**Project Title:** Climate smart dairy goat husbandry support systems for improved livelihoods of small-scale dairy farmers

**KCSAP livestock Applied**

<table>
<thead>
<tr>
<th>Value chain</th>
<th>Duration:</th>
<th>Start Date:</th>
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<tbody>
<tr>
<td>Dairy</td>
<td>12 Months (1/10/2020-30/9/2021)</td>
<td>October 2020</td>
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</table>

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**Collaborators and their contacts:**

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3. E. Ilatsia (KALRO-DRI)
4. J.O. Ondiek (Egerton University)

**Reporting Period:** October 2020-September 2021

**Background**

Dairy goats are important for food security and income. In Kenya, dairy goats are fed predominantly on Napier grass and crop residues. Their milk productivity is thus low and ranges from 1.0 to 2.1 litres per goat/day. Their potential milk productivity in temperate countries is better and is estimated to be 4.0 L/goat/day. Supplementation with an energy and a protein source is required to achieve enhanced milk production. Information on milk production following supplementation with protein from a legume and an energy source is however scarce in Kenya. This project aims to investigate the effect of feeding Napier grass as a basal diet and supplementation with various levels of protein from a legume, and energy on milk production in dairy goats.

**Objectives**

1. To develop and test feed supplements based on concentrates and forage legume for milk production and composition from dairy goats.
2. To determine the appropriate feeding levels of feed supplement based on concentrates and forage legume

**Expected Outputs**

1. Feed supplements containing a forage legume for increased milk productivity in dairy goats developed and tested.
2. Different levels of concentrates for increased milk productivity in dairy goats developed and tested.
I ACHIEVEMENTS

**Objective 1:** To develop and test feed supplements based on concentrates and forage legume for milk production and composition from dairy goats.

**Activity 1.1:** Constituting legume and concentrate rations

**Achievements 1.1**

**OVI 1.1** At least one fodder for ration development established on centre by end of 2nd quarter of 1st year of the project (Mar 2021)

**Progress:** One acre of Napier grass and Leucaena each were established on centre.

**OVI 1.2** At least three rations with different compositions developed for testing by end of 3rd quarter of 1st year of the project (Jun 2021)

**Progress:** Five feed rations were constituted after proximate and fibre (Van Soest) analyses of individual feed constituents in March 2021. This followed identification of farms with Leucaena trees in October 2020 and sourcing of 280 kg Leucaena leaf hay in December 2020 and March 2021; 13 bags (90-kg capacity for dry maize) of maize cobs and 10 bags of rice husks in December 2020; and 100 kg each for maize meal, maize germ, cotton seedcake and sunflower seedcake in March 2021.

**OVI 1.3** Feeds analysed for nutrient composition by end of 2nd quarter of 1st year of the project (Mar 2021)

**Progress:** Analyses for dry matter, ash, crude protein, crude fibre, ether extracts, neutral detergent fibre, acid detergent fibre and lignin of the individual feed constituents used for feed constitution was done.

**OVI 1.4** Leucaena leaves being dried at harvesting site by end of 1st quarter of 1st year of the project (Dec 2020).

**Progress:** Leucaena leaves harvested and dried in Ndithini Ward, Machakos County.

**Activity 1.2:** Testing concentrate and legume rations to supplement basal feed

**Achievement 1.2**

**OVI 1.2.1** At least three rations of different compositions tested by end of 3rd quarter of 1st year of the project (Jun 2021)

**Progress:** Five rations with different nutrient composition were tested using 15 dairy goats in a Latin square design, from April-August 2021.

**OVI 1.2.2** A feeding ration based on concentrates and a legume determined for recommendation by end of 4th quarter of 1st year of the project (Sep 2021)

**Progress:** Samples of feeds and feed left-overs were analysed for nutritive properties and an appropriate ration composition determined after the end of feeding experiments.

**Activity 1.3:** Planning and review meeting

**Achievement 1.3**

**OVI 1.3.1** At least one planning meeting held by implementers during project implementation by end of 4th quarter of 1st year of the project (Sep 2021)

**Progress:** A planning and review meeting on the way forward will be held after the results of the feeding experiment are fully analysed.

**Summary of achievements under Objective 1**

A feed supplement for dairy goats containing a legume was constituted and tested, using Napier grass as the basal diet. Results of the daily total dry matter consumption by the goats and milk production
were obtained. Milk composition analysis will be completed when some of the required laboratory standards are obtained.

**Objective 2:** To determine the appropriate feeding levels of feed supplement based on concentrates and forage legume fed to dairy goats.

**Activity 2.1:** Constituting a feed supplement based on the best obtained concentrates composition using a legume

**Achievements 2.1**

OVI 2.1.1 At least three levels of a ration based on concentrates and a legume being tested for milk production.

**Activity 2.2:** Testing levels of concentrate and legume ration to supplement basal feed

OVI 2.2.1 A feeding level of a ration based on concentrates and a legume determined for recommendation

OVI 2.2.2 Milk composition from feeding a ration based on a legume determined.

**Progress:** Activity 2.2 is not yet done, till 2022.

**Summary of Achievements under Objective 2:**

This activity was pending by end of September 2021.

**II Other Achievements**

One Technical report was developed for the period October 2020-April 2021.

**III Constraints and how they were overcome**

- Scarcity of Leucaena trees in KCSAP Wards like Ikombe in Yatta sub-county – Leucaena shrubs were sought from another subcounty and harvesting of the leaf started in Masinga sub-county in Machakos County.

- Competition for the single system of sprinkler irrigation at DRI-Naivasha among the various fodder-growing sites – an arrangement was made such that water pipes and sprinklers were rotated to cover the crops that were in need of water.

- Rains when Leucaena leaves are being dried in the field – more canvases for Leucaena leaf drying and covering in bad weather were acquired.

**IV Summary of funds received**

<table>
<thead>
<tr>
<th>Project Amount (KES)</th>
<th>Amount Received (KES)</th>
<th>Amount Accounted for (KES)</th>
<th>Balance (KES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,975,050</td>
<td>1,380,200</td>
<td>757,700</td>
<td>3,594,850</td>
</tr>
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**IV Way Forward**

- Monitor the performance of Napier and Leucaena established on centre
- Monitor Leucaena harvesting and drying on-farm
• Prepare milk samples for Butter fat, Lactose, and Protein analyses
• Prepare feeds for the subsequent experiment on appropriate feeding levels of identified concentrate.
• Organize a Project Review Workshop
• Prepare appropriate reports and submit to secretariat