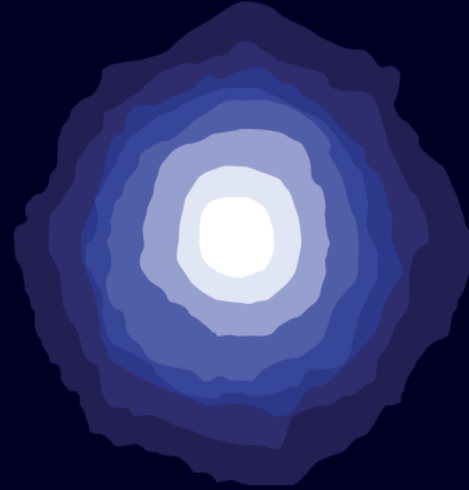


# SIRIUS

MINERALS PLC



*THE FUTURE OF  
FERTILIZER*

Tanzania Corn – Southern Highlands  
December 2016

# Important notices



## **BASIS CPD Points - PN/52112/1516/h**

This document is produced for information only and not in connection with any specific or proposed offer (the "Offer") of securities in Sirius Minerals Plc (the "Company"). No part of these results constitutes, or shall be taken to constitute, an invitation or inducement to invest in the Company or any other entity, and must not be relied upon in any way in connection with any investment decision.

An investment in the Company or any of its subsidiaries (together, the "Group") involves significant risks, and several risk factors, including, among others, the principal risks and uncertainties as set out on pages 28 to 30 of the Company's 2015 Annual Report and other risks or uncertainties associated with the Group's business, segments, developments, regulatory approvals, resources, management, financing and, more generally, general economic and business conditions, changes in commodity prices, changes in laws and regulations, taxes, fluctuations in currency exchange rates and other factors, could have a material negative impact on the Company or its subsidiaries' future performance, results and financial standing. This document should not be considered as the giving of investment advice by any member of the Group or any of their respective shareholders, directors, officers, agents, employees or advisers.

Any Securities offered for sale by the Company will not be registered under the U.S. Securities Act of 1933 (the "Securities Act") and may only be offered and sold pursuant to an exemption from, or in a transaction not subject to, such registration requirements and applicable U.S. state securities laws.

Unless otherwise indicated, all sources for industry data and statistics are estimates or forecasts contained in or derived from internal or industry sources believed by the Company to be reliable. Industry data used throughout this document was obtained from independent experts, independent industry publications and other publicly-available information. Although we believe that these sources are reliable, they have not been independently verified, and we do not guarantee the accuracy and completeness of this information.

The information and opinions contained in this document are provided as at the date of this document and are subject to amendment without notice. In furnishing this document, no member of the Group undertakes or agrees to any obligation to provide the recipient with access to any additional information or to update this document or to correct any inaccuracies in, or omissions from, this document which may become apparent.

This document contains certain forward-looking statements relating to the business, financial performance and results of the Group and/or the industry in which it operates. Forward-looking statements concern future circumstances and results and other statements that are not historical facts, sometimes identified by the words "believes", "expects", "predicts", "intends", "projects", "plans", "estimates", "aims", "foresees", "anticipates", "targets", and similar expressions. The forward-looking statements contained in this document, including assumptions, opinions and views of the Group or cited from third party sources are solely opinions and forecasts which are uncertain and subject to risks, including that the predictions, forecasts, projections and other forward-looking statements will not be achieved. Any recipient of this document should be aware that a number of important factors could cause actual results to differ materially from the plans, objectives, expectations, estimates and intentions expressed in such forward-looking statements. Such forward looking-statements speak only as of the date on which they are made.

No member of the Group or any of their respective affiliates or any such person's officers, directors or employees guarantees that the assumptions underlying such forward-looking statements are free from errors nor does any of the foregoing accept any responsibility for the future accuracy of the opinions expressed in this presentation or the actual occurrence of the forecasted developments or undertakes any obligation to review, update or confirm any of them, or to release publicly any revisions to reflect events that occur due to any change in the Group's estimates or to reflect circumstances that arise after the date of this document, except to the extent legally required.



Any statements (including targets, projections or expectations of financial performance) regarding the financial position of the Company, any of its subsidiaries or the Group or their results are not and do not constitute a profit forecast for any period, nor should any statements be interpreted to give any indication of the future results or financial position of the Company, any of its subsidiaries or the Group.

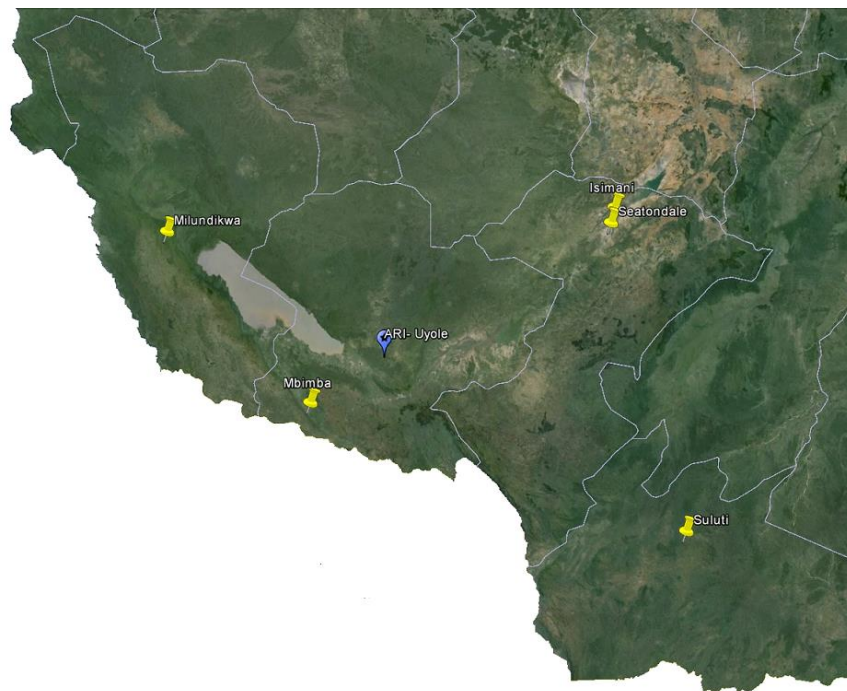
Any statements (including targets, projections or expectations of financial performance) regarding the financial position of the Company, any of its subsidiaries or the Group or their results are not and do not constitute a profit forecast for any period, nor should any statements be interpreted to give any indication of the future results or financial position of the Company, any of its subsidiaries or the Group.

# Regional scale trial programme

Six trials were conducted across the Southern Highlands

## Map of trial locations

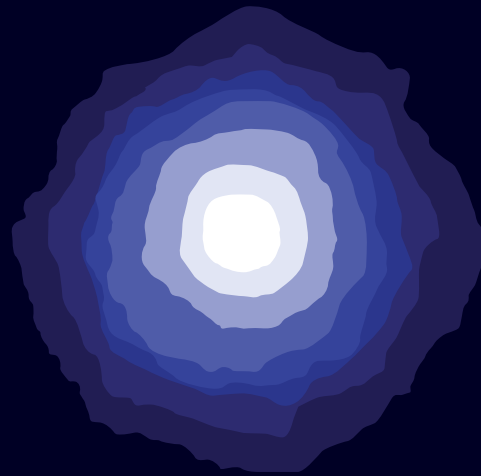
 Trial Site  ARI trial site at headquarters



## Key comments

- Corn is the largest crop grown in Tanzania with 6.7 Mt produced, accounting for 24% of all crops grown
- Around 80% of corn production is from small scale farmers with 65 - 80% of produced corn consumed within the household<sup>1</sup>
- The Southern Highlands produces approximately half of all corn in Tanzania<sup>1</sup>
- Although soil is fertile, fertilizer is required to prevent nutrient mining that would cause widening of the yield gap in the long term
- Six trials across the Southern Highlands were established with the Uyole Agricultural Research Institute to assess POLY4's performance

**Multiple trial sites produces robust data across different environments**

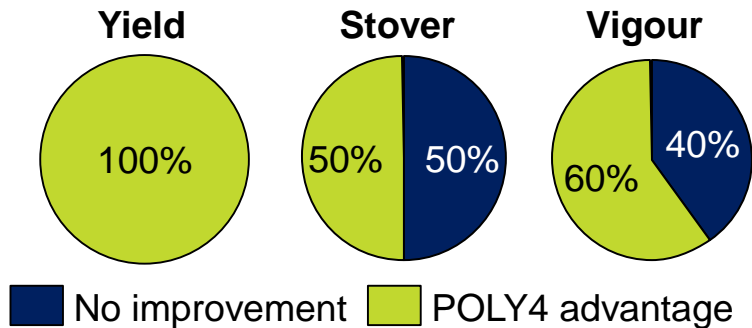


Straights

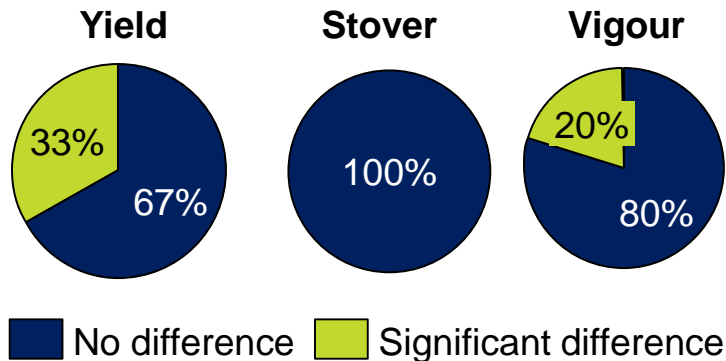
# POLY4's performance in the Southern Highland

## Yield enhancement through POLY4 as a straight fertilizer

### Numerical difference of POLY4 over MOP<sup>1,2</sup>



### Statistical difference of POLY4 over MOP<sup>1-3</sup>



### Key comments

- Straight trials allow the effectiveness of potassium fertilizers to be demonstrated at recommended nitrogen and phosphorus applications
- POLY4 increased yield, outperforming MOP in 100% of the trials
- Crop stover and vigour were higher in 50% and 60% of trials respectively, which indicates better plant health
- In two instances, POLY4 also showed a clear statistically significant yield advantage over MOP
- This regional trial programme demonstrates POLY4's effectiveness as a potassium fertilizer in comparison to MOP

**POLY4 shows significant improvements in corn yields over MOP**

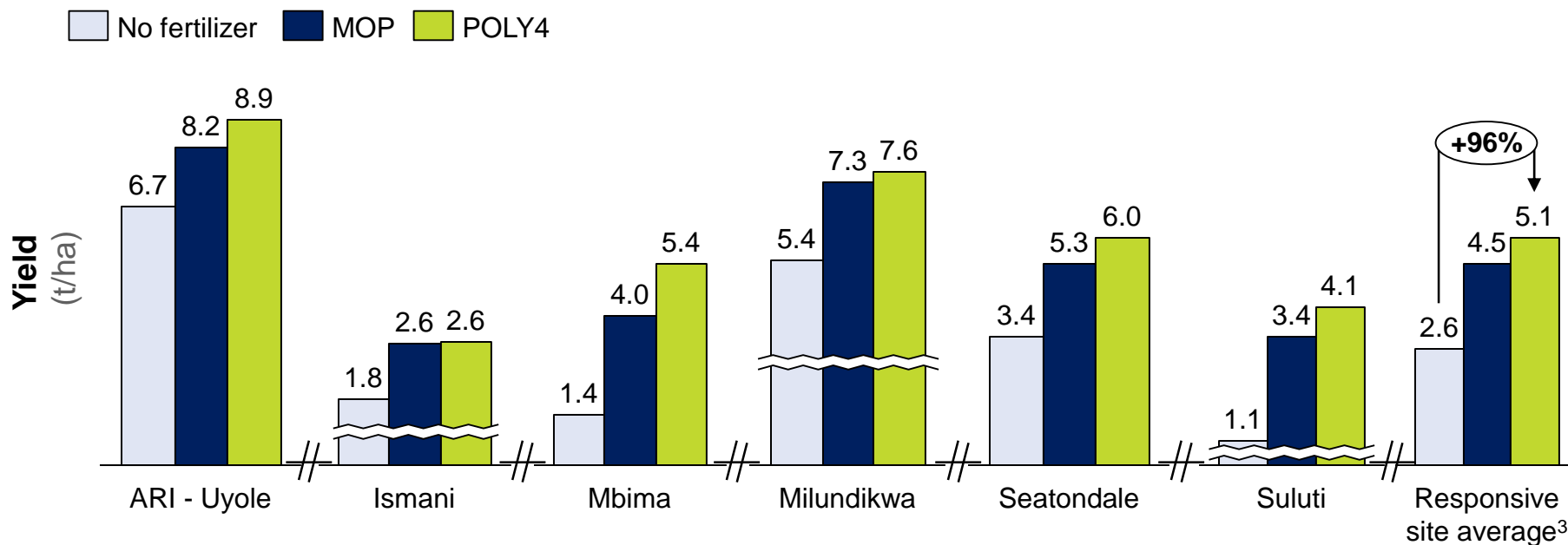
Notes: 1) GENSTAT statistical analysis; 2) Vigour from based on 5 trial results; 3) Statistical significant at  $p < 0.1$ . Initial soil data for each site is provided in the appendix

Source: Agricultural Research Institute – Uyole (2015)

# Yield response to NPK fertilizer plans

Broad spectrum fertilization with POLY4 supports corn yield

**Corn yield<sup>1,2</sup>**  
(t/ha)



- Application of potassium-based fertilizers prevents nutrient mining in the long term and aids crop growth
- Across all locations in the Southern Highland region, corn responded positively to a multi-nutrient fertilizer plan
- On average, POLY4 recorded a 14% higher grain yield than MOP

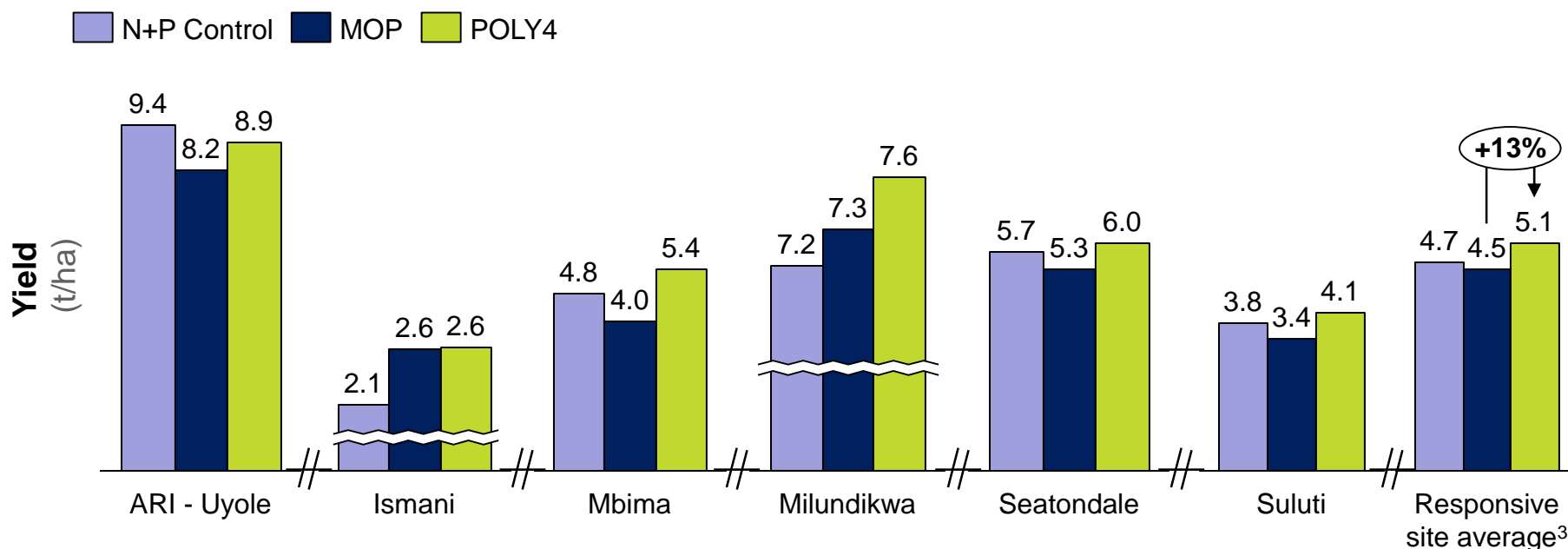
**POLY4 consistently outperformed MOP as a straight potassium fertilizer**

Notes: 1) GENSTAT means; 2) The recommended rate of 120 kg N/ha and 30 kg P<sub>2</sub>O<sub>5</sub>/ha from urea and DAP with 20 kg K<sub>2</sub>O/ha supplied from MOP or POLY4 were supplied to all plots except “No Fertilizer” plots. 3) ARI – Uyole excluded from average due to high initial soil K. Initial soil data for each site is provided in the appendix. Source: Agricultural Research Institute – Uyole (2015)

# The effect of potash compared to N+P

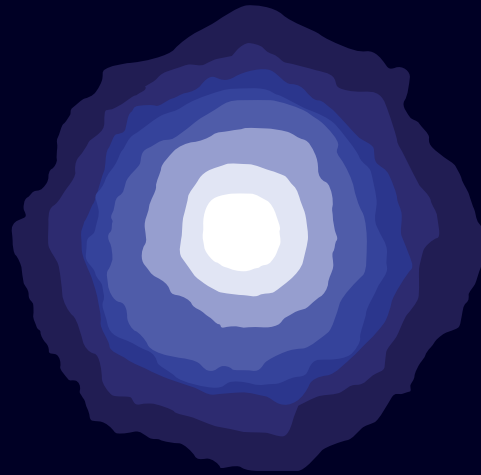
POLY4 improves yield compared to local practice

**Corn yield<sup>1,2</sup>**  
(t/ha)



- Nitrogen and phosphorus are recommended in Tanzania due to the high soil potassium content
- Application of potassium fertilizer is valid in high proportion of the region
- On average<sup>3</sup>, the POLY4 option improved yield by 9% compared to N+P and 13% compared to MOP
- At 67% of sites, MOP resulted in lower yields than the N+P control

**POLY4 consistently outperformed MOP as a straight potassium fertilizer**



# Blend Composition

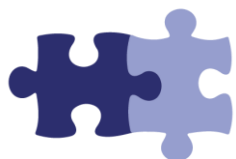


# Evaluation of fertilizer blends

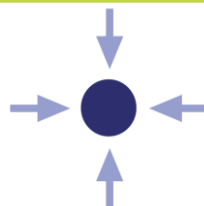
Nutrients applied from blends in Southern Highland trials

## Blend nutrient content<sup>1,2</sup>

Blend	Nutrient applied in trial (kg/ha)						
	N	P	K	CaO	MgO	S	Cl
<b>20:10:10 blend</b>							
Standard	120	60	60	0	0	0	49
POLY4	120	60	60	40	13	35	29
<b>17:17:17 blend</b>							
Standard	120	120	120	0	0	0	96
POLY4	120	120	120	22	7	19	85



Chemically safe for use



Suitable crush strength for transport and handling



Efficient multi-nutrient delivery in blends

**POLY4 blends deliver a wider nutrient spectrum and lower chloride levels**

Notes: 1) Standard 20:10:10 and 17:17:17 blends were made with urea, DAP and MOP; 2) POLY4 20:10:10 and 17:17:17 blends made with urea, DAP, MOP and POLY4. Initial soil data for each site is provided in the appendix

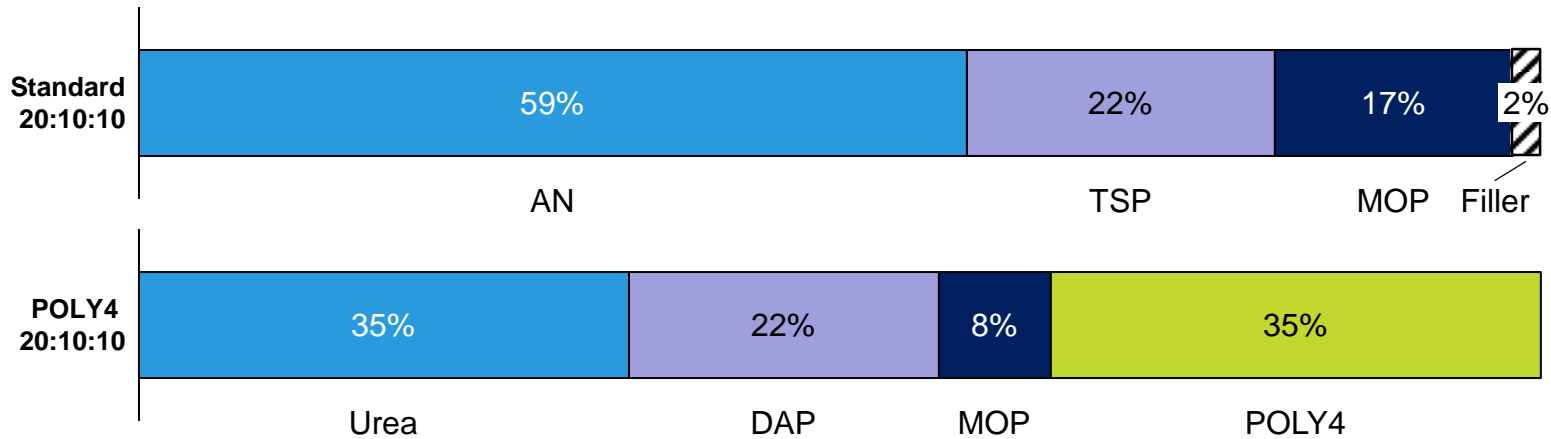
Sources: Sirius Minerals, Agricultural Research Institute – Uyole (2015)

# Corn blend options

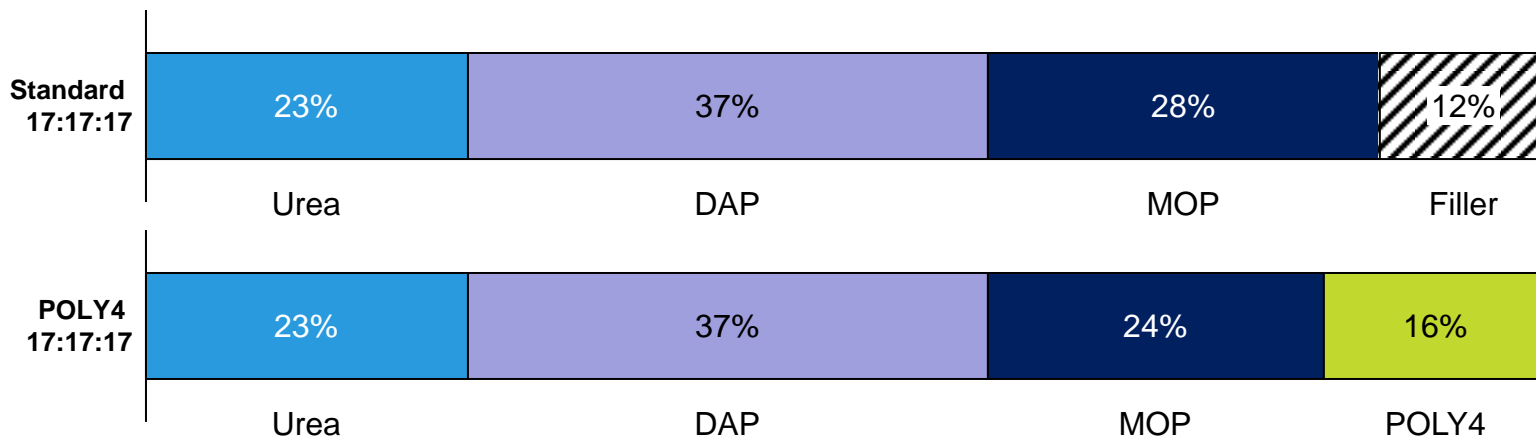
POLY4 replaces filler with additional nutrients of agronomic value

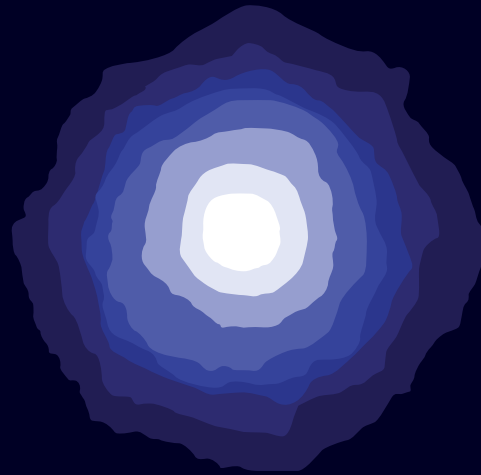


## ① 20:10:10 blend composition<sup>1</sup> (in as nutrient kg/ha)



## ② 17:17:17 blend composition<sup>1</sup> (in as nutrient kg/ha)



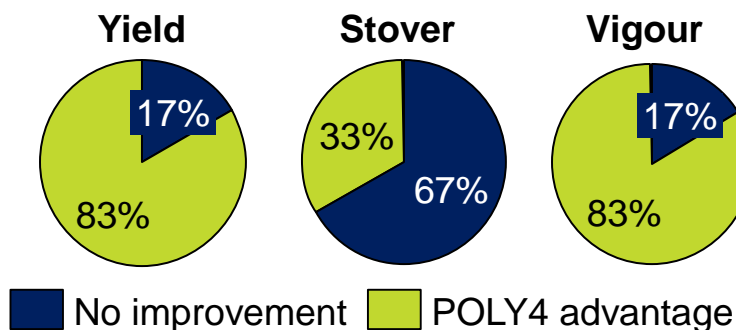


20:10:10 Blend

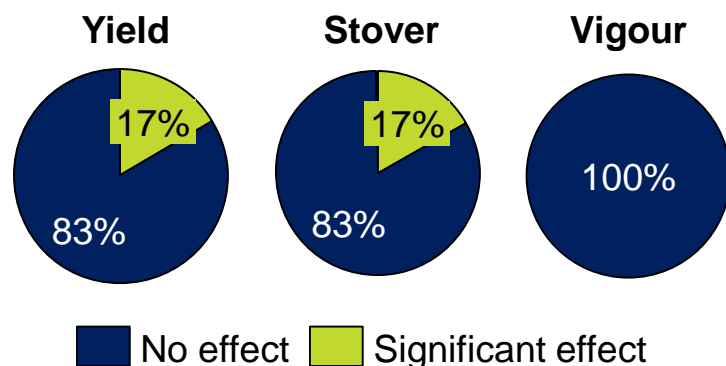
# 20:10:10 blend performance

POLY4 inclusion in 20:10:10 blends supports corn production

## Numerical difference of POLY4 blend over standard blend<sup>1-4</sup>



## Statistical difference of POLY4 blend over standard blend<sup>1-5</sup>



## Key comments

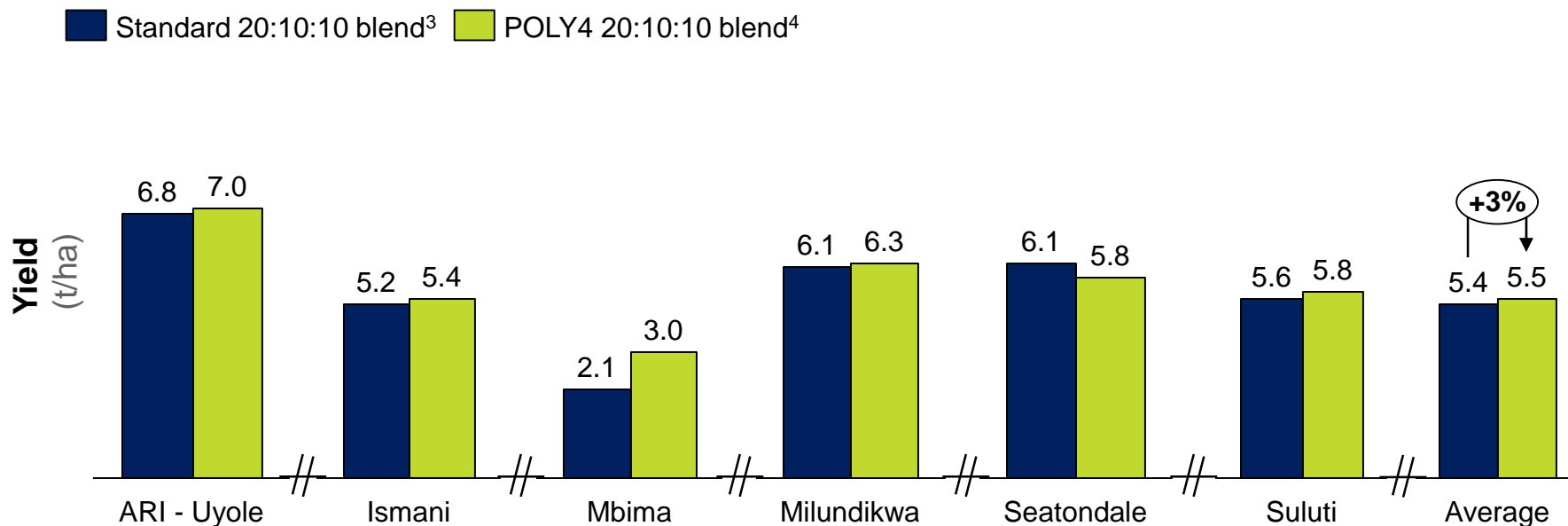
- 20:10:10 blends are the most commonly available for corn globally
- Construction of a 20:10:10 blend with POLY4 inclusions results in high crop chloride loading compared to the straight trial
- The standard and POLY4 blends were tested at the recommended 120 kg N/ha rate<sup>2</sup>
- The POLY4 blend showed numerical improvements in yield and vigour across most sites
- Significant improvements in yield and stover from the POLY4 blend were observed at one site

**The POLY4 20:10:10 blend improved yield and stover**

# Yield results using 20:10:10 blends

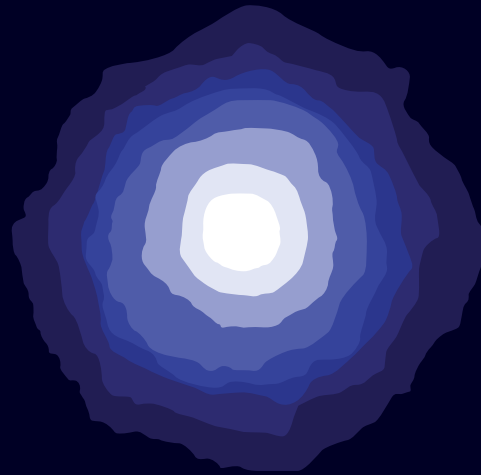
83% of sites showed improved yield with POLY4 20:10:10 blends

## Corn yield<sup>1,2</sup> (t/ha)



- 20:10:10 blends can be an efficient way to meet nitrogen recommendations without excess phosphorus and potassium application
- The POLY4 blend showed a higher yield than the standard blend at five out of six locations
- On average, the POLY4 blend resulted in a 3% increase in corn yield compared to the standard blend

**POLY4 20:10:10 blends can improve yield**

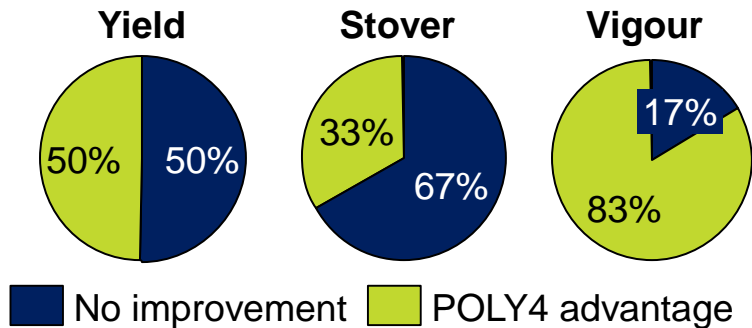


17:17:17 Blend

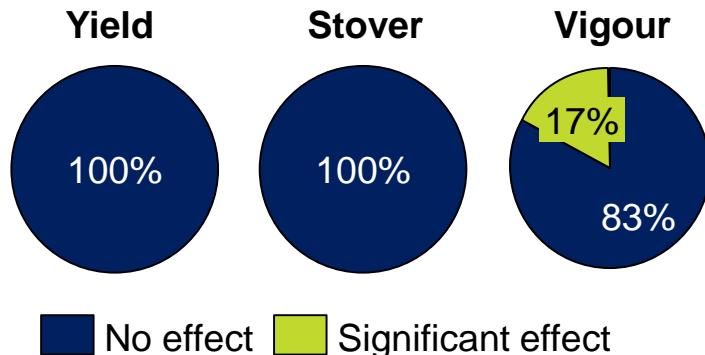
# 17:17:17 blend performance

17:17:17 blend proves inappropriate for Tanzanian corn production

## Numerical difference of POLY4 blend over standard blend<sup>1-4</sup>



## Statistical difference of POLY4 blend over standard blend<sup>1-5</sup>



## Key comments

- At the recommended nitrogen rate of 120 kg N/ha, 17:17:17 blends supply equal rates of phosphorus and potassium<sup>2</sup>
- Oversupply of nutrients to crops incurs financial costs for no real gains compared to appropriate fertilizer application
- Construction of standard and POLY4 17:17:17 blends results in high chloride application compared to the 20:10:10 option
- Standard and POLY4 blends were evaluated at this rate for grain and stover yields and crop vigour
- The POLY4 NPK blend statistically improved vigour rating over the commercial standard

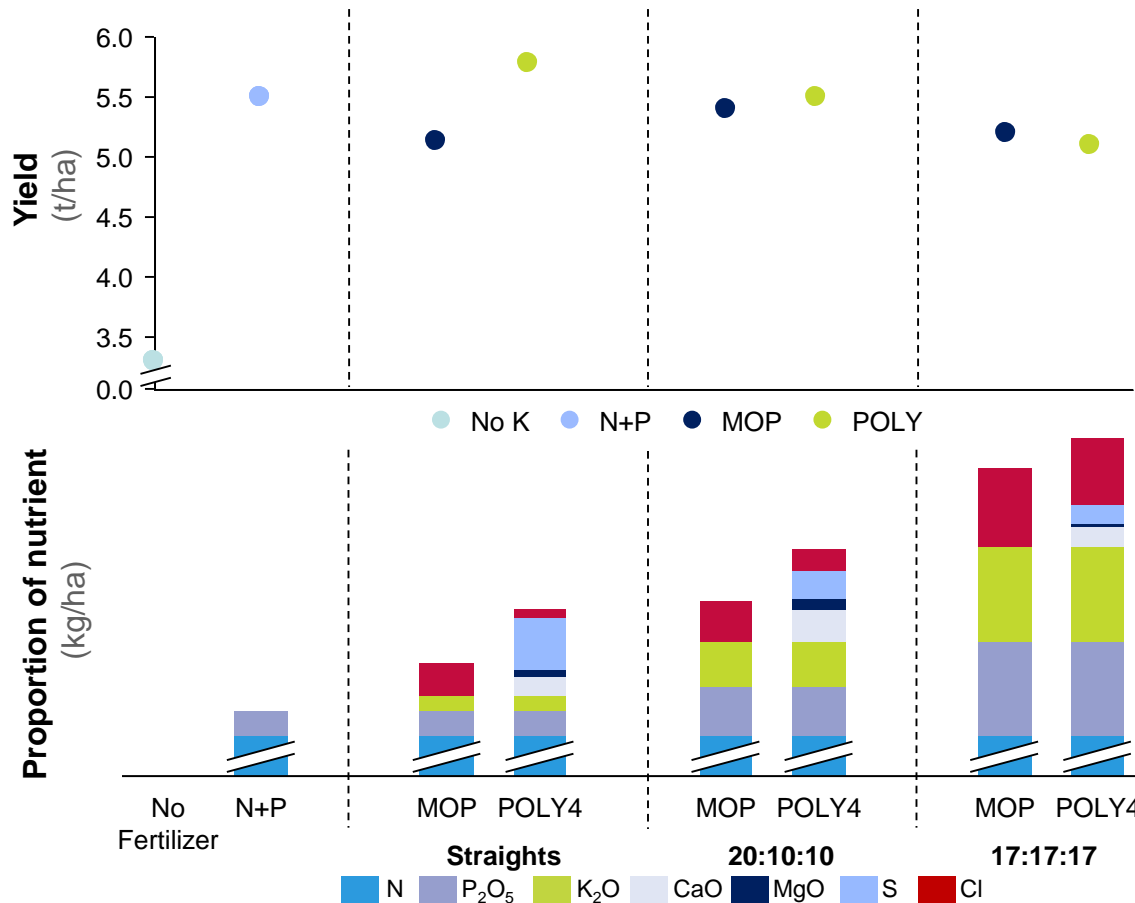
**Under high K and Cl loading both blends perform similarly**

# Corn fertilizer application

POLY4 delivers improved yield at low application rates



## Yield response to nutrients applied<sup>1,2</sup>



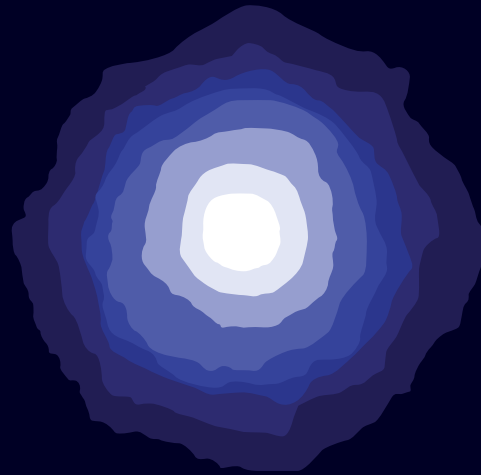
## Summary comments

- Potassium is not currently recommended in the Southern Highland region of Tanzania for corn
- Soil nutrient mining is not sustainable
- Without fertilizer, nutrient depletion threatens food security and widens the yield gap
- 20:10:10 and 17:17:17 blends prove unsuitable in these regions due to increasing chloride content that hinders crop performance
- POLY4 offers a route to replace potassium and elevate yield through straight application

**POLY4 improves yields above current recommendations of N and P**

Notes: 1) Extrapolation from all trial straight and blend results present; 2) P<sub>2</sub>O<sub>5</sub> application increased with K<sub>2</sub>O application; 3) Standard practice is defined as fertilizer plan that contains potassium from MOP; 4) POLY4 practice is defined as a fertilizer plan that contains potassium from POLY4. Sources: Agricultural Research Institute – Uyole (2015), Sirius Minerals





Appendix

# Southern Highland initial soil analysis

Soil analysis from six sites in the southern highlands

## Initial soil analysis

Site	Soil parameter			Nutrient content (mg/kg)					
	pH	Organic Content (g/kg)	CEC (cmol/kg)	N	P	K	Ca	Mg	S
ARI- Uyole	5.6	20	17.66	1650	2.06	917	1240	149	13.04
Ismani	5.6	8.4	14.86	2400	4.16	234	774	403	36
Mbimba	5.2	18.4	15.84	2200	5.22	246	394	149	15.73
Milundikwa	5.5	25.5	16.3	2530	5.17	445	944	257	9.18
Seatondale	5.5	6.1	4.88	1770	13.33	117	356	192	20.18
Suluti	5.3	6.2	12.08	2070	10.05	230	270	210	12.03

**Soils are slightly acidic, low in organic matter and high in potassium content**