PROJECT TITLE: ECOLOGCAL RESTRUCTURING OF MANGO-BASED FARMING AND IMPROVEMENT OF BREEDING AND FEEDING PRACTICES FOR SUSTAINED GOAT PRODUCTION

Study 1 – Integration of Goat and Cash Crops with Mango for Enterprise Value Adding
2 – Ecological Pest management for Mango-Goat-Crop Mixed

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Problem/
Objectives: Tropical farming systems nowadays are mostly unbalanced which lead to loss of equilibrium and environmental deterioration. Therefore, this study generally aimed to determine the optimal mango-goat-crop mixed that could increase the crop yield in a Mango-Goat-Crop mixed and minimize pests to improve plant growth and increase crop yield.

Specifically:
   a. To determine the growth and yield of performance of cash crops grown under mango with goat integration,
   b. To develop/validate "green technologies" appropriate for the system and probable "model" for technology transfer and
   c. To determine the farm size that can generate a family income that could support a decent living.

Significance: Increased growth and yield of crops is the goal of every farm, and at the same time improved animal production (specifically in terms of breeding and feeding of goats).   Thus**,** this study is necessary to determine the optimal set-up for mixed farming system (specifically for mango and goat) as well as the management in controlling pests.

Methodology:

Mango seedlings having a height of about two meters will be planted in an area of 16,200 square meters. The distance of planting will be 10m x 10m between trees and the area per plot will be 900 square meters. Before planting the mango seedlings, a 0.5 x 0.5m hole will be dug to a depth of 0.70m. This will be placed with 5kg compost organic fertilizer to serve as the base of the hole to facilitate easy penetration of roots at the same time source of nutrients for easy establishment. The mango seedlings will be sprayed with compost/vermin tea of known nutrients and concentration. Before the onset of the rainy season, 3 kg of compost organic fertilizer will be applied.

There will be eight (8) trees per treatment and the number of goats prescribed per treatment will be integrated. The treatment combinations will be replicated two (2) times and will be fitted in a Randomized Complete Block Design:

The treatments are as follows:

I.   8 mango trees with 2 goats + rice-rice rotation
II.   8 mango trees with 2 goats + rice-vegetable rotation
III.   8 mango trees with 2 goats + rice-legume rotation
IV.   8 mango trees with 3 goats + rice-rice rotation
V.   8 mango trees with 3 goats + rice-vegetable rotation
VI.   8 mango trees with 3 goats + rice-legume rotation
VII.   8 mango trees with 4 goats + rice-rice rotation
VIII.   8 mango trees with 4 goats + rice-vegetable rotation
IX.   8 mango trees with 4 goats + rice-legume rotation

The study will use 54 upgraded female goats about 4-5 months of age with approximately similar body weight. These will be integrated in the mango-cash crop mix based on the above treatments. The goats will occupy half of the plot (approximately 400 sq. m.) This will be fenced and a temporary house will be constructed in each plot according to their floor space requirement. The area will be planted with grass and orage legumes at 70-30 ratio for grazing purposes. The biomass production will be quantified using a plant imager and will be validated using a 2m x 2m quadrant.

The growth performance of the animals will be monitored and evaluated. Feed offered will be weighed and orts will be collected in the morning of the following day. Feed and fecal samples will be analyzed for nutrient composition.

Three bucks will also be used in the breeding practices as the female does reached their breeding age. These will be trained for semen collection. Collection will be done twice a week and the ejaculates will be evaluated in the laboratory. Normally cycling does will be artificially inseminated using fresh extended semen. (Extender to be used: Skim Milk Extender and the IIlini Variable Temperature Extender (IVT)

Semi-intensive system will be followed and the "cut and carry" system will be employed in addition to the undergrowth available for grazing. Multi-purpose trees (MPTs) will be planted around the area to serve as additional source of feeds for the animals. If the supply of forage is not enough, concentrate feeds will be used as supplement at about 25% of the dry matter requirement.

The use of estrus synchronization could be done as Part 2 of this study to develop a controlled breeding program for the animals. The animals to be used in this study are the expected progenies from the females in Study I which will reach age of breeding 3-4

months after the start of the first study and the assumption that there will be 18 kids born after a year. Thus, this study will be conducted on the second year of the project. he same management practices will be employed to all the animals with "cut and carry" feeds.

The study will determine an economic farm size that can support a decent family living.

Data to be collected will be statistically analyzed using Completely Randomized Block Design and Treatment means will be compared by Duncan's Multiple Range Test (DMRT).

Data to be gathered:

1. Initial weight of the animals
2. Average daily gain in weight
3. Final/marketable weight
4. Forage biomass
5. Feed conversion ratio
6. Cost and return analysis
7. Reproductive performance of the inseminated does
    a. Conception rate
    b. Kidding/litter size
    c. Kidding interval
    d. Kids male to female ratio
    e. Birth weight
    f. Weaning weight
    g. Pre-weaning mortality
    h. Post-weaning mortality

Expected Output:

1. Improved/increased daily gain in weight of the growing goats
2. Increased final/marketable weight attained
3. Higher forage biomass collection for animal feeds
4. Efficient conversion of feed to animal weight
5. Family farm size that can support decent living
6. Increased growth and yield of crops

Proposed Budget