

TRIAL RESULTS

RICE

SOUTHERN HIGHLANDS, TANZANIA (2016)

HIGHLIGHTS

925 kg ha⁻¹ greater yield compared to N + P.

787 kg ha⁻¹ increase at maximum yield over MOP.

Increased economic benefit by US\$613/ha over MOP.

OVERVIEW

- Rice is one of the primary staple crops in the world. In production area, Tanzania ranks 17th globally and third in Africa.¹
- Smallholder farmers often apply a limited amount of fertilizers, which frequently do not include potassium.

TRIAL OBJECTIVE

To assess rice response to POLY4 fertilization and its effect on crop’s yields compared to other fertilizer blends in Southern Highlands of Tanzania.

PARTNER: Selian Agricultural Research Institute

LOCATION: Southern Highlands

YEAR: 2016

METHODOLOGY

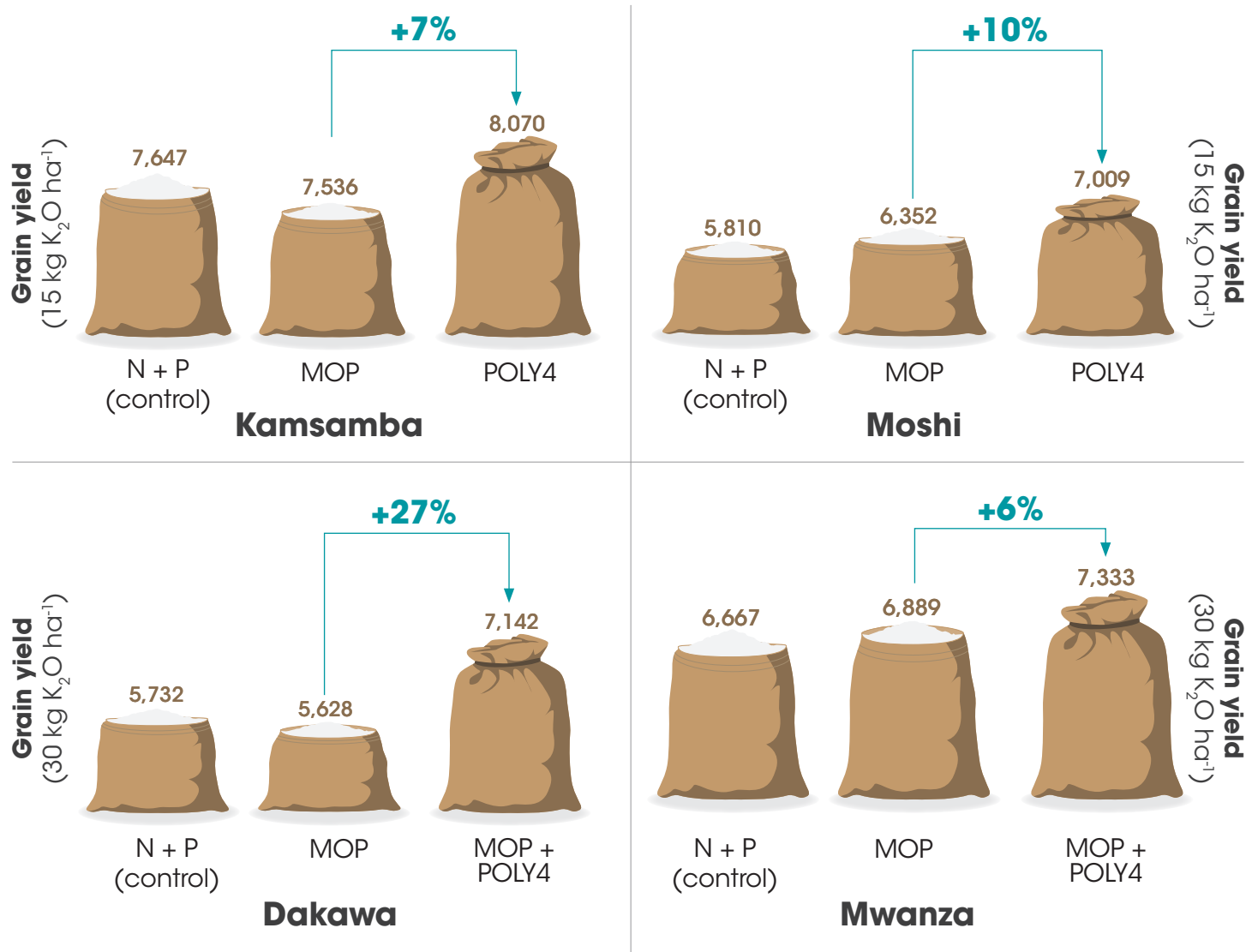
- A field experiment was conducted at four sites in the largest rice-growing region of Tanzania.
- Tanzanian exchangeable soil K is widely variable² ranging from <8 to >800 mg kg⁻¹. Sites were chosen to represent this range.³
- Each trial was a randomised block design with four replicates.

TREATMENT TABLE³⁻⁵

Treatment	Average nutrients applied (kg ha ⁻¹)					
	N	P ₂ O ₅	K ₂ O	CaO	MgO	S
N + P (control)	120	60	0	0	0	0
POLY4	120	60	15	18	6	20
MOP + POLY4	120	60	30	16	6	18
MOP + POLY4	120	60	45	11	4	12
MOP	120	60	15	0	0	0
MOP	120	60	30	0	0	0
MOP	120	60	45	0	0	0



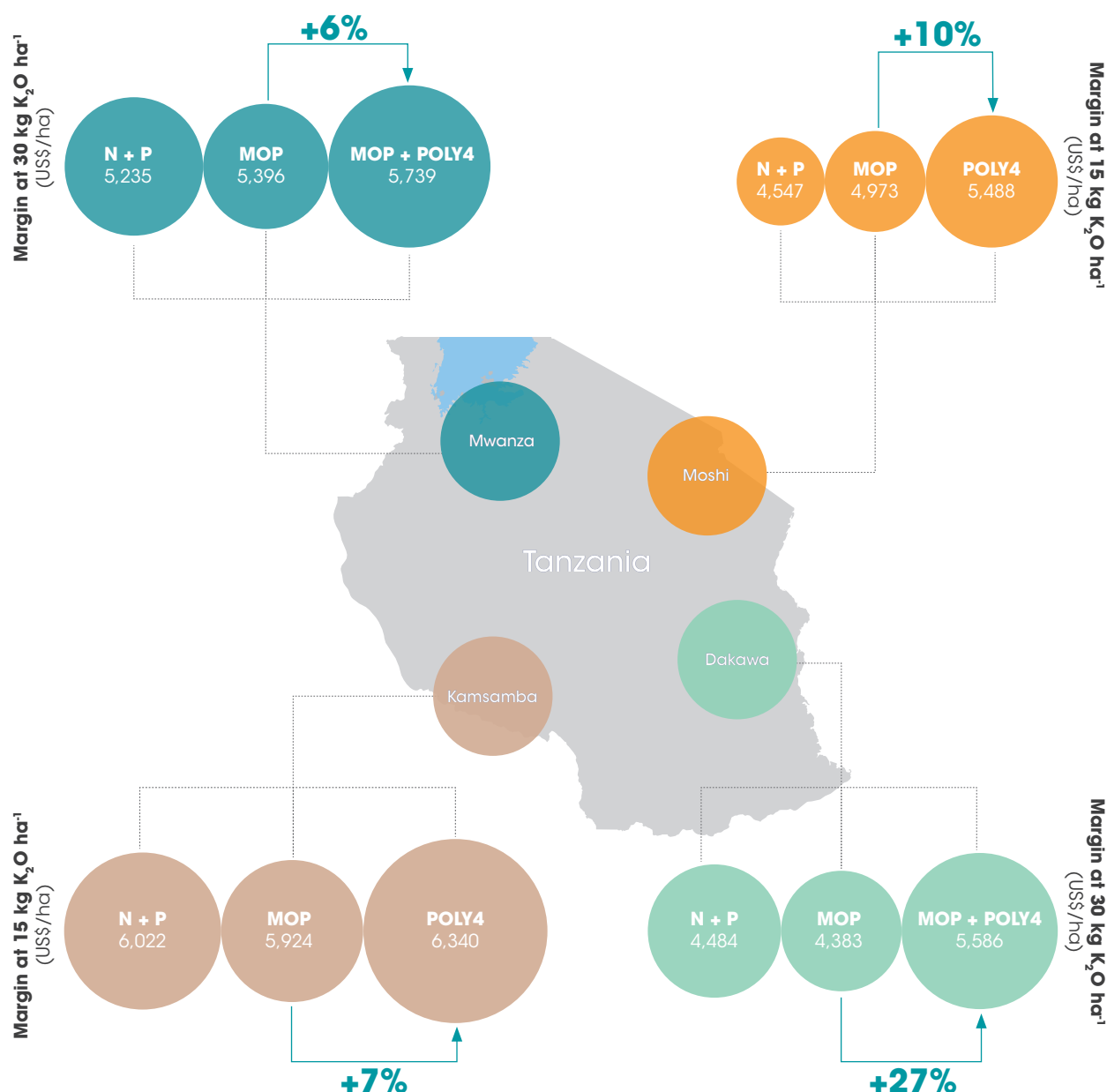
GRAIN YIELD IMPROVEMENT OVER MOP-K³⁻⁵



- Grain yield is presented for the K₂O application that achieved maximum yield.
- At two of the four sites MOP had lower yield than N + P (control) and, on average, only increased yield by 137 kg ha⁻¹.
- Average rice yield was 925 kg ha⁻¹ greater when fertilized with POLY4 compared to N + P (control).
- Inclusion of POLY4 in the fertilizer plan produced the largest yield at all four sites.
- At maximum yield, POLY4 increased yield on average by 12% compared to MOP (+787 kg ha⁻¹).



INCREASED ECONOMIC BENEFIT⁶⁻⁸



- MOP increased fertilizer margin at two of the four sites compared to N + P (control). On average, adding MOP increased margin by US\$97/ha.
- Including POLY4 in the fertilizer plan increased fertilizer margins at all sites. On average, adding POLY4 increased fertilizer margin by US\$619/ha compared to MOP and US\$716/ha compared to N + P (control).

Notes: 1) FAOSTAT (2016); 2) Meliyo *et al* (2015) Variability of exchangeable potassium in soils of Tanzania: A soil fertility challenge for sustainable crop production; 3) Initial soil analysis: Dakawa: pH 6.0, 8 mg P kg⁻¹, 417 mg K kg⁻¹, 9 mg S kg⁻¹; Kamsamba: pH 6.8, 6 mg P kg⁻¹, 768 mg K kg⁻¹, 9 mg S kg⁻¹; Moshi: pH 6.5, 13 mg P kg⁻¹, 1022 mg K kg⁻¹, 5 mg S kg⁻¹; Mwanza: pH 7.0, 7 mg P kg⁻¹, 534 mg K kg⁻¹, 8 mg S kg⁻¹; 4) All plots except control received 120 kg N ha⁻¹ from urea in two application times; 5) Genstat ANOVA means presented; 6) Fertilizer costs: urea = US\$290/t; DAP = US\$441/t; MOP = US\$337/t; POLY4 = US\$200/t; fertilizer spreading cost = US\$3.64/ha; 7) Sale price for rice: US\$803/t; 8) Fertilizer margin is the output minus cost of fertilizer material and spreading.

Source: Selian Agricultural Research Institute, Tanzania 25000-SOH-25011-16

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