

Introduction:

- Climate change is a global issue
- Ruminants emit methane
- They contribute to climate change
- Nigeria has very large ruminant pop
- Largest small ruminant pop in Africa
- Nigeria recently signed the GMP
- Needs to ↓ GHGs including CH₄
- Also needs to report GHG inventory
- Lack of data on methane emissions
- Lack of measurement tools

Aims:

- To estimate CH₄ emission of Yankasa sheep
- To assess the use of high concentrate diet as a CH₄ reduction strategy.



Fig 1. Yankasa sheep



Fig 2. Portable accumulation chambers

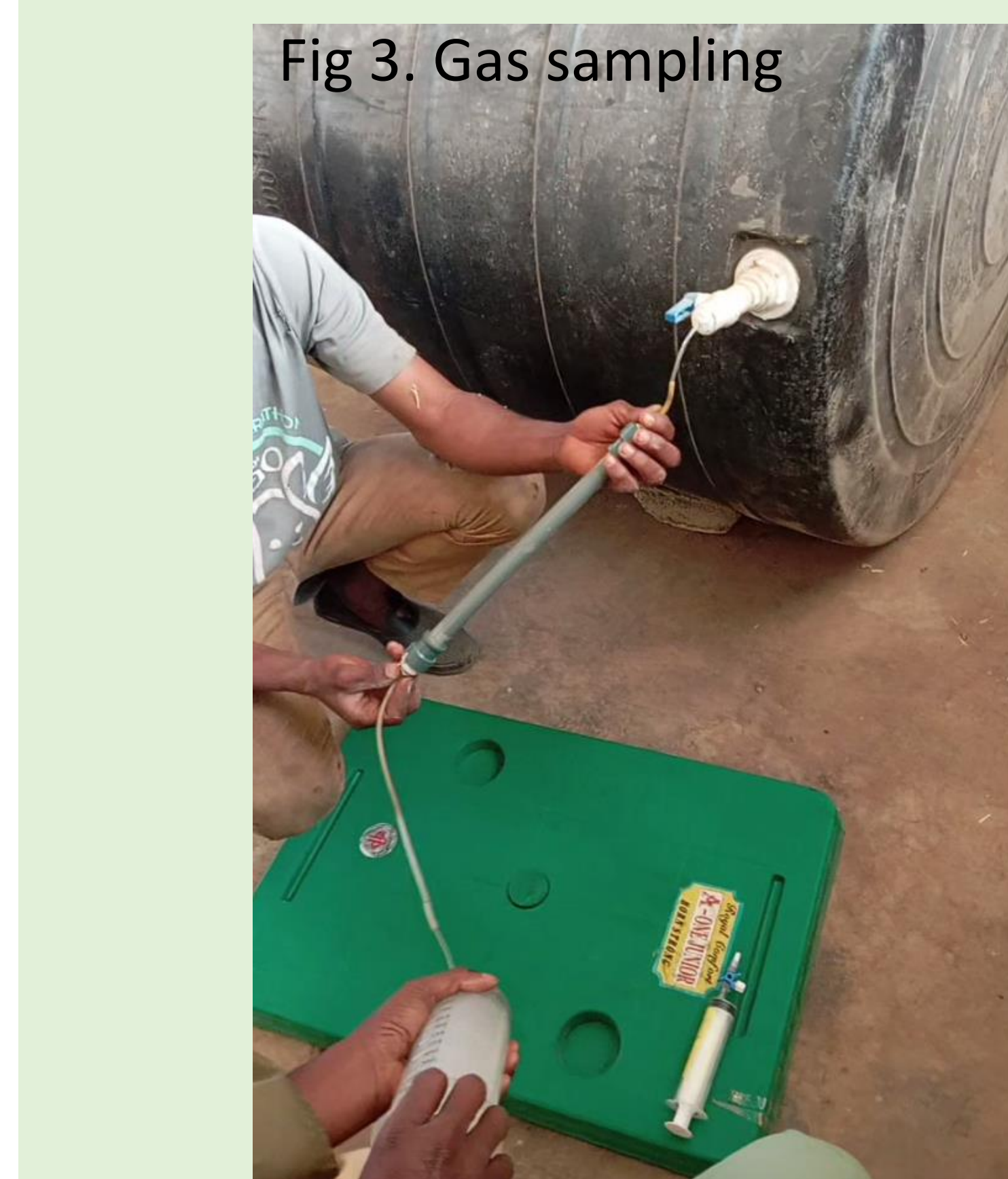


Fig 3. Gas sampling

Methodology:

- 8 Yankasa weaner rams: 20.08 kg
- Divided into two treatment groups:
 - HCD (50:50 forage to concentrate)
 - LCD (73:27 forage to concentrate)
- Fed for 84 days
- CH₄ measured in last week of Exp
- Measurement of methane using:
 - Portable accumulation chamber
- Used two spot sampling protocols:
 - Single spot – 1pm
 - Four spots – 7am, 1pm, 7pm & 1am
- Sampling replicated twice
- Animals sampled for 30 minutes
- Gas samples pooled & stored in vials
- CH₄ conc analysed with SRI GC.

Results:

Table 1: Effect of diets on methane production

Parameters	Diets		p-values
	HCD	LCD	
Body weight (kg)	30.48±3.01	26.98±4.00	0.040
Single spot			
DMI (kg)	0.81±0.11	0.68±0.19	0.118
CH ₄ /Day (g/Day)	29.18±3.66	23.26±3.78	0.009
CH ₄ /BW ^{0.75} (g/kg)	2.25±0.20	1.99±0.38	0.107
CH ₄ /DMI (g/Day)	36.22±3.74	36.76±10.70	0.916
Four spots			
DMI (kg)	1.00±0.12	0.89±0.19	0.203
CH ₄ /Day (g/Day)	23.84±2.89	20.39±2.09	0.007
CH ₄ /BW ^{0.75} (g/kg)	1.84±0.13	1.73±0.12	0.113
CH ₄ /DMI (g/kg)	23.86±1.09	23.55±3.82	0.835
CH ₄ /ADG (g/kg)	198.48±15.02	272.05±63.41	0.083

- Higher feed intake in HCD
- Higher weight gain in HCD
- Higher daily CH₄ emissions in HCD
 - mainly due to higher feed intake
- Results similar for the two protocols
- CH₄ intensity lower in HCD
 - higher prod = lower CH₄ intensity
- Yankasa CH₄/Day = **22.11 g/Day**.

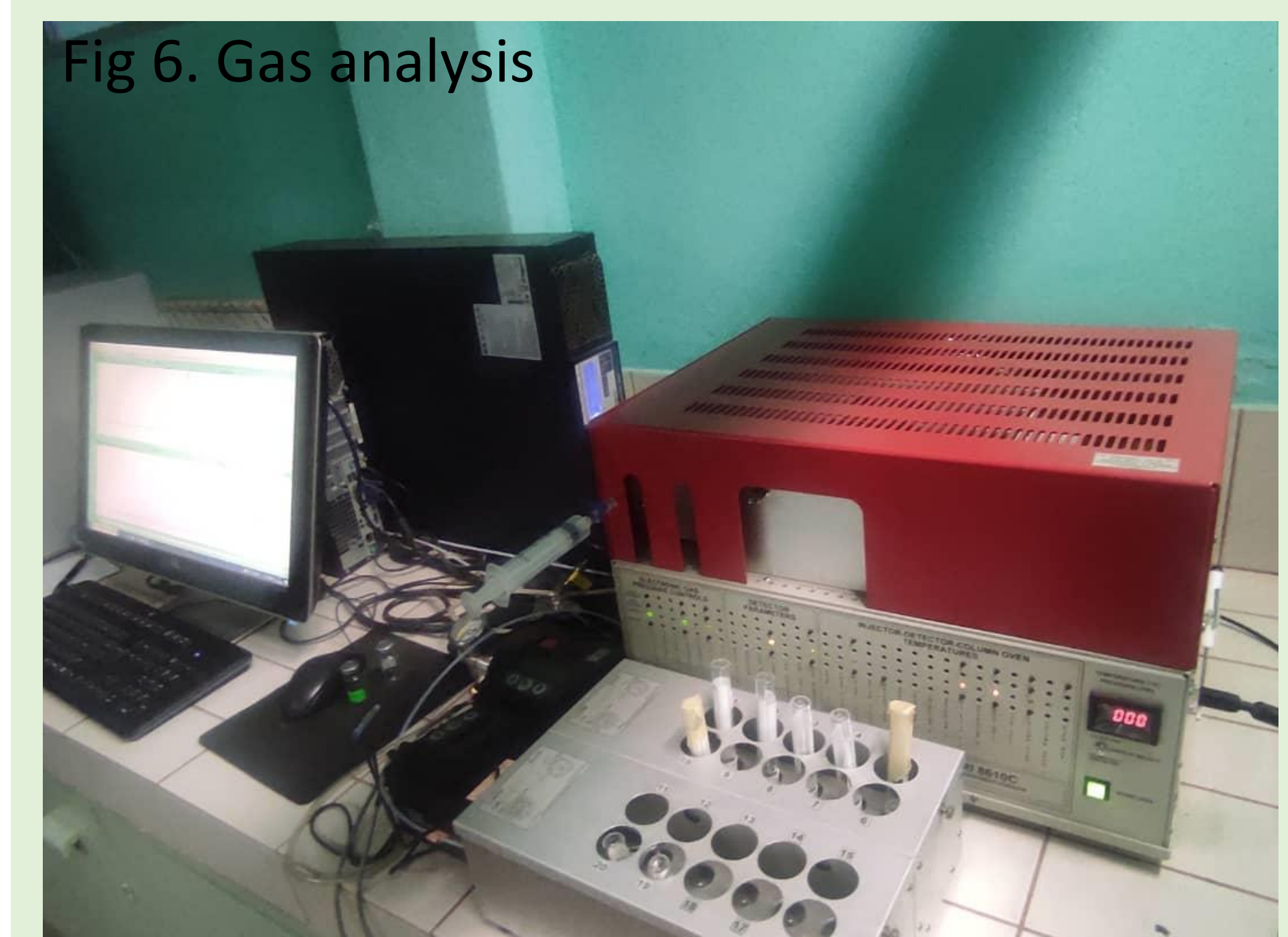
Fig 4. Gas pooling



Fig 5. Gas storage



Fig 6. Gas analysis



Discussion:

Breed	Body weight (kg)	DMI (kg)	CH ₄ /Day (g/Day)	CH ₄ /BW ^{0.75} (g/kg)	CH ₄ /DMI (g/kg)	Authors
Djallonke	22.9	0.61	18.9	1.8	30.9	Ouermi et al., 2024
Maasai	24.8	0.63	14.6	1.3	23.3	Mwangi et al., 2023
Dorper	26.8	0.66	17.4	1.5	26.4	Mwangi et al., 2023
Menz	24.8	1.09	17.8	1.6	16.3	Bekele et al., 2025
Yankasa	28.73	0.99	22.11	1.8	22.6	This study

- Yankasa CH₄ emissions similar to that of other Africa breeds
- CH₄ emissions mainly driven by feed intake & body weight.

Conclusions:

- HCD led to ↑ CH₄/Day but also ↓ CH₄/ADG
- Yankasa CH₄/Day = 22.11 g/Day
- PAC can discriminate between dietary treatments
- PAC can be used to estimate daily CH₄ emissions.