



**Effect of plant density and mineral fertilizer application
on yield and yield components of two groundnuts
(*Arachis hypogaea* L) varieties
in Northern Mozambique**

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Putting nitrogen fixation to work for smallholder farmers in Africa

OUTLINES



BACKGROUND

OBJECTIVES

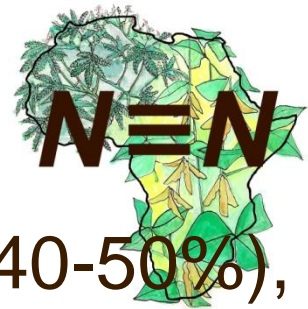
METODOLOGIES

RESULTS AND DISCUSSIONS

CONCLUSIONS

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BACKGROUND



- Groundnut as legume is a source of oil (40-50%), protein (20-40%) and carbohydrates (10-20%) for human food, animal feed and industrial raw materials.
- G/nut has ability to fix atmospheric nitrogen and provide residual nitrogen to subsequent crop.

BACKGROUND



- Potential g/nut grain yield in Mozambique is as high above 4 t/ha, but several biotic and abiotic constraints reduce it as low as 200 kg/ha in smallholder farmers' fields
- Biotic factors that cause yield reduction are insect pests, disease and parasitic weeds.
- The abiotic factors that cause yield reduction are drought, low opportunity of market, low soil fertility, low seed quality and poor agronomic practices.

OBJECTIVES

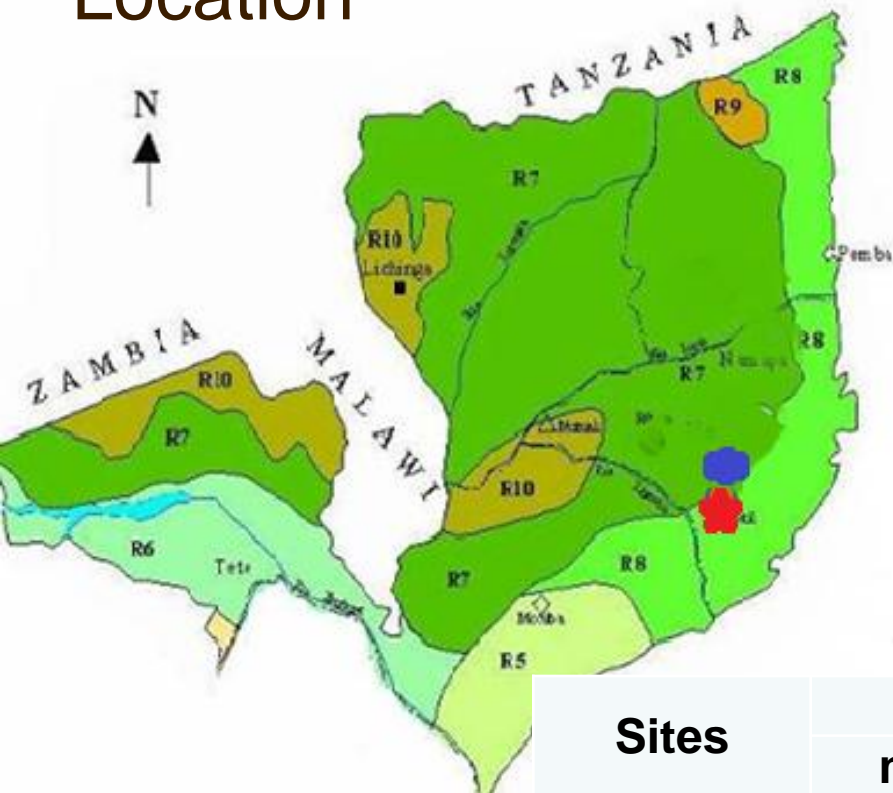


- To assess the response of groundnuts to the application of P, lime and starter N.
- To determine the effect of planting densities and their interactions with P and lime on groundnuts yield and yield components.

METODOLOGIES



Location



★ Muriaze site with 377m above sea level, 15.28°S latitude and 39.32° E Longitude

★ Nametil site with 161m above sea level, 15.740S latitude and 39.380 E Longitude

Sites	K	Org_ C	P	pH
	mg/kg	%	mg/kg	Water
Nametil	29.84	0.38	1.49	5.77
Muriaze	99.13	1.21	2.35	6.18

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METODOLOGIES



- Varieties:
 - Mamane virginia type
 - Nametil spanish type

- Mineral fertilizes rates:
 - P 20 kg/ha in the form of SSP
 - N 40 kg/ha in the form of Urea
 - Lime 1000 kg/ha (Dolomitic lime)

- Row spacing:
 - 50x15 cm (133,333 plts/ha)
 - 75x20cm (66,667 plts/ha)

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RESULTS AND DISCUSSIONS

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Effect of Sites, Varieties, Row spacing and Mineral fertilizers on pod load, SDM and Yield



Sites	Pod load	SDM (g/plt)	Yield (t/ha)
Muriaze	29 a	20.8 b	1.28 b
Nametil	18 b	23.9 a	3.77 a
Varieties			
nametil	24 a	19.8 b	2.69 a
mamane	23 a	24.9 a	2.34a
Row spacing			
50x15	19 b	19.2 b	1.11 b
75x20	27 a	24.7 a	3.58 a
Mineral fertilizes			
None	20 c	17.8 c	1.74 b
P	24 b	22.6 b	2.24 b
P+lime	23 b	23.8 b	3.11 a
P+lime+Urea	29 a	27.7 a	3.48 a

3 WAYS ANOVA

Row spacing (R.)	p<0.0001
Sites (S)	p<0.0001
Treatemts(T)	p<0.0022
TxR Interaction	p<0.0074
SxT Interaction	p<0.0009
SxTxR Interaction	p<0.0001



mamane



mamane+P



mamane+P+Lime

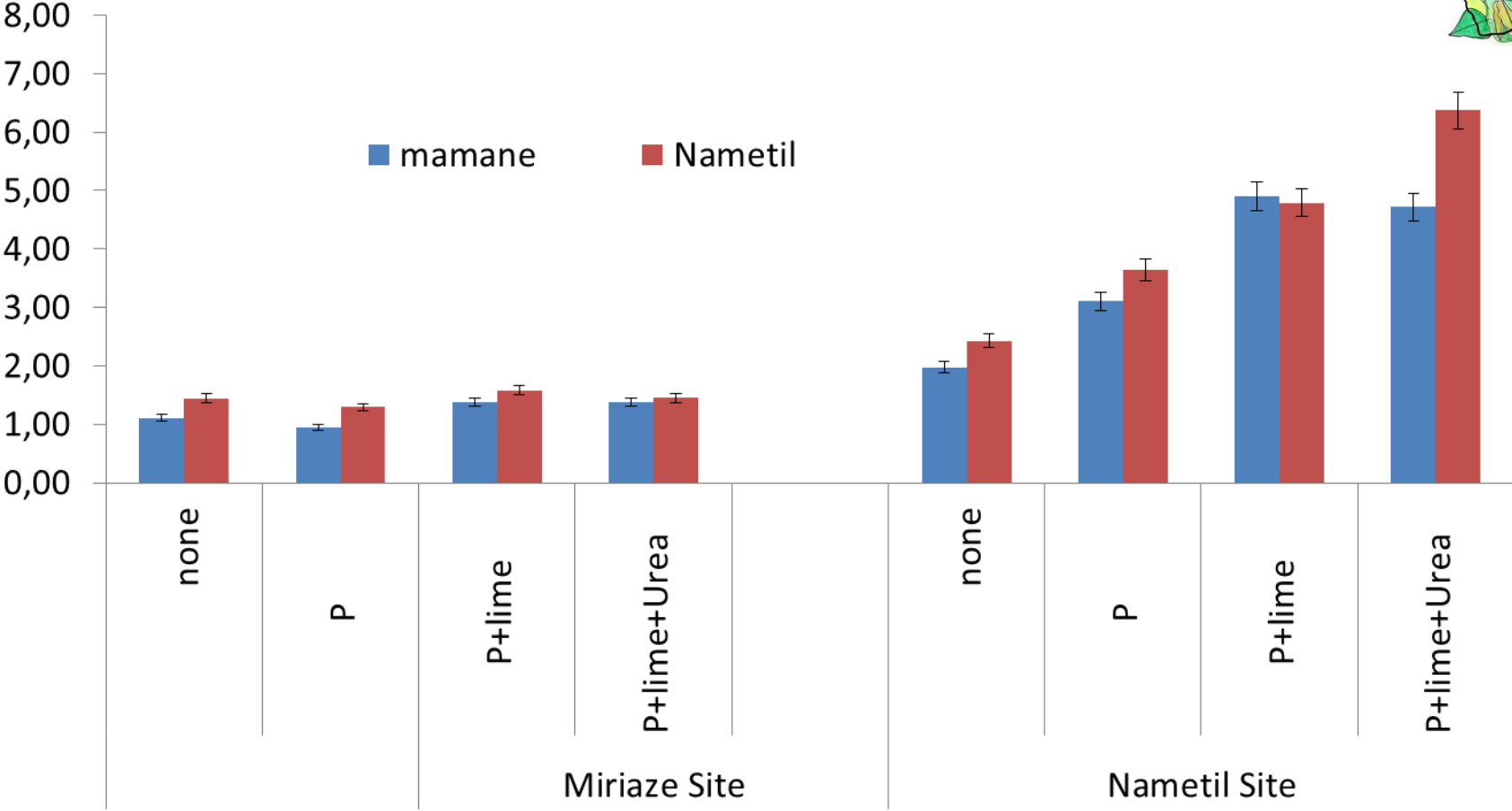


mamane+P+Lime +Urea

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Mean yield (ton/ha) of mamane and nametil varieties with mineral fertilizers across the two sites (Muriaze and Nametil).

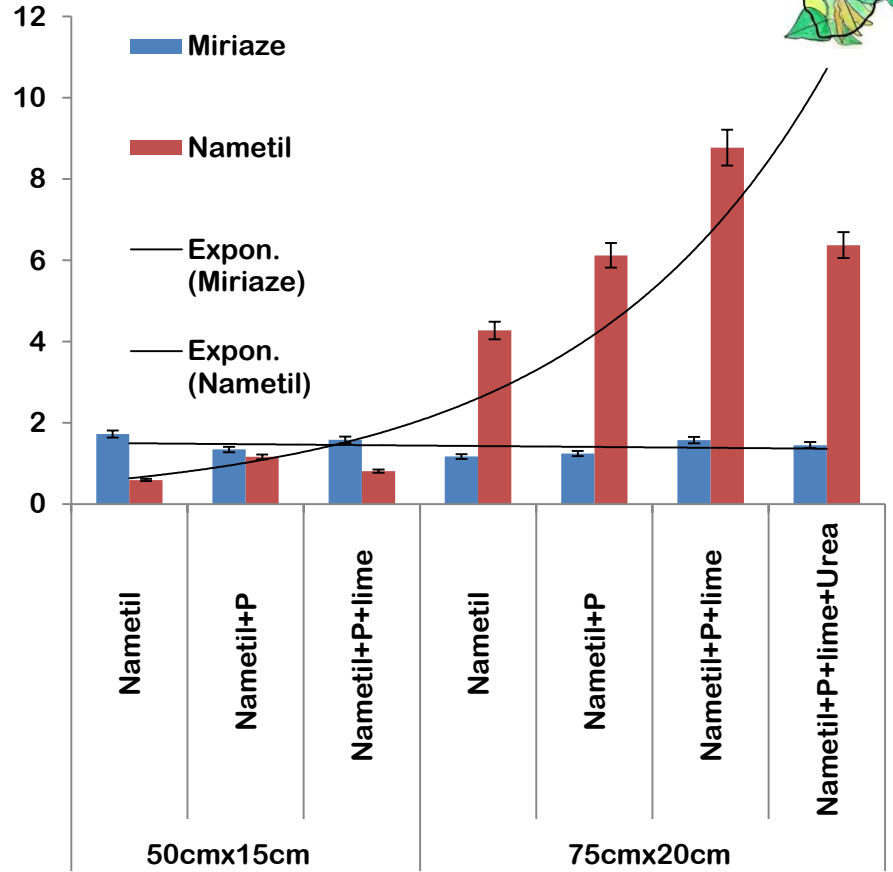
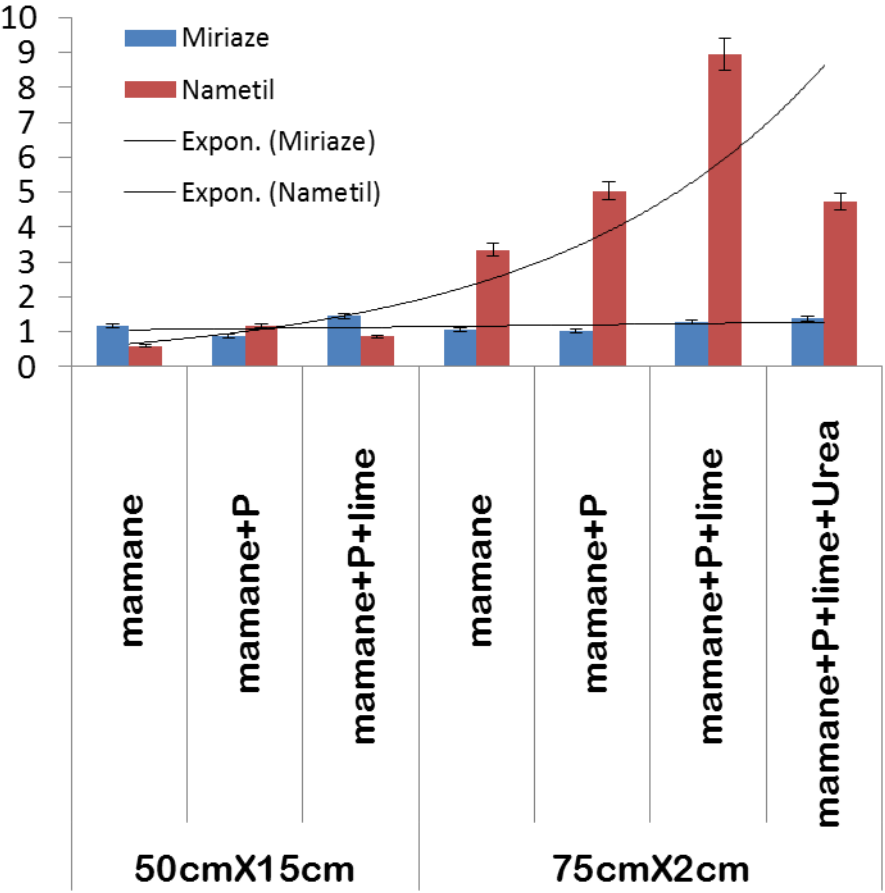


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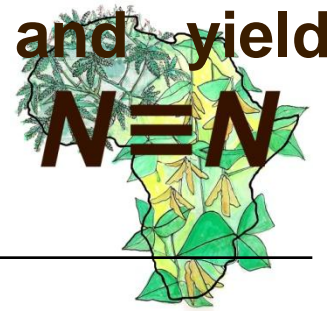
NEN

Mean yield (ton/ha) of the mamane and nametil varieties with mineral fertilizers in both row spacing across the two sites (Muriaze and Nametil)



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Correlation coefficient of growth parameters and yield component with grain yield across the sites



Yield components /growth parameters	Sites	
	Muriaze	Nametil
Grain yield (ton/ha)	1	1
seed size (g)	0.010	0.506
Pod load	0.089	0.078
Nodule No/plt	0.116	0.150
100-nodule weight (g)	0.004	0.217
Shoot biomass (g/plt)	0.260	0.017
Root biomass (g/plt)	0.184	0.659
Root Shoot Ratio (RSR)	-0.395	-0.708
Plant height (cm)	-0.283	-0.489
Rosette infest (%)	-0.352	-0.019
Empty pod No/plant	-0.453	-0.043
Shelling (%)	-0.441	-0.206
50% of Flowering days	-0.278	0.587

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Conclusion



- The treatments performed significantly different within each site and the performance was consistent across sites. Nametil site gave high yield (3.77 ton/ha).
- Row spacing and mineral fertilizer, played an important role in phenotypic expression of grain yield, yield components and plant growth parameters of groundnut.

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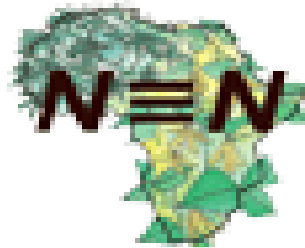
Conclusion



- Combined application of P and Lime improved yield of groundnut varieties. Treatment effect was more pronounced Nametil site.
- The correlation analysis showed that yield component and growth parameters were positively correlated with grain yield at all sites.
- The grain yield was significantly reduced due to the reduction of yield components and plant growth parameters that were also significantly reduced by when P and lime was not used and/or when a planting density of 50x15cm was used.

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ACKNOWLEDGEMENTS



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THANK YOU FOR LISTENING
