loan, or purchase of a high-quality breeding male more than MHHs (22%–16.5%).

On average, FHHs spend more a year on animal health services than MHHs (USD 84.24–80.40), but MHHs spend more on extension services, bull service and artificial insemination. Twenty nine households in the sample were registered in a dairy cooperative: Twenty one were male headed and eight were female headed. Women received money from morning milk in 38.7% of the households and from evening milk in 71% of the households.

Odera-Wanga, D., Mulu-Mutuku, M., and Ali-Olubandwa, A. 2009. Value-added milk products: Constraints to women in milk micro enterprise in Kenya. *Journal of Development and Agricultural Economics***, 1(7) 144–149.**

This research paper draws upon the 2001 study of women's dairy micro-enterprises from Kiambu, Nairobi, and Nakuru, and echoes the findings from Odera-Wanga et al. (2006).

Additional findings reported in this document were that for those processing fermented milk, many women were not using the right method or equipment, leaving milk to ferment without using starter culture. The authors note that this is dangerous to consumer health, as the catalyst bacteria are unknown. The authors suggest that policies that reduce or subsidize the cost of technologies that would ensure safe production practices should be put into effect, as well as lower the entry barriers (legislative costs) associated with dairy enterprise.

Mulu-Mutuku, M., Ali-Olubandwa, A. and Odera-Wanga, D. 2006. Case Study: Challenges to the advancement of women-owned dairy processing micro-enterprises in Kenya. In: Creighton C. and Yieke F. (eds.), *Gender inequality in Kenya***, UNESCO, pp. 25–30.**

Using data collected in 2001 in Nairobi, Nakuru and Kiambu on 108 women dairy micro-entrepreneurs, this study revealed five challenges to the advancement of women-owned dairy processing micro-enterprises: legislative barriers, access to adequate financial resources, technological barriers, access to appropriate training and marketing. The legislative barriers associated with being a legal dairy business (having to register with the Kenya Dairy Board, paying fees, obtaining annual operating license from local authorities and possessing a public health certificate) make it difficult for these entrepreneurs to compete with milk hawkers who do not pay fees or with large-scale milk processors that benefit from economies of scale.

The study found that there were five sources of start-up capital: 41.8% used personal and family savings; 16.5% sold existing personal or financial property; 18.5% used loans from co-operative societies and commercial banks; 21.3% used contributions from friends and relatives; and a mere 1.9% used informal rotating savings and credit associations. When it came time to upgrade via borrowing money, 56.5% said they were concerned by high interest rates, and

34.9% said they were afraid of losing their business assets if they failed to re-pay the loan, and 30.4% said they were hesitant due to unfavourable credit conditions (short repayment periods, smallness of loans and length of time taken to re-pay credit).

Ninety-six per cent of micro-entrepreneurs heated milk during processing, despite the fact that this practice is not recommended because it interferes with the structure of milk protein. Nearly 1.9% used high-technology equipment like pasteurizers, compressors and commercial butter churns. Over 27% of women did not have any cooling or preservation equipment at all. Over 91% of women mentioned barriers with upgrading, including lack of knowledge of sources (50%), lack of time to look for information (28.3%) and the high costs of acquiring the information (13%).

Marketing and low demand were cited by 49.1% of women who felt that customers preferred products from larger enterprises. Another emergent issue was quality control standards. Over 28% of entrepreneurs did nothing to ensure product quality, 42.6% used medium-technology methods like lactometers to determine raw milk quality before processing, and 16.5% relied on smell, taste, and sight. Over 12% combined methods. Another marketing issue was the inability to estimate customer numbers, thus affecting the ability to develop strategic market plans, resulting in a high rate of unsold products.

Growth in the dairy industry requires technological upgrading, which in turn relies on knowledge, training, and a higher level of finance than can be met from the reinvestment of profits. The authors conclude that women need to be provided with training and information on appropriate technologies, marketing and financial management. This training should be conducted close to women's homes so they can attend. Furthermore, they suggest that government should provide funds and other resources to subsidize these training sessions as women entrepreneurs may not be able to cover the cost themselves.

3 Synthesis

These articles were selected for review because they provide important insights into the gender issues surrounding intensive dairy development in Kenya. Overall, it seems women entering the dairy industry are ill prepared (Mulu-Mutuku et al. 2015), and face many challenges to entering the formal milk market. Cultural constraints in the form of patriarchal control of resources and finances limit women's ability to benefit from market integration (Nyongesa et al. 2016), although patriarchy is being contested through urbanization and young women's aspirations to live differently (Farnworth 2015). The few women who enter the formal marketplace face a lack of support, training and capacity building to grow their enterprises (Mulu-Mutuku et al. 2006; 2015). These challenges have inspired women to take on strategies of their own, which include relying primarily on family for financial assistance, using low-level technologies, managing their businesses close to home, and operating their enterprises illegally to avoid fees (Odero-Wanga 2013).

At the cooperative level, women are not taking on leadership roles at pace with men (Nyongesa et al. 2016), and female registration at the hub level remains comparatively low (Omondi et al. 2014). The issue of women's lack of serious engagement in the dairy value chain can be attributed to the inhibiting factors listed above, as well as women's relative lack of control over dairy proceeds (Farnworth 2015). This issue is particularly salient when the majority of daily dairy labour tasks are women's responsibility (Njauri et al. 2012).

Thus, the first recommendation that can be distilled from this literature is for development interventions to take women's already heavy labour burden into account when designing new technologies and/or tools. In addition to considering women's labour burden, the role of hired male labour plays a crucial role in medium- to high-intensity dairy enterprises, accounting for more than two-thirds of total labour requirements in some cases (Njauri et al. 2012). Based on these findings, it would be useful for interventionists to consider dairy enterprises as being more complicated than the traditional 'family farm' model, and to include non-family members when targeting information and training for interventions.

A common theme among these papers was the recommendation that women be provided with training and credit support so they are able to upgrade their technologies. Simplifying and reducing transaction costs of business registration and licensing would facilitate women's full participation in the formal sector, and allow them to benefit from any training or advisory services which they miss out on for operating illegally (Odero-Wanga et al. 2013).

With regard to recommendations for targeting intervention beneficiaries, FHHs represent a potential target group, as evidence suggests the gender barriers they experience may be less restrictive than those faced by women in joint-headed households (Omondi et al. 2014). However, as these women often have lower levels of education, cash income and other resources, they will likely require additional support via subsidies for production, technology upgrades, training and capacity building, etc.

Further recommendations that can be garnered from the literature include creating innovative entrepreneurial learning networks (Mulu-Mutuku et al. 2015); supporting policies to subsidize the cost of technology to ensure safe

production practices (Odera-Wanga et al. 2009); and monitoring medium-intensity production level households as they may be more at risk for child malnutrition due to early weaning (Njuki et al. 2015). Perhaps most importantly, if gender equity and social inclusion are to be prioritized in the Kenyan dairy NAMA, the fundamental conflicts around barriers to women's entry and control of profits commensurate with labour burden must be addressed in policies and interventions (Farnworth 2015). The following section presents a set of 'best practices' from development experts working on these issues in East Africa.

4 Discussion of interviews

In February 2016, interviews were conducted with 12 development professionals with expertise in the areas of gender equity and social inclusion in the Kenyan dairy sector. Interviewees represent organizations including ILRI, Netherlands Development Organization (SNV), Kenya Agricultural and Livestock Research Organizaton (KALRO), Heifer International and East African Dairy Development (EADD), all of which have substantial experience in the Kenyan dairy sector. Interview data is clustered around three key themes: (1) What are the drivers of change and gender dynamics that need to be considered in order to achieve the mitigation goals of dairy intensification? (2) How can an intervention respond to the needs of women and men? and (3) What are some example indicators of gender-relevant outcomes and impacts? This section ends with a summary outlining the key gender issues to be addressed in a mitigation intervention.

4.1 What are the drivers of change and gender dynamics that need to be considered in order to achieve the mitigation goals of dairy intensification?

As discussed in the empirics section of this review, men and women generally have differential roles in dairy production based on cultural gender norms. An open challenge is for interventions to deal with the cultural stereotypes and cultural biases arising from these norms. In order to appropriately address gender and socially inclusive development in the Kenyan dairy sector, an intervention must take into consideration the substantive cultural gender issues that are at play at both the household and cooperative/producer organization levels.

Household-level gender dynamics

The household-level complexities of resource ownership, the gender division of labour and intra-household decision-making must be considered in dairy intensification interventions. With regard to resource ownership, while experts acknowledge that evening milk is largely considered to be owned by women for home consumption and that men own the cow and most milk that is marketed for profit, they also recognize that this is a contested dynamic. As one independent consultant noted, 'Women are struggling to re-work social norms, so it's about how to assist them within the existing contestation of norms'. EADD uses informal education communication (IEC) material such as posters depicting traditional and non-traditional gender roles to trigger community discussion.

> *The aim is not getting somewhere; the aim is to make people question when they want to go.*
>
> *—ILRI expert*

In order to do this, an intervention must have context-specific information on gender norms.

> *It's important to have context-specific information on gender norms. Understanding what the parameters of these norms are can assist project planners in leveraging what options and openings are available for women and other social groups. For example, you can start with meetings that are close to the house if women are unable to travel long distances to producer organizations.*
>
> *—ILRI expert*

Because women's daily dairy labour burden is generally much higher than men's, experts suggest interventions to make sure women have access to simple technologies that would make their work easier (e.g. chaff cutters for fodder, fodder preservation technologies like silage, hay, etc., cooking technologies).

An ILRI expert noted that local power relationships mediate how people are able to participate in mitigation interventions, as this type of local social capital carries unfair advantages for certain members of the community. Indeed, the level of variability in capital (natural, financial, human, social and manufactured) can differ a lot between households even in the same community, making them difficult to classify. Yet it's important to look at these capitals to inform individual resource and capacity profiles, as 'pushing advanced technology on people without resources is problematic', said an ILRI expert.

Co-op-level dynamics

In Kenya, there is a strong male dominance in dairy cooperatives because cows culturally 'belong' to men. Despite the fact that many women are highly involved in dairy production, experts suggested that women's representation at cooperatives is still low. Women are often less confident in their leadership abilities than men, and may be hesitant to be elected as leaders of co-ops. At producer organization level, experts stated that men are often not willing to nominate women for leadership positions. This leads to co-ops having training that excludes women.

The importance of making the meeting space gender sensitive was raised by several experts. Depending on the context, this could mean providing child care during meetings, holding the meetings at schools or locations near the homes of women members. For example, if you bring the hub closer to women they are more likely to participate in other services too (beyond milk collection, also credit schemes, capacity training, etc.). Distance is an outstanding issue, so having subsidiary hubs closer to people's homes can help.

There's also the issue of gender discrimination in dairy sector employment. An expert from SNV noted that co-ops prefer to hire men for two reasons. The first reason is because the technology for bulking is predominately manually done. The second is the issue of security. Milk collection centres can open as early as 0300 hours, so co-ops do not want to take responsibility for women traveling before dawn.

Lastly, experts noted that since the devolution of the dairy sector, nepotism and political patronage have emerged as major issues. Corruption can occur at different levels of a producer organization, thus it is important to have an advisory group that can oversee management, to ensure against abuses by 'dairy dictators'.

Recommendations

To broaden the discussion of culturally-based gender norms, interventions should engage cultural institutions in discussing the importance of gender equity. An expert from Heifer International noted that elders in a community are often the gatekeepers for enforcing these norms. One strategy for engagement is to speak with elders using stories of change over time for gender awareness. This can be done through community meetings, or using a radio program where people can call in to ask questions.

A best practice suggested by an expert from Heifer International is to introduce gender issues delicately. Interventions should refrain from using a confrontational or accusatory approach, as this can lead men to become defensive and 'shut down'. Instead, using an approach that asks questions like, 'who does what?' to make the business case for educating women in the household, has been shown to be more effective and less intimidating. SNV is currently launching their 'Balancing benefits in agriculture' project, which will focus on illustrating the economic benefits of gender equity in hopes of incentivizing change.

Inviting both husbands and wives to participate in training sessions and meetings, and holding these meetings at appropriate times/places is critical. An expert from KALRO suggested that since women are preparing children for school until mid-morning, training sessions should begin at around 10–11 in the morning, but wrap up by midday so women can prepare dinner for their children.

According to an expert from Heifer International, sustained efforts are needed to build women's confidence in participating in producer organizations. This means alerting women as to what opportunities exist, and assisting them in gaining the skills needed to succeed, as success in dairy is largely underpinned by access to knowledge and markets.

4.2 How can an intervention respond to the needs of women and men?

Putting gender on the agenda from day one

For a program to be socially inclusive, it needs to consider the various intersections of people's identities (intersectionality) and have an understanding of local social relations. An expert from Heifer International suggested that social inclusion issues be included during the planning stage of an intervention. An expert from SNV stated that whether and how gender and social issues are included at this stage is very much dependent on the donor, and that gender-conscious people are needed in the design team. Budgeting for gender inclusion, in terms of funding and time allocation, was highlighted by multiple experts as being a remaining challenge. Interviewees from both ILRI and SNV suggested embedding a gender expert in the project planning stage, and making sure that funds are available after the data has been collected for appropriate analysis. For this to occur, programs must be proactive in finding people to mainstream gender into interventions. Critically, as a development consultant stated, for mitigation interventions to succeed, a conscious and deliberate effort to reach women must be enforced but with men's support.

Building gender capacity within the project staff

For an intervention to appropriately respond to the needs of men and women there needs to be strong gender capacity in the project team. At SNV, this involves training field staff as trainers so they have the skills to do gender analysis and are able to prioritize activities and assess their relative importance. Experts from ILRI noted that farmers and development practitioners alike can have a difficult time understanding the concept of gender, and why it should be 'mainstreamed' into projects. They suggest that finding ways for people to apply the concept to the work they do daily can be a beneficial learning exercise.

Building women's capacity

An expert from ILRI commented on experiences working with women's-only groups, saying that despite having good facilitators, women weren't able to cope due to their lack of education and gender norms curtailing their advancements. Women's capacity must be matched to their new roles; it is not just a matter of 'mind changing'. Along with building women's capacity is the need to protect women's interests. For example, SNV suggests registering both men and women in registrars for payments so men cannot abscond with all the proceeds. Importantly, the connections between development programs and women's own lives should be explored: what are women already involved in? An independent consultant suggested that an intervention should consider 'women as women' before considering them as (potential) dairy farmers.

Identifying agents of change

EADD had an interesting model of gender outreach, where local people were hired as community facilitators or 'change agents' to support dairy group formation, group management and cohesion and assist farmers in trainings on gender justice. An EADD expert also stressed the importance of giving opportunities to men to be change agents.

'As much as our organization focuses on women, we believe men are key for sustainable change. Now the reason we bring in men as change agents is people have this mentality that when you talk about gender you just talk about women, and that is not it. Gender is about roles—identifying the roles and responsibilities, who the vulnerable are among them and giving them those opportunities'.

Practical advice for the production of learning materials

Choosing the right language is critical in the production of learning materials on gender equity. For example, using the term, 'empowerment' will not easily translate into Swahili or other Kenyan languages. An expert from Heifer International advocated for consulting with local people and finding ways to express the concepts of gender relations, roles and ownership is critical to ensuring the message of gender equity is understood.

On-the-ground practices for intervention staff

For projects operating in areas where there are cultural barriers to women speaking with 'strange men' (e.g. male extension officers), intervention staff should travel in mixed groups of officers/scientists to talk to farm women.

With regard to knowledge sharing, several experts suggested that technical advice reaches women most effectively through peer-to-peer learning. Exchange visits to successful farms and operations are an example of peer-to-peer learning that has been implemented by KALRO. Forums that are open for community members to share their struggles and how they were able to succeed are a strategy that has been used by EADD with some success.

Targeting beneficiaries: Mixed groups or women-only groups?

With regard to targeting beneficiaries, all of the experts agreed that mixed gender dairy groups tend to perform better than women-only or men-only groups. The idea that women need to interact more with men to learn so they can compete effectively was an issue that arose several times during interviews. An expert from SNV noted that, in her experiences, women's groups were slow to adapt to interventions compared to gender mixed groups or male-dominant groups because it's more risky, and requires more exposure, management skills, knowledge and access to capital. Although mixed groups were advocated, experts cautioned that separate sessions may be necessary for women to gain confidence to voice their concerns/views. As an expert from SNV observed, 'Women will voice out in their own sessions. We're preparing women to be part of a man's world. So we need to prepare them for competition in markets. They must work alongside men. Men can also learn from the resilience of women'.

> *I don't believe in women's-only groups because they don't exist! Most of these groups have a man somewhere. For me, the idea goes against inclusiveness. It may actually create problems at the household level . . . if you promote women's-only groups, you could disempower men quite a bit. These have been my experiences working in East Africa.*
> *—ILRI expert*

Ultimately when deciding on beneficiaries, ideally a program coordinator should work in coordination with local institutions and to identify appropriate users.

Furthermore, in an interview with a KARLO expert, the issue of social differentiation emerged with regard to targeting beneficiaries. The popular rhetoric of working with the 'poorest of the poor' can be problematic, as these people may not have the resources to respond or innovate within interventions. An ILRI expert proposed that targeting more resource-endowed households will have spill-over effects. For example, even when a household has one–two cows, the people will employ labourers to assist them.

Assisting smallholders in accessing financial services

Small groups are encouraging men and women to save money. Linking farmers to merry-go-rounds, like savings and credit cooperatives societies, has empowered women, since this link allows them to access government funds through the women's fund, and so can young people through the youth fund.

EADD created a taskforce to ensure that gender equity and mainstreaming was happening in their intervention sites. Their gender committee comprises one board member, one woman representative, one youth representative and the manager of the cooperative. The committee added a component of accountability to the community facilitators.

How can you get men and women to reflect on their gender roles in order for there to be greater equity?

Several experts suggested using peer-to-peer learning to show farmers couples that have empowered each other. Another strategy, as used by most organization, is to utilize men as agents of change. As an expert from Heifer International explained, 'In a patriarchal community, when a woman speaks to men about gender issues, the majority of men don't listen . . . but having a man speak gives weight to the issues, especially during outreach programs'.

> *The most important question is: Who in the household can make decisions to do something differently? Who's the innovator? Are women allowed to make decisions by themselves, or jointly with their husbands? What exactly is going to be changing? If there is change, then, who is involved? What is the project trying to achieve? Will it affect women and men differently?*
>
> *—EADD expert*

4.3 Indicators of gender-relevant outcomes and impacts

Interventions aimed at lowering emissions and improving productivity prioritize multiple factors in their monitoring, reporting and verification (MRV) of outcomes. Because social and gender equity outcomes are important components to the overall success of mitigation interventions, there is a need to discuss indicators for monitoring gender parity.

In order to develop fitting indicators for an intervention, it is important to ask, what is the project goal? Working your way backwards from the anticipated goals and outcomes of an intervention can be a helpful exercise in determining what type of indicator is best for assessing change. Experts from ILRI suggest that the CGIAR theory of change (ToC) approach can be used to tease out gender and social issues with partners, and it is a good way to project the changes one wants to see in beneficiaries' activities. Addressing the complex issues of gender equity and social inclusion may best be answered using a multi-pronged approach that uses multiple measures.

Drawn from relevant literature and interviews with experts, the following indicators have been used to measure gender and social inclusion goals in low-emissions dairy development:

Basic indicators

- Gender of who in the household is registered with the producer organization/hub (EADD 2009)
- Gender of who in the household delivers the milk (EADD 2009)
- Gender of whose bank account milk sale profits are delivered (ILRI expert)
- Number of women and youth in leadership positions/are board members (ILRI expert)
- Number of women/youth attending and participating in meetings (ILRI expert)

Advanced indicators

- Milk availability for children at household consumption level (International consultant)
- Commensurate milk sales with women's labour (Tavenner, Fraval and Crane, forthcoming)
- Ownership/control of livestock assets and technologies (EADD 2009)
- Income controlled by women from morning and evening milk sales (EADD 2009)
- Decision-making for milk sales, cattle sales and purchases, and animal health/breeding (EADD 2009)
- Number of hours spent on dairy-related tasks for men and women (EADD 2009)

The use of program-specific indicators such as how the program has changed and whether/how it has built gender expertise, are also important points for monitoring and evaluation.

Potential frameworks for measuring, reporting and verification of indicators

Frameworks that have been used for MRV for gender and social inclusion include the women's empowerment in agriculture index (WEAI), the women's economic empowerment index (WEEI) and the newly created women in livestock empowerment index (WELI). The WEAI uses five domains of empowerment: (1) decisions about agricultural production; (2) access to and decision-making power over productive resources; (3) control over use of income; (4) leadership in the community; and (5) time use. The framework stresses collecting data from both men and women so comparisons of empowerment can be made at the household level. The WELI builds off this framework by adding a capital domain that specifically addresses livestock issues, as opposed to agriculture more broadly (Galie et al. forthcoming). The WEEI addresses the areas of profitability, access to capital, turnover and other business indicators.

Having relevant statistical indicators that are testable and capable of validation for MRV is a crucial knowledge gap that must be filled. However, the use of these types of indicators is just one method to assess intervention outcomes. Qualitative and participatory methods have also been used to assess gender and social equity concerns in dairy development. For example, Heifer International regularly uses gender action learning systems (GALS), a participatory and visually driven set of learning activities to enrich discussions about gender equity with project beneficiaries. In one activity, spouses first individually draw their personal vision, and share it with their partner. Then the couple draws a joint vision of their farm. This has been a useful tool for learning about joint planning and decision-making processes that would be difficult to gather by survey instrument alone.

Recommendation: Training staff to collect and analyse intra-household data

One expert made the point that too often there is not enough emphasis on the project staff that is responsible for collecting MRV information. An organization can design a beautiful questionnaire, but if the people on the ground speaking with farmers do not understand the importance of asking for intra-household data, the likelihood of attaining robust, accurate information is unlikely.

5 Summary of key findings

Agricultural intensification interventions have a long history of enhancing men's control of resources and marginalizing women due to lack of attention to gendered roles, dynamics and spaces. In order for low-emissions dairy development initiatives to achieve climate mitigation in a way that enhances gender equity and social inclusion in the sector, several actions can be taken. First, interventions must address the financial constraints facing smallholders. Providing credit support and training to women in particular, and lobbying the dairy sector to reduce transaction costs could boost women's participation. These costs include registration fees from the Kenyan Dairy Board, annual operating licenses and public health certification fees. To ensure women's full participation and leadership in mixed-gender dairy groups, interventions should focus on making meeting spaces gender sensitive, addressing the issue of gender discrimination in dairy sector employment and working to build women's capacity and strengthen their control over dairy proceeds. At the farm level, interventions should support technological innovations with 'women as users' in mind.

Interventions must pro-actively engage with the complexity of household gender and social dynamics. By building gender capacity in project staff and by gathering context-specific information, project staff can adapt learning materials to be culturally appropriate (e.g. available in the local language), while at the same time sparking and supporting discussions regarding traditional and non-traditional gender roles. Interventions should focus on making the business case for addressing gender by illustrating the economic benefits of gender equity to incentivize change within the dairy sector.

As one international consultant commented, 'To prevent low levels of adoption, you must train the right people'. This review has outlined the key aspects of who does what, who has control over which resources and who has the ability to make decisions at the household level. Any successful low-emissions development in the Kenyan dairy sector will need to use these as starting points to planning interventions, but also need to remain sensitive to context-specific variability. Adopting MRV tools and gender indicators that align with these questions will further assist interventions in measuring the goals of social inclusion and gender equity in ways that are both valid and reliable.

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