



# Processed Croton (*Croton megalocarpus*) Nuts as an Alternative Feed Resource for Increased Ruminant Productivity in the ASALs

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# Challenges Affecting Livestock Production



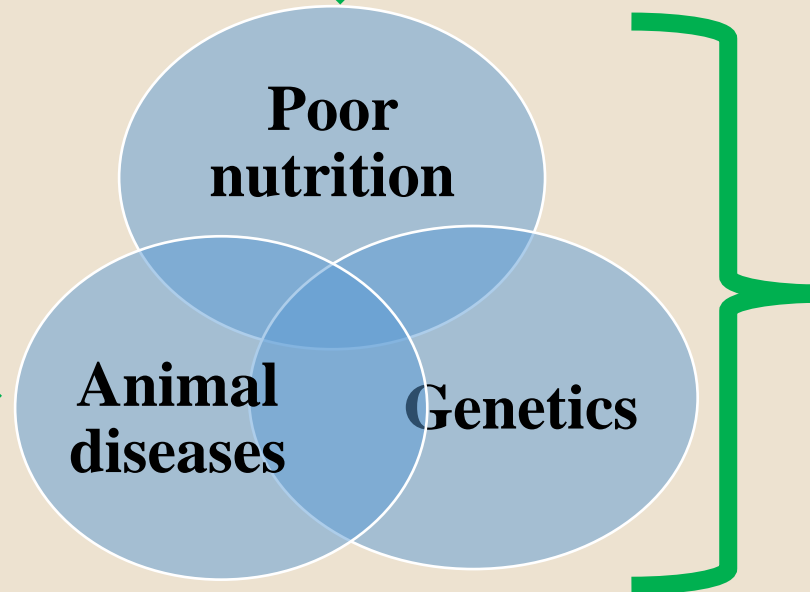
**Climate change**



**Feed Scarcity**

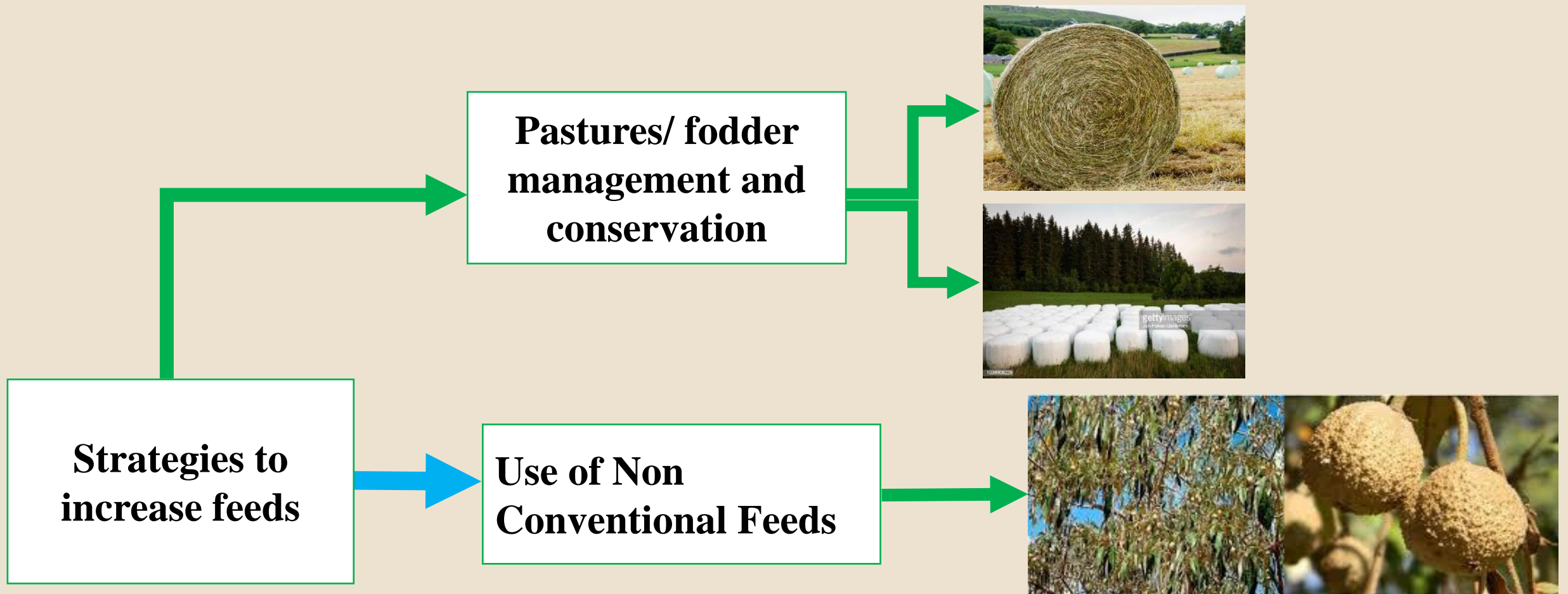


**Vectors**



- **Decreased production: meat, milk, wool etc**
- **Poor growth rates**
- **Mortalities- especially due to starvation and increased diseases**

# Strategies to Increase Feeds



# Study Objectives

## Overall

- To evaluate the nutritive value of croton nuts as an alternative ruminant feed

## Specific

1. To determine the nutritional composition of the various forms of Croton nuts
2. To assess *in vitro* gas production of various forms of *Croton* nuts

# Materials and Methods

## A) Croton Nut Processing

1



2



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# Materials and methods...

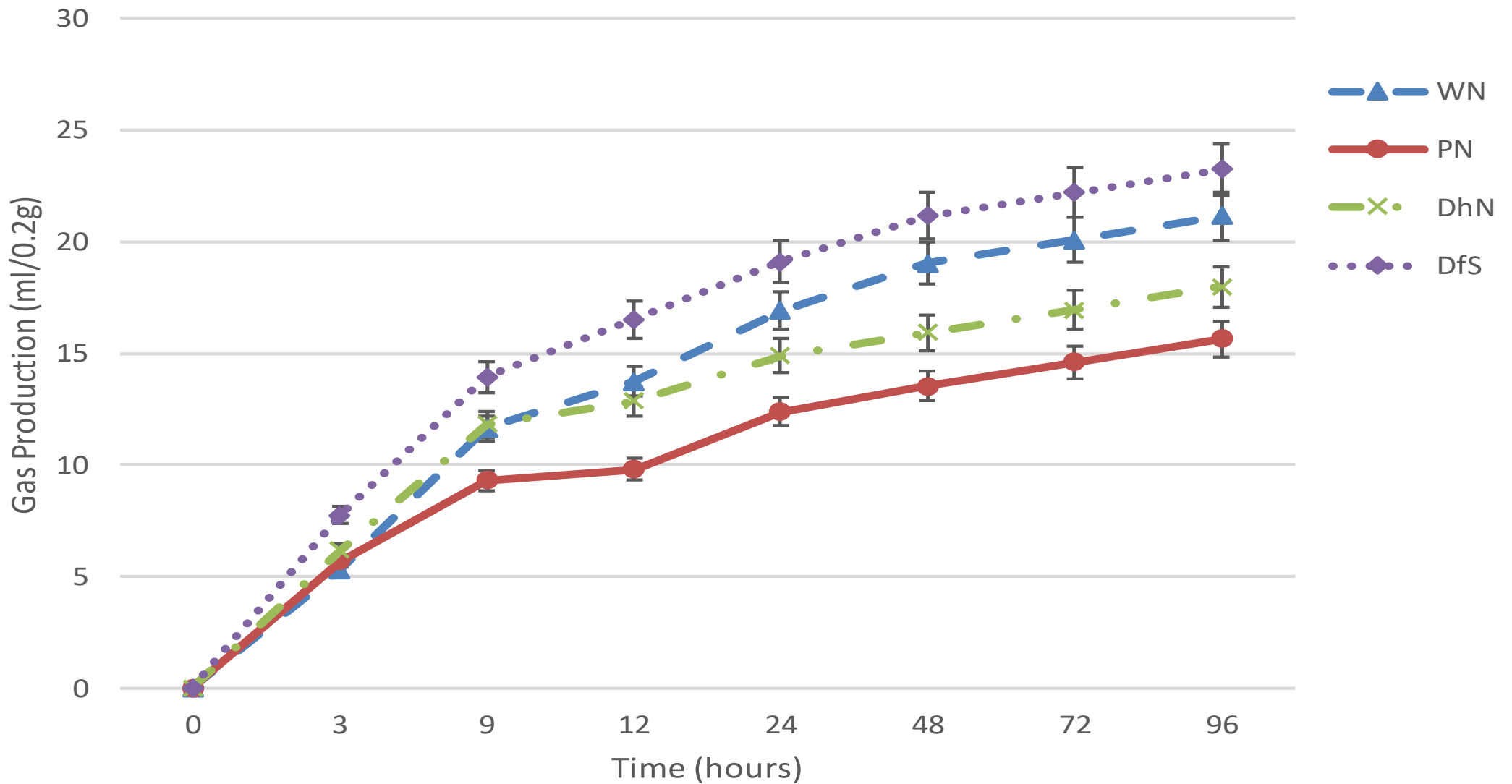
## B) Proximate analysis and *In vitro* gas Production

- Rumen liquor was drawn in the morning and strained through four layers of cheese cloth into a pre-warmed, vacuum flask and kept at 39°C under CO<sub>2</sub> atmosphere
- 0.2 grams of the sample was placed in 30ml of rumen liquor and buffer in the ratio of 1:2 incubated in 100ml calibrated glass syringes pre-warmed to 39°C
- Gas production readings were recorded after 3, 9, 12, 24, 48, 72 and 96 hours of incubation

## Results for Proximate Composition

Nutritional parameter	WN	PN	DhN	DfS	SEM
DM	89.3 <sup>a</sup>	96.3 <sup>b</sup>	91.7 <sup>c</sup>	91.9 <sup>c</sup>	0.7632
CP	8.9 <sup>a</sup>	8.0 <sup>a</sup>	15.8 <sup>b</sup>	19.8 <sup>c</sup>	1.4876
CF	52.2 <sup>a</sup>	57.9 <sup>b</sup>	33.6 <sup>c</sup>	47.6 <sup>a</sup>	2.7479
EE	18.5 <sup>a</sup>	17.5 <sup>a</sup>	36.3 <sup>b</sup>	11.3 <sup>c</sup>	2.8241
Ash	5.9 <sup>a</sup>	2.3 <sup>b</sup>	2.4 <sup>b</sup>	3.8 <sup>c</sup>	0.4496
NFE	14.3 <sup>a</sup>	14.3 <sup>a</sup>	12.0 <sup>a</sup>	17.5 <sup>a</sup>	0.8477
GE (MJ/kg)	18.1	17.3	21.1	19.3	0.8261

# Results for In vitro Gas Production





## Results for In vitro gas production (ml gas/0.2g dry matter)

Gas production parameters <sup>1</sup>	WN	PN	DhN	DfS	SEM
<b>a</b>	<b>1.4<sup>a</sup></b>	<b>4.2<sup>a</sup></b>	<b>2.4<sup>a</sup></b>	<b>3.7<sup>a</sup></b>	<b>0.4656</b>
<b>b</b>	<b>18.6<sup>a</sup></b>	<b>10.6<sup>b</sup></b>	<b>14.3<sup>ab</sup></b>	<b>18.4<sup>a</sup></b>	<b>1.2813</b>
<b>a+b</b>	<b>20.1<sup>ab</sup></b>	<b>14.9<sup>a</sup></b>	<b>16.8<sup>ab</sup></b>	<b>22.2<sup>b</sup></b>	<b>1.1331</b>
<b>c</b>	<b>0.08<sup>a</sup></b>	<b>0.06<sup>a</sup></b>	<b>0.10<sup>a</sup></b>	<b>0.08<sup>a</sup></b>	<b>0.0070</b>

## Results for In vitro gas production (ml gas/0.2g dry matter)

Gas production parameters	WN	PN	DhN	DfS	SEM
OMD	34.1 <sup>ab</sup>	29.8 <sup>a</sup>	35.3 <sup>b</sup>	41.0 <sup>c</sup>	1.5416
ME (MJ/Kg)	5.0 <sup>a</sup>	4.3 <sup>a</sup>	5.1 <sup>a</sup>	5.9 <sup>b</sup>	0.2189
DMI (kg/day)	2.6 <sup>a</sup>	3.8 <sup>a</sup>	2.8 <sup>a</sup>	3.6 <sup>a</sup>	0.2260
SCFA (mmol/L)	0.37 <sup>a</sup>	0.27 <sup>ab</sup>	0.32 <sup>ab</sup>	0.41 <sup>b</sup>	0.0224

## Conclusion and/Recommendations

- Processing improved the nutritional composition and ruminal degradability of the various forms of croton nut
- Enhanced energy, protein, mineral and degradability profiles in DhN and DfS compared to WN and PN
- DhN and DfS forms could be used in improving ruminant production in the ASALS
- Ruminant feeding trial to assess palatability, level of intake and production performance of ruminants fed on croton nuts is necessary

# Acknowledgements

1. Kenya Climate Smart Agriculture Project (KCSAP) for funding the research
2. Maseno University for providing a conducive learning environment
3. County Government of Laikipia for granting me the study leave