KEY FINDINGS

POLY4 fertilizer plan increased the yield by 3%

MOP + POLY4 was a profitable alternative to a current commercial practice of MOP + AS

POLY4 BENEFITS

- Source of macro and micro nutrients
- Sustained dissolution rate
- Suitable for organic farming
- No requirement for chemical processing
- Low CO₂ emissions

A CASE FOR POLY4

- Wheat is the largest crop by area in Poland with an average yield of 4.5 t ha⁻¹.
- S deficiency is an increasing problem for European farmers.
- POLY4 supplies K, S, Mg and Ca in one product.
The study compared the effect of POLY4 with standard K and S fertilizer on winter wheat yield and quality at four sites across Poland.

**IMPROVED YIELD**

POLY4 or MOP + POLY4 fertilized crops had the greatest yield at all four sites.

**OPTIMAL GRAIN WEIGHT**

Balanced nutrition and K supply are important for optimal grain fill and ripening. Across the four sites POLY4 fertilized crops had the highest thousand grain weight.

**INCREASED FERTILIZER MARGIN**

MOP + POLY4 treatment increased fertilizer margin by US$11/ha compared to MOP + AS.

**IMPROVED QUALITY**

Hagberg falling number (HFN) of POLY4 treated wheat was 300 and was 8.5% higher than MOP + AS. HFN reflects starch digestion and is an important parameter for determining premium payments for bread-making wheat. Bakers typically target an HFN value above 250.

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**Average nutrients applied in trial (kg ha⁻¹)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N</th>
<th>P₂O₅</th>
<th>K₂O</th>
<th>CaO</th>
<th>MgO</th>
<th>S</th>
<th>Cl</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOP + AS</td>
<td>190</td>
<td>50</td>
<td>75</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>MOP + POLY4 (70:30)</td>
<td>190</td>
<td>50</td>
<td>75</td>
<td>27</td>
<td>9</td>
<td>30</td>
<td>47</td>
</tr>
<tr>
<td>POLY4</td>
<td>190</td>
<td>50</td>
<td>75</td>
<td>91</td>
<td>32</td>
<td>102</td>
<td>16</td>
</tr>
</tbody>
</table>

**Notes:**
1) Pulawy (2016) Trial report; 2) FAOSTAT (2018); 3) Trials were conducted at four locations with the following initial soil analysis:
- Pulki I: pH (H₂O) 6.6, pH (KCl) 5.5, 116 mg P kg⁻¹, 180 mg K kg⁻¹, 29 mg Mg kg⁻¹, 4.6 mg S kg⁻¹;
- Pulki II: pH (H₂O) 6.8, pH (KCl) 5.9, 301 mg P kg⁻¹, 59 mg Mg kg⁻¹, 2.8 mg S kg⁻¹;
- Babórówko I: pH (H₂O) 6.3, pH (KCl) 6.1, 170 mg P kg⁻¹, 104 mg Mg kg⁻¹, 3.8 mg S kg⁻¹;
- Babórówko II: pH (H₂O) 6.0, pH (KCl) 4.7, 87 mg P kg⁻¹, 112 mg Mg kg⁻¹, 25 mg S kg⁻¹, 4.6 mg S kg⁻¹;
4) Results presented are based on data from GENSTAT ANOVA at K₂O rate of 75 kg ha⁻¹; Fertilizer CRU prices: urea US$290/t, DAP US$532/t, AS US$168/t, MOP US$333/t, spreading cost: US$20.11/t; wheat price: US$176/t, spreading cost US$20.11/t. Fertilizer margin is the value of the crop output minus the cost of fertilizer product and spreading.