## Context

- Climate change demands  the pursuit of crop diversity that thrives under drought, waterlogging, heat, and salinity, addressing biodiversity requirements.
- Exacerbated by climate change, malnutrition and dietary deficiencies pose significant challenges in numerous regions.
- Grass pea's nutritional potential offers a distinct opportunity to combat health and nutritional issues.
- Nonetheless, the need to manage Oxalyldiaminopropionic acid (ODAP) presents a hurdle, affecting the safety and acceptability of the crop for food consumption and animal feed.

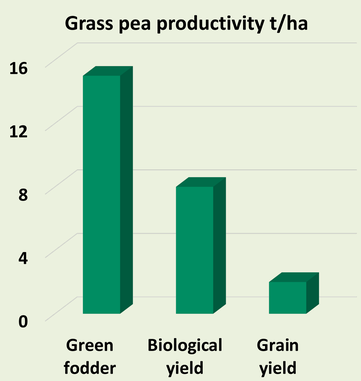
## Our innovative approach

- **Trait Discovery:** Pioneering the identification of desirable traits.
- **Genebank Material Assessment**: Evaluating vital grasspea genebank resources for target traits.
- **Molecular Breeding:** Establishing an advanced molecular breeding platform for swift varietal development in grass pea.
- **Harnessing Crop Wild Relatives:** Uncovering valuable traits, including minimal ODAP content

INITIATIVE ON
Livestock and Climate

# Cultivating Resilience: Climate-Smart Grass pea as a Multifunctional Feed, Forage, and Fodder Crop in Dry Areas through Integrated Genomic Approaches

- Grass pea: A Climate-Smart Nutritional Resource for Food, Feed, and Fodder.
- High-yielding low-ODAP (Oxalyldiaminopropionic acid) cultivars are available for adoption
- Grass pea thrives in fragile agro-ecosystems plagued by frequent drought, extreme heat, and mild salinity.




**Grass pea straw yield and quality**

| Parameters | Mean |
|---|---|
| Straw Yield (kg/ha) | 3133 |
| Crude protein (g/kg DM) | 183 |
| Acid detergent fibers (g/kg DM) | 258 |
| Neutral detergent fibers (g/kg DM) | 561 |
| Digestibility (DOMD) | 547 |

| Species | Min | Max | Mean |
|---|---|---|---|
| *Lathyrus staivus* | 0.20 | 2.4 | 1.3 |
| *Lathyrus cicera* | 0.03 | 0.22 | 0.16 |
| *Lathyrus ochrus* | 0.46 | 2.5 | 1.4 |

**Genetic variation for Oxalyldiaminopropionic acid (ODAP)  in germplasm**

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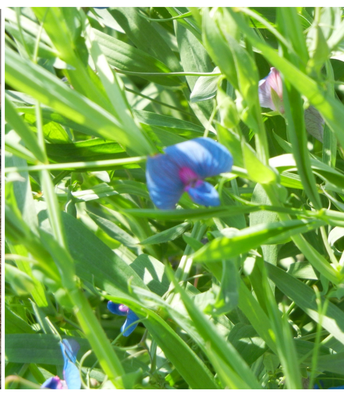
## Progress/outcomes

- Expansion of grass pea after the harvest of rice in rainfed areas of South Asia.
- Relay planting of grass pea in rice fields helps mitigate the terminal water stress in South Asia.
- Overnight soaking of grains helps reduce the ODAP content in grass pea substantially.
- Established global partnership for grasspea research and development.
- Breeding populations of low-toxin grasspea to national and international programs in >17 countries.
- Four International nurseries  established
- **Next steps**
- Utilizing Genome wide association studies (GWAS) for trait-marker association and genome editing for zero ODAP germplasm development
- Farmers in Bangladesh, Nepal, India, and Ethiopia participating in on-farm prebreeding line evaluations.



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