



**KAAALO**  
Aid and Development Org.



# MILK VALUE CHAIN ANALYSIS STUDY

IN DANGORAYO, BADHAN AND BOSSASO DISTRICTS  
IN NUGAL, SANAAG AND BARI REGIONS  
PUNTLAND - SOMALIA

KAAALO AID AND DEVELOPMENT ORGANIZATION UNDER THE RESTORE PROJECT  
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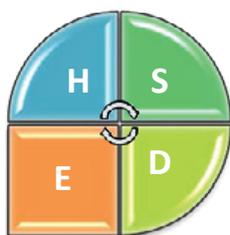


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# List of Abbreviations and Acronyms

BBC . . . . .	British Broadcasting Corporation
BRCiS. . . . .	Building Resilient Community in Somalia
CAHW . . . . .	Community Animal Health Workers
EU . . . . .	European Union
FAO . . . . .	Food agricultural Organization of the United Nations
FGD . . . . .	Focus Group Discussion
FSNAU . . . . .	Food Security and Nutrition Analysis Unit Somalia
GAM . . . . .	Global Acute Malnutrition
HH . . . . .	Household
IDP. . . . .	Internally Displaced Person
IYCF . . . . .	Infant and Young Child Feeding
KAD . . . . .	Kaalo Aid and Development
KII . . . . .	Key Informant Interview
MOPIC . . . . .	Ministry of Planning and International Cooperation
MVCA. . . . .	Milk Value Chain Analysis
NGO . . . . .	Nongovernmental organization
UNDP. . . . .	United Nation’s Development Program
SAM . . . . .	Severe Acute Malnutrition
SPSS . . . . .	Statistical Package for Social Sciences
SWOT . . . . .	Strength, Weaknesses, Opportunities and Threats
TOR . . . . .	Terms of Reference
UNICEF . . . . .	United Nations Children’s Fund
UNFPA . . . . .	United Nations Population Fund
WASH. . . . .	Water and Sanitation Hygiene
WHO . . . . .	World Health Organization



# Glossary

- Deyr* The secondary rainy season in Somalia, starting in September and extending to November
- Gu* The main rainy season in Somalia, starting from mid - April and ending in June.
- Hagga* A cool, dry and rather cloudy season in Somalia, starting in July and ending in mid - September
- Jilal* A warm, sunny and dry season in Somalia, starting from December and ending in mid - April
- Zakat* Charitable gifts in the Somali community

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# Executive Summary

## Background

KAAALO AID development organization is implementing a three years “Restore” program (2018 - 2020) through funding from the European (EU) under the Building Resilient Community in Somalia (BRCiS) Consortium. This program is aimed at increasing the resilience of pastoralist, agro - pastoralist, and Internally displaced persons (IDP) communities in Somaliland and Puntland by building community and local authority capacity to predict, adapt to, cope with and mitigate against future droughts in particular, as well as other local shocks and stresses. In order to strengthen the resilience of pastoralists and agropastoralists in Bossaso District of Bari region, Badhan District of Sanaag region and Dangoranyo District of Nugal region there is need to conduct a milk value analysis. This milk value chain analysis (MVCA) was conducted to clearly identify the overall value chain of the milk, from the producer to the end user as well as to identify the main causes of decline the quantity of milk supply to dairy cooperative which affect the profitability of dairy cooperative in order to improve their position in milk value chain. The findings of the MVCA were aimed to improve the productivity pastoralists and agro - pastoralists community in the target areas.

## Methodology

The study was conducted in the month of June 2018 in Budhan, Bossaso and Dangoyaro districts and was of a an retrospective cohort study comparing milk production and utilization, milk sale and prices and livestock keeping patterns in wet and lean seasons. The MVCA analysis applied a mixed - methods approach including:

- Literature review on program documents and other relevant materials on nutrition, livelihoods, resilience and livestock production in Puntland;
- A quantitative survey of 357 households - 20 agropastoralists and 337 pastoralists (52.10% of the respondents being males and 47.90% being females, 101 in Bossaso, 205 in Badhan and 51 in Dangoyaro);
- A quantitative survey of 58 milk traders (9 males and 49 females);
- Ten focus group discussion (FGD) interviews with 5 male and 5 female groups;
- One key informant interview (KII) with a Ministry of Livestock official in Puntland;

- 1 KI with a veterinary board official;
- 2 KIIs with female group leaders;
- 2 KIIs with livestock association representatives;
- 3 KIIs with community leaders
- Observation and photography in the program sites.

Quantitative data was analysed through the statistical package for social sciences (SPSS) Version 23 while qualitative data was analysed through Atlas.ti and flow chart matrix to identify convergence and divergence of themes.

### *Findings*

Livestock and milk production in Puntland are guided by the Puntland Dairy Act, Milk Hygiene guidelines for Puntland, Puntland livestock policy and a strategy but these documents are not known to stakeholders in the livestock and milk sectors thus they are not followed or adhered to. Because of this gap the region faces; poor milk marketing strategies; poor quality milk to unhygienic handling; lack of processing industries; weak livestock production skills by farmers; importation of milk and milk products even in rainy seasons; poor quality assessment and monitoring of milk in the region. The region also lacks a dairy industry development policy/strategic plan. The main source of household income in the three districts is sale of livestock and livestock products (90.70%) among pastoralists and casual labour (33.30%) and sale of livestock and livestock products (33.30%) in agropastoralists' households. The average monthly income in households in the most recent rainy season was 1643806.92 Somali Shillings while in the most recent dry season the average income was 1169726.86 Somali Shillings.<sup>1</sup> Overall, households in Dangorayo district recorded the least amounts in terms of monthly household income at 2,481.80 and 2347.06 Somali Shillings in the rainy and wet seasons. Overall, only 19.05% of the households reported ownership precisely 85.00% of the agropastoralists 15.13% of the pastoralists who largely reported communal land ownership. As regards livestock ownership, 93.28% of the households kept goats, 47.90% kept sheep, 0.57% kept cows and 31.93% kept camels. In terms of herd composition, goats were the most commonly kept livestock in the households (57.37% of all the livestock species) followed by sheep (36.76%), camel (5.81%) and cattle (0.06%). A typical pastoralists' herd structures was reflected in the households visited where majority of the livestock are mature females kept for milk namely 68.48% mature

<sup>1</sup> Somali Shilling=0.00173556 USD as at 25th June 2018. Calculated on 25th June 2018 at: < <https://www.xe.com/currencyconverter/convert/?Amount=1&From=USD&To=SOS>>.

females goats, 69.85% mature female sheep, 85.71% mature females cows and 66.05% mature female camels. Goat milk is the preference of most households in the three districts (90.90%) followed by camel milk (70.90%) with a very low preference for cow milk (19.90%) and sheep milk (5.60%). In the dry seasons, goats and sheep are the most commonly sold/given out/slaughtered at 60.32% and 42.85% while only 20.45% and 7.84% of the households do destock camels and cows. Among the pastoralists' households, mature male livestock, mature females and offspring are destocked in equal measures in the dry seasons (>94.00 %) while in agropastoralists' households, there are few cases of destocking in times of drought (7.00 %<). Seasonal changes have effects on livestock prices with the highest purchase amounts being in rainy seasons and from FGDs, both pastoralists and agropastoralists lack the prerequisite livestock production skills with only 18 out of 357 (5.00%) of the respondents reporting to have been trained on livestock production while only 33 of the 357 respondents (9.20%) were aware of a livestock extension/production officers most of whom resided in Garoowe and visited the areas for work under the Puntland Ministry of Livestock and Animal Husbandry with support of Food and Agriculture Organization (FAO) and other humanitarian organizations. Pastures and water availability are influenced by seasonal changes in the three districts, thus they are available in the rainy seasons and unavailable in dry seasons limiting the productivity of livestock; the main sources of pasture were open grazing fields while the source of water for livestock were community owned boreholes (26.90%), Berkads (20.40%), water trucking (19.60%) and community natural water points (20.70%). During survey, in Badhan and Bossaso districts, respondents reported that the main source of water for livestock were water trucking in dry season, since community owned boreholes and Berkads were not available/were dry. On average the households produced 4.48 litres of milk per day in the rainy seasons and 1.63 litres of milk per day in the dry seasons. From FGDs, low milk production in dry seasons was attributed to lack of livestock pastures, lack of water, diseases and death of livestock in the dry seasons. Goats appear not to be affected by much by seasonal changes with milk volumes going down by only 0.01 litres in the households. There were very few cows in the three districts thus only a total of 17 litres of cow milk were reported in all the households in the rainy season and 13 litres in the dry seasons. Thus , goats accounted for the largest volume of milk in all households at 35,853 litres per day in rainy seasons and 30,222 litres in the dry season followed by camels (293 litres in rainy seasons and 121 litres in the dry seasons) and sheep (28 litres in the rainy seasons and 24 litres in the dry seasons).The largest volume of milk in the households is for consumption (665 litres in rainy seasons and 198 litres in dry seasons) followed by sale

(403 litres in rainy seasons and 162 litres in the dry seasons). Other minor uses of milk are presented in annex 20. Thus, the primary use of milk is consumption in 73.10% of the households in the rainy seasons and 69.50% of the households in the dry seasons while 20.70% of the households sell milk in the rainy seasons and only 9.20% of the households sell milk in the dry seasons largely due to unavailability and limited food in the households. The average volume of milk consumed in a day in the rainy season is 1.86 litres and 0.55 litres in dry seasons against production levels of 0.92 litres in the rains seasons and 0.65 litres in a dry season an indication that there is a high purchasing power in the rainy due to high supply/milk availability in the villages. Children aged below 5 years consumed an average of 0.97 litres in a day in the rainy seasons but 0.66 litres in the dry seasons. Similarly, 1.13 litres of milk are sold when milk is in glut in the rainy seasons in comparison with 0.45 litres in the dry season; an indication that low availability of pasture, food, income and milk the dry seasons limit milk availability and sale. On average only 40.00% (153) of the households reported children under 5 years not consuming milk in the rainy seasons but this figure almost doubles up to 71.71% (256) households in the dry seasons. Purchase of milk in the 24 hours preceding the survey was based on actual needs for this commodity in the households as reported by 74.30% of the households (69.20% males and 79.20% females). The need for milk was higher (88.00%) in Dangorayo district where most respondents were IDPs; respondents overwhelmingly reported that goat milk is preferred for kids (91.30%) - From FGDs, this preference was largely attribute to ease in mixing with other food stuffs, ease in digestion and low incidences of allergies. Milk consumption in the households by children is largely in the fresh form (86.80% overall and 54.90% in Dangorayo district among IDPs), followed by tea (71.40%) and milk powder especially in dry seasons (8.10%) with only two households reporting mixing of food with mashed potatoes and vegetables. During migration, most of the households leave behind goats for milking purposes by women and children left behind (94.10%) and women are the key decision makers on volumes of milk to be consumed or sold (61.30%) in the households. Milking, packaging and storage of milk is purely a females; responsibility (71.90% of the households); similarly, women are in charge of transporting milk to selling points and overseeing sale (57.70% of the households) as well as making decisions on use of income from sale of milk (51.00%). Traditional gourdes were the predominant equipment used for milking livestock (72.80% of the households) while plastic jericans (43.75%) and traditional gourdes (38.02%) were the main equipment used for transporting milk. In addition, traditional gourdes (55.50%), plastic utensils (21.30%) and plastic jericans (17.10%) were the predominant milk storage equipment in the three districts. Only 19.90% of the

households reported to always boil milk before consumption by children and adults with 5.60% reporting irregular milk boiling and a further 74.50% not boiling drinking milk at all; similar practices were common when consuming raw blood and ruminal juice. Soap availability is a challenge in the three districts, thus 61.90% of the households clean milk handling equipment through smoking, 12.60% of the households use water without soap, 12.60% use soapy water, 2.80% use water, 7.80% use water and sand and ash. Traditional methods are used to ensure longevity of milk produced in the households and this through use of cold water (90.20%), repeated boiling (2.20%), fermentation (2.00%) and refrigeration (0.80%). Local health facilities, community health workers and community leaders are the main sources of health and nutrition information in the three districts. Bossaso had GAM levels of 14.7% and SAM levels of 2.3% in the Food Security and Nutrition Analysis Unit - Somalia (FSNAU) 2017/2018 post drier report but figures for the other districts included in this study were not available; these are relatively high figures in view of the short rains in October and November 2018. Additionally, 37.00% and 26.10% of the households reporting to have children (5 years<) being treated for under nutrition in nutrition supplementary centres in the most recent dry and rainy seasons once again an indication that seasonal changes affecting milk availability have an effect on children's nutritional status. Community members attributed under nutrition to reduced food availability (27.90%), reduced milk availability (36.10%), childhood infections (13.10%) and separation of children from mothers (1.60%); when surplus milk is available is fed to children 34.70% of the households an indication that milk availability can help address under nutrition in children. Knowledge on Infant and Young Child Feeding (IYCF) was relatively fair with over half of the respondents demonstrating the correct knowledge but IYCF practices in the region were poor largely due to unavailability of food, separation of mothers and children, traditional practices such giving newborn children water and animal fats as well as delays in breastfeeding due to child naming practices. Community members reported that milk buyers in the Bossaso and Badhan were largely local business dealers (59.70% and 75.00%) while in Dangorayo it was the business dealers from other regions (72.50%). There are three key actors in the three districts' milk market chain: farmers who are producers, local handlers (distributors, buyers and sellers), and consumers. Fifty eight milk traders were encountered and interviewed; they were largely females (84.58%) with only a few males (15.52%) which does reaffirm the role of women in the milk sector in Puntland. These milk dealers were largely involved in milk sale (49.10%), milk purchase (37.70%) and milk distribution. Milk is largely bought or sold from local shelters/collection points (55.00%), local neighborhoods (10.00%), market places

(30.00%) and local restaurants (2.50%) but traders reported long distance to markets, poor road networks, a lack of information on marketing, poor storage facilities for milk, perishability of milk, the seasonality of milk availability, and inadequate transport means as gaps in the milk participation. Milk traders purchase more milk in the dry seasons (24.74 litres) than in the rainy seasons (18.78 litres) when there is milk glut and low demand for this commodity in the community and overall the milk buying and selling prices are highest in the dry seasons.<sup>2</sup> Seasonality plays a major role in milk marketing, as supply, quality and transport challenges change drastically between dry and wet seasons, with consequent price fluctuations. Milk is sold to local consumers in the villages at a lower price than is sold to traders in the same region. Upon arrival in selling points, milk prices significantly increase, demonstrating a greater demand for milk by households not producing the commodity. In terms of value addition, 20.20% of the community members reported to be aware of companies that sell milk and milk products locally and this was in Bossaso and Bidhan districts only but there were no milk cooling plants in these three districts. Ghee is the most preferred milk commodity in the districts visited (81.90% of community members and 60.42% of milk traders) followed by butter and butter blends (13.70% of community members and 22.91% of milk traders) and there is also some preference for packaged commercial milk as reported by 7.67% of the milk traders. From quantitative interviews with community members, 22.10% (79 of the 357 households) reported to have had difficulties in selling milk/participating in the milk markets in the preceding month. Reasons for being unable to sell milk were described as unavailability of buyers (28.20%), low process (9.20%) and low milk production (55.30%) - Annex 18. In addition, 74.14% (43 out of 58) of the traders reported difficulties in selling milk in the preceding month as well with reasons given as unavailability of buyers (24.13%), low prices (17.24%), inaccessibility of markets (10.34%) and high milk purchasing prices. Only 17.40% and 12.90% of the respondents reported awareness of and membership in milk farmers' cooperatives; this was Bosasso and Badhan districts with no respondents reporting membership or awareness of cooperatives in Dangoyaro largely due to the IDP set ups in the villages visited. A majority of the respondents in Bosasso and Badhan districts (82.20% and 94.60%) were willing to have livestock extension services and support to increase the productivity of

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	Camel milk	Goat milk	Cow milk	Sheep milk
Buying price by traders in rainy season	27926.02	22311.24	3204.00	4580.552
Buying price by traders in dry season	46392.38	28025.90	4278.707	12097.84
Selling price by traders in rainy season	35201.28	26885.48	3742.328	1827.67
Selling price by traders in dry season	39944.50	33783.97	3986.172	2086.35

their livestock but only 43.10% of the respondents in Dangorayo districts were receptive of this assistance; 92.10% of the respondents in Bossaso and 98.00% of the respondents in Badhan reported that their districts were suitable for livestock and milk interventions while only 49.00% of the respondents in Dangorayo were of this opinion. Although women play a major role in milking, milk handling, milk storage, milk transportation and milk trade, males are the owners of livestock thus there was a general response that milk interventions in the region should target both genders (83.50%); livestock diseases (18.00%) and environmental changes (11.80%) were the foreseen negative effects of livestock milk value chain interventions in the three districts. In terms of coping mechanisms during drought, migration (45.20%), family splitting (17.70%) and destocking (8.10%) were the major measures adopted by communities (Annex 16). In dry seasons, the major milk shortage coping mechanism in the households were described as: adults going without milk (57.30%) and using of milk alternatives (powder, ghee and butter) - 24.00%.

### ***Conclusion***

There is no dairy industry development policy in Puntland and the available policies and guidelines are not known or implemented in the region. Livestock and milk interventions are not only culturally and politically acceptable, but are also in line with local communities' way of life, needs and livelihood orientation. There are weak value chains for milk and no milk products are produced in the region despite a high preference for ghee, butter and butter products. Milk value chain improvement interventions are viable in the three districts due to constraints on milk consumption related to low production during dry seasons; high levels of livestock ownership; a broad understanding of milk's role in improving nutrition outcomes, especially among pastoralist families; and the potential for layering activities focused on livelihoods and resilience, as part of a wider approach. This could provide significant benefits in terms of improving food security and nutrition in targeted communities, as well as enhancing the sustainability of interventions in emergency and non - emergency contexts. There are considerations that need to be addressed if the programme is to be implemented in Dangoyaro district including; the dynamics of IDPs, low land ownership, partial resistance of the intervention with community members having an interest in interventions that will meet their immediate basic needs.

## *Programming recommendations*

- Focus on households with women/adult females but also leverage interventions support by males and youths e.g. in the production of pastures and water for livestock
- From the past experiences on milk production and value chains in Somalia and Ethiopia the proposed interventions should provide support in terms of fodder and veterinary services for goats whose milk is preferred in the region. These two interventions should trigger improvements in milk production. Strategic community pasture points, drought resistant pasture seeds, conservation of fodder and commercial production and sale of fodder will be a solution to perennial shortage of livestock feeds.
- Establish and train milk farmers' cooperatives and where they already exist strengthen them - The interventions should be firmly embedded in a community - based approach with a focus on long - term community capacity building on issues of fodder production and management, water conservation and environmental management.
- In terms of value addition, small scale milk processing schemes with a focus on milk preservation, production of ghee and butter and butter products and commercially packaged milk with local community branding. Goat milk is particularly encouraged given its popularity and preference in the three districts. During rainy seasons, activities aimed at improving the storage of fodder and the conversion of milk to products with a longer shelf life should be introduced.
- Promote “multiple livelihoods” approaches in the communities - To reduce overreliance on milk and promote resilience in the region, leverage the program on other livelihood activities and cross - sectoral links to the extent possible. Activities aimed at the introduction of drought - resistant crop and fodder varieties should be introduced as part of the pilot project, to improve year round fodder availability.
- Establish communal water schemes to promote water availability across the dry and rainy seasons hence reduce migration, livestock deaths and reduced livestock productivity.
- Provide milk hygiene training and provide appropriate milk handling equipment while also incorporating WASH and ICF trainings to ensure a holistic hygiene sensitization approach in the communities.
- In addition to hygiene trainings, construction of milk market for milk traders in areas with high milk production or consumption in order to promote milk hygiene and create new source revenue for local authority as result of Taxes to be paid to local authorities.

- A phased approach is recommended as opposed to going large scale at once - Phase 1 should focus on support for goats that stay close to women given the critical role of women in the milk sector while phase 2 should focus on water and water committees fodder, livestock health interventions, hygiene training and environmental safeguarding interventions. Phase 2 should focus on distribution of lactating animals (both goats and cows in this case for scalability) to poor and marginalized households with no livestock; formation milk farmers cooperatives, associations and groups (e.g. VSLAs); setting up of small scale milk processing plants and the processing and value addition of livestock products; and promoting the community members capacity to manage pasture, water animal health services and rangeland management.
- Villages that demonstrate strong results during the pilot project should be chosen as 'model sites' for learning by other community members as well as development organisations.
- Primarily focus on pastoral and agro - pastoral communities - there is some resistance for the interventions among IDPs in Dangoyaro who feel that they have other needs that are primary to milk and livestock production.
- The household selection criteria should be: ownership of small ruminants or readiness to receive livestock; recently lactating animals with normal milk yield; no apparent livestock diseases; presence of children up to 12 years; willingness to participate in the program given the record keeping requirements; willingness to attend trainings; willingness to join farmers cooperatives; willingness to join water committees; and availability of land pasture production and management. If the age of females is to be considered in the selection of female beneficiaries, the World Health Organization (WHO) reproductive age bracket (15 - 49 among females) should be the basis of selection of female beneficiaries. On the aspect of age there should be some flexibility to incorporate care givers/caretakers (such as grandmothers and other relatives).
- In consultation with livestock associations and the Puntland government's ministry of livestock develop a package of animal health interventions entailing prophylactic and curative services, based on the common livestock diseases in the region. These services can be accessed by community members through a voucher system in the initial phase but in the second phase females and males selected consultatively from the communities should be trained to uptake livestock treatment services (as community animal health workers - CAHWs) in the communities as a livelihood activity.

- For issuance of livestock in the second phase reference should be made to the relevant restocking guidelines as well as consult community members at the planning stage. Another approach could be to calculate the number of eligible animals per household based on the number of children. However, a standard figure is recommended for impact assessments; in Karamoja - Uganda and Ethiopia, such interventions have focused on either 3 goats or 1 cow per household.
- Fodder support should be done in phase 1 given the immediate needs before production and availability of pastures as well as in the long term sustainability concerns. In the first phase fodder vouchers should be issued but in the second phase focus on strategic pasture reserves and drought resistant pastures and commercial production and sale of pastures. Appropriate varieties of fodder should be determined at the programme - planning stage, depending on the conditions and needs of different communities.
- Water availability should be promoted through establishment of strategic village boreholes managed by local water users' associations. To promote sustainability of the water point, IGAs such as shops can be opened up by the committees to generate revenue for repair of boreholes and use of solar borehole pumps.
- Potential negative environmental damages that comes large high livestock herds resulting from the introduction of a large number of animals should be adequately anticipated, and remedial measures should be considered and mitigated in consultation with the environmental experts in Puntland as well as KAALO AID environment programs. The proposed pilot project should also include expanded activities for income generation and rangeland management.
- Post - distribution monitoring should be maintained to track results and identify any issues related to livestock disease or death, as well as proper usage of vouchers, livestock feeding practices and shelter.
- A realistic monitoring and evaluation framework for the program not only focusing on milk but also resilience, income and food security in the households will be required.
- Establish beneficiary and stakeholder feedback provision mechanisms long before the program roll out - The programme should invest in developing relationships with local governments, partners and community leaders prior to programme roll - out, based on previous experiences.
- Together with the Ministry of livestock in Puntland come up with a dairy sector development policy and also enlighten stakeholders and community members on the existing/available milk and livestock production policies ad guidelines.

# Section One: Introduction

## 1.1 Background

Created in 1960 from a former British protectorate and an Italian colony, Somalia collapsed into anarchy following the overthrow of the military regime of President Siad Barre in 1991. The effects of this anarchy were poverty, lagged development, destruction of social amenities, an upsurge in diseases and the disintegration of the country into three main regions namely Somaliland, Puntland and South Central Somalia (Figure 1.1).<sup>3</sup> Puntland and Somaliland are relatively stable while South Central region of Somalia remains the epicenter of the anarchy. Unlike its neighbour, breakaway Somaliland, Puntland says it does not seek recognition as an independent entity, wishing instead to be part of a federal Somalia.<sup>4</sup> Puntland is a region in northeastern Somalia with its headquarters in the town of Garowe in the Nugal province; its leaders declared the territory an autonomous state in 1998.<sup>5</sup>

The regions of Bari (9 districts); Nugal (4 districts); Mudug with the exception of Hobyo and Harardhere districts (North Mudug which belongs to Puntland has 3 districts); Sanag except El - Afweyne and Northwest of Erigabo district (this region has 3 districts); Sool (3 districts) and; Ayn (3 districts) make up Puntland which has been self - governing since 1998; the territory takes its name from the Land of Punt, a centre of trade for the ancient Egyptians and a place shrouded in legend. Puntland disputes its border with Somaliland as it also claims the regions of Sool and Sanaag, and portions of Togdheer. The total area of the State of Puntland is 212,510 kilometers squared, (roughly one - third of Somalia's geographical area) and it is bordered by Somaliland to its west, the Gulf of Aden in the north, the Indian Ocean in the southeast, the central Galmudug region of Somalia in the south, and Ethiopia in the southwest.<sup>6</sup> Puntland had shown some degree of initiative to step up the slow and hesitant development of governance structures and socio - economic reconstruction without the benefit of much international assistance.<sup>7</sup>

3 Central Intelligence Agency (CIA).2018. The world fact book, Somalia. Retrieved on 16<sup>th</sup> May 2018 at:<<https://www.cia.gov/library/publications/the-world-factbook/geos/so.html>>

4 British Broadcasting Corporation - BBC.2018. Puntland profile. Retrieved on 17<sup>th</sup> May 2018 at:< <http://www.bbc.com/news/world-africa-14114727>>.

5 Puntland Government.2018. Puntland state of Somalia. Retrieved on 16<sup>th</sup> May 2018 at:<<http://www.puntlandgovt.com/puntland-state-of-somalia/>>

6 Ministry of Planning and Statistics Puntland State of Somalia2003. Puntland facts and figures. Retrieved on 13<sup>th</sup> May 2018 at:< <http://siteresources.worldbank.org/SOMALIAEXTN/Resources/PuntlandFigures.pdf>>.

7 Puntland Government.2018. Puntland state of Somalia. Retrieved on 16<sup>th</sup> May 2018 at:<<http://www.puntlandgovt.com/puntland-state-of-somalia/>>

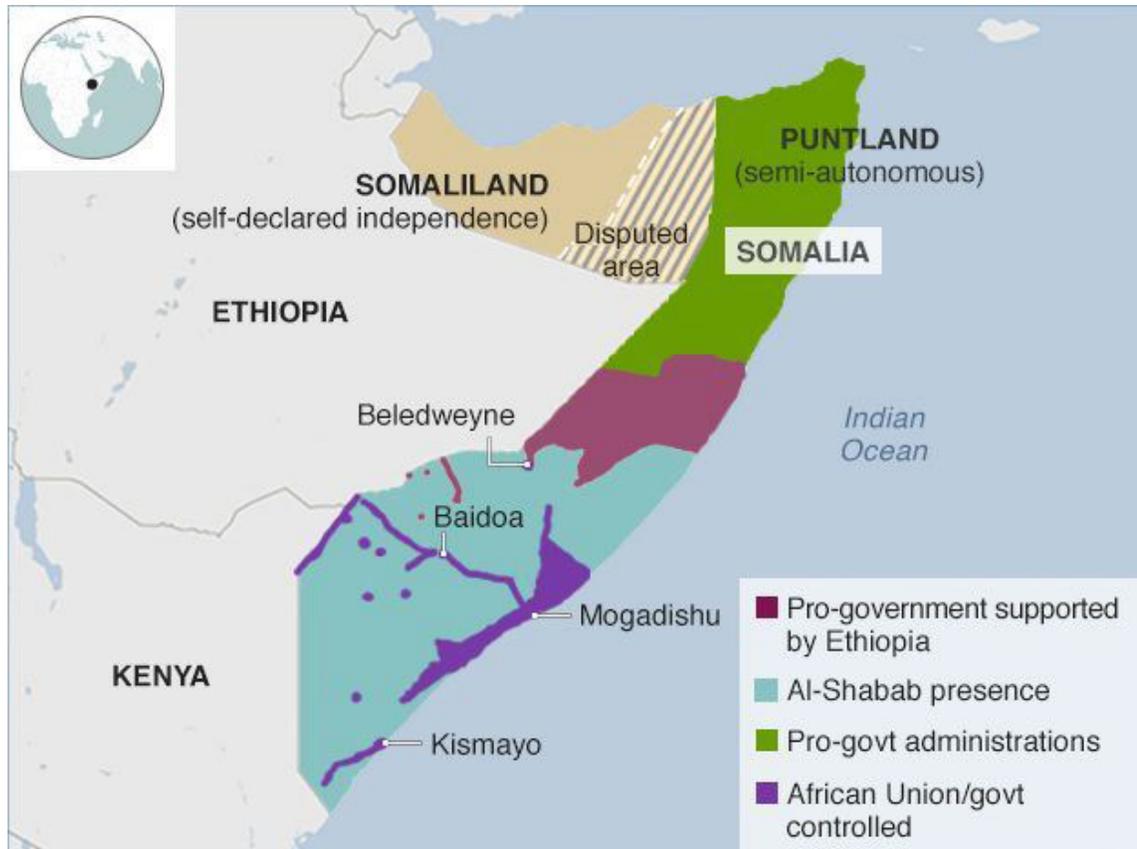


Figure 1.1: Map of Somalia (Source: BBC, 2018)

The population growth rate of Puntland State is currently very high due to the influx of people from war - torn southern Somalia and from neighbouring countries. The population of Puntland State is estimated at 2.4 million, of which 65% are nomadic. Currently, 30% of Puntlanders live in the fast growing towns of Bosasso, Gardo, Las - Anod, Garowe, and Galkacyo. Approximately 70% of the population is below the age of 30.<sup>8</sup> There are four main sources of revenue in Puntland: Livestock, Fishery, Agriculture and Remittance. The livestock sector dominates the economy of the Puntland regions. The livestock products not only contribute to the livelihood of the nomads, but are also a substantial portion of the daily food intake of the population living in rural and urban areas. The economy of Puntland is largely dependent on livestock exports, which contribute to approximately 80% of foreign exchange earnings, 40% of the GDP and 60% of employment opportunities. The population mainly depends, either directly or indirectly, on livestock products for their livelihood. Remittance from the Diaspora has also played a major role in the economy.<sup>9</sup>

state - of - somalia/>.

8 Puntland Government.2018. Puntland state of Somalia. Retrieved on 16th May 2018 at:<<http://www.puntlandgovt.com/puntland-state-of-somalia/>>.

9 Ministry of Planning and Statistics Puntland State of Somalia2003. Puntland facts and figures. Retrieved on 13th May 2018 at:< <http://siteresources.worldbank.org/SOMALIAEXTN/Resources/PuntlandFigures.pdf>>.

The State of Puntland is semi - arid; the country has a warm climate and average daily temperatures range from 27 ° C to 37 ° C. This favours pastoralism as the most effective use of land in most parts of the State. The most valuable pastures include the Hawd region in the high plateau of the West of Mudug and Sool regions and into Ethiopia and the low Nugal valley. In contrast, it is only along the high mountain ranges of Bari that mild temperatures are experienced. In all other parts, the State generally endures tropical desert heat.<sup>10</sup> Rainfall is variable and sparse with no one area receiving more than 400mm of rain annually. Therefore, nomads rely primarily on wells as a water source rather than surface water. There are four main seasons dictated by shifts in wind patterns. Pastoral and agricultural life revolves around these seasons. These are:

- Jilal from January to March, the harshest dry season of the year;
- Gu is the main rainy season from April to June;
- Hagua from July to September is the second dry season;
- Dayr is the shortest and less reliable rainy season, lasting from October to December.

### ***1.2 Context of the Milk Value Chain Analysis Study***

The main livelihood systems in Somalia are pastoral, agro - pastoral and farming, which rely on adequate rainfall. Given 25 years of conflict, these systems are highly vulnerable to shocks, such as consecutive seasons of rain failure, droughts, floods and inflation, which all have a direct impact on the food security and nutrition situation of the population. Somalia's population is faced with a chronic nutrition crisis, with global acute malnutrition rates (GAM) in most parts exceeding the emergency threshold of 15 percent.<sup>11</sup> Milk, the predominant food among the pastoral population, is a good source of high quality protein and micronutrients, as well as a source of livelihood and income in most pastoralist and agropastoralist households.<sup>12</sup>

Pastoral communities make up about 65 per cent of the Puntland population and most of these pastoralists in Somalia are in the Haud and Sool plateau.<sup>13</sup> Their livelihoods mainly depend on herding livestock, predominantly camels and goats, as well as good rains and pasture. This livelihood is under increased threat because of recurring drought, environmental degradation and livestock depletion. Rainfall is considered

10 Puntland Government.2018. Puntland state of Somalia. Retrieved on 16th May 2018 at:<<http://www.puntlandgovt.com/puntland-state-of-somalia/>>

11 Farming Early Systems Network.2017. Wide - spread Emergency (IPC Phase 4) expected after third consecutive very poor season. Retrieved on 17<sup>th</sup> May 2018 at:< <http://fews.net/east-africa/somalia/food-security-outlook/june-2017>>.

12 Sandler K et al.2009. A Literature Review of Pastoralist Nutrition and Programming Responses. Retrieved on 17<sup>th</sup> May 2018 at:< [http://www.fao.org/fileadmin/user\\_upload/drought/docs/Tufts%20Feinstein%20Ethiopia%20Milk%20Matters-A%20Literature%20Review%20of%20Pastoralist%20Nutrition%20and%20Programming%20Responses.pdf](http://www.fao.org/fileadmin/user_upload/drought/docs/Tufts%20Feinstein%20Ethiopia%20Milk%20Matters-A%20Literature%20Review%20of%20Pastoralist%20Nutrition%20and%20Programming%20Responses.pdf)>.

13 Ministry of Planning and Statistics Puntland State of Somalia2003. Puntland facts and figures. Retrieved on 13th May 2018 at:< <http://siteresources.worldbank.org/SOMALIAEXTN/Resources/PuntlandFigures.pdf>>.

the most important meteorological element affecting life in Somalia. In particular, variations from season to season, and within the season, are what determine the successes of agricultural activities. Dry seasons and water shortages have been a constant problem in the Puntland region of Somalia. Scarcity of water and the lack of rain restrict pastoralists who struggle to provide bare necessity to their livestock, which is their source of livelihood.<sup>14</sup> With fodder and water scarcity, pastoralists are enduring recurrent animal mortality rates; in addition, weakened, surviving livestock are not producing enough milk and their sale value has slid. The result in the shorter term: Rising food insecurity in rural areas and population displacement from rural areas. Consequences for the longer - term: a longer, steeper climb back to self - reliance and persistent system fragility.<sup>15</sup> Building resilience for pastoralists and agropastoralists commits long - term development for communities in Puntland.

KAALO AID is implementing a three years “Restore” program (2018 - 2020) through funding from the European Union (EU) under the Building Resilient Community in Somalia (BRCiS) Consortium. This program is aimed at increasing the resilience of pastoralist, agro - pastoralist, and IDP communities in Somaliland and Puntland by building community and local authority capacity to predict, adapt to, cope with and mitigate against future droughts in particular, as well as other local shocks and stresses. The expected outcomes from the program are: strengthened community based drought mitigation and preparedness measures; improved natural resource management for drought mitigation and adaptation and: diversification livelihoods and assets rebuilt.<sup>16</sup>

In order to strengthen the resilience of pastoralists and agropastoralists in Bossaso District of Bari region, Badhan District of Sanaag region and Dangoranyo District of Nugal region there is need to conduct a milk value analysis. The main purpose of the task is to clearly identify the overall value chain of the milk, from the producer to the end user. This is aimed at improving the productivity of pastoralists and agro - pastoralists livestock in the targeted communities. The study will also identify the main causes of decline the quantity of milk supply to dairy cooperative which affect the profitability of dairy cooperative in order to improve their position in milk value chain following the milk matters approach.

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14 United Nations Development Program - UNDP, Somalia.2018. Water dam to help build community resilience to climate in Puntland. Retrieved on 18<sup>th</sup> May 2018 at:< [http://www.so.undp.org/content/somalia/en/home/ourwork/hiv\\_aids/successstories/water-dams-build-resilience-for-communities-in-puntland.html](http://www.so.undp.org/content/somalia/en/home/ourwork/hiv_aids/successstories/water-dams-build-resilience-for-communities-in-puntland.html)>.

15 Food agricultural organization - FAO.2017. Preventing famine, building resilience, promoting recovery. Retrieved on 18<sup>th</sup> May 2018 at:<<http://www.fao.org/3/a-i7400e.pdf>>.

16 See Terms of Reference (Annex 22)

### ***1.3 Objectives of the Milk Value Chain Analysis Study***

Value chain analysis is essential to an understanding of markets, their relationships, the Participation of different actors, and the critical constraints that limit the growth of livestock production and consequently the competitiveness of smallholder farmers. As outlined in the Terms of Reference - TOR (Annex 22), the objectives of this milk value chain analysis study were:

- To review the existing policies and regulations in the milk production and identify the gaps for improvement.
- To identify challenges associated with milk value chain.
- To examine the impact of milk on children nutrition in pastoralist and agro - pastoralist community.
- To examine existing practices in targeted population.
- To assess the impact of animal feed on milk production in lean dry/season.
- To identify existing coping strategies employed by target population in times of drought.
- To review on the relative importance of livestock on milk, the amount of milk utilized for various uses (household consumption, marketing, donating to relatives ...), and household income.
- To assess the viability in general and cost - benefit analysis in particular of small scale milk processing scheme.
- To assess the value chain actors (the players involved in value chain transaction - both from the supply and demand sides) and the nature and scale of their relative functions.
- To analyze the factors (internal and external influences) that affect the nature and terms of transaction along the value chain with a particular focus on information flow, transparency and efficiency of transaction.
- To examine the relationships which include power, knowledge and benefits asymmetry throughout the chain.
- To identify major marketing channels sub channels and routs.
- To identify the key constraints, opportunities and threats of milk and milk products marketing.
- To identify the underline causes of low milk supply and quality in the pastoral area
- To propose simple and practical intervention areas which help to facilitate milk

and milk products marketing.

- To conduct gender analysis of the value chain while highlighting of men and women across the chain will be conducted.
- To propose preliminary implementation plan for the project with recommendations for intervention with in the project time frame and alignment with the project objective.

## **1.4 Research Questions**

### **1.4.1 Livestock Inputs**

- Is fodder available in the region? What types are available and at what cost during the dry and wet seasons?
- Which milking animals and breeds are kept in the area? What is their production capacity/capability?
- What are the current livestock management practices and veterinary services?
- What are the major livestock diseases and animal management policies in the region? What are the disease coping mechanisms?
- Are there sufficient water supplies for fodder production?
- Are skilled animal extension workers available locally? Do they have adequate/ appropriate experience/ background?
- How effective are the veterinary inputs for livestock?
- What is the availability and affordability of agricultural extension services?
- What are the livestock coping mechanisms of pastoralists during drought?

### **1.4.2 Milk Access, Handling and Utilization**

- What are the milk production levels in the region?
- How is milk collected in the region?
- What is the quality of milk in the region?
- How is milk handled/processed in the region?

Is the milk produced accessible for use in the household?

- Who drinks the milk in the household? Are there cultural practices to this?
- Do children in the household drink milk?
- Would children be allowed to take milk if it was available?
- How is milk used in the households?

- What type of milk is recommended for children? When and why?
- What are the community socio - cultural perspectives on the use of milk?
- How is milk used in a household, in both rainy and dry seasons, and how can we protect milk supply to children in that stress context?
- Gender issues - who influences the milk consumption and child nutrition decisions in the household?

### **1.4.3 Milk Marketing/Enterprise**

- What is the cost of milk, per litre?
- How is milk handled?
- Are there milk - selling centres? How close are they to communities?
- Who sells milk in the region?
- Is there value addition in milk processing?
- What are the milk products in the region?
- What are the milk demand and supply dynamics?
- Does a value chain for the product exist?
- What milk products exist in this region? Who produces them?
- What milk products are preferred in the region?
- Does the Infrastructure allow processing, transportation and handling of milk?

### **1.4.4 Management, Risk and Sustainability**

- How is fodder managed during peak and off - peak seasons?
- How is milk managed during periods of surplus?
- Are there early warning systems within the community to cope with fodder and milk shortages?
- Are there community mitigation measures during dry seasons?
- What are the community's coping mechanisms during periods of glut?
- Are there any potential causes for project failure that cannot be mitigated?
- Are overall risks acceptable?
- What will be the effect of the programme on the environment?
- Will the project generate good will locally?
- Are impacts of political threats small/ insignificant?

- Can a definite project timeline be defined /designed?

### **1.4.5 Child Health and Nutrition**

- What are the nutritional practices in the region?
- What is the community perception of milk in malnutrition management?
- What is the nutrition status of infant children (under five years.)?
- What type of food is given to infants in the region?
- How many children consume milk in dry and wet seasons?
- What amount of milk is consumed in dry and wet seasons?
- What are the prevalent childhood illnesses in the region?
- Are health care workers available? (existence, effectiveness of health services and availability of community nutrition and health workers)
- Are ante - and post - natal services available? (distances and quality of services)
- In areas where there are no health facilities, how do mothers treat ill children?

### **1.4.6 Resilience and Coping strategies**

- What are the households coping strategies in terms of livestock keeping across wet and dry seasons
- What are the general coping strategies in terms of drought?
- How do communities cope with milk shortage in times of drought?
- How is excess milk handled in the wet season?
- What are the sources of food and income across seasons?

### **1.4.7 Policies and Regulations on Milk**

- What are the existing policies and regulations in the milk production?
- What are the gaps in these policies and regulations?
- How can the policy and regulation gaps be improved?

# Section Two: Milk Value Chain Analysis Methodology

## 2.1 Introduction

In order to achieve the objectives of this assignment and to answer the underlying questions, the activities outlined in this section were undertaken.

## 2.2 Study Area

This milk value chain analysis study was conducted in Bossaso, Badhan and Dangoranyo Districts of Puntland. Bossaso is a district in the northeastern Bari region of Somalia and it is the commercial capital of Puntland state of Somalia and one of Somalia's commercial capitals.<sup>17</sup> The estimated population of Bosasso in 2005 was 164,906 while the United Nations Population Fund (UNFPA) estimated that Bari region had a population of around 719,512 people in 2014, almost two or third of which is urban inhabitants and the rest the rural areas of the district.<sup>18&19</sup> Baran is a district in northern Sanaag region of Puntland - in July 2007 with a population of about 55,000 people, the district became the capital city of the autonomous Maakhir (Maakhir rejoined Puntland since January 2009) region of Somalia.<sup>20</sup> Sanaag region had an estimated population of 544,123 as at 2014.<sup>21&22</sup> The broader Dangorayo District has a total population of 20,331 residents and lies in the northeastern Nugal region of Somalia. Muduug region had an estimated population of 717,863 as at 2014.<sup>23</sup>

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17 Bosasso district local government.2013. District development framework, Revised and updated Dec'2013. Retrieved on 17<sup>th</sup> May 2017 at:< [http://www.moipuntland.com/moi/wp-content/uploads/2015/01/Final\\_Bosaso\\_DDF1.pdf](http://www.moipuntland.com/moi/wp-content/uploads/2015/01/Final_Bosaso_DDF1.pdf) >.

18 UNDP.2005. Regions, districts, and their populations: Somalia 2005.Retrieved on 17th May 2018 at: <<https://www.unocha.org/sites/dms/Somalia/UNDP-POP-RURAL-URBAN%202005.pdf>>

19 UNFPA.2014.Population estimation survey 2014, population estimation survey 2014, Federal Republic of Somalia, for the 18 regions. Retrieved on 17<sup>th</sup> May 2018 at:< <https://somalia.unfpa.org/sites/default/files/pub-pdf/Population-Estimation-Survey-of-Somalia-PESS-2013-2014.pdf>>.

20 WikiVisually.2018. Badhan, Sanaag. Retrieved on 17<sup>th</sup> May 2018 at:< [https://wikivisually.com/wiki/Badhan%2C\\_Sanaag](https://wikivisually.com/wiki/Badhan%2C_Sanaag) >.

21 UNDP.2005. Regions, districts, and their populations: Somalia 2005.Retrieved on 17<sup>th</sup> May 2018 at: <<https://www.unocha.org/sites/dms/Somalia/UNDP-POP-RURAL-URBAN%202005.pdf>>

22 UNFPA.2014.Population estimation survey 2014, population estimation survey 2014, Federal Republic of Somalia, for the 18 regions. Retrieved on 17th May 2018 at:< <https://somalia.unfpa.org/sites/default/files/pub-pdf/Population-Estimation-Survey-of-Somalia-PESS-2013-2014.pdf>>.

23 UNFPA.2014.Population estimation survey 2014, population estimation survey 2014, Federal Republic of Somalia, for the 18 regions. Retrieved on 17th May 2018 at:< <https://somalia.unfpa.org/sites/default/files/pub-pdf/Population-Estimation-Survey-of-Somalia-PESS-2013-2014.pdf>>.

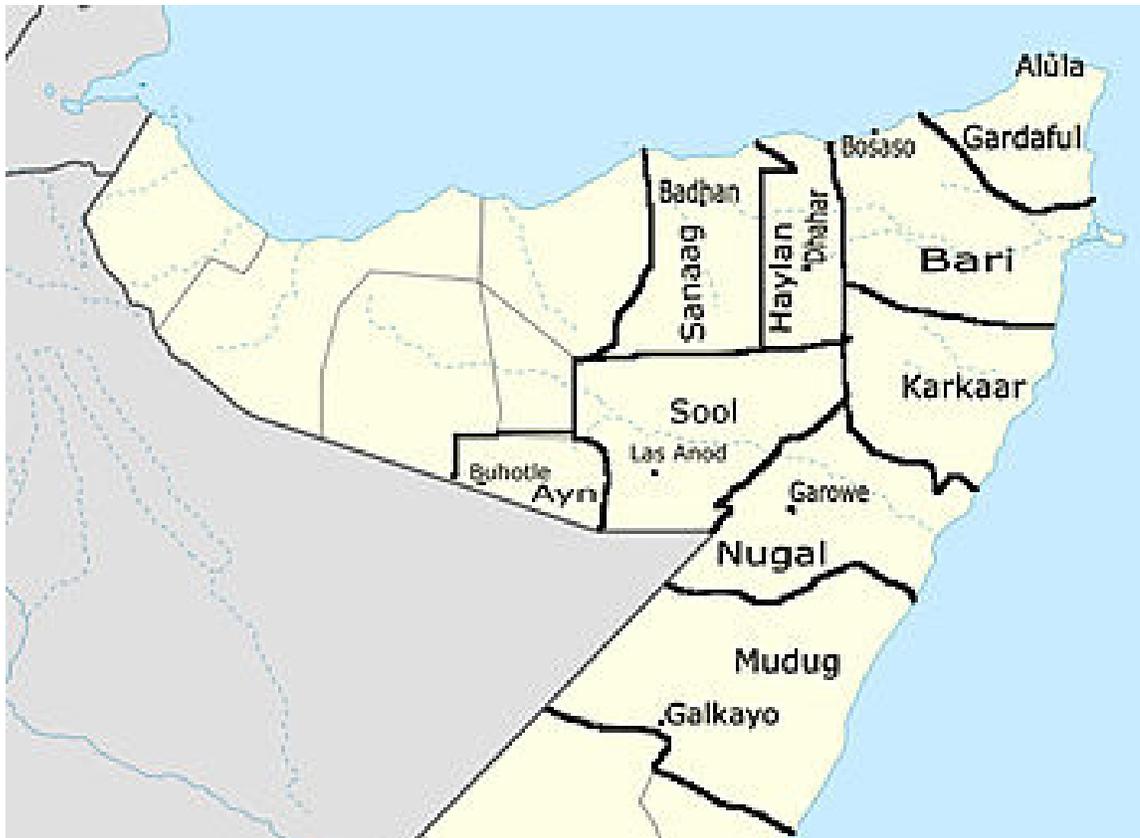


Figure 2.1: Study Sites

### 2.3 Study Population

The target population for this milk value chain study will comprised of pastoralist communities, agropastoralists communities, and Puntland Ministry of Livestock and Animal Husbandry officials, milk traders, Livestock Professional Association, CBOs and milk consumers who play a significant role in milk value chain. As for the household survey, MVCA targeted men and women involved in milk production, handling and marketing, while also making consumption decisions at the household level.

### 2.4 Data Collection Methods

This assessment was of a retrospective cohort study comparing milk production and livestock keeping patterns in wet and lean seasons precisely collecting data on milk practices in the months of March to April 2016 (*Jilal* season) and May 2016 (*Gu'* season). A desk review of literature and program documents preceded the development of data collections tools and in country field visits. During this initial phase of the assignment, the following tasks were undertaken by the consultants: (i) joint briefing, (ii) in - depth literature review, (iii) fine - tuning of methodology and data collection tools, and (iv)

finalizing a detailed work plan and travel schedule. Quantitative data was collected through a household survey targeting household heads and senior most females in the household as well as milk traders. Qualitative data was collected through focus group Discussions (FGD) with men and women in the community as well as Key Informant Interviews (KIIs) with customary leaders, Puntland Ministry of Livestock and Animal Husbandry officials, Livestock Professional Association, agricultural and livestock extension workers and CBOs representatives.

## 2.5 Sample Size and Sampling Approach

### 2.5.1 Quantitative Data

The “Restore” program was targeting 19,259 households in Puntland, 4,029 in Dangoroyo district, 8,340 in Badhan and 6,890 in Bossaso inclusive of host communities and IDPs (Table 2.1). However only pastoralist and agropastoralists households were included in the MVCA study; thus 14,512 household were eligible for inclusion in the study (Table 2.2).

Table 2.1: Distribution of Program Beneficiaries by Village (Source: Program Records)

District	Region	Main Village Name	Livelihood Group	Host population HH	IDP HH	Total
Dangoroyo	Nugal	Dangoroyo	Urban, IDP	1500	385	1885
		Haji - khair	Pastoral, IDP	455	130	585
		El - buh	Pastoral, IDP	560	190	750
		Uusgure	Pastoral, IDP	442	152	594
		Baarweyn	Pastoral, IDP	160	55	215
<b>Subtotal</b>				<b>3117</b>	<b>912</b>	<b>4029</b>
Badhan	Sanaag	Badhan	Pastoral, IDP, Urban,	4500	300	4800
		Rad	Pastoral, IDP, Agro - pastoral, Urban	380	200	580
		Midigale	Pastoral, IDP, Agro - pastoral, Urban	650	160	810
		Awsane	Pastoral, IDP, Urban	300	150	450
		El - buh	Pastoral, IDP, Urban	1500	200	1700
<b>Subtotal</b>				<b>7330</b>	<b>710</b>	<b>8340</b>
Bossaso	Bari	El - Dahir	Urban, IDPs, Agro - Pastoral, and Pastoral	1168	600	1768
		Armo	Urban, IDPs. Pastoral	3604	520	4124
		Kob Dehad	Urban, IDPs. Pastoral	450	50	500
		Kalabeyr	Urban, IDPs. Pastoral	343	80	423
		Faluja	Urban, Farmers	50	25	75
<b>Subtotal</b>				<b>5615</b>	<b>1275</b>	<b>6890</b>
<b>Grand total</b>						<b>19,259</b>

Using the Raosoft online sample size calculator, a 5 % margin error, a 90% confidence interval (in view of recall bias), an estimation that 65% of Puntland residents own livestock and 14,512 residents in the three districts , a sample of 375 households was arrived at.<sup>24&25</sup> This sample was further increased by 20% to cater for non - response and errors in the field thus arriving at a sample size of 450 respondents namely head of the households (whether male or female) or the senior most females in the households. In addition, the study team purposively targeted to interview 60 milk traders (20 in each district). Sampling for the household survey was done proportionately to size at the village level to capture adequate and representative samples in each district as outlined in Table 2.2 below.<sup>26</sup>

**Table 2.2: Sampling for the Households**

District	Village	Livelihood Group	Host population HHs	Households to be interviewed
Dangoroyo	Haji - khair	Pastoral, IDP	455	14
	El - buh	Pastoral, IDP	560	17
	Uusgure	Pastoral, IDP	442	14
	Baarweyn	Pastoral, IDP	160	5
	Subtotal		1617	50
Badhan	Badhan	Pastoral, IDP, Urban,	4500	139
	Rad	pastoral, IDP, Agro - pastoral, Urban	380	12
	Midigale	Pastoral, IDP, Agro - pastoral, Urban	650	20
	Awsane	Pastoral, IDP, Urban	300	9
	El - buh	Pastoral, IDP, Urban	1500	47
	Subtotal		7330	227
Bossaso	El - Dahir	Urban, IDPs, Agro - Pastoral, and pastoral	1168	36
	Armo	Urban, IDPs. Pastoral	3604	112
	Kob Dehad	Urban, IDPs. Pastoral	450	14
	Kalabeyr	Urban, IDPs. Pastoral	343	11
	Subtotal		5565	173
Grand total			1,4512	450

Systemic random sampling was proposed, every 5<sup>th</sup> household in each village was visited for household interviews. The starting point for data collection in each village was any major geographic site such a main road, shopping centre, administrative unit or school etc. All milk vendors (buyers, sellers, processors and transporters) encountered were interviewed through a separate quantitative household questionnaire.

24 Raosoft.2018.Sample size calculator. Used on 18<sup>th</sup> May 2018 at:<<http://www.raosoft.com/samplesize.html>>

25 Ministry of Planning and Statistics Puntland State of Somalia2003. Puntland facts and figures. Retrieved on 13th May 2018 at:< <http://siteresources.worldbank.org/SOMALIAEXTN/Resources/PuntlandFigures.pdf>>.

26 Skinner J.C.2016.Probability Proportional to Size (PPS) Sampling. Wiley StatsRef. Statistics Reference Online. DOI: 10.1002/9781118445112.stat03346.pub2.

## 2.5.2 Qualitative Data Collection

A total of 12 key informant interviews and 9 focus group discussion sessions were planned. Purposive and snowball sampling was used in the selection of key informants while convenience sampling was applied in selecting FGDs participants (Table 2.3).

Table 2.3: Qualitative Data

KIs	Bossaso	Badhan	Dangorayo	Sub totals
Customary leaders	1	1	1	3
Puntland Ministry of Livestock and Animal Husbandry officials	2			2
CBOs representatives	1	1	1	3
Livestock professional Association	2			2
Agricultural and livestock extension workers	2			2
<b>Grand total</b>				<b>12</b>
FGDs**Agropastoralists and pastoralist separately	Bossaso	Badhan	Dangorayo	Sub totals
Males	1	1	1	3
Females	1	1	1	3
Youth	1	1	1	3
<b>Grand total</b>				<b>9</b>

## 2.6 Training of the Supervisors and Enumerators

A one day training of the supervisors and enumerators was conducted by a Somali speaking consultant from the HSED group. The training was conducted in Garowe and focused on:

- The study objectives.
- Confidentiality protocols.
- Interviewing techniques and methodology.
- Communication skills during interviews.
- Orientation with the assessment tools including skip patterns.
- Field work activities.
- Data quality checks in the field.
- Pilot testing of procedures: sampling techniques/respondent selection procedures.
- Roles and responsibilities of the enumerators and supervisors.
- Content and use of the questionnaires, survey forms and materials.
- Pre - testing of the questionnaires.
- Logistics planning.

Data quality assurance mechanisms employed include: over the shoulder supervision of the enumerators, double data entry and use of professional software for data management.

### ***2.7 Data Analysis***

Qualitative data was analyzed using Atlas.ti and flow chart matrix to establish convergence and divergence of themes. Quantitative data was analysis was using SPSS (version 23) and graphics were generated using Microsoft Excel 2013.

### ***2.8 Limitations in the Study***

- Sample sizes limitations - The study team spent 10 days on data collection against a planned 6 days and they were not able to meet the targeted sample sizes due to Ramadhan and refusal to participate in the interviews by urban communities and agropastoralists. However, with 75% of the targeted sample size achieved, the statistical threshold for the study was met.
- Recall bias - This study heavily relied on recall questions revolving around seasonal changes and seasonal figure on milk production volumes and livestock and children population. There might have been errors caused by differences in the accuracy or completeness of the recollections retrieved by study participants regarding events or experiences from the past. To overcome this, triangulation of findings using qualitative interviews was adopted.
- The 2017 - 2018 drought - The milk volumes reported are very low in comparison with the herd size due to the 2017 - 2018 drought in the horn of Africa; the study coincided with the post drought recovery period.
- The inability of milk traders and farmers to estimate the costs of milk production and distribution hindered the calculation off profit margins in milk sale.

# Section Three: Findings

## 3.1 Introduction

The findings presented in this section are based on 10 FGDs with community members (5 with males and 5 with females) in the three districts, 1 KII with a Ministry of Livestock official in Puntland, 1 KII with a veterinary board official, 2 KIIs with female group leaders, 2KIIs with livestock association representatives, 3 KIIs with community leaders, quantitative interviews with 53 milk traders and a quantitative survey of 357 households.

## 3.2 Social demographic background of the household respondents and milk traders

The study involved 5.60% (20) agropastoralists and 94.40% (337) pastoralists' households with 52.10% of the respondents being males and 47.90% being females. In terms of distribution by region, 28.29% of the respondents were from Bossaso district, 57.42% from Badhan district and 14.29% from Dangorayo district (Table 3.1). Respondents had a mean age of 47.88 years (standard deviation of 13.94) with a minimum of 20 years and a maximum of 88 years (Annex 1).

Table 3.1: Distribution of HH respondents by gender, livelihood and district

Male		Respondent's sex		Total
		Female	Male	
District	Bossaso	21.80%(22)	78.20%(79)	28.29%(101)
	Badhan	66.30%(136)	33.70%(69)	57.42%(205)
	Dangorayo	54.90%(28)	45.10%(23)	14.29%(51)
Livelihood	Pastoralist	52.50%(77)	47.50%(160)	94.40%(337)
	Agropastoralists	45.00%(9)	55.00%(11)	5.60%(20)
All respondents		52.10%(186)	47.90%(171)	100.00%(357)

On average households had a mean of 8 household members sharing a pot of food (standard deviation of 3.64) with minimum of 2 household members and a maximum of 30 household members. Related to this was the presence of an average of 2 children aged below 5 years in each household visited (standard deviation of 1.41) with a minimum of zero children in this age group and a maximum of 9 children in the age

group (Table 3.2).

**Table 3.2: Number of HH members and Children below 5 years in HHs**

		Number of household members	Number of children below 5 years in the households
Bossaso	Mean	8.37	1.95
	Std. Deviation	3.63	1.38
	Minimum	3	0
	Maximum	25	4
Badhan	Mean	8.27	1.45
	Std. Deviation	3.68	1.40
	Minimum	2	0
	Maximum	30	9
Dangorayo	Mean	7.35	1.80
	Std. Deviation	2.79	1.09
	Minimum	2	0
	Maximum	14	5
Overall Total	Mean	8.32	1.68
	Std. Deviation	3.64	1.41
	Minimum	2	0
	Maximum	30	9

### 3.3 Household income dynamics

The main source of household income in the preceding year was sale of livestock and livestock products (90.70%) among pastoralists while in agropastoralists' households, casual labour (33.30%) and sale of livestock and livestock products (33.30%) - Table 3.3.

**Table 3.3: Source of income in the households**

	Sale of livestock and livestock products	Business/Trade	Donations/ Zakaat	Relief Aid	Casual labour	Agricultural produce sale and relief aid
Bossaso	79.60%(43)	3.70%(2)	1.90%(1)	1.90%(1)	9.30%(5)	3.70%(2)
Badhan	92.10%(117)	0.00%(0)	0.80%(1)	2.40%(3)	1.60%(2)	3.10%(4)
Dangorayo	92.20%(47)	3.90%(2)	0.00%(0)	3.90%(2)	0.00%(0)	0.00%(0)
Pastoralist	90.70%(205)	1.30%(3)	0.90%(2)	6(2.70%)	2.20%(5)	2.20%(5)
Agropastoralists	33.30%(2)	16.70%(1)	0.00%(0)	0.00%(0)	33.30%(2)	16.70%(1)
All households	89.20%(207)	1.70%(4)	0.90%(2)	2.60%(6)	3.00%(7)	2.60%(6)

The average monthly income in households in the most recent rainy season was 1643806.92 Somali Shillings while in the most recent dry season the average income was 1169726.86 Somali Shillings. Overall, households in Dangorayo district recorded the least amounts in terms of monthly household income at 2,481.80 and 2347.06 Somali Shillings in the rainy and wet seasons (Table 3.4).<sup>27</sup>

<sup>27</sup> 1 Somali Shilling=0.00173556 USD as at 25th June 2018. Calculated on 25th June 2018 at: < <https://www.xe.com/currencyconverter/>

**Table 3.4: Average monthly income in households per season (in Somali Shillings)**

		Rainy season	Dry season
Bossaso	Mean	1680786.00	1211533.00
	Std. Deviation	1870420.00	1472201.00
	Minimum	0.00	0.00
	Maximum	9000000.00	6000000.00
Badhan	Mean	1513818.00	1116608.00
	Std. Deviation	1286168.00	1327797.00
	Minimum	1500.00	1300.00
	Maximum	6000000.00	8000000.00
Dangorayo	Mean	2481.80	2347.06
	Std. Deviation	1683.28	2357.21
	Minimum	12.00	0.00
	Maximum	8000.00	6000.00
Overall	Mean	1643806.92	1169726.86
	Std. Deviation	1683.28	2155353.82
	Minimum	12.00	0.00
	Maximum	30000000.00	28000000.00

## 3.4 Land Availability and Use

Overall, only 19.05% of the households reported ownership of land (Figure 3.1). Specifically, 85.00% of the agropastoralists reported ownership of land in comparison with 15.13% of the pastoralists. In Dangorayo district, no household reported land ownership while in Badhan and Bossaso districts land ownership was reported by 18.54% and 29.70% of the households. From FGDs, issues of communal land ownership by pastoralists were reported. Land in Puntland, just as in many other regions of Somalia, exists in the following units: hectares and Tacaabs.<sup>28</sup> Deegaan - the exclusive control of land and the natural resources found there, by a group sharing a similar language, identity or clan affiliation - plays an important role in the dynamics of communal clan tenure. In many areas, clan presence and territorial land ownership do not match.<sup>29</sup> The pastoral rangeland remains a common area, where claims on water and grazing areas are communal and possessed by clans, rather than individuals. However, in some pastoral areas, private claims of land ownership were reported.

convert/?Amount=1&From=USD&To=SOS>

28 16 Tacaabs = 1 Hectare

29 Norwegian Refugee Council, UN Habitat and UNHCR.2013.Land, Property, And Housing in Somalia .Accessed on 25th June 2018 at:<<https://reliefweb.int/sites/reliefweb.int/files/resources/34013FB1A4970B76492575900009D650> - Full\_Report.pdf>

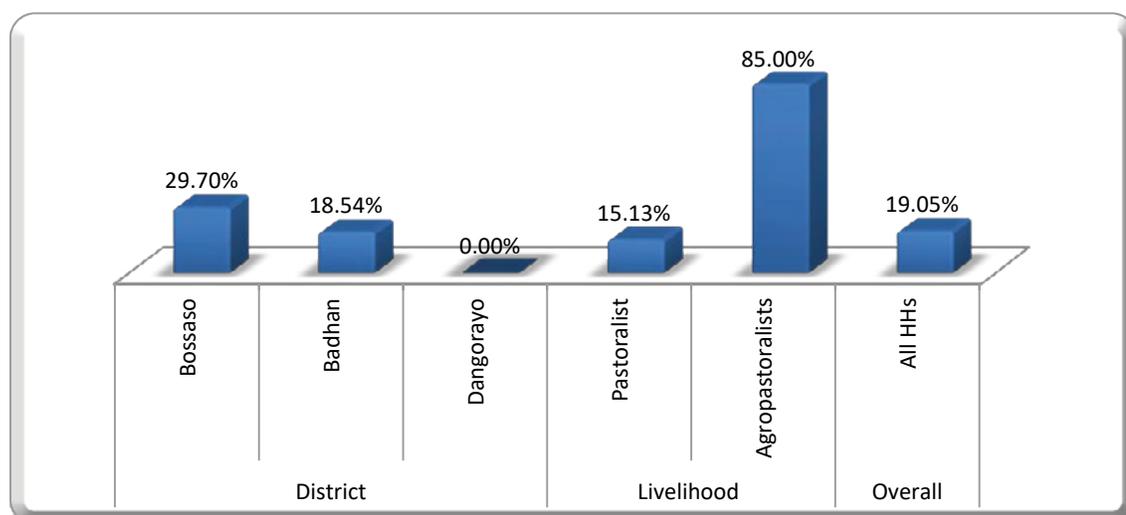


Figure 3.1: Land ownership

When further asked about the availability of land for agricultural and livestock production, most households reported even communal land; in Bossaso and Badhan districts median of 4 and 5.5 hectares for use were reported by households (Table 3.5). The means appear higher than the medians due to outliers especially in the few selected households with large pieces of land as well as households that can access communal land for agricultural and livestock production. Those interviewed in Dangorayo district were largely IDPs hence no land availability for agricultural and livestock production.

Table 3.5: Total land available for agriculture and livestock use in the household

District	Median	Minimum	Maximum	Mean	Std. Deviation of the mean
Bossaso	4	0	1920	116.10	412.47
Badhan	5.5	0	1500	105.58	317.35
Total	4	0	1920	110.22	359.56

### 3.5 Livestock Production

Only 6.72% of households had no goats while 52.10%, 99.43% and 68.07% of households had no sheep, cows and camels respectively. These dynamics are replicated in all the districts and all the two livelihoods of interest in this study (Table 3.6).

**Table 3.6: Households with no livestock**

Livestock	District			Livelihood		All HHs
	Bossaso	Badhan	Dangorayo	Pastoralist	Agropastoralists	Total
No goats	41.70%(10)	58.30%(14)	0.00%(0)	95.80%(23)	4.20%(1)	6.72%(24)
No sheep	39.20%(73)	45.70%(85)	15.10%(28)	93.50%(174)	6.50%(12)	52.10%(186)
No cows	28.50%(101)	57.20%(203)	14.40%(51)	94.40%(335)	5.60%(20)	99.43%(355)
No camels	33.70%(82)	50.60%(123)	15.60%(38)	94.20%(229)	5.80%(14)	68.07%(243)

In terms of herd composition, goats were the most commonly kept livestock in the households (57.37% of all the livestock species) followed by sheep (36.76%), camel (5.81%) and cattle (0.06%) as illustrated in Table 3.7. Cattle are largely kept for social cultural purposes while goats are kept for both milk and meat while sheep are largely kept for meat and camels are kept for milk, meat and transport purposes.

**Table 3.7: Herd Composition**

District	Livelihood	Total Goats	Total Sheep	Total Cows	Total Camels	All livestock
Bossaso	Pastoralist	65.16%(2325)	30.89%(1102)	0.00%(0)	3.95%(141)	100.00(3568)
	Agropastoralists	78.99%(188)	9.24(22)	0.00%(0)	11.76%(28)	100.00%(238)
	Total	66.03%(2513)	29.53%(1124)	0.00%(0)	4.44%(169)	100.00%(3806)
Badhan	Pastoralist	54.65%(8941)	39.15%(6405)	0.08%(13)	6.12%(1002)	100.00%(16361)
	Agropastoralists	60.98%(186)	31.80%(97)	0.00%(0)	7.21%(22)	100.00%(305)
	Total	54.76%(9127)	39.01%(6502)	0.08%(13)	6.14%(1024)	100.00%(16666)
Dangorayo	Pastoralist	65.44%(852)	29.11%(379)	0.00%(0)	5.45%(71)	100.00%(1302)
	Total	65.44%(852)	29.11%(379)	0.00%(0)	5.45%(71)	100.00%(1302)
Total	Pastoralist	57.08%(12118)	37.14%(7886)	0.06%(13)	5.72%(1214)	100.00%(21231)
	Agropastoralists	68.88%(374)	21.92%(119)	0.00%(0)	9.21%(50)	100.00%(543)
	Total	57.37%(12492)	36.76%(8005)	0.06%(13)	5.81%(1264)	100.00%(21774)

*“Camels were once considered to be drought resistant but of late have become susceptible to the effects of prolonged drought and are become less and less resistant to the droughts”*

*[FGD participant in Armo village]*

Typical pastoralists’ and agropastoralists’ herd structures are reflected in the households visited where majority of the livestock are mature females kept for milk. Specifically, 68.48% of the goats are mature females, 69.85% of the sheep are mature female, 85.71% of the cows are mature females and 66.05% of the camels are mature females (Table 3.8).

**Table 3.8: Herd structure**

		Bossaso	Badhan	Dangorayo	Total
Goats	Mature male goats	17.29%(454)	11.28%(1035)	19.38%(138)	13.00%(1627)
	Mature female goats	64.20%(1686)	70.52%(6472)	58.01%(413)	68.48%(8571)
	Young goats	18.51%(486)	18.21%(1671)	22.61%(161)	18.52(2318)
	All goats	100.00%(2626)	100.00%(9178)	100.00%(712)	100.00%(12516)
Sheep	Mature male sheep	10.68%(120)	10.14%(585)	15.92%(57)	10.51%(762)
	Mature female sheep	75.18%(845)	69.18%(3991)	63.97%(229)	69.85%(5065)
	Young sheep	14.15%(159)	20.68%(1193)	20.11%(72)	19.64%(1424)
	All sheep	100.00%(1124)	100.00%(5769)	100.00%(358)	100.00%(7251)
Cows	Mature male cows	0.00%(0)	14.29%(2)	0.00%(0)	14.29%(2)
	Mature female cows	0.00%(0)	85.71%(12)	0.00%(0)	85.71%(12)
	Young cows	0.00%(0)	0.00%(0)	0.00%(0)	0.00%(0)
	All cows	0.00%(0)	100.00%(14)	0.00%(0)	100.00%(14)
Camels	Mature male camels	24.60%(46)	20.08%(209)	33.85%(22)	21.42%(277)
	Mature female camels	68.45%(128)	66.09%(688)	58.46%(38)	66.05%(854)
	Young camels	6.95%(13)	13.83%(144)	7.69%(5)	12.53%(162)
	All camels	100.00%(187)	100.00%(1041)	100.00%(65)	100.00%(1293)

Goat milk is the preference of most households in the three districts (90.90%) followed by camel milk (70.90%) with a very low preference for cow milk (19.90%) and sheep milk (5.60%) - Table 3.9. From FGDs, goat milk was described as being easily digestible especially by children and also associated with low incidences of allergic reactions by consumers as well as being easy to mix with other feeds that are given to children.

**Table 3.9: Preferred livestock milk source**

	District	Camel	Goat	Cow	Sheep
Pastoralists	Bossaso	83.70%(77)	76.10%(70)	25.00%(23)	1.10%(1)
	Badhan	85.10%(165)	94.30%(183)	20.60%(40)	5.70%
	Dangorayo	5.90%(3)	100.00%(51)	0.00%(0)	15.70%(8)
	Total	72.70%(245)	90.20%(304)	18.70%(63)	5.90%(20)
Agropastoralists	Bossaso	88.90%(8)	100.00%(9)	44.40%(4)	0.00%(0)
	Badhan	100.00%(11)	90.90%(10)	36.40%(4)	0.00%(0)
	Total	95.00%(19)	95.00%(19)	40.00%(8)	0.00%(0)
Both pastoralist and agropastoralists	Bossaso	84.20%(85)	78.20%(79)	26.70%(27)	1.00%(1)
	Badhan	85.90%(176)	94.10%(193)	21.50%(44)	5.40%(11)
	Dangorayo	5.90%(3)	100.00%(51)	0.00%(0)	15.70%(8)
	Total	73.90%(264)	90.50%(323)	19.90%(71)	5.60%(20)

Goats (92.40%) are preferred livestock species for meat followed by camels (55.50%) and sheep (48.70%) while only 15.70% of the households preferred cow meat - Table 3.10. It is evident that in this region, cows were largely kept for social - cultural reasons, an assertion supported by FGDs respondents.

**Table 3.10: Preferred source of meat**

	District	Camel	Cow	Goat	Sheep
Pastoralists	Bossaso	71.70%(66)	17.40%(16)	93.50%(86)	28.30%(26)
	Badhan	60.80%(118)	17.00%(33)	90.20%	61.90%
	Dangorayo	3.90%(2)	2.00%(1)	98.00%(50)	33.30%(17)
	Total	55.20%(186)	14.80%(50)	92.30%(311)	48.40%(163)
Agropastoralists	Bossaso	66.70%(6)	33.30%(3)	88.90%(8)	33.30%(3)
	Badhan	54.50%(6)	27.30%(3)	100.00%(11)	72.70%(8)
	Total	60.00%(12)	30.00%(6)	95.00%(19)	55.00%(11)
Total	Bossaso	71.30%(72)	18.80%(19)	93.10%(94)	28.70%(29)
	Badhan	60.50%(124)	17.60%(36)	90.70%(186)	62.40%(128)
	Dangorayo	3.90%(2)	2.00%(1)	98.00%(50)	33.30%(17)
	Total	55.50%(198)	15.70%(56)	92.40%(330)	48.70%(174)

The major source of livestock in the three districts was reported as local breeding followed by social donations (28.34%), purchase (21.15%) and other sources namely inheritance and restocking from relief organizations (13.14%) - Table 3.11. Use of bulls is the most common form of breeding used followed by artificial insemination (3.058%) while 2.52% used both artificial insemination and use of bulls for breeding purposes (Annex 2).

**Table 3.11: Source of livestock**

	Bossaso	Badhan	Dangorayo	Total
Purchase	28.20%(29)	51.50%(53)	20.40%(21)	21.15%(103)
Local breeding	24.70%(45)	71.40%(130)	3.80%(7)	37.37%(182)
Social donations/dowry etc.	23.20%(32)	56.50%(78)	20.30%(28)	28.34%(138)
Other (inheritance and restocking from relief organizations)	43.80%(28)	53.10%(34)	3.10%(2)	13.14%(64)

In terms of destocking in the dry seasons, goats and sheep are the most commonly sold/given out/slaughtered at 60.32% and 42.85% while only 20.45% and 7.84% of the households do destock camels and cows (Table 3.12).

**Table 3.12: Livestock species destocked in the dry seasons**

Livestock	District			Livelihood		Total
	Bossaso	Badhan	Dangorayo	Pastoralist	Agropastoralists	
Camel	27.40%(20)	71.20%(52)	1.40%(1)	95.90%(70)	4.10%(3)	20.45%(73)
Cows	60.70%(17)	39.30%(11)	0.00%(0)	78.60%(22)	21.40%(6)	7.84%(28)
Goat	25.60%(86)	59.20%(109)	15.20%(51)	95.20%(320)	4.80%(16)	60.32%(336)
Sheep	24.20%(37)	63.40%(97)	12.40%(19)	90.80%(139)	9.20%(14)	42.85%(153)

Among the pastoralists' households, mature male livestock, mature females and offsprings are destocked in equal measures in the dry seasons (>94.00%) while in agropastoralists' households, there are few cases of destocking in times of drought (7.00%<) - Figure 3.2.

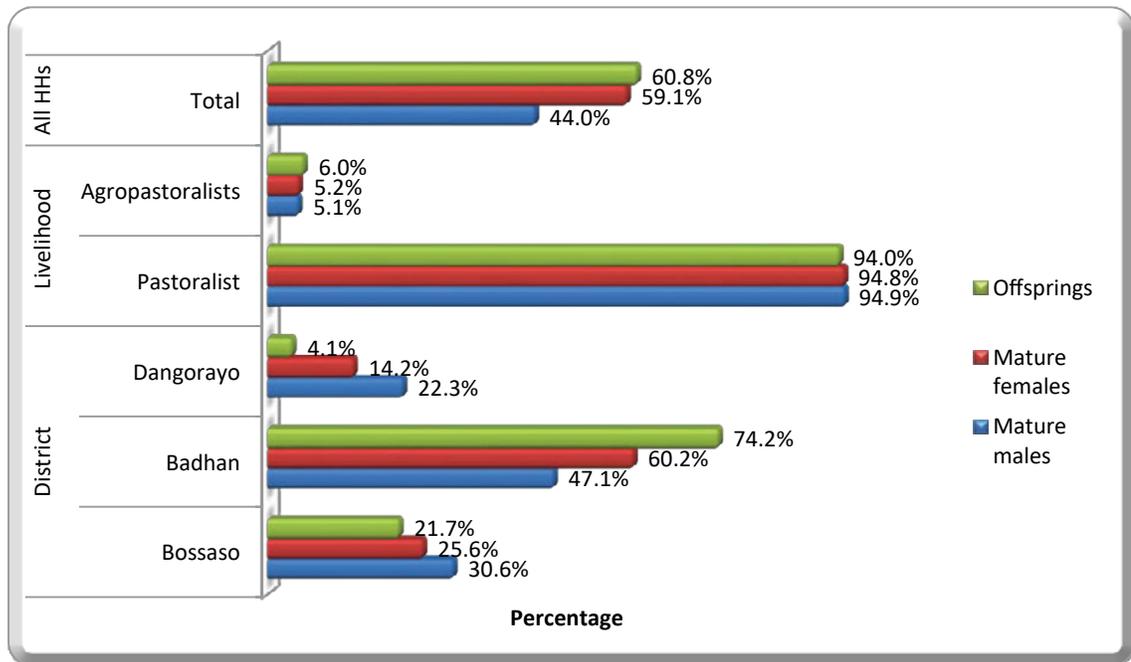


Figure 3.2: Livestock destocking

Seasonal changes have effects on livestock prices with the highest purchase amounts being in rainy seasons. Female camels were reported as the most expensive livestock species in both the dry season and wet seasons at mean prices of 12300862.2 and 16593111.65 Somali Shillings (Figure 3.3). Livestock prices are relative to the season and the body conditions of the animal. In some rainy seasons, and even in the dry season, the animals may fetch good returns at the market depending on the physical condition of the animal and the prevailing situation in an area. However, in other situations when animals become emaciated and specifically in the dry season, the pastoralists get a raw deal where the animal may not even find a buyer or the animal is given away at a throwaway price therefore affecting the lives of the families involved as they will be unable to purchase the items they need from towns including foodstuffs and clothing.

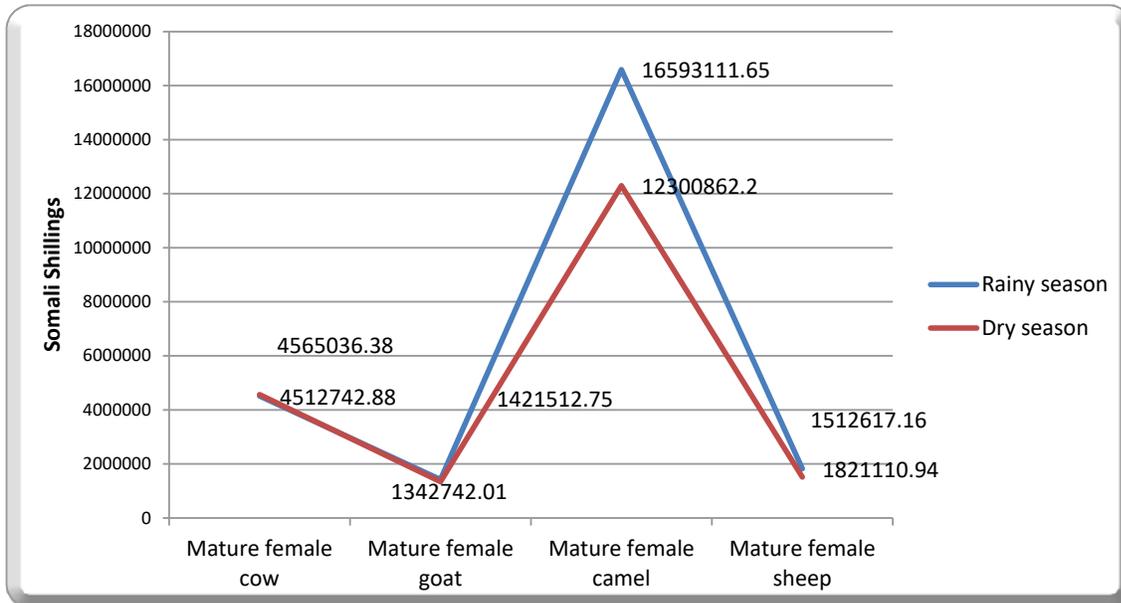


Figure 3.3: Price of mature female livestock in wet and dry seasons

### 3.6 Livestock Extension Services

From FGDs, both pastoralists and agropastoralists lack the requisite livestock production skills. Only 18 000 of 375 (5.00%) of the respondents reported to have been trained on livestock production and extension skills in the year preceding survey (Figure 3.4).

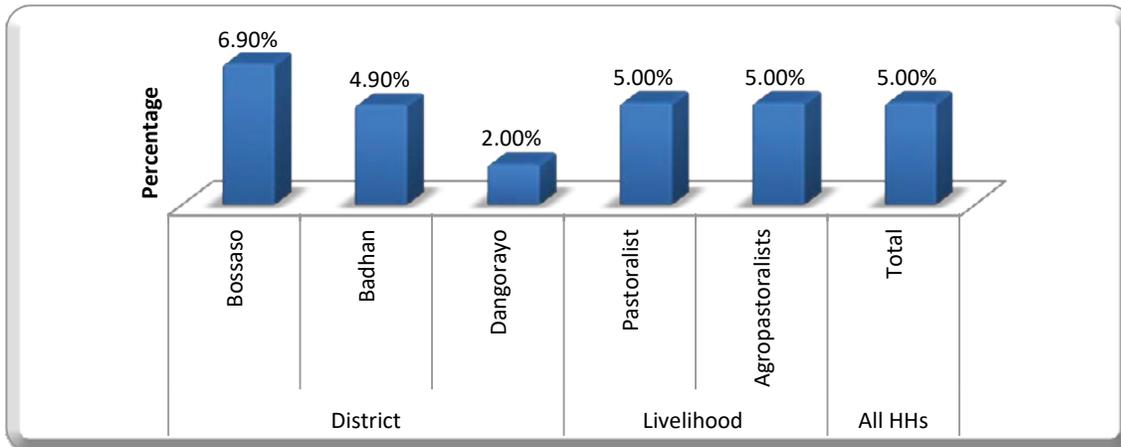


Figure 3.4: HHs trained on livestock production in the preceding year

Related to the aforementioned was the fact that only 33 of the 357 respondents (9.20%) were aware of a livestock extension/production officer in their village (Annex 3). This is further reflected by the low number of respondents visited by livestock extension/production officers in the preceding year (33) - Table 3.13. Livestock health services are largely paid for farmers (43.00%) with a few households reporting payment by international organizations (7.20%) and local NGOs (3.20%) while 43.20% were not sure of who pays for livestock health services (Annex 4).

**Table 3.13: Number of visits by a livestock production/extension officer in the preceding year**

1		Number of visits					
		2	3	8	12	15	
District	Bossaso	61.50% (8)	15.40% (2)	23.10% (3)	0.00% (0)	0.00%(0)	0.00% (0)
	Badhan	38.90% (7)	33.30% (6)	11.10% (2)	5.60% (1)	5.60%(1)	5.60% (1)
	Dangorayo	0.00% (0)	100.00% (2)	0.00% (0)	0.00% (0)	0.00%(0)	0.00% (0)
Livelihood	Pastoralist	41.40%(12)	34.50% (10)	13.80% (4)	3.40% (1)	3.40%(1)	3.40% (0)
	Agropastoralists	75.00% (3)	0.00% (0)	25.00% (1)	0.00% (0)	0.00%(0)	0.00% (0)
Total		45.50%(15)	130.30%(10)	15.20% (5)	3.00% (1)	3.00%(1)	3.00%(1)

As discussed in other sections of this report, migration and livestock division are some of the drought coping strategies reported in FGDs. Thus, livestock services are largely available for over 4/5 of the households in the rainy seasons but with division of livestock and the subsequent migration, livestock health services become hardy as reported by 2/5 of the households (Table 3.14). Disease outbreaks in the migratory corridors were described as high by the veterinary and livestock association officials interviewed in KIIs due to a “mix - up” of livestock from different villages some of which are sickly hence disease transmission to the healthy livestock.

**Table 3.14: Availability of livestock health services**

Rainy seasons		Easily available	Available	Moderately available	Unavailable	Very Unavailable
District	Bossaso	37.60% (38)	31.70%(32)	23.80% (24)	6.90% (7)	0.00% (0)
	Badhan	35.10% (72)	25.40%(52)	35.60% (73)	3.90% (8)	0.00% (0)
	Dangorayo	13.70% (7)	19.60%(10)	27.50% (14)	35.30% (18)	3.90% (2)
Livelihood	Pastoralist	33.50% (113)	25.80%(87)	30.90% (104)	9.20% (31)	0.60% (2)
	Agropastoralists	20.00% (4)	35.00% (7)	35.00% (7)	10.00% (2)	0.00 (0)
Total	All HHs	32.80%(117)	26.30%(94)	31.10%(111)	9.20% (33)	0.60% (2)
Dry seasons		Easily available	Available	Moderately available	Unavailable	Very Unavailable
District	Bossaso	6.90% (7)	30.70%(31)	36.60% (37)	25.70%(26)	0.00% (0)
	Badhan	5(2.40%)(5)	10.20%(21)	46.30% (95)	39.00%(80)	2.00% (4)
	Dangorayo	(0.00%) (0)	3.90% (2)	13.70% (7)	68.60%(35)	13.70% (7)
Livelihood	Pastoralist	3.30% (11)	14.50% (49)	38.60% (130)	40.40%(136)	3.30% (11)
	Agropastoralists	5.00% (1)	25.00% (5)	45.00% (9)	25.00% (5)	0.00% (0)
Total	All HHs	3.40% (12)	15.10%(54)	38.90%(139)	39.50%(141)	3.10% (11)

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*“Yes we have a few livestock health officers; they come from Garowe mostly and they include both non - governmental organizations including FAO and the staff from the ministry of livestock” [Female FGD respondent in Dangoyaro]*

From FGDs, most households depended on rainfall for natural livestock pastures availability with no resilience or fodder conservation measures to ensure livestock feeds availability in the dry seasons. As such, 63.90% and 31.70% of the households described livestock pastures easily available and available in the rainy seasons why in the dry seasons, pastures were described as moderately available and unavailable by 25.80% and 49.60% of the respondents across the three districts (Table 3.15).

**3.15: Livestock pasture availability in the dry and wet seasons**

Rainy seasons		Easily available	Available	Moderately available	Unavailable	Very Unavailable
District	Bossaso	69.30%(70)	30.70% (31)	0.00%(0)	0.00%(0)	0.00%(0)
	Badhan	54.10%(111)	38.00% (78)	6.30%(13)	1.50%(3)	0.00%(0)
	Dangorayo	92.20%(47)	7.80% (4)	0.00%(0)	0.00%(0)	0.00%(0)
Livelihood	Pastoralist	65.00%(219)	30.60%(103)	3.60%(12)	0.90%(3)	0.00%(0)
	Agropastoralists	45.00% (9)	50.00%(10)	5.00%(1)	0.00%(0)	0.00%(0)
Total	All HHs	63.90%(228)	31.70% (113)	3.60%(13)	0.80%(3)	0.00%(0)
Wet seasons		Easily available	Available	Moderately available	Unavailable	Very Unavailable
District	Bossaso	4.00% (4)	15.80%(16)	31.70%(32)	42.60%(43)	5.90%(6)
	Badhan	2.40% (5)	14.60%(30)	22.00%(45)	50.20%(103)	10.70%(22)
	Dangorayo	3.90% (2)	2.00% (1)	29.40%(15)	60.80%(31)	3.90%(2)
Livelihood	Pastoralist	3.30% (11)	13.60%(46)	26.40%(89)	48.10%(162)	8.60%(29)
	Agropastoralists	0.00% (0)	5.00% (1)	15.00%(3)	75.00%(15)	5.00%(1)
Total	All HHs	3.10% (11)	13.20%(47)	25.80%(92)	49.60%(177)	8.40%(30)

The source of water for livestock consumption in the households was from four main sources namely community owned boreholes (26.90%), Berkads (20.40%), water trucking (19.60%) and community natural water points (20.70%) - Table 3.16). During survey, in Badhan and Bossaso districts, respondents reported that the main source of water for livestock were water trucking in dry season, since community owned boreholes and Berkads were not available/were dry.

Table 3.16: Source of water for livestock

		Community boreholes	Family boreholes	Berkads	Pits and trenches	Water tracking	Community natural water points	Other (Buying water from vendors; dam wells, rain)
District	Bossaso	34.70% (35)	7.90%(8)	15.80%(16)	0.00%(0)	14.90%(15)	20.80% (21)	5.90% (6)
	Badhan	28.80% (59)	5.90% (12)	4.40%(9)	5.90%(12)	25.90% (53)	26.80%(55)	2.40% (5)
	Dangorayo	3.90% (2)	0.00% (0)	94.10%(48)	2.00% (1)	0.00% (0)	0.00% (0)	0(0.00%) 0)
Livelihood Zone:	Pastoralist	27.60% (93)	5.90% (20)	0.80%(70)	3.00%(10)	19.90%(6)	20.50% (69)	2.40% (8)
	Agropastoralists	15.00% (3)	0.00%(0)	15.00%(3)	15.00%(3)	15.00%(3)	25.00% (5)	15.00% (3)
<b>Total</b>		<b>26.90%(96)</b>	<b>5.60%(20)</b>	<b>20.40%(73)</b>	<b>3.60%(13)</b>	<b>19.60%(70)</b>	<b>20.70% (74)</b>	<b>3.10% (11)</b>

Close to 2/5 of the households have no water conservation measures for livestock consumption in dry seasons while 51.50%, 31.90% and 3.40% of the households depend on Berkads, storage tanks and pits and trenches respectively (Table 3.17). For those reason, water for livestock consumption is available in over 85.00% of the households during the rainy seasons but unavailable in more than 65.00% of the households in the dry seasons (Annex 5).

Table 3.17: Livestock water storage

		Pits and trenches	Storage tanks	Berkads	No storage
District	Bossaso	1.00% (1)	227.70%(28)	64.40% (65)	6.90% (7)
	Badhan	4.90% (10)	37.60% (77)	38.00%(78)	19.50% (40)
	Dangorayo	2.00% (1)	17.60% (9)	80.40%(41)	0.00% (0)
Livelihood Zone:	Pastoralist	3.30% (11)	33.50% (113)	50.10%(169)	13.10% (44)
	Agropastoralists	5.00% (1)	5.00% (1)	75.00% (15)	15.00% (3)
<b>Total</b>		<b>3.40% (12)</b>	<b>31.90% (114)</b>	<b>51.50% (184)</b>	<b>41.20% (47)</b>

### 3.7 Milk Access and Utilization

On average the households produced 4.48 litres of milk per day in the rainy seasons and 1.63 litres of milk per day in the dry seasons. From FGDs, low milk production in dry seasons was attributed to lack of livestock pastures, lack of water, diseases and death of livestock in the dry seasons. Goats appear not to be affected by much by seasonal changes with milk volumes going down by 0.01 litres in the households (Figure 3.5).

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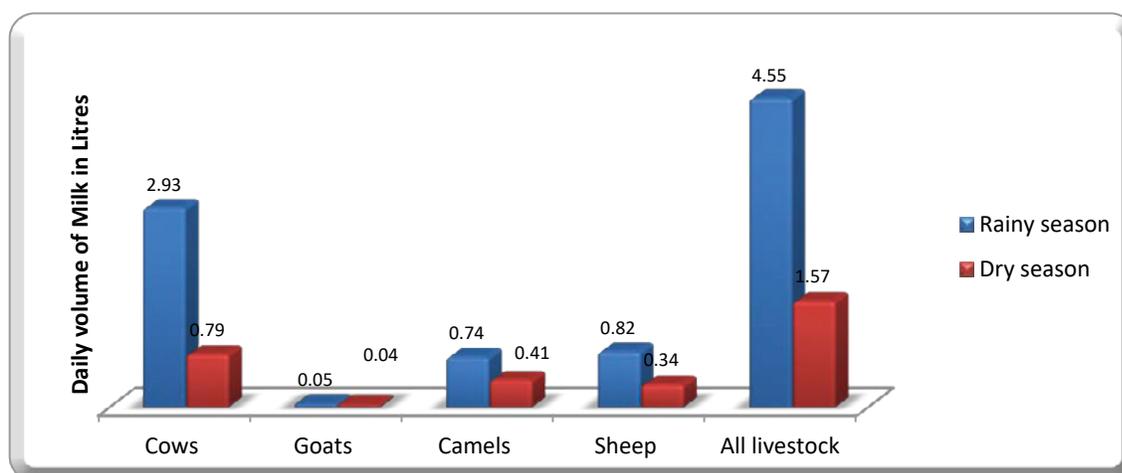


Figure 3.5: Daily milk production in the households in the rainy and dry seasons in 24 hours

There were very few cows in the three districts thus only a total of 17 litres of cow milk were reported in all the households in the rainy season and 13 litres in the dry seasons. Thus, goats accounted for the largest volume of milk in all households at 35,853 litres per day in rainy seasons and 30,222 litres in the dry season followed by camels (293 litres in rainy seasons and 121 litres in the dry seasons) and sheep (28 litres in the rainy seasons and 24 litres in the dry seasons) - Table 3.18.

Table 3.18: Milk produced by various livestock species

		How much milk have you produced from cows in the last 24 hours? (In Litres)	How much milk did you produce from cows within 24 hours in the dry season? (In Litres)	How much milk have you produced from goats in the last 24 hours? (In Litres)	How much milk did you produce from goats within 24 hours in the dry season? (In Litres)	How much milk have you produced from camels in the last 24 hours? (In Litres)	How much milk did you produce from camels within 24 hours in the dry season? (In Litres)	How much milk have you produced from sheep in the last 24 hours? (In Litres)	How much milk did you produce from sheep within 24 hours in the dry season? (In Litres)
Bossaso	Mean	0.15	0.06	2.28	0.89	0.7426	0.41	0.08	0.079
	Sum	16	6	232	90	75	41	8	8
Badhan	Mean	0	0.01	173.26	147.58	0.8878	0.28	0.10	0.08
	Sum	0	1	35518	30106	182	58	20	16
Dangorayo	Mean	0.02	0.12	2.02	0.52	0.7059	0.43	0	0
	Sum	1	6	103	26	36	22	0	0
Total	Mean	0.05	0.04	100.43	85.13	0.8207	0.34	0.08	0.07
	Sum	17	13	35853	30222	293	121	28	24

*“Availability of milk is highly dependent on the season as many of the animals and their owners migrate following pastures and the rains. Hence it is difficult to maintain a reliable supply of milk to urban centers especially those that are located away from the main roads” [FGD participant in Armo village]*

The largest volume of milk in the households is for consumption (665 litres in rainy seasons and 198 litres in dry seasons) followed by sale (403 litres in rainy seasons and 162 litres in the dry seasons) - Table 3.19. Other minor uses of milk are presented in Annex 20.

Table 3.19: Milk use in the households

	Bossaso		Badhan		Dangorayo		Total	
	Mean	Sum	Mean	Sum	Mean	Sum	Mean	Sum
What is the total milk produced by livestock in your household in the last 24 hours? (In Litres)	2.49	251	3.30	676	2.35	120	2.93	1047
During the dry seasons how much milk is produced by livestock in your household in 24 hours? (In Litres)	0.88	89	0.71	145	0.92	47	0.79	281
How much milk was consumed in this household in the last 24 hours? (In Litres)	1.68	170	1.95	400	1.86	95	1.86	665
On average how much milk is consumed in this household in 24 hours during the dry seasons? (In Litres)	0.78	79	0.41	84	0.67	35	0.55	198
How much milk was consumed by children below five years in this household in the last 24 hours? (In Litres)	0.92	93	0.93	190	1.27	65	0.97	348
On average how much milk is consumed by children below 5 years in this household in 24 hours during the dry seasons? (In Litres)	0.47	47	0.24	50	2.75	140	0.66	237
How many of the children aged below 5 years in this household have consumed milk in the last 24 hours? (In Litres)	1.44	145	1.09	223	1.47	75	1.24	443
In the dry season (Jilaal) how many children aged below 5 years consumed milk in 24 hours? (In Litres)	0.53	54	0.35	71	0.75	38	0.46	163
How much milk was sold by this household in the last 24 hours? (In Litres)	1.14	115	1.16	238	0.98	50	1.13	403
On average how much milk is sold by this household in 24 hours during the drought? (In Litres)	0.63	64	0.36	74	0.47	24	0.45	162

Despite the number of households using milk primarily for consumption not changing as highlighted above, the volume levels consumed significantly decline in the dry seasons. The average volume of milk consumed in a day in the rainy season is 1.86 litres and 0.55 litres in dry seasons against production levels of 0.92 litres in the rains seasons and 0.65 litres in a dry season an indication that there is a high purchasing power in the rainy due to high supply/milk availability in the villages. Children aged below 5 years consumed an average of 0.97 litres in a day in the rainy seasons but 0.66 litres in the dry seasons. Similarly, 1.13 litres of milk are sold when milk is in glut in the rainy seasons in comparison with 0.45 litres in the dry season; an indication that low availability of pasture, food, income and milk the dry seasons limit milk availability and sale - Figure 3.6.

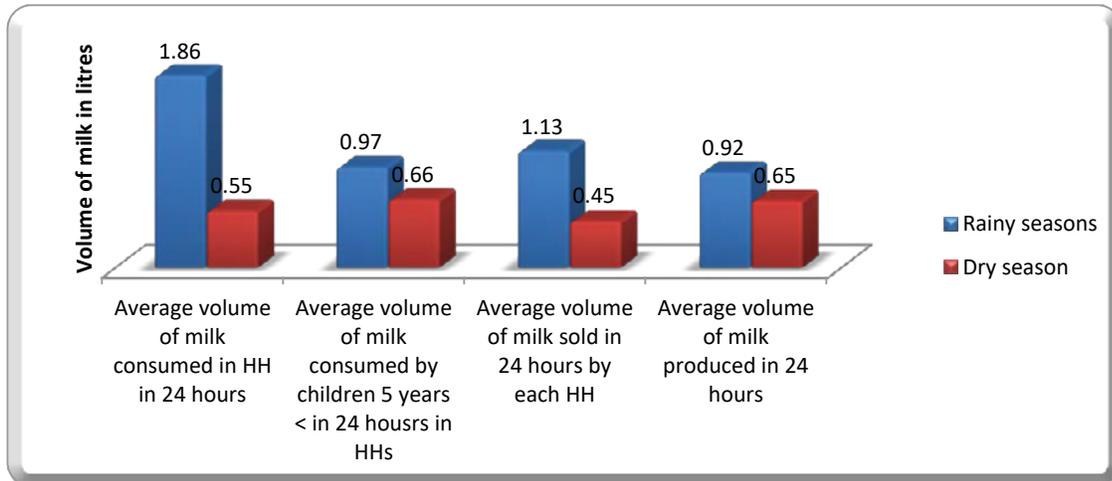


Figure 3.6: Average volume of milk sold and consumed

On average only 40.00% (153) of the households reported children under 5 years not consuming milk in the rainy season but this figure almost doubles up to 71.71% (256) households in the dry season (Figure 3.7). A Pearson’s correlation of income level in the rainy season and the number of children consuming milk in the rainy season shows a moderate downhill (negative) relationship (0.035) with a P value of 0.52 (not significant). In the dry seasons the Pearson’s relation between income levels and children consuming milk in this season shows weak downhill (negative) linear relationship ( - 0.13) with a significance level of 0.80 (not significant). These are indications that income levels are not influencing milk consumption in households but rather, consumption is influenced by availability.

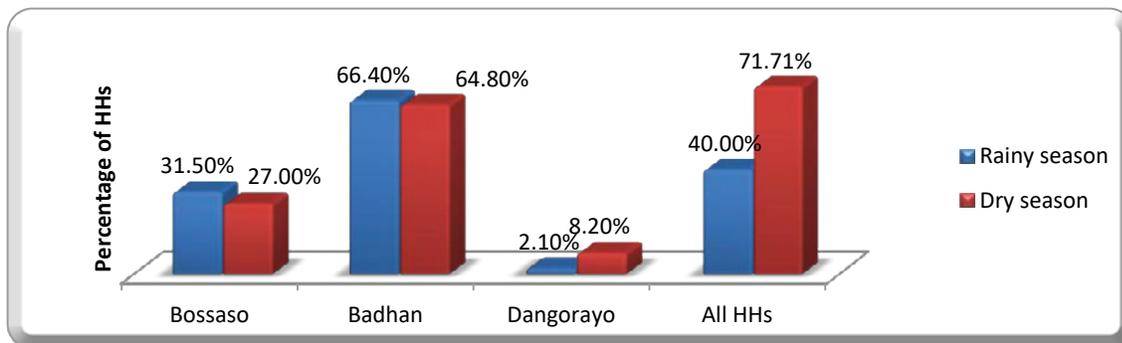


Figure 3.7: Households with children below 5 years not consuming milk in 24 hours

On average, one child below would consume milk in a day in rainy seasons (mean=1.24) but no child below five years consumes milk in a day in the dry season (mean=0.46) - Table 3.20. This is an indication that when milk is available children consumed it but when unavailable, they are no prioritized in consumption.

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**Table 3.20: Number of children 5 years< consuming milk in a day in rainy and dry seasons**

District	Statistics	Rainy season	Dry season
Bossaso	Mean	1.44	0.53
	Minimum	0	0
	Maximum	41	4
	Std. Deviation	4.17	0.90
Badhan	Mean	1.09	0.35
	Minimum	0	0
	Maximum	9	8
	Std. Deviation	1.39	0.91
Dangorayo	Mean	1.47	0.75
	Minimum	0	0
	Maximum	6	3
	Std. Deviation	1.03	0.80
All households	Mean	1.24	0.46
	Minimum	0	0
	Maximum	41	8
	Std. Deviation	2.49	0.90

Purchase of milk in the 24 hours preceding the survey was based on actual needs for this commodity in the households as reported by 74.30% of the households (69.20% males and 79.20% females). The need for milk was higher (88.00%) in Dangorayo district where most respondents were IDPs - Table 3.21.

**Table 3.21: Reasons behind milk purchase**

		Actual need	Milk price	Purchasing power	Did not purchase milk
District	Bossaso	78.70%(37)	8.50%(4)	0.00%(0)	12.80%(6)
	Badhan	66.70%(60)	3.30%(3)	0.00%(0)	30.00%(27)
	Dangorayo	88.00%(44)	6.00%(3)	2.00%(1)	4.00%(2)
Livelihood	Pastoralist	75.80%(135)	5.60%(10)	0.60%(1)	18.00%(32)
	Agropastoralists	66.70%(6)	0.00%(0)	0.00%(0)	33.30%(3)
Gender	Male	69.20%(63)	7.70%(7)	0.00%(0)	23.10%(21)
	Female	81.40%(78)	3.10%(3)	1.00%(1)	14.60%(14)
<b>Total</b>		<b>75.40%(141)</b>	<b>5.30%(10)</b>	<b>0.50%(1)</b>	<b>18.70%(35)</b>

Respondents overwhelmingly reported that goat milk is preferred for kids (91.30%). The demand for goat milk is high hence a preference for sale of this type of milk (80.10%) - Table 3.22. From FGDs, this preference was largely attribute to ease in mixing with other food stuffs, ease in digestion and low incidences of allergies.

**Table 3.22: Milk preferred for consumption by children aged below five years and milk sold**

Milk consumed by children	Cow milk	Goat milk	Camel Milk	Sheep milk	Packaged/commercial milk
Bossaso	16.80%(17)	84.20%(85)	37.60%(38)	0.00%(0)	19.80%(20)
Badhan	5.90%(12)	93.70%(192)	43.90%(90)	4.40%(9)	19.50%(40)
Dangorayo	2.00%(1)	96.10%(49)	11.80%(6)	0.00%(0)	2.00%(1)
Total	8.40%(30)	91.30%(326)	37.50%(134)	2.50%(9)	17.10%(61)
Milk sold	Cow milk	Goat milk	Sheep milk	Camel Milk	Packaged/commercial milk
Bossaso	11.90%(12)	72.30%(73)	0.00%(0)	52.50%(53)	9.90%(10)
Badhan	19.00%(39)	81.50%(167)	1.00%(2)	71.20%(146)	3.40%(7)
Dangorayo	0.00%(0)	90.20%(46)	0.00%(0)	23.50%(12)	2.00%(1)
Totals	14.30%(51)	80.10%(286)	0.60%(2)	59.10%(211)	5.00%(18)

*“Many end users also prefer milk from the animals that roam and graze in contrast to animals that are kept on farms and given fodders. This is due to the fact that these grazers feed on various trees and plants that are seen as healthy for the consumers”*

*[Female FGD participant in Armo village]*

Milk consumption in the households by children is largely in the fresh form (86.80% overall and 54.90% in Dangorayo district among IDPs), followed by tea (71.40%) and milk powder especially in dry seasons (8.10%) with only two households reporting mixing of food with mashed potatoes and vegetables (0.60%) - Table 3.23.

**Table 3.23: Forms in which milk is consumed by children aged below 5 years**

District	Fresh drinking milk	Tea	Milk in meals (mashed vegetables/potatoes etc.)	Milk powder
Bossaso	94.10%(95)	70.30%(71)	0.00%(0)	6(5.90%)
Badhan	91.20%(187)	70.70%(145)	0.50%(1)	23(11.20%)
Dangorayo	54.90%(28)	76.50%(39)	2.00%(1)	0(0.00%)
Total	86.80%(310)	71.40%(255)	0.60%(2)	29(8.10%)

The role of women in decision making on milk appears well defined in the three districts. In the households visited women largely made decisions on how milk was used in the households (59.10%) while both males and females made this decision jointly (35.30%). Similarly, decisions on volumes of milk for various purposes are made by women in two thirds of the households (61.30%) and also jointly in one third of the households (33.60%).

**Table 3.24: Decisions on milk usage in the households**

Decision on milk usage		Men	Women	Both	Other
District	Bossaso	8.90%(9)	60.40%(61)	30.70%(31)	0.00%(0)
	Badhan	2.40%(5)	69.80%(143)	27.30%(56)	0.50%(1)
	Dangorayo	2.00%(1)	13.70%(7)	76.50%(39)	7.80%(4)
Livelihood	Pastoralist	4.20%(14)	57.30%(193)	37.10%(125)	1.50%(5)
	Agropastoralists	5.00%(1)	90.00%(18)	5.00%(1)	0.00%(0)
<b>Total</b>		<b>4.20%(15)</b>	<b>59.10%(211)</b>	<b>35.30%(126)</b>	<b>1.40%(5)</b>
Decision on volume consumed/sold/donated		Men	Women	Both	Other
District	Bossaso	8.90%(9)	66.30%(67)	24.80%(25)	0.00%(0)
	Badhan	2.00%(4)	70.70%(145)	26.80%(55)	0.50%(1)
	Dangorayo	2.00%(1)	13.70%(7)	78.40%(40)	5.90%(3)
Livelihood	Pastoralist	3.90%(13)	59.90%(202)	35.00%(118)	1.20%(4)
	Agropastoralists	5.00%(1)	85.00%(17)	10.00%(2)	0.00%(0)
<b>Total</b>		<b>3.90%(14)</b>	<b>61.30%(219)</b>	<b>33.60%(120)</b>	<b>1.10%(4)</b>

*“In many instances it is not a very big deal issue on who determines the usage of milk as it is the female members of the household who take care of the milk issues here. Men will ensure all other needs are taken care of but will leave the issue to the woman on how milk is used especially when goats are involved. Milking of camels is usually a men’s affair but it is not uncommon for some women to venture in here too” [Female participant in a FGD at Dangorayo]*

Migration of pastoralists, family and livestock splitting are common practices in the households visited. Thus, during migration, most of the households leave behind goats for milking purposes by women and children left behind (94.10%) - Table 3.25. From FGDs, this livestock species is easy to manage and even though pastures are not available they can be feed on the few available scrubs and thorny bushes in drought.

**Table 3.25: Livestock left behind during migration in dry seasons**

		Camel	Cow	Goat	Sheep
District	Bossaso	6.20%(4)	4.70%(3)	87.50%(56)	1.60%(1)
	Badhan	1.10%(1)	0.00%(0)	97.80%(88)	1.10%(1)
	Dangorayo	3.20%(1)	0.00%(0)	96.80%(30)	0.00%(0)
Livelihood	Pastoralist	3.40%(6)	1.70%(3)	93.80%(166)	1.10%(2)
	Agropastoralists	0.00%(0)	0.00%(0)	100.00%(8)	0.00%(2)
Gender	Male	4.90%(4)	1.20%(1)	92.70%(76)	1.20%(0)
	Female	1.90%(2)	1.90%(2)	95.10%(98)	1.00%(1)
<b>Total</b>		<b>3.20%(6)</b>	<b>1.60%(3)</b>	<b>94.10%(174)</b>	<b>1.10%(2)</b>

*“Grass is abundant in rainy seasons but can quickly be used up if not managed well; in the very dry seasons the price of any available fodder increases dramatically and we cannot afford to buy” [Male FGD participant in Awsane village]*

Offspring (53.60%) are largely left behind during migration followed by mature males

(26.80%) and mature females (19.60%) - Table 3.26. From FGDS, offsprings were described as consuming very little fodders and being unable to endure environmental and distance challenges associated with migration. A higher number of mature males than females are left behind with considerations of slaughter for food in worsening drought conditions while one or two goats at most are left behind for milking purposes.

**Table 3.26: Age and gender of livestock left behind during migration**

		Mature males	Mature females	Off springs
District	Bossaso	38.50%(15)	25.60%(10)	35.90%(14)
	Badhan	10.90%(5)	8.70%(4)	80.40%(37)
	Dangorayo	137.00%(10)	29.60%(8)	33.30%(9)
Livelihood Zone:	Pastoralist	26.40%(29)	19.10%(21)	54.50%(60)
	Agropastoralists	50.00%(1)	50.00%(1)	0.00%(0)
Gender	Male	20.50%(9)	18.20%(8)	61.40%(27)
	Female	30.90%(21)	20.60%(14)	48.50%(33)
<b>Total</b>		<b>26.80%(30)</b>	<b>19.60%(22)</b>	<b>53.60%(60)</b>

### 3.8 Decision Making on Milk Use and Sale

Milking, packaging and storage of milk is purely a females; responsibility (71.90% of the households) with only 13.20% of the respondent reporting joint sharing of this responsibility and 11.90% describing this as a males’ role in their households (Table 3.27).

**Table 3.27: Milking, packaging and storage of milk in the household**

		Husband	Wife	Both Spouses	Boys	Girls	Other
District	Bossaso	7.10%(6)	81.20%(69)	8[9.40%]	0.00%(0)	0.00%(0)	2.40%(2)
	Badhan	3.00%(5)	82.70%(139)	13.10%(22)	0.00%(0)	0.60%(1)	0.60%(1)
	Dangorayo	50.00%(25)	20.00%(10)	20.00%(10)	2.00%(1)	2.00%(1)	6.00%(3)
Livelihood Zone:	Pastoralist	12.50%(36)	70.40%(202)	13.90%(40)	0.30%(1)	0.70%(2)	2.10%(6)
	Agropastoralists	0.00%(0)	100.00%(16)	0.00%(0)	0.00%(0)	0.00%(0)	0.00%(0)
Gender	Male	15.90%(24)	67.50%(102)	13.20%(20)	0.70%(1)	1.30%(2)	1.30%(2)
	Female	7.90%(12)	76.30%(116)	13.20%(20)	0.00%(0)	0.00%(0)	2.60%(4)
<b>Total</b>		<b>11.90%(36)</b>	<b>71.90%(218)</b>	<b>13.20%(40)</b>	<b>0.30%(1)</b>	<b>0.70%(2)</b>	<b>2.00%(6)</b>

*“Milk use is mostly determined by women; they are aware of the household needs” [Male FGD participant in Awsane village]*

*“We milk our animals usually in the morning at sunrise as well as in the evening, after milking for our needs we release the offspring to suckle their mothers. The milk is mainly added to tea and sometimes used with rice and children and elderly can consume it directly. Any remaining amount of milk can be sold to buy other things needed at household” [Female FGD participant in Dangorayo]*

In the three districts of interest, women were largest in charge of transporting milk to

selling points and overseeing sale (57.70%) while alternate duties for this role as jointly executed by both spouses in 34.20% of the households. Only 4.60% of the households reported to have males unilaterally performed these duties of transportation and sale of milk an affirmation that this is largely female dominated business venture (Table 3.28).

**Table 3.28: Transportation and sale of milk**

		Husband	Wife	Both Spouses	Boys	Girls	Other
District	Bossaso	7.70%(6)	65.40%(51)	26.90%(21)	0.00%(0)	0.00%(0)	0.00%(0)
	Badhan	1.30%(2)	54.20%(84)	43.90%(68)	0.00%(0)	0.60%(0)	0.00%(0)
	Dangorayo	9.80%(5)	56.90%(29)	15.70%(8)	2.00%(1)	0.00%(0)	15.70%(8)
Livelihood	Pastoralist	4.80%(13)	57.10%(156)	34.40%(94)	0.40%(1)	0.40%(1)	2.90%(8)
	Agropastoralists	0.00%(0)	72.70%(8)	27.30%(3)	0.00%(0)	0.00%(0)	0.00%(0)
Gender	Male	4.90%(7)	50.00%(71)	43.00%(61)	0.70%(1)	0.70%(1)	0.70%(1)
	Female	4.20%(6)	65.50%(93)	25.40%(36)	0.00%(0)	0.00%(0)	4.90%(7)
<b>Total</b>		<b>4.60%(13)</b>	<b>57.70%(164)</b>	<b>34.20%(97)</b>	<b>0.40%(1)</b>	<b>0.40%(1)</b>	<b>2.80%(8)</b>

**Photo 3.1: Milk transportation equipment**



Just as in Table 3.27 and 3.28, the role of women in the milk commodity is once again pronounced in their decision making ability in usage of household income from the commodity (51.00%) when compared to joint decision making (40.90%) and unilateral decision making by males (4.2%) - Table 3.29. From FGDs, these proceeds from milk sale are largely used to buy food in the households.

**Table 3.29: Decisions on use of income from milk sale**

		Male	Female	Both	Don't Know/Not sure
District	Bossaso	8.90%(9)	55.40%(56)	35.60%(36)	0.00%(0)
	Badhan	2.40%(5)	58.50%(120)	38.50%(79)	0.50%(1)
	Dangorayo	2.00%(1)	11.80%(6)	60.80%(31)	25.50%(13)
Livelihood	Pastoralist	4.50%(15)	49.00%(165)	42.40%(143)	4.20%(14)
	Agropastoralists	0.00%(0)	85.00%(17)	15.00%(3)	0.00%(0)
Gender	Male	3.20%(6)	50.00%(93)	44.10%(82)	2.70%(5)
	Female	5.30%(9)	52.00%(89)	37.40%(64)	5.30%(9)
<b>Total</b>		<b>4.20%(15)</b>	<b>51.00%(182)</b>	<b>40.90%(146)</b>	<b>3.90%(14)</b>

*“Women are able to do the much they want with any income from milk sale: men will not care what happens with it because they know the woman will use the money on purchase foodstuffs using milk money” [Male FGD participant in Awsane village]*

### 3.9 Milk Hygiene and Handling Practices

Traditional gourdes were the predominant equipment used for milking livestock (72.80% of the households) while plastic jericans (43.75%) and traditional gourdes (38.02%) were the main equipment used for transporting milk. In addition, traditional gourdes (55.50%), plastic utensils (21.30%) and plastic jericans (17.10%) were the predominant milk storage equipment in the three districts (Table 3.30).

**Table 3.30: Equipment for milking, transporting milk and storage of milk**

Equipment for milking		Plastic utensils (bowls, cups)	Traditional gourdes	Aluminium cans	Plastic jericans	Other (glass jars)
District	Bossaso	11.80%(8)	48[70.60%(48)]	0.00%(0)	1.50%(1)	16.20%(11)
	Badhan	2.50%(3)	68.10%(81)	2.50%(3)	0.00%(0)	26.90%(32)
	Dangorayo	40.40%(19)	36.20%(17)	0.00%(0)	0.00%(0)	23.40%(11)
Livelihood	Pastoralist	13.50%(30)	61.90%(138)	1.30%(3)	0.40%(1)	22.90%(51)
	Agropastoralists	0.00%(0)	72.70%(8)	0.00%(0)	0.00%(0)	27.30%(3)
<b>Total</b>		<b>31.30%(112)</b>	<b>72.82%(260)</b>	<b>19.33%(6)</b>	<b>0.5%(1)</b>	<b>24.56%(44)</b>
Equipment for transporting milk		Plastic utensils (bowls, cups)	Traditional gourdes	Aluminium cans	Plastic jericans	Other (glass jars)
District	Bossaso	14.80%(8)	50.00%(27)	1.90%(1)	33.30%(18)	0.00%(0)
	Badhan	3.30%(3)	42.20%(38)	4.40%(4)	50.00%(45)	0.00%(0)
	Dangorayo	38.80%(19)	16.30%(8)	0.00%(0)	42.90%(21)	2.00%(1)
Livelihood	Pastoralist	16.30%(30)	38.60%(71)	2.70%(5)	41.80%(77)	0.50%(1)
	Agropastoralists	0.00%(0)	22.20%(2)	0.00%(0)	77.80%(7)	0.00%(0)
<b>Total</b>		<b>15.44%(60)</b>	<b>38.02%(146)</b>	<b>2.62%(10)</b>	<b>43.75%(168)</b>	<b>0.60%(2)</b>
Equipment for storage of milk		Plastic utensils (bowls, cups)	Traditional gourdes	Aluminium cans	Plastic jericans	Other (glass jars)
District	Bossaso	10[21.30%(10)]	63.80%(30)	2.10%(1)	10.60%(5)	2.10%(1)
	Badhan	5.60%(4)	71.80%(51)	11.30%(8)	11.30%(8)	0.00%(0)
	Dangorayo	45.70%(21)	21.70%(10)	0.00%(0)	32.60%(15)	0.00%(0)
Livelihood	Pastoralist	21.90%(35)	55.60%(89)	5.60%(9)	16.20%(26)	0.60%(1)
	Agropastoralists	0.00%(0)	50.00%(2)	0.00%(0)	50.00%(2)	0.00%(0)
<b>Total</b>		<b>21.30%(35)</b>	<b>55.50%(91)</b>	<b>5.50%(9)</b>	<b>17.10%(28)</b>	<b>0.60%(1)</b>

Photos 3.2 and 3.3: Milk storage equipment



Only 19.90% of the households reported always boiling milk before consumption by children and adults with 5.60% reporting irregular milk boiling and a further 74.50% not boiling drinking milk at all (Table 3.31). Qualitative interviews revealed similar practices were common when consuming raw blood and ruminal juice.

Table 3.31: Boiling of drinking milk

		Yes	No	Not every time
District	Bossaso	34.70%(35)	55.40%(56)	9.90%(10)
	Badhan	14.10%(29)	81.50%(167)	4.40%(9)
	Dangorayo	13.70%(7)	84.30%(43)	2.00%(1)
Livelihood	Pastoralist	20.20%(68)	74.80%(252)	5.00%(17)
	Agropastoralists	15.00%(3)	70.00%(14)	15.00%(3)
<b>Total</b>		<b>19.90%(71)</b>	<b>74.50%(266)</b>	<b>5.60%(20)</b>

Soap availability is a challenge in the three districts, thus 61.90% of the households clean milk handling equipment through smoking, 12.60% of the households use water without soap, 12.60% use soapy water, 2.80% use water, 7.80% use water and sand and ash for cleaning milking equipment (Table 3.32).

Table 3.32: Cleaning of milk handling equipment

	Smoking	Water but no soap	Soapy water	Water and ash	Water and sand	Other
Bossaso	72.30% (73)	9.90% (10)	13.90% (14)	0.00% (0)	2.00% (2)	2.00% (2)
Badhan	66.30% (136)	14.10% (29)	13.70% (28)	1.50% (3)	0.50% (1)	3.90% (8)
Dangorayo	23.50% (12)	11.80% (6)	5.90% (3)	13.70% (7)	45.10% (23)	0.00% (0)
Pastoralist	63.50% (214)	13.10% (44)	10.70% (36)	3.00% (10)	7.10% (24)	2.70% (9)
Agropastoralists	35.00% (7)	5.00% (1)	45.00% (9)	0.00% (0)	10.00% (2)	5.00% (1)
<b>Total</b>	<b>61.90% (22)</b>	<b>12.60% (45)</b>	<b>12.60% (45)</b>	<b>2.80% (10)</b>	<b>7.30% (26)</b>	<b>2.80% (10)</b>

Traditional methods are used to ensure longevity of milk produced in the households and this through use of cold water (90.20%), repeated boiling (2.20%), fermentation (2.00%) and refrigeration (0.80%) - Table 3.33. The unaffordability of fridges and freezers together with power unavailability in the villages limit refrigeration as method of milk preservation.

**Table 3.33: Preservation of milk in the households**

		Use of cold water	Repeated Boiling of milk	Fermentation of milk	Refrigeration	Other (Cooling using sack and water)
District	Bossaso	92.10% (93)	1.00% (1)	0.00% (0)	2.00% (2)	5.00% (5)
	Badhan	90.70% (186)	1.50% (1)	1.50% (3)	0.50% (1)	5.90% (5)
	Dangorayo	84.30% (43)	7.80% (4)	7.80% (4)	0.00% (0)	0.00% (0)
Livelihood	Pastoralist	89.90% (303)	2.40% (8)	2.10% (7)	0.90% (3)	4.70% (16)
	Agropastoralists	95.00% (19)	0.00% (0)	0.00% (0)	0.00% (0)	5.00% (1)
<b>Total</b>		<b>90.20%(322)</b>	<b>2.20% (8)</b>	<b>2.00% (7)</b>	<b>0.80% (3)</b>	<b>4.80% (17)</b>

*“Hygiene issues are a problem as currently flies move around the milk containers at the market, and the market shade is very poor and is shared with all other businesses here in Badhan” [Women group leader in Badhan]*

**Photos 3.4 and 3.5: Poor hygiene in milk sale places**



## 3.10 Child Health and Nutrition

From FGDs, there is no comprehensive nutrition surveillance system in the region and nutrition interventions at household level are limited due to insecurity, inaccessibility of some parts of the region, and limited health care services. What exists is currently limited in coverage and quality due to weaknesses in the public health system. Information on health and nutrition of children hardly reached one third of the households (35.50%) while local health facilities (37.60%) was the source of health and nutrition information followed by religious leaders (1.10%), community leaders (6.50%) and community health workers (15.10%) - Table 3.34. There are hardly any

differences between availability of this information in rainy seasons (34.20%) and dry seasons (28.90%) but in 20.20% of the households' health and nutrition information was available throughout the year (annex 6).

Table 3.34: Source of information on health and nutrition

		Community Health workers	Health Facilities	Religious leaders	Community leaders	Radio	No information
District	Bossaso	37.50% (18)	35.40% (17)	0.00% (0)	0.00% (0)	4.20%(2)	22.90%(11)
	Badhan	3.30% (3)	41.80% (38)	0.00% (0)	4.40% (4)	2.20%(2)	48.40%(44)
	Dangorayo	14.90% (7)	31.90% (15)	4.30% (2)	17.00% (8)	8.50%(4)	23.40%(11)
Livelihood	Pastoralist	14.60% (26)	38.80% (69)	1.10% (2)	6.70% (12)	4.50%(8)	34.30%(61)
	Agropastoralists	25.00% (2)	12.50% (1)	0.00% (2)	0.00% (0)	0.00%(0)	62.50% (5)
<b>Total</b>		<b>15.10% (28)</b>	<b>37.60% (70)</b>	<b>1.10% (2)</b>	<b>6.50% (0)</b>	<b>4.30%(8)</b>	<b>35.50%(66)</b>

Related to the above is a similar finding where 34.20% of households had never received WASH information while 39.00% of the households had received WASH information from health centres, 13.90% from community health workers and 8.60% from community leaders - Table 3.35.

Table 3.35: Source of WASH information

		Community Health workers	Health Facilities	Religious leaders	Political leaders	Community leaders	Radio	No information
District	Bossaso	18.40% (7)	50.00%(19)	0.00% (0)	0.00% (0)	7.90% (0)	2.60% (1)	21.10% (8)
	Badhan	9.70% (10)	39.80%(41)	0.00% (0)	0.00% (0)	4.90% (5)	1.90% (2)	43.70%(45)
	Dangorayo	19.60% (9)	28.30%(13)	2.20% (1)	2.20% (1)	17.40% (8)	6.50% (3)	23.90%(11)
Livelihood	Pastoralist	14.00% (25)	40.80%(73)	0.60% (1)	0.60% (1)	8.40% (15)	3.40% (6)	32.40%(58)
	Agropastoralists	12.50% (1)	0.00% (0)	0.00% (0)	0.00% (0)	12.50% (1)	0.00% (0)	75.00% (6)
<b>Total</b>		<b>13.90% (26)</b>	<b>39.00%(73)</b>	<b>0.50% (1)</b>	<b>0.50% (1)</b>	<b>8.60% (16)</b>	<b>3.20%(6)</b>	<b>34.20%(64)</b>

Seasonal changes and the subsequent milk availability appears to influence under nutrition trend in the households as depicted by 37.00% and 26.10% of the households reporting to have children being treated for under nutrition in nutrition supplementary centres in the rainy and wet seasons (Figure 3.8).

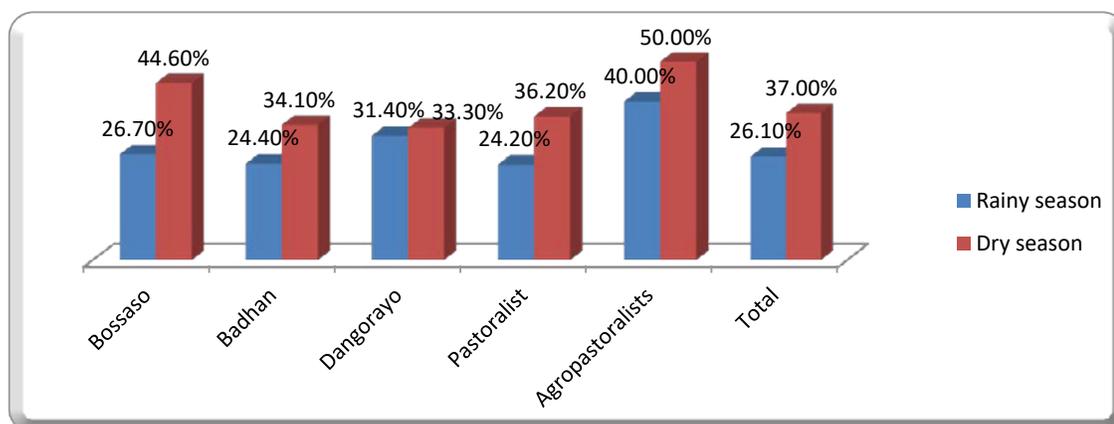


Figure 3.8: Households with children enrolled in nutrition therapeutic centres

Bossaso had GAM levels of 14.7% and SAM levels of 2.3% but figure for the other districts

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included in this study were not available. These are relatively high figures in view of the short rains in October and November 2018 (Photo 3.6).<sup>30</sup>

Photo 3.6: Post Dyer 2017/2018 SAM and GAM levels in Somalia (Source: FSNAU, January 2018)

2017/18 Deyr Season Risk Factors Related to Acute Malnutrition										
Population Group Assessed	Global Acute Malnutrition - GAM Prevalence (%)	Severe Acute Malnutrition - SAM Prevalence (%)	Childhood illness (Morbidity) ≥ 20% of children 6-59 months	Measles vaccination < 90% of children 6-59 months	Vit A Supplementation < 50% of children 6-59 months	Poor/ Borderline food consumption in ≥ 20% of HHs	≥ 15% of HHs experienced to Severe Hunger	≥ 20 of HHs using Medium to High Coping Strategies	Morbidity, vaccination and Vitamin A supplementation are important	Food Security related factors are important
Guban Pastoral	6.6	0.5	19.4	33.3	30	53	24	53	Yes	Yes
West Gols	6.3	0.6	19.7	48.4	46.4	46	24	58	Yes	Yes
NW Agropastoral	8.8	1.7	20.9	29.1	34.2	44	23	39	Yes	Yes
Hargeisa IDPs (W. Galbeed)	8.6	1.7	27.6	31.6	36.4	55	13	50	Yes	Yes
Berbera IDPs (W. Galbeed)	10.9	2.3	31.1	60.6	50.2	42	9	48	Yes	Yes
Burao IDPs (Togdeer)	8.5	1.7	6.8	92.6	87.8	23	28	37	Yes	Yes
Northern Inland Pastoral NW	14.1	3.1	22.6	67.1	62	20	56	47	Yes	Yes
Hawd Pastoral NW	6.8	1.4	19.8	55.8	64.3	47	35	57	Yes	Yes
East Gols	10.3	1.3	25.8	53.4	63.4	52	31	42	Yes	Yes
Bosaso IDPs (Bari)	14.7	2.3	20.0	57	76.3	16	18	34	Yes	Yes
Northern Inland Pastoral NE	13.6	1.5	41.2	84.7	55	12	2	35	Yes	Yes
Hawd Pastoral NE	14.5	2.8	61.0	44.1	50.8	17	25	47	Yes	Yes
Garbho IDPs (Bari)	31.9	3.7	43.7	50.3	21.4	9	3	13	Yes	Yes
Coastal Deen NE	13.8	1.6	40.6	60.4	37.5	24	27	41	Yes	Yes
Garowe IDPs (Nugaal)	17.6	2.9	18.8	64.1	64.5	12	8	25	Yes	Yes
Galkayo IDPs (Mudug)	21.8	4.8	48.9	86.4	83.4	39	35	82	Yes	Yes
Onusamareb IDPs (Galgadud)	14.8	3.6	45.0	63.8	63.6	35	47	29	Yes	Yes
Addua Pastoral	17.9	2.3	40.0	70.7	72.4	35	16	39	Yes	Yes
Shabelle Riverine	13.2	2.9	40.8	42.3	40.2	2	27	36	Yes	Yes
Shabelle Agropastoral	13.8	3.3	32.1	18.1	16.6	1	19	31	Yes	Yes
Mogadishu urban (Banadir)	11.2	1.3	37.0	59.7	52.5	0	2	9	Yes	Yes
Mogadishu IDPs (Banadir)	16.1	4.1	44.1	47.9	45.8	17	41	52	Yes	Yes
Bay Agropastoral	11.1	1.5	16.1	9.5	6.2	71	9	36	Yes	Yes
Baidoa IDPs (Bay)	16.1	3.5	11.1	23.7	23.7	93	32	48	Yes	Yes
Dolow IDPs (N Gedo)	13.9	2.0	10.2	34.1	25.6	30	17	52	Yes	Yes
North Gedo pastoral	15.7	1.8	16.5	34.8	13.3	16	17	48	Yes	Yes
North Gedo Riverine	14.5	1.1	21.0	52.1	43.8	10	29	37	Yes	Yes
Dobley IDPs (L. Jubba)	13.3	1.8	29.6	47.4	59.7	21	17	24	Yes	Yes
Kismayu Urban (L. Jubba)	8.8	1.2	12.4	77.3	77.3	0	19	34	Yes	Yes
Kismayu IDPs (L. Jubba)	13.5	3.6	13.6	54.6	45.8	3	67	64	Yes	Yes

Note: Highlighted cells are those that exceed thresholds stated in the headings of each column

From FGDs and quantitative data under nutrition is attributed to reduced food availability (27.90%), reduced milk availability (36.10%), childhood infections (13.10%) and separation of children from mothers (1.60%) - Table 3.36. Milk was highly regarded as an important nutritional component for the diet of kids by 355 out of the 357 respondents interviewed (Annex 7). There were particularly strong feelings about the benefits of animal milk in preventing malnutrition, with camel, goat and cow milk perceived by all groups as ‘better’ than milk - cereal mixes and powdered milk, when asked during the FGDs.

Table 3.36: Perceived causes of under nutrition

		Reduced food availability	Reduced milk availability	Childhood infections	Mother's separation from mother	Not sure
District	Bosaso	20.00% (3)	40.00% (6)	26.70% (4)	0.00% (0)	13.30% (2)
	Badhan	22.60% (7)	38.70% (12)	3.20% (1)	0.00% (0)	35.50% (11)
	Dangorayo	46.70% (7)	26.70% (4)	20.00% (3)	6.70% (1)	0.00% (0)
Livelihood	Pastoralist	28.10% (16)	36.80% (21)	14.00% (8)	1.80% (1)	19.30% (11)
	Agropastoralists	25.00% (1)	25.00% (1)	0.00% (0)	0.00% (0)	50.00% (2)
Total		27.90% (17)	36.10% (22)	13.10% (8)	1.60% (1)	21.30% (13)

*“As pastoralists milk forms an integral part of our food system and these days we don’t*

30 FSNAU. 2018. 2017 Somalia Post Deyr Seasonal Food Security and Nutrition Assessment Key Findings. Accessible online at: < <http://www.fsnau.org/downloads/2017-post-deyr-joint-fsnau-fews-net-presentation-29-january-2018> >.

*have adequate milk and our children have suffered as health has deteriorated in the absence of adequate milk” [Male FGD participant in Awsane village]*

*“After milking is done, the first people to consume milk are the children milk is regarded one of the best contributors to their health and growth and help prevent diseases” [Female FGD participant in Dangoyaro]*

Knowledge on IYCF was relatively fair with over half of the respondents correctly describing the correct timing for initiation of breast feeding following child delivery, correct duration of exclusive breastfeeding, correct timing of introducing complementary and the correct length of breastfeeding children (Figure 3.9). Males had a marginally higher score in these indicators as opposed to females. However, despite this moderate awareness on IYCF requirements, from FGFs they are not practiced largely due to unavailability of food, separation of mothers and children, traditional practices such giving newborn children water and animal fats as well as delays in breastfeeding due to child naming practices.

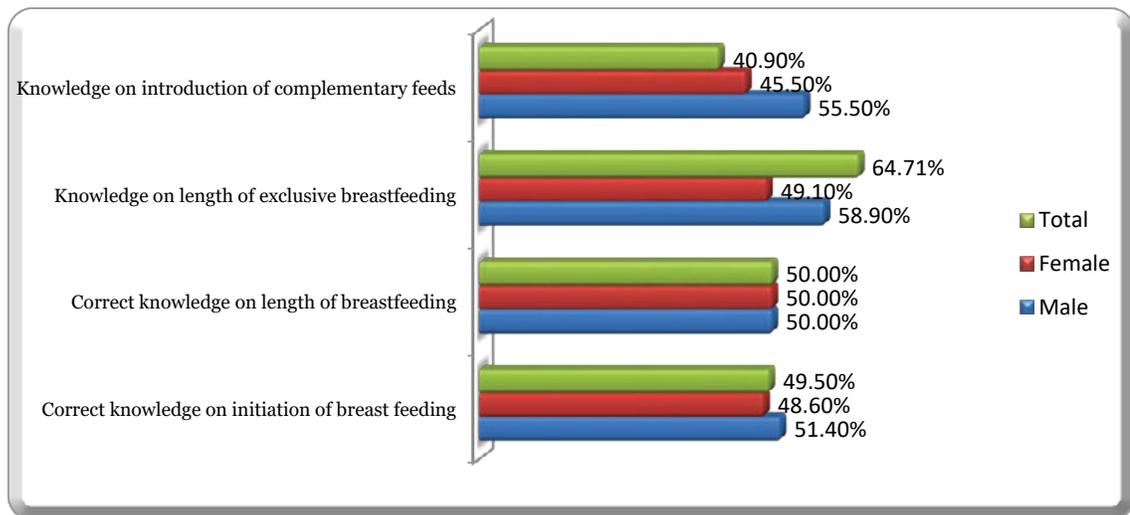


Figure 3.9: IYCF knowledge

### 3.11 Milk Value Chains

Community members reported that milk buyers in the Bossaso and Badhan were largely local business dealers (59.70% and 75.00%) while in Dangorayo it was the business dealers from other regions. This is explained by fact that in Dangorayo most of the respondents were IDPs.

Table 3.37: Milk buyers

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		The local business dealers	The business community from other areas	Both	Don't Know/Not sure	IPDs and local community members
District	Bossaso	59.70% (37)	6.50% (4)	27.40% (17)	3.20% (2)	3.20% (2)
	Badhan	75.00% (81)	9.30% (10)	13.00% (14)	0.00% (0)	2.80% (3)
	Dangorayo	2.00% (1)	72.50% (37)	3.90% (2)	17.60% (9)	3.90% (2)
Livelihood	Pastoralist	55.10% (114)	23.70% (49)	13.00% (27)	5.30% (11)	2.90% (6)
	Agropastoralists	35.70% (5)	14.30% (2)	42.90% (6)	0.00% (0)	7.10% (1)
<b>Total</b>		<b>53.80% (119)</b>	<b>23.10%(51)</b>	<b>14.90% (33)</b>	<b>5.00% (11)</b>	<b>3.20% (7)</b>

There are three key actors in the three districts' milk market chain: famers who are producers, local handlers (distributors, buyers and sellers), and consumers. Fifty eight milk traders were encountered and interviewed; they were largely females (84.58%) with only a few males (15.52%) which does reaffirm the role of women in the milk sector in Puntland - Table 3.338. The milk traders were of ages 15 to 66 years with a mean age of 41.60 with no differences between males and females (Annex 8). While training programmes are virtually nonexistent for milk traders, study participants appeared receptive to the idea of increasing their knowledge and understanding of milk marketing. Indeed, their recommendations reveal that the proposed initiative will require an extensive literacy and educational awareness programme, to enhance the target groups' basic knowledge and understanding of the market dynamics within the milk enterprise.

**Table 3.38: Gender of the milk traders**

	Pastoralist	Agropastoralists	Bossaso	Badhan	Dangorayo	Total
Male	77.80%(7)	22.20%(2)	22.20%(2)	0.00%(0)	77.80%(7)	15.52%(9)
Female	91.80%(45)	8.20%(4)	44.90%(22)	30.60%(15)	24.50%(12)	84.58%(49)
<b>All traders</b>	<b>89.70%(52)</b>	<b>10.30%(6)</b>	<b>41.40%(24)</b>	<b>25.90%(15)</b>	<b>32.80%(19)</b>	<b>100.00%(58)</b>

*“Milk is sold in the villages along the streets. Milk comes from deep in the remote areas and also nearby in the valleys where the animals graze. The routes here are along the main road between Eldahir and here in Awsane and between this village and Badhan are rough” [Male FGD participant in Awsane village]*

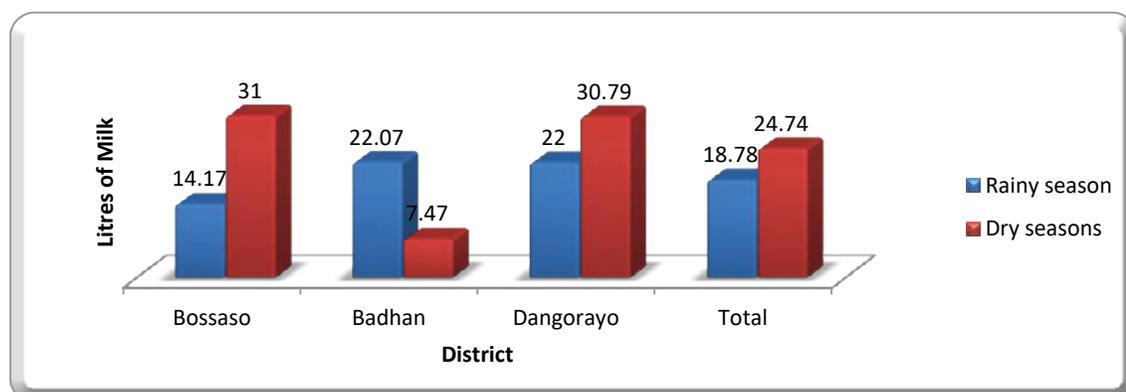
Milk traders encountered were largely involved in milk sale (49.10%), milk purchase (37.70%) and milk distribution (Annex 9). From FGDs and KIs the milk traders were within the confines of the villages and were all selling, buying or distributing milk locally. As was the case with farmers, the milk traders lacked milk preservation equipment and thus largely relied on cold water (52.94%) for milk preservation, fermentation (20.59%) and boiling milk repeatedly to avoid spoilage (17.76%) - Annex 10. Milk is largely bought or sold from local shelters/collection points (55.00%), local neighborhoods (10.00%), market places (30.00%) and local restaurants (2.50%) - Annex 11. The long distance

to markets, poor road networks, a lack of information on marketing, poor storage facilities for milk, the seasonality of milk availability, and inadequate transport means, all limit milk market participation.

**Table 3.39: Business line activities of milk traders**

		Milk distribution	Milk buying	Milk sale	Other	Total
District	Bossaso	0.00%(0)	47.60%(10)	147.60%(10)	4.80%(1)	39.62%(21)
	Badhan	15.40%(2)	30.80%(4)	53.80%(7)	0.00%(0)	24.53%(13)
	Dangorayo	21.10%(4)	31.60%(6)	47.40%(9)	0.00%(0)	35.85%(19)
Gender	Male	50.00%(4)	12.50%(1)	25.00%(2)	12.50%(1)	15.09%(8)
	Female	4.40%(2)	42.20%(19)	53.30%(24)	0.00%(0)	84.91%(45)
<b>All milk traders</b>		<b>11.30%(6)</b>	<b>37.70%(20)</b>	<b>49.10%(26)</b>	<b>1.90%(1)</b>	<b>100.00%(53)</b>

Milk traders in Dangorayo and Bossaso purchased higher volumes of milk in the rainy seasons when supply was low and demand was high by community members unlike those in Badhan. Overall, milk traders purchased more milk in the dry seasons (24.74 litres) than in the rainy seasons (18.78 litres) when there is milk glut and low demand for this commodity in the community (Figure 3.10).



**Figure 3.10: Volume of milk purchased by traders in dry and rainy seasons**

As can be seen in figure 3.11, selling prices are highest in the dry seasons and so are the buying prices for milk from cow, goat, camel and sheep. The exact buying and selling process are indicated in Table 3.40 and they indicate that milk supply/availability in dry seasons is low hence high prices while milk supply/availability is high in rainy seasons hence low prices.

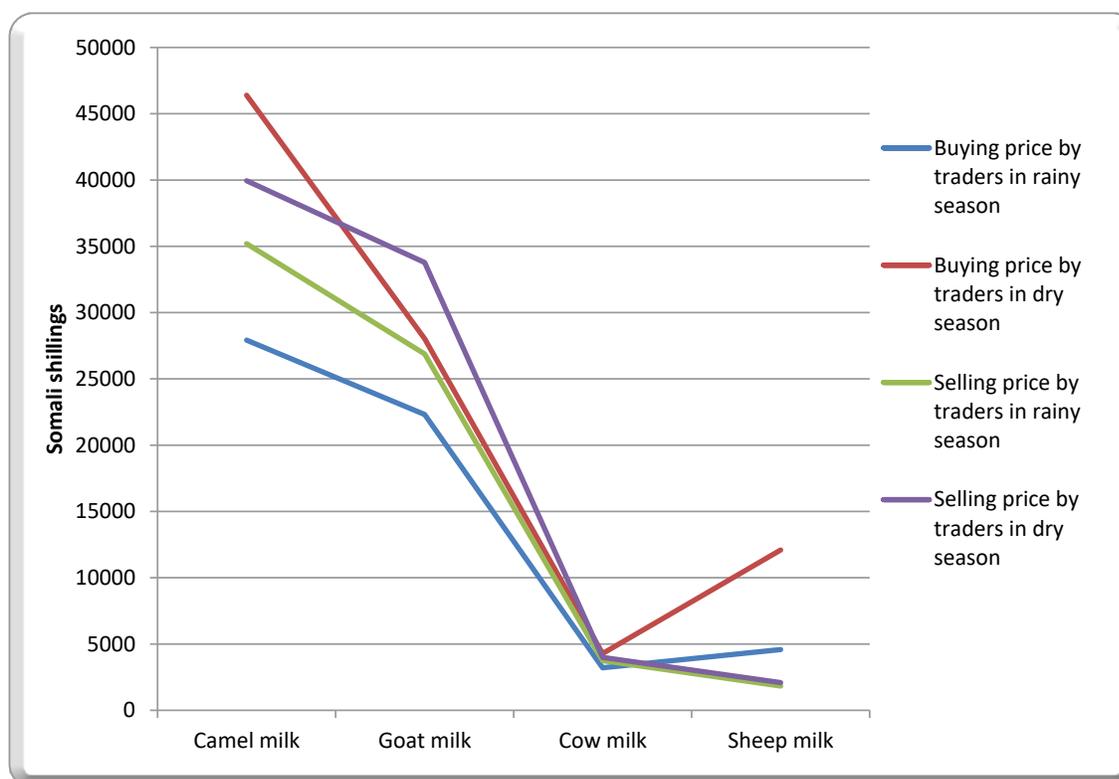


Figure 3.11: Graphic indication of milk price changes across seasons as reported by traders

Table 3.40: Buying and selling prices for milk by traders

	Camel milk	Goat milk	Cow milk	Sheep milk
Buying price by traders in rainy season	27926.02	22311.24	3204.00	4580.552
Buying price by traders in dry season	46392.38	28025.90	4278.707	12097.84
Selling price by traders in rainy season	35201.28	26885.48	3742.328	1827.67
Selling price by traders in dry season	39944.50	33783.97	3986.172	2086.35

*“In Some rainy seasons when many animals give birth to new ones, there will abundant milk available to households while in dry periods and during prolonged drought situations, there will be very little or no milk at all” [Female FGD participant in Dangoyaro]*

Other than sheep milk, milk from other livestock is sold at low prices in rainy seasons and bought at higher prices in the dry seasons by community members (Table 3.41). Seasonality plays a major role in milk marketing, as supply, quality and transport challenges change drastically between dry and wet seasons, with consequent price fluctuations. Milk is sold to local consumers in the villages at a lower price than is sold to traders in the same region. Upon arrival in selling points, milk prices significantly increase, demonstrating a greater demand for milk by households not producing the commodity.

**Table 3.41: Milk price changes across the season as reported by community members**

	Cow milk rainy season	Cow milk dry season	Goat milk rainy seasons	Goat milk dry seasons	Camel milk rainy seasons	Camel milk dry seasons	Sheep milk rainy season	Sheep milk dry seasons
Selling price of a litre of milk by farmers	10372.66	13347.34	36453.2	43794.72	45316.26	53609.46	1964.706	1333.894
Buying price for a litre of milk by farmers	10308.24	10274.51	29025.01	38105.52	38493.75	48785.53	1166.387	1067.81

*“The milk we produce in our households is not enough at the moment, because we have had severe droughts” [Female FGD respondent in Dangorayo]*

In terms of value addition, 20.20% community members reported to be aware of companies that sell milk and milk products locally and this was in Bossaso and Bidhan districts only (Annex 12). However, there were no milk cooling plants in these three districts (Annex 13). Ghee is the most preferred milk commodity in the districts visited (81.90% of community members and 60.42% of milk traders) followed by butter and butter blends (13.70% of community members and 22.91% of milk traders) and there is also some preference for packaged commercial milk as reported by 7.67% of the milk traders (Table 3.42).

**Table 3.42: Preference for milk products**

Responses by community members		Butter and butter blends	Cheese	Ghee	Packaged drinking milk
District	Bossaso	14.30% (8)	0.00% (0)	80.40% (45)	5.40% (3)
	Badhan	3.80% (4)	0.00% (0)	94.20% (98)	1.90% (2)
	Dangorayo	36.40% (16)	9.10% (4)	54.50% (24)	0.00% (0)
District	Bossaso	14.30% (8)	0.00% (0)	80.40% (45)	5.40% (3)
	Badhan	3.80% (4)	0.00% (0)	94.20% (98)	1.90% (2)
	Dangorayo	36.40% (16)	9.10% (4)	54.50% (24)	0.00% (0)
<b>Total</b>		<b>13.70% (28)</b>	<b>2.00% (4)</b>	<b>81.90% (167)</b>	<b>2.50% (5)</b>
Responses by traders		Butter and butter blends	Cheese	Ghee	Packaged drinking milk
District	Bossaso	9.10% (1)	0.00% (0)	44.80% (13)	57.10% (4)
	Badhan	0.00% (0)	0.00% (0)	34.50% (10)	28.60% (2)
	Dangorayo	90.90% (10)	1.00% (1)	20.70% (6)	14.30% (1)
Livelihood	Pastoralist	63.60% (7)	0.00% (0)	85.70% (29)	13.30% (6)
	Agropastoralists	36.40% (4)	1.0% (1)	0.00% (0)	14.30% (1)
<b>Total</b>		<b>22.91% (11)</b>	<b>2.08% (1)</b>	<b>70.42% (29)</b>	<b>7.67% (5)</b>

Milk limited milk preservation equipment and no evidence of value chains addition in the milk, community members were asked how they handle excess milk availability in the households (glut milk production); 34.70% gave the excess milk to children in the households while 29.40% sold it in local markets among other uses. With over one third of households h=giving excess milk to their children for consumption, there is a programming window for ensuring milk availability hence addressing under nutrition in children using milk and milk products in dry and lean seasons (Table 3.42).

**Table 3.43: Handling of excess milk in the household**

	District			Livelihood		Total
	Bosaso	Badhan	Dangorayo	Pastoralist	Agropastoralists	
Consumed by children	42.60% (43)	32.70% (67)	27.50% (14)	36.20% (122)	10.00% (2)	34.70%(124)
Consumed at by adults	6.90% (7)	11.20% (23)	17.60% (9)	11.60% (39)	0.00% (0)	10.90% (39)
Feed off springs	10.90% (11)	14.10% (29)	39.20%(20)	16.00%(54)	30.00% (6)	16.80% (60)
Sold to neighbours	4.00% (4)	0.50% (1)	0.00% (0)	1.50% (5)	0.00% (0)	1.40% (5)
Donated to other people	0.00% (0)	2.40% (5)	0.00% (0)	1.20% (4)	5.00% (1)	1.40% (5)
Sent to local market for sale	30.70% (31)	32.70% (67)	13.70% (0)	28.50%(96)	45.00% (9)	29.40%(105)
Fermented	1.00% (1)	0.50% (1)	0.00% (0)	0.60% (2)	0.00% (0)	0.60% (2)
Other (consumed by all HH members and no excess milk)	4.00% (4)	5.90% (12)	2.00% (1)	4.50% (15)	10.00% (2)	4.80% (17)

*“When the milk is produced in excess we have challenges for us in marketing as prices will fall and the transportation difficulties increase due to roads spoilt by rains” [Female FGD participant in Dangorayo]*

From quantitative interviews with community members, 22.10% (79 of the 357 households) reported to have had difficulties in selling milk/participating in the milk markets in the preceding month. Reasons for being unable to sell milk were described as unavailability of buyers (28.20%), low process (9.20%) and low milk production (55.30%) - Annex 18. In addition, 74.14% (43 out of 58) of the traders reported difficulties in selling milk in the preceding month as well with reasons given as unavailability of buyers (24.13%), low prices (17.24%), inaccessibility of markets (10.34%) and high milk purchasing prices (20.68%) - Annex 19.

### **3.12 Management, Risk and Sustainability**

Only 17.40% and 12.90% of the respondents reported awareness of and membership in milk farmers’ cooperatives; this was Bosaso and Badhan districts with no respondents reporting membership or awareness of cooperatives in Dangorayo largely due to the IDP set ups in the villages visited (Table 3.44).

Table 3.44: Milk farmers' cooperatives

		Aware of milk farmers cooperatives	Membership in milk farmers cooperatives
District	Bossaso	17.80% (18)	10.90% (11)
	Badhan	21.50% (44)	17.10% (35)
	Dangorayo	0.00% (0)	0.00% (0)
Livelihood	Pastoralist	17.50% (59)	13.40% (45)
	Agropastoralists	15.00% (3)	5.00% (1)
Total		17.40% (62)	12.90% (46)

A majority of the respondents in Bossaso and Badhan districts (82.20% and 94.60%) were willing to have livestock extension services and support to increase the productivity of their livestock but only 43.10% of the respondents in Dangorayo districts were receptive of this assistance (Table 3.45); from FGDs they are largely IDPs with other immediate needs as well as limited land for this kind of programming intervention. In addition, 92.10% of the respondents in Bossaso and 98.00% of the respondents in Badhan reported that their districts were suitable for livestock and milk interventions while only 49.00% of the respondents in Dangorayo were of this opinion (Annex 14). Lastly on viability of the program, a combined score of cultural, political and religious acceptability was given by respondents (90.50%) - Annex 15.

Table 3.45: Willingness to receive support to improve livestock production

		Yes	No	Not sure
District	Bossaso	82.20% (83)	12.90% (13)	5.00% (5)
	Badhan	94.60% (194)	4.90% (10)	0.50% (1)
	Dangorayo	43.10% (22)	27.50% (14)	29.40% (15)
Livelihood Zone:	Pastoralist	82.80% (279)	11.00% (37)	6.20% (21)
	Agropastoralists	100.00% (20)	0.00% (0)	0.00% (0)
Total		83.80% (299)	10.40% (37)	5.90% (21)

Although women play a major role in milking, milk handling, milk storage, milk transportation and milk trade, males are the owners of livestock thus there was a general response that milk interventions in the region should target both genders (83.50%) - Table 3.46. From FGDs, the role of youths in livestock interventions was equally emphasised in view of the high unemployment rates among them in the three districts. Specifically, labour availability (provision of water to pastures, feeding livestock and milk processing) for this group was highlighted.

**Table 3.46: Perceived “correct” target group for milk interventions**

	Men	Women	Both men and women	Community Leaders	Livestock/ Agricultural Officials	Religious leaders	Other
Bossaso	4.80%(4)	14.30% (12)	77.40% (65)	2.40% (2)	1.20% (1)	0.00% (0)	0.00% (0)
Badhan	1.20%(2)	9.30%(16)	86.60% (149)	0.60% (1)	0.00% (0)	0.00% (0)	2.30% (4)
Dangorayo	5.70%(2)	2.90%(1)	82.90% (29)	2.90% (1)	0.00% (0)	2.90% (1)	2.90% (1)
Pastoralist	2.90%(8)	9.20%(25)	83.90% (229)	1.50% (4)	0.40% (1)	0.40% (1)	1.80% (5)
Agropastoralists	0.00%(0)	22.20% (4)	77.80% (14)	0.00% (0)	0.00% (0)	0.00% (0)	0.00%(0)
<b>Total</b>	<b>2.70%(8)</b>	<b>10.00%(29)</b>	<b>83.50%(243)</b>	<b>1.40% (4)</b>	<b>0.30% (1)</b>	<b>0.30% (1)</b>	<b>1.70% (5)</b>

Livestock diseases (18.00%) and environmental changes (11.80%) were the foreseen negative effects of livestock milk value chain interventions in the three districts with over half of the respondents (56.50%) reporting unawareness of negative effects from such interventions (Table 3.47).

**Table 3.47: Foreseen negative effects of the proposed milk value chain interventions**

		Animal diseases	Human diseases	Zoonotic diseases	Drought	Conflict	Increased family tension	Environmental changes	Not sure
District	Bossaso	7.30%(3)	2.40(1)	0.00%(0)	2.40%(1)	0.00%(0)	0.00% (0)	26.80% (11)	61.00%(25)
	Badhan	6.00% (5)	0.00%(0)	0.00%(0)	2.40%(2)	2.40%(2)	4.80% (4)	6.00% (5)	78.60%(66)
	Dangorayo	58.30%(21)	13.90%(5)	13.90%(5)	5.60%(2)	0.00%(0)	0.00% (0)	8.30% (3)	0.00% (0)
Livelihood	Pastoralist	19.90%(29)	4.10%(6)	3.40%(5)	3.40%(5)	1.40%(2)	2.10% (3)	12.30% (18)	53.40%(78)
	Agropastoralists	0.00% (0)	0.00%(0)	0.00%(0)	0.00%(0)	0.00%(0)	6.70% (1)	6.70% (1)	86.70% (13)
<b>Total</b>		<b>18.00%(29)</b>	<b>3.70%(6)</b>	<b>3.10%(5)</b>	<b>3.10%(5)</b>	<b>1.20%(2)</b>	<b>2.50% (4)</b>	<b>11.80% (19)</b>	<b>56.50%(91)</b>

Milk value addition interventions in Badhan and Bossaso districts had the backing of local government officials, as well as community members. In Dangorayo, there were mixed and divided opinions regarding these types of interventions. Comments, observations and advice from local government officials included:

- The intervention will offer sustainable and reliable local solutions to nutrition challenges in the region
- The road networks are improving
- The security in the region has improved
- The intervention must have the backing of the community members thus consultations are required
- Livestock pasture and water shortages have to be addressed
- Livestock production skills have to be improved

- Milk farmers associations/cooperatives should be part of these interventions
- Communal resources, such as boreholes and grazing zones, will need to be given due consideration, since they constitute a source of conflict
- The intervention must address concerns regarding the mechanisms to appropriately manage excess milk production
- Commercial value addition is better handled by the private sector and milk farmers cooperatives

*“A milk value chain program is suitable and can be implemented with support from the government and non - governmental organizations and subsequently assigned to management committees to oversee the sustainability of the initiatives” [Male community leader in Dangoroyo]*

*“A small scale milk processing scheme is vital to the local communities in this region as there are livestock but to overcome the milk availability challenges, it needs capacity building of the community livestock production skills” [Livestock officer, Puntland]*

*“The most important recommendation is to come up with ways of supporting the milk producing households in the dry season when they are under severe stress due to unavailability of water or the long distances needed to get to the nearest water point. Also come up with ways of availing affordable fodder and animal feeds. Also there needs to be focus on supporting women household members who are at the backbone of this business. This can be in forms of training, grants, provision of tools and equipment” [Livestock association representatives]*

*“Starting small is good and begin by providing training for the livestock owners on how to improve productivity. We can also organize them into cooperatives that support each other and share experiences and knowledge and have also collective voice” [Livestock association representatives]*

### 3.13 Coping Strategies

Low milk production in the three districts was attributed to high cost of feeds/feeds unavailability (44.10%), shortage of livestock inputs (16.90%), livestock diseases/lack of livestock health services (6.90%) - Annex 17. In terms of coping mechanisms during drought, migration (45.20%), family splitting (17.70%) and destocking (8.10%) were the major measures adopted by communities (Annex 16). In dry seasons, the major milk shortage coping mechanism in the households were described as: adults going without milk (57.30%) and using of milk alternatives (powder, ghee and butter) - 24.00%. The use of milk alternatives in the dry season particularly presents a good opportunity for milk value chain additions in line with the milk products regularly used by community members in this region (Table 3.48).

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**Table 3.48: Milk shortage coping strategies**

		Adults do without milk (milk is given to children only)	Children do without milk (Milk is consumed by adults)	Both adults and children do without milk	Livestock off springs do without milk	Purchase of milk	Milk alternatives (powder, ghee, butter etc.)	Other
District	Bossaso	58.70% (27)	4.30% (2)	6.50% (3)	2.20% (1)	4.30% (2)	21.70% (10)	2.20% (1)
	Badhan	62.70% (69)	6.40% (7)	4.50% (5)	0.90% (1)	0.90% (1)	23.60% (26)	0.90% (1)
	Dangorayo	38.90% (14)	0.00% (0)	30.60% (11)	2.80% (1)	0.00% (0)	27.80% (10)	0.00% (0)
Livelihood	Pastoralist	57.00% (102)	4.50% (8)	10.60% (19)	1.70% (3)	1.10% (2)	24.00% (43)	1.10% (2)
	Agropastoralists	61.50% (8)	7.70% (1)	0.00% (0)	0.00% (0)	7.70% (1)	23.10% (3)	0.00% (0)
<b>Total</b>		<b>57.30% (110)</b>	<b>4.70% (9)</b>	<b>9.90% (19)</b>	<b>1.60% (3)</b>	<b>1.60% (3)</b>	<b>24.00% (46)</b>	<b>1.00% (2)</b>

*“Each one of us makes frantic efforts to survive and make the animals survive during these situations, some people borrow from shops while others may resort to cutting trees for firewood and charcoal sale” [Male FGD respondent in Awsane village]*

*“To mitigate the effects of drought, we save some food in the seasons when they are cheaper, we also sell some of the animals to fund the survival of the herds, we buy water and grass for the animals, move to new places that are relatively better and we also split families as some male members move long distances with livestock while women can look after the children” [Female FGD participant in Dangoyaro]*

An example is the Armo region which was described by FGD participants as a climatic harsh zone where severe shortages of water and fodder for animals in dry periods which affects livelihoods but also life. Even in rainy seasons when supposedly life should be smoother for pastoralists, it can mean animals aren't productive enough to sustain livelihoods and hence the effects of the droughts are felt even though the drought has ended. These scenarios and unpredictable and recurring droughts has prompted many pastoralists and particularly those who have lost large herds in the previous droughts to adopt new lifestyles most notably settling in makeshift homes near urban and semi urban centers where they live in destitution. Having practiced nomadism for all their lives, these families are unable to cope with drought effectively having either lost or sold off their productive assets due to climate changes and natural disaster including floods.

*“There is need for more water harvesting; we should be supported in the creation of dams that hold water for a long time. This coupled with grazing zones that are well managed can address the drought coping ability of this community” [Female FGD participant in Dangoyaro]*

The seasonal calendar influences water availability, pasture availability, malnutrition, human diseases, livestock migration and livestock diseases in the households. When there are rains, livestock and human decreases increase due to contaminated and untreated water. When it rains, there is food hence low incidences of under nutrition;

the reverse is also applicable (Table 3.49). Milk production is influenced by livestock feed availability, which is dependent on seasonal variations characterised by the biannual rainfall pattern. The seasonal calendar of events illustrated below shows significant associations between the prevalence of acute malnutrition (peak admissions at nutritional centres), the hungry season, peaks in diseases (such as diarrhoea and acute respiratory tract infections), high food prices at market, and poor availability of farm labour or temporary jobs. Milk and food availability (food security), health care and waterborne diseases are also affected by these seasonal changes.

Table 3.49: Seasonal Calendar

	January	February	March	April	May	June	July	August	September	October	November	December
Prevalence of acute malnutrition	H	H	H	L	L	M	H	H	H	H	M	M
Ground water availability	M	L	L	L	H	M	L	L	L	H	H	M
Food prices	H	H	H	L	L	L	H	H	H	M	M	H
Waterborne diseases	M	L	L	H	H	H	L	L	L	L	M	H
Human and livestock migration	H	H	M	L	L	L	M	H	H	M	M	H

Key: H=High, M=Moderate and L=Low

### 3.14 Policies on Milk Production

Key informants reported the presence of a ministry of livestock in Puntland which was not fully operational. Ministry of livestock officials interviewed reported the presence of the Puntland Dairy Act, Milk Hygiene guidelines for Puntland, Puntland livestock policy and a strategy of ministry of livestock to enhance the quality and the performance of the livestock. However, these materials were not available online/ from internet sources for review. The ministry of livestock officials further reported that the key challenges in the milk sector in Puntland were:

- Lack of improvement of animal health and husbandry
- Poor milk marketing
- Poor quality milk
- Lack of processing industries
- No capacity building and awareness creation in the dairy sector
- Lack of control and monitoring of milk quality (laboratory facilities)
- Unrestricted importation of milk and milk products
- No dairy development policy

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*“I am not aware of the government policies or strategies on milk and livestock but I think the livestock ministry may have plans that are not implemented” [Women group leader in Badhan]*

*“Yes there is a livestock policy developed by the Puntland Ministry of livestock, but it is better to ask for more details on this policy from the ministry officials. Policies may be there but if they are not implemented or there is no investment in the livestock sector then their usefulness is limited” [Livestock association representatives]*

The livestock officers and veterinary association representatives interviewed called for the following considerations in addressing milk value chain problems in the region:

- Promote systematic and sustainable milk collection
- Encourage formation of associations of milk producers, traders , handlers, processors
- Improve the quality of milk and its products across the value chain
- Promote the use of hygienic milk containers and discourage plastic containers
- Encourage use of appropriate milk transportation
- Promote and improve storage and marketing facilities in local markets in collaboration with local authorities
- Set up milk quality control laboratories

A SWOT analysis can help in analyzing the factors which can play an important role in the milk value chains interventions’ success. Factors that may contribute or hinder this program’s success are hereby presented in Table 3.50. The strengths are opportunities largely outweigh the weaknesses and threats given that latter are modifiable.

**Table 3.50: SWOT analysis for the proposed milk value chain interventions in Bossaso, Budhan and Dangorayo districts**

Strength	Opportunities
<ul style="list-style-type: none"> <li>- Vast unused land resources among the pastoralists and agropastoralists.</li> <li>- Livestock farming is a major source of income in the region.</li> <li>- Livestock farming is a major source of food in the region.</li> <li>- Ample human resource and manpower availability (the youth).</li> </ul>	<ul style="list-style-type: none"> <li>- The project is acceptable to the community members.</li> <li>- The program is addressing an important problem in the community.</li> <li>- Ready market for dairy product especially ghee and butter</li> <li>- Non - existence of any value added products</li> <li>- Demand for farmers cooperatives/associations by community leaders and livestock stakeholders</li> </ul>
Weaknesses	Threats
<ul style="list-style-type: none"> <li>- Weak technical support of agricultural and livestock extension services.</li> <li>- Traditional approaches of livestock production due to lack of skills.</li> <li>- Remoteness of the region limits transportation and market chains.</li> <li>- Seasonal changes hamper the livestock productivity and milk production.</li> <li>- Poor milk preservation methods.</li> <li>- Poor milk handling hygiene and safety.</li> </ul>	<ul style="list-style-type: none"> <li>- High risks of diseases in livestock.</li> <li>- High risk of human diseases due to poor milk safety and handling.</li> <li>- Fragmented markets.</li> <li>- Sequential drought in the region.</li> <li>- Lack of community organizations and out dated farming practices.</li> <li>- The unpredictable security situation</li> <li>- Unacceptability of the program in Dangoyaro.</li> </ul>

# *Section 4: Discussion, Conclusion and Recommendations*

## *4.1 Discussion and Conclusion*

Livestock and milk production in Puntland are guided by the Puntland Dairy Act, Milk Hygiene guidelines for Puntland, Puntland livestock policy and a strategy but these documents are not known to stakeholders in the livestock and milk sectors thus they are not followed or adhered to. Because of this gap the region faces; poor milk marketing strategies; poor quality milk to unhygienic handling; lack of processing industries; weak livestock production skills by farmers; importation of milk and milk products even in rainy seasons; poor quality assessment and monitoring of milk in the region. The region also lacks a dairy industry development policy/strategic plan.

Livestock and milk interventions are not only culturally and politically acceptable, but are also in line with local communities' way of life, needs and livelihood orientation. The three districts of interest to this study rely heavily on livestock production for income and livelihood. Milk production and value chain interventions have the potential to exploit the gaps in livestock production sector and improve people's nutrition and income. Initially a pilot phase of the program should be implemented before scaling it up. In the other two districts, communal land ownership patterns under the Deegaan will also need to be considered. This needs to be considered when planning milk production and livestock production in the wake of fodder production in communal land tenure systems. There are considerations that need to be addressed if the programme is to be implemented in Dangoyaro district including; the dynamics of IDPs, low land ownership, partial resistance of the intervention with community members having an interest in interventions that will meet their immediate basic needs. Thus community consultations for a buy in of the proposed program and considerations for livestock shelters, feeding points and fodder should be considered among this population group. Women play a critical role in milking livestock, milk storage, transportation, sale and decision making on use of milk and income from milk hence a need to focus on them in this intervention.

Goat milk is the preference of most households in the three districts (9 out of 10

households) followed by camel milk (7 out of 10 households) with a very low preference for cow milk (2 out of 10 households) and sheep milk. Excess milk in the households is largely fed children followed by sale purposes. Cows account for largest volume of milk produced in the households every day in the households in rainy and dry seasons despite being fewest livestock species in the herds while goats produce a very limited proportion of milk in the household which appears to increase in the dry seasons due to a dilutional effect in destocking of cows.

Milk consumption in the households is largely dependent on availability which is further influenced by seasonal variations that determine water and pasture availability. This indicates low milk consumption during dry seasons can be attributed to low production. These dynamics in milk consumption across the seasons have largely been documented in the past including in the Hiran region of Somalia.<sup>31&32</sup> Low milk production in dry seasons was attributed to lack of livestock pastures, lack of water, diseases and death of livestock in the dry seasons. In dry seasons, the major milk shortage coping mechanism in the households are adults going without milk and using of milk alternatives namely powder, ghee and butter and butter products.

Under nutrition in dry seasons are commonly high in Somalia and the most recent post Dyer figures indicate SAM levels of 2.5% and GAM levels of 14.7% in Bossaso, this coupled with the acceptance that milk can address malnutrition as reported by study respondents, boosts the merit of the program. There are moderate levels of knowledge on IYCF, as well as traditional cultural practices affecting infant and young child nutrition. Sources of information on nutrition are community health workers and workers in the few available health facilities. There are limited interventions on health and nutrition in the region, asserting the need to complementary interventions in milk handling and use. Milk hygiene trainings and well as the provision of milk handling equipment would come in handy in this program given the low quality of milk which is attributed to unhygienic practices.

Livestock ownership is high in the region and the herd composition is largely made up goats and sheep; precisely 93.2% of the households have goats, 47.90% of the households have sheep, 6.8% of the households have cows and 31.93% of the households have camels. Typical pastoralists<sup>□</sup> and agropastoralists<sup>□</sup> heard structures were reflected in the households visited were over two thirds of the livestock kept were mature females

31 Sadler S and Catley A.2009. Milk matters, The Role and Value of Milk in the Diets of Somali Pastoralist Children in Liben and Shinile, Ethiopia. Participatory Research for the Pastoralist Health and Nutrition Initiative.< <http://fic.tufts.edu/assets/Milk - Matters in 2009.pdf> >

32 Save the Children International and UNICEF.2017. Milk matters feasibility study in Hiran region.< <https://somalia.savethechildren.net/sites/somalia.savethechildren.net/files/library/MILK%20MATTERS%20FEASIBILITY%20STUDY%20%20FINAL.pdf>>.

kept for milk. There are however a number of constraints exist in the value chain, including scarcity of fodder; livestock diseases; scarcity of water; inadequate livestock production support services iv) low technical capacity, governance and coordination mechanisms; low phyto - hygienic standards; poor transport infrastructure; unavailability of milk preservation services despite high temperature and humidity which lead to rapid spoilage; and weak market systems.

Fodder production has the most significant impact on livestock milk yields and coping mechanisms during drought include migration, family splitting and destocking were the major measures adopted by communities. Ruminant livestock production relies heavily on natural pasture for feeding. Both the quantity and quality of this pasture is low during the dry season and this is a major constraint to livestock milk production. Providing protein supplements to animals existing on the natural pasture is a strategy farmers use to alleviate the problem of poor forage quality. Strategic pasture points and distribution of drought resistant pasture seeds and commercial production and sale of pastures were described as solutions to pasture unavailability. Strategic community water points in the earmarked interventions' villages would also promote water availability and further promote milk production and reduce livestock migration and deaths in the dry seasons.

The value chain of milk in the region entails three activities: gathering (collecting milk from the villages), transportation and retail trading. There are three key actors in the three districts' milk market chain: famers who are producers, local handlers (transporters/distributors, buyers and sellers), and consumers. The milk purchases, distribution and sale is predominated by local dealers who are largely women. Other than in Bossaso, there are no reports of commercial milk businesses or value chain additions for milk. Milk prices are largely dependent on seasonality which determines milk availability. Challenges in the market chains include perishability of milk, poor transport/inaccessibility of markets in rainy seasons, unavailability of milk in dry seasons and low demand for milk in rainy seasons hence price fluctuations.

Livestock and milk interventions are viable in the three districts is feasible not only because of constraints on milk consumption and a broad understanding of milk's role in improving nutrition outcomes, particularly among pastoralist families, but also because it offers an opportunity to introduce value addition activities, as part of the approach to increase income and improve food security and nutrition. Specifically, there is a high presence for Ghee and butter and butter products as well as commercially packaged milk in dry seasons; this further asserts the need for small scale milk processing plants in the

region. The region has youths to offer labour in this sector and traditional community leaders have the power to influence uptake of such interventions. KIIs interviewed have largely emphasized on the need to have farmers' associations/cooperatives for these kinds of interventions.

A focus on goats whose milk is preferred is encouraged rather than cows; goats also for the bulk of the herd structure and they are largely left behind in times of migration. Cows are grazers; they primarily consume grass and have digestive systems capable of handling large quantities of forages with relatively low nutritional quality. Goats' milk is superior to cows' milk and has fewer incidences of allergies; similarly, in terms of nutrition content, goats' milk is superior to cow, camel and sheep milk.<sup>33</sup>

The proposed beneficiary selection criteria for the propose program should entail: ownership of small ruminants (goats specifically) that are recently lactating, with normal milk yield; no apparent livestock health issues, and; the presence of children aged up to 12 years; willingness to participate in the program; availability of labour for livestock care in households; presence of women/adult females in the households. Including all eligible households in selected communities will help reduce the potential for any conflicts, and dilute results by sharing fodder among different households, as observed in "Milk Matters and milk value chain" programming in Ethiopia.

### ***4.2 Recommendations***

The following recommendations aim to provide guidance for improving livestock and milk production as well as value chains for milk in Badhan, Bossaso and Dangoyaro districts:

- Focus on households with women/adult females but also leverage interventions support by males and youths e.g. in the production of pastures and water for livestock
- From the past experiences on milk production and value chains in Somalia and Ethiopia the proposed interventions should provide support in terms of fodder and veterinary services for goats whose milk is preferred in the region. These two interventions should trigger improvements in milk production. Strategic community pasture points, drought resistant pasture seeds, conservation of fodder and commercial production and sale of fodder will be a solution to perennial shortage of livestock feeds.
- Establish and train milk farmers' cooperatives and where they already exist

<sup>33</sup> FAO.2013.Milk and dairy products in human nutrition. E - ISBN 978 - 92 - 5 - 107864 - 8.[Online].< [www.fao.org/docrep/018/i3396e/i3396e.pdf](http://www.fao.org/docrep/018/i3396e/i3396e.pdf)>

strengthen them - The interventions should be firmly embedded in a community - based approach with a focus on long - term community capacity building on issues of fodder production and management, water conservation and environmental management.

- In terms of value addition, small scale milk processing schemes with a focus on milk preservation, production of ghee and butter and butter products and commercially packaged milk with local community branding. Goat milk is particular encouraged given its popularity and preference in the three districts. During rainy seasons, activities aimed at improving the storage of fodder and the conversion of milk to products with a longer shelf life should be introduced.
- Promote “multiple livelihoods” approaches in the communities - To reduce overreliance on milk and promote resilience in the region, leverage the program on other livelihood activities and cross - sectoral links to the extent possible. Activities aimed at the introduction of introducing drought - resistant crop and fodder varieties should be introduced as part of the pilot project, to improve year round fodder availability.
- Establish communal water schemes to promote water availability across the dry and rainy seasons hence reduce migration, livestock deaths and reduced livestock productivity.
- Provide milk hygiene training and provide appropriate milk handling equipment while also incorporating WASH and ICF trainings to ensure a holistic hygiene sensitization approach in the communities.
- In addition to hygiene trainings, construction of milk market for milk traders in areas with high milk production or consumption in order to promote milk hygiene and create new source revenue for local authority as result of Taxes to be paid to local authorities.
- A phased approach is recommended as opposed to going large scale at once - Phase I should focus on support for goats that stay close to women given the critical role of women in the milk sector while phase as well as water and water committees fodder, livestock health interventions, hygiene training and environmental safeguarding interventions. Phase 2 should focus on distribution of lactating animals (both goats and cows in this case for scalability) to poor and marginalized households with no livestock; formation milk farmers cooperatives, associations and groups (e.g. VSLAs); setting up of small scale milk processing plants and the processing and value addition of livestock products; and promoting the community members capacity to manage pasture, water animal health services and rangeland management.

- Villages that demonstrate strong results during the pilot project should be chosen as ‘model sites’ for learning by other community members as well as development organisations.
- Primarily focus on pastoral and agro - pastoral communities - there is some resistance for the interventions among IDPs in Dangoyaro who feel that they have other needs that are primary to milk and livestock production.
- The household selection criteria should be: ownership of small ruminants or readiness to receive livestock; recently lactating animals with normal milk yield; no apparent livestock diseases; presence of children up to 12 years; willingness to participate in the program given the record keeping requirements; willingness to attend trainings; willingness to join farmers cooperatives; willingness to join water committees; and availability of land pasture production and management. If the age of females is to be considered in the selection of female beneficiaries, the World Health Organization (WHO) reproductive age bracket (15 - 49 among females) should be the basis of selection of female beneficiaries. On the aspect of age there should be some flexibility to incorporate care givers/caretakers (such as grandmothers and other relatives).
- In consultation with livestock associations and the Puntland government’s ministry of livestock develop a package of animal health interventions entailing prophylactic and curative services, based on the common livestock diseases in the region. These services can be accessed by community members through a voucher system in the initial phase but in the second phase females and males selected consultatively from the communities should be trained to uptake livestock treatment services (as community animal health workers - CAHWs) in the communities as a livelihood activity.
- For issuance of livestock in the second phase reference should be made to the relevant restocking guidelines as well as consult community members at the planning stage. Another approach could be to calculate the number of eligible animals per household based on the number of children. However, a standard figure is recommended for impact assessments; in Karamoja - Uganda and Ethiopia, such interventions have focused on either 3 goats or 1 cow per household.
- Fodder support should be done in phase 1 given the immediate needs before production and availability of pastures as well as in the long term sustainability concerns. In the first phase folder vouchers should be issued but in the second phase focus on strategic pasture reserves and drought resistant pastures and commercial production and sale of pastures. Appropriate varieties of fodder should be determined at the programme - planning stage, depending on the conditions and needs of different communities.

- Water availability should be promoted through establishment of strategic village boreholes managed by local water users' associations. To promote sustainability of the water point, IGAs such as shops can be opened up by the committees to generate revenue for repair of boreholes and use of solar borehole pumps.
- Potential negative environmental damages that comes large high livestock herds resulting from the introduction of a large number of animals should be adequately anticipated, and remedial measures should be considered and mitigated in consultation with the environmental experts in Puntland as well as KAALO AID environment programs. The proposed pilot project should also include expanded activities for income generation and rangeland management.
- Post - distribution monitoring should be maintained to track results and identify any issues related to livestock disease or death, as well as proper usage of vouchers, livestock feeding practices and shelter.
- A realistic monitoring and evaluation framework for the program not only focusing on milk but also resilience, income and food security in the households will be required.
- Establish beneficiary and stakeholder feedback provision mechanisms long before the program roll out - The programme should invest in developing relationships with local governments, partners and community leaders prior to programme roll - out, based on previous experiences.
- Together with the Ministry of livestock in Puntland come up with a dairy sector development policy and also enlighten stakeholders and community members on the existing/available milk and livestock production policies ad guidelines.

# List of Annexes

## Annex 1: Age distribution of household respondents

District	Livelihood	Gender	Mean	Std. Deviation	Minimum	Maximum
Bossaso	Pastoralist	Male	51.68	15.07	28	85
		Female	45.62	12.43	22	80
		Total	46.87	13.17	22	85
	Agropastoralists	Male	54.33	15.95	41	72
		Female	49.83	8.86	40	65
		Total	51.33	10.85	40	72
	Total	Male	52.05	14.82	28	85
		Female	45.94	12.21	22	80
		Total	47.27	12.99	22	85
Badhan	Pastoralist	Male	50.58	15.20	20	88
		Female	47.80	12.96	26	75
		Total	49.66	14.52	20	88
	Agropastoralists	Male	51.33	18.72	32	75
		Female	46.80	13.22	28	65
		Total	49.27	15.83	28	75
	Total	Male	50.62	15.29	20	88
		Female	47.72	12.88	26	75
		Total	49.64	14.56	20	88
Dangorayo	Pastoralist	Male	41.32	10.98	20	62
		Female	42.83	12.43	20	70
		Total	42.00	11.56	20	70
	Total	Male	41.32	10.98	20	62
		Female	42.83	12.43	20	70
		Total	42.00	11.56	20	70
All respondents	Pastoralist	Male	49.24	14.93	20	88
		Female	46.09	12.68	20	80
		Total	47.74	13.98	20	88
	Agropastoralists	Male	52.33	16.87	32	75
		Female	48.45	10.57	28	65
		Total	50.20	13.51	28	75
	Total	Male	49.39	15.00	20	88
		Female	46.24	12.54	20	80
		Total	47.88	13.94	20	88

## Annex 2: Local breeding mechanisms

	Bossaso	Badhan	Dangorayo	Pastoralist	Agropastoralists	Total
Bull use	24.80%(27)	67.90%(74)	7.30%(8)	96.30%(105)	3.70%(4)	30.50%(109)
Artificial insemination	36.40%(4)	18.20%(2)	45.50%(5)	100.00%(11)	0.00%(0)	3.08%(11)
Both bulls and artificial insemination	66.70%(6)	33.30%(3)	0.00%(0)	100.00%(9)	0.00%(0)	2.52%(9)
No local breeding	28.10%(64)	55.30%(126)	16.70%(38)	93.00%(212)	7.00%(16)	63.87%(228)

## Annex 3: Respondents who know of a livestock extension / production officer in their region

		Yes	No
District	Bossaso	12.90% (13)	87.10% (88)
	Badhan	8.80% (18)	91.20% (187)
	Dangorayo	3.90% (2)	96.10% (49)
Livelihood	Pastoralist	8.60% (29)	91.40% (308)
	Agropastoralists	20.00% (4)	80.00% (16)
Total	All respondents	9.20% (33)	90.80% (324)

## Annex 4: Payment for livestock health services

		Self	Regional governments	International organizations	Local organizations	Not sure/Don't know
District	Bossaso	46.90% (38)	7.40% (6)	(0.00%) (0)	(6.20%) (5)	(39.50%) (32)
	Badhan	38.90% (58)	0.70% (1)	0.70% (1)	2.00% (3)	57.70% (86)
	Dangorayo	48.90% (23)	4.30% (2)	40.40% (19)	2.10% (1)	4.30% (2)
Livelihood	Pastoralist	44.90% (118)	3.40% (9)	7.60% (20)	3.00% (8)	41.10% (108)
	Agropastoralists	7.10% (1)	0.00% (0)	0.00% (0)	7.10% (1)	85.70% (12)
Total		43.00% (119)	3.20% (9)	7.20% (20)	3.20% (9)	43.30% (120)

## Annex 5: Water availability in rainy and dry seasons

Wet seasons		Easily available	Available	Moderately available	Unavailable	Very Unavailable
District	Bossaso	56.40%(57)	33.70%(34)	10(9.90%(10)	0.00%(0)	0(0.00%(0)
	Badhan	54.10%(111)	30.70%(63)	12.20%(25)	2.00%(4)	1.00%(2)
	Dangorayo	68.60%(35)	25.50%(13)	2.00%(1)	3.90%(2)	0.00%(0)
Livelihood	Pastoralist	57.90%(195)	30.30%(102)	9.50%(32)	1.80%(6)	0.60%(2)
	Agropastoralists	40.00%(8)	40.00%(8)	20.00%(4)	0.00%(0)	0.00%(0)
Total	All HHs	56.90%(203)	30.80%(110)	10.10%(36)	1.70%(6)	0.60%(2)
Dry seasons		Easily available	Available	Moderately available	Unavailable	Very Unavailable
District	Bossaso	3.00% (3)	13.90% (14)	24.80% (25)	44.50%(49)	9.90% (10)
	Badhan	0.50% (1)	5.90% (12)	23.90% (49)	46.30% (95)	23.40% (48)
	Dangorayo	0.00% (0)	0.00% (0)	27.50% (14)	64.70% (33)	7.80% (47)
Livelihood	Pastoralist	1.20% (4)	7.70% (26)	24.60% (83)	49.30%(166)	17.20% (58)
	Agropastoralists	0.00% (0)	0.00% (0)	25.00% (5)	55.00% (11)	20.00% (4)
Total	All HHs	1.10% (4)	7.30% (26)	24.60% (88)	49.60% (177)	17.40% (62)

## Annex 6: Availability of health and nutrition across the seasons

		Dry season	Rainy season	Throughout the year (all seasons)	No information
District	Bossaso	34.70% (35)	34.70% (35)	20.80% (21)	9.90% (10)
	Badhan	26.30% (54)	30.70% (63)	22.00% (45)	21.00% (43)
	Dangorayo	27.50% (14)	47.10% (24)	11.80% (6)	13.70% (7)
Livelihood	Pastoralist	30.30%(102)	34.40% (116)	19.30% (65)	16.00% (54)
	Agropastoralists	5.00% (1)	30.00% (6)	35.00% (7)	30.00% (6)
Total		28.90%(103)	34.20% (122)	20.20% (72)	16.80% (60)

## Annex 7: Importance of milk for children's health

		Very Important	Important	Moderately important	Don't Know/Not sure
District	Bossaso	95.00% (96)	3.00% (3)	2.00% (2)	0.00% (0)
	Badhan	89.80% (184)	9.30% (19)	1.00% (2)	0.00% (0)
	Dangorayo	66.70% (34)	25.50%(13)	3.90% (2)	3.90% (2)
Livelihood	Pastoralist	87.20% (294)	10.40%(35)	1.80% (6)	0.60% (2)
	Agropastoralists	100.00% (20)	0.00% (0)	0.00% (0)	0.00% (0)
Total		88.00% (314)	9.80% (35)	1.70% (6)	0.60% (0)

### Annex 8: Age of the milk traders

District	Respondent's sex	Minimum	Maximum	Mean	Std. Deviation
Bossaso	Male	66	69	67.50	2.12
	Female	25	60	39.68	9.32
	Total	25	69	42.00	11.88
Badhan	Female	30	58	46.53	8.16
	Total	30	58	46.53	8.16
Dangorayo	Male	15	50	34.00	11.85
	Female	22	51	39.08	9.71
	Total	15	51	37.21	10.52
Total	Male	15	69	41.44	18.00
	Female	22	60	41.63	9.48
	Total	15	69	41.60	11.01

### Annex 10: Milk preservation techniques by milk traders

		Boiling over and over	Pasteurization	Fermentation	Cold water	No preservation	Other
District	Bossaso	50.00% (2)	0.00%(0)	0.00% (0)	50.00% (9)	50.00% (1)	100.00%(1)
	Badhan	0.00% (0)	0.00% (0)	0.00% (0)	11.10% (2)	50.00% (1)	0.00% (0)
	Dangorayo	50.00% (2)	100.00%(2)	100.00%(7)	38.90% (7)	0.00% (0)	0.00%(0)
Gender	Male	25.00% (1)	50.00% (1)	57.10% (4)	5.60% (1)	0.00% (0)	100.00%(1)
	Female	75.00% (3)	50.00% (1)	42.90% (3)	94.40% (17)	100.00% (2)	0.00%(0)
Total		17.76% (4)	5.90% (2)	20.59% (7)	52.94% (18)	5.90% (2)	2.45% (1)

### Annex 11: Milk selling/purchasing points

		Collection Points	Neighbourhood	Market	Local Restaurant	Open distribution
District	Bossaso	82.40% (14)	11.80% (2)	0.00% (0)	5.90% (1)	0.00% (0)
	Badhan	85.70% (6)	14.30% (1)	0.00% (0)	0.00% (0)	0.00% (0)
	Dangorayo	12.50% (2)	6.20% (1)	75.00%(12)	0.00% (0)	6.20% (1)
Gender	Male	0.00% (0)	12.50% (1)	62.50%(5)	12.50% (1)	12.50% (1)
	Female	68.80% (22)	9.40% (3)	21.90%(7)	0.00% (0)	0.00% (0)
Total		55.00% (22)	10.00% (4)	30.00% (12)	2.50% (1)	2.50% (1)

### *Annex 12: Awareness of companies selling milk locally*

		Yes	No	Not sure
District	Bossaso	41.60% (42)	51.50% (52)	6.90% (7)
	Badhan	14.60% (30)	84.90% (17)	0.50% (1)
	Dangorayo	0.00% (0)	68.60% (35)	31.40% (16)
Livelihood	Pastoralist	19.60% (66)	73.60% (248)	6.80% (23)
	Agropastoralists	30.00% (6)	65.00% (13)	5.00% (1)
Total		20.20% (72)	73.10% (261)	6.70% (24)

### *Annex 13: Milk cooling centres and processing companies*

		Yes	No	Not sure
District	Bossaso	1.00% (1)	93.10% (94)	5.90% (6)
	Badhan	0.50% (1)	98.00% (201)	1.50% (3)
	Dangorayo	0.00% (0)	54.90% (28)	45.10% (23)
Livelihood	Pastoralist	0.60% (2)	89.90% (303)	9.50% (32)
	Agropastoralists	0.00% (0)	100.00% (20)	0.00% (0)
Total		0.60% (2)	90.50% (323)	9.00% (32)

### *Annex 14: Suitability of the three districts for milk interventions*

		Yes	No
District	Bossaso	92.10% (93)	7.90% (8)
	Badhan	98.00% (201)	2.00% (4)
	Dangorayo	49.00% (25)	51.00% (26)
Livelihood Zone:	Pastoralist	88.70% (299)	11.30% (38)
	Agropastoralists	100.00% (20)	0.00% (0)
Total		89.40% (319)	10.60% (38)

### *Annex 15: Political, religious and cultural acceptability of livestock value chain interventions*

		Yes	No
District	Bossaso	91.10% (92)	8.90% (9)
	Badhan	97.60% (200)	2.40% (5)
	Dangorayo	60.80% (31)	39.20% (20)
Livelihood Zone:	Pastoralist	90.20% (304)	9.80% (33)
	Agropastoralists	95.00% (19)	5.00% (1)
Total		90.50% (323)	9.50% (34)

### *Annex 16: Households' drought coping mechanisms*

		Family splitting	Destocking	Migration	Engagement in income earning	Herd splitting	Changing species composition	Call for aid/relief/donations	None	Not sure
District	Bossaso	0.00% (0)	0.00%(0)	42.90%(3)	0.00%(0)	14.30% (1)	0.00%(0)	28.60%	0.00%(0)	14.30%(1)
	Badhan	0.00%(0)	20.00%(1)	20.00%(1)	0.00%(0)	20.00%(1)	0.00%(0)	0.00%(0)	20.00%(1)	20.00%(1)
	Dangorayo	22.00% (11)	8.00% (4)	48.00%(24)	4.00% (2)	0.00%(0)	2.00%(1)	0.00%(0)	16.00% (8)	0.00%
Livelihood	Pastoralist	18.00%(11)	8.20% (5)	45.90%(28)	3.30%(2)	3.30%(2)	1.60%(1)	1.60%(1)	14.80% (9)	3.30%(2)
	Agropastoralists	0.00%(0)	0.00%(0)	0.00%(0)	0.00%(0)	0.00%(0)	0.00%(0)	100.00%(1)	0.00%(0)	0.00%(0)
Total		17.70% (11)	8.10%(5)	45.20% (28)	3.20%(2)	3.20%(2)	1.60%(1)	3.20%(2)	14.50% (9)	3.20%(2)

### *Annex 17: Reasons given for low milk production*

		High cost of livestock feeds	Shortage of livestock inputs (minerals etc.)	Diseases and lack of animal health extension services	Lack of good breeds	Not sure
District	Bossaso	46.20% (6)	15.40% (2)	7.70% (1)	0.00% (0)	30.80% (4)
	Badhan	31.60% (6)	36.80% (7)	0.00% (0)	0.00%(0)	31.60% (6)
	Dangorayo	51.90% (14)	3.70% (1)	11.10% (3)	7.40% (2)	25.90% (7)
Livelihood Zone:	Pastoralist	43.90% (25)	17.50% (10)	7.00% (4)	3.50% (2)	28.10% (16)
	Agropastoralists	50.00% (1)	0.00% (0)	0.00% (0)	0.00% (0)	50.00% (1)
Total		44.10% (26)	16.90% (10)	6.80% (4)	3.40% (2)	28.80% (17)

### Annex 18: Reasons for community members being unable to sell milk

		No buyers	Low prices	Inaccessible markets	No roads/no transport to market/migratory movement	Many sellers/ over supply/ Over production	Low milk production
District	Bossaso	8.50% (4)	25.50% (12)	0.00% (0)	0.00% (0)	0.00% (0)	66.00%(31)
	Badhan	18.20% (20)	2.70% (3)	10.90% (12)	0.90% (1)	0.90% (1)	66.40%(73)
	Dangorayo	69.40% (34)	8.20% (4)	0.00% (0)	0.00% (0)	2.00% (1)	20.40%(10)
Livelihood	Pastoralist	30.40% (58)	9.90% (19)	5.80% (11)	0.50% (1)	1.00% (2)	52.40%(100)
	Agropastoralists	0.00% (0)	0.00% (0)	6.70% (1)	0.00% (0)	0.00% (0)	93.30%(14)
Total		28.20% (58)	9.20% (19)	5.80% (12)	0.50% (1)	1.00% (2)	55.30%(114)

### Annex 19: Reasons for buyers being unable to sell milk

		No buyers	Low prices	Market far way/ inaccessible/	No roads/ no transport to market/ migratory movement	Many sellers/ over supply/ Over production	Not sure	High milk purchasing price
District	Bossaso	28.60% (2)	0.00% (0)	0.00% (0)	100.00% (1)	0.00% (0)	33.30% (2)	50.00% (3)
	Badhan	14.30% (1)	0.00% (0)	0.00% (0)	0.00% (0)	100.00% (1)	0.00% (0)	16.70%
	Dangorayo	57.10% (4)	100.00% (5)	100.00% (3)	0.00% (0)	0.00% (0)	66.70% (4)	33.30% (2)
Gender	Male	0.00% (0)	20.00% (1)	33.30% (1)	0.00% (0)	0.00% (0)	66.70% (4)	50.00% (3)
	Female	100.00% (7)	80.00%	66.70% (2)	100.00% (1)	100.00% (1)	33.30% (2)	50.00% (3)
Total		24.13% (7)	17.24% (5)	10.34% (3)	3.51%(1)	3.51% (1)	20.68% (6)	20.68% (6)

**Annex 20: Milk usage in the households**

Rainy seasons		Consumption	Sale	Donation	Fed to off springs	Other - unspecified
District	Bossaso	70.30%(71)	23.80%(24)	1.00%(1)	2.00%(2)	3.00%(3)
	Badhan	72.70%(149)	22.00%(45)	0.00%(0)	0.50%(1)	14.90%(10)
	Dangorayo	80.40%(41)	9.80%(5)	0.00%(0)	7.80%(4)	2.00%(1)
Livelihood	Pastoralist	73.60%(248)	20.50%(69)	0.30%(1)	2.10%(7)	3.60%(12)
	Agropastoralists	65.00%(13)	25.00%(5)	0.00%(0)	0.00%(0)	10.00%(2)
Gender	Male	76.90%(143)	21.00%(39)	1(0.50%)	0.50%(1)	1.10%(2)
	Female	69.00%(118)	20.50%(35)	0.00%(0)	3.50%(6)	7.00%(12)
Total		73.10%(261)	20.70%(74)	0.30%(1)	2.00%(7)	3.90%(14)
Dry seasons		Consumption	Sale	Donation	Fed to off springs	Other - unspecified
District	Bossaso	67.30%(68)	13.90%(14)	0.00%(0)	16.80%(17)	2.00%(2)
	Badhan	72.70%(149)	4.90%(10)	0.00%(0)	14.60%(30)	7.80%(16)
	Dangorayo	60.80%(31)	17.60%(9)	2.00%(1)	3.90%(2)	15.70%(8)
Livelihood	Pastoralist	69.10%(23)	9.20%(31)	0.30%(1)	14.20%(48)	7.10%(24)
	Agropastoralists	75.00%(15)	10.00%(2)	0.00%(0)	5.00%(1)	10.00%(2)
Gender	Male	74.20%(138)	7.50%(14)	0.50%(1)	11.80%(22)	5.90%(11)
	Female	64.30%(110)	11.10%(19)	0.00%(0)	15.80%(27)	8.80%(15)
Total		69.50%(248)	9.20%(33)	0.30%(1)	13.70%(49)	7.30%(26)

**Annex 21: Data Collection Tools**

Presented as a separate Annex

## ***Annex 22: Terms of Reference***

Terms of reference for milk value chain analysis study in Dangorayo, Badhan and Bossaso districts in Nugal, Sanaag and Bari regions, Puntland - Somalia

### **BACKGROUND**

#### **About KAALO**

KAALO Aid and Development (KAD) is a community based non - profit, humanitarian and development organization, headquartered in Garowe, Puntland in Somalia. The organization was established in October, 1991 just after the collapse of the Somali central government. KAALO is one of the humanitarian and development NGO in Somalia. The organization has been in existence for 27 years with a successful record in implementing more than 200 programs and projects in both the emergency and the development sector in 9 regions of Puntland. Considering the need and the prevailing development issues in other parts of Somalia, KAALO has expanded the geographic areas of its operation and now includes South and Central Somalia. Kaalo has more than 20 donors and partners, including UN agencies and international humanitarian agencies.

#### **About the Project (RESTORE)**

RESTORE Project is an EU - funded 3 - year (2018 - 2020) project under Building Resilient Community in Somalia (BRCiS) Consortium. The project aims to increase the resilience of pastoralist, agro - pastoralist, and IDP communities in Somaliland and Puntland by building community and local authority capacity to predict, adapt to, cope with and mitigate against future droughts in particular, as well as other local shocks and stresses. The objective will be reached through three main expected results. Result 1: Strengthened community based drought mitigation and preparedness measures). Results 2: Improved Natural Resource Management for drought mitigation and adaptation and Result 3: Diversified livelihoods and assets rebuilt.

## THE PURPOSE OF THE TASK (MVCA)

The main purpose of the task is to clearly identify the overall value chain of the milk, from the producer to the end user. This is aimed to improve the productivity pastoralists and agro - pastoralists community in the target areas (Bossaso District of Bari region, Badhan District of Sanaag and Dangoranyo District of Nugal region). As well as to identify the main causes of decline the quantity of milk supply to dairy cooperative which affect the profitability of dairy cooperative in order to improve their position in milk value chain following the milk matters approach.

### Specific Objectives

- To review the existing policies and regulations in the milk production and identify the gaps for improvement.
- To Identify challenges associated with milk value chain.
- To examine the impact of milk on children nutrition in pastoralist and agro - pastoralist community.
- To examine existing practices in targeted population.
- To assess the impact of animal feed on milk production in lean dry/season.
- To identify existing coping strategies employed by target population in times of drought
- To review on the relative importance of livestock on milk, the amount of milk utilized for various uses (household consumption, marketing, donating to relatives), and household income.
- To assess the viability in general and cost - benefit analysis in particular of small scale milk processing scheme.
- To assess the value chain actors (the players involved in value chain transaction - both from the supply and demand sides) and the nature and scale of their relative functions
- To analyze the factors (internal and external influences) that affect the nature and terms of transaction along the value chain with a particular focus on information flow, transparency and efficiency of transaction.
- To examine the relationships which include power, knowledge and benefits asymmetry throughout the chain.
- To identify major marketing channels sub channels and routs.
- To Identify the key constraints, opportunities and threats of milk and milk products marketing.

- To identify the underline causes of low milk supply and quality in the pastoral area
- To propose simple and practical intervention areas which help to facilitate milk and milk products marketing.
- To conduct gender analysis of the value chain while highlighting of men and women across the chain will be conducted.
- To propose preliminary implementation plan for the project with recommendations for intervention with in the project time frame and alignment with the project objective

### Methodology and Process

- In the assessment, Kaalo expects the consultant to employ both quantitative and qualitative methods for collection of data/information, using Participatory Tools and Techniques for data collection, which may include but not be limited to In - depth interview, Key informant interview, Focus group discussion etc.
- Comprehensive desk review of all relevant documents i.e. related literature, project proposal, and related Government Policy documents including Puntland Ministry of Livestock and Animal Husbandry strategies for development of airy and meat value chain.
- The consultant will interact with RETORE project staff, MoLAH and other stakeholders on a sample basis.
- The consult(s) will have to fully engage a sample of target project primary stakeholders (i.e. agro - pastoralists, Pastoralists, customary authorities, milk/ meat traders, Livestock Professional Association, CBOs, consumers, etc.) who play significant role in milk value chain.
- The study information will be collected from three districts mentioned above
- The total population of this survey will be determined by the consultant as a sample of household's target beneficiaries who are Pastoralist and Agro - pastoralist and milk vendors /processors, Community Animal Health Workers and private veterinary drug suppliers, staff of Ministries of Livestock, Health and Local government authorities and youth and women who get employed in the milk value chain.

### Deliverables

- **Inception report:** The consultant will submit a preliminary report of execution of the assignment in electronic version. The report should be very precise and address each specific objective and should include: Executive summary (1 - 2 pages); Methodology; Limitations of the assignment and way forward for the assessment. The aim of the preliminary report is to give a picture of the situation on the ground

which may require adjustment of the planned itinerary of the consultant for effective collection of data and information.

- The consultant will make a **draft report** and Power - Point presentation of the findings of the whole study and will present to KAALO
- **Final Report** should produce after the inputs and validation and Submitted to Soft and Hard copy

### Reporting and Timeframe Of The Study

The assignment should be carried out within a maximum period of 20 days and the study Consultant will report to the KAALO Programme coordinator.

### Qualification and Experiences

1. At least a Master Degree qualification in any of the following areas Agriculture, Animal Production, Veterinary Medicine, Social Sciences, Natural Resource Management, Dairy Technology or any other relevant fields from recognized institutions.
2. Must have minimum of 5 years' of overall experience conducting baseline assessment for livelihoods and resilience building initiatives.
3. Must demonstrate a minimum of 3 years' experience of conducting baseline surveys in the Greater Horn of Africa particularly in pastoral and agro - pastoral areas.
4. Must have good understanding of livestock, livelihoods, women empowerment
5. Experience in Somalia, particularly Puntland, is a plus.

### Knowledge and Skills

- Excellent analytical, interpersonal, communication and reporting skills.
- Excellent technical knowledge on food security and Resilience issues in Pastoral and agro - pastoral systems
- Should have knowledge and experience in gender and women's rights issues.
- Mastery of written and spoken English.

### Application Process

- The consulting firm/ The consultant shall submit of technical and financial proposal
- A sample of relevant written work is also a plus.



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