

Funding models for Pre-breeding SFSA Perspective

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Outline

- SFSA mission and involvement in PPPs
- Pre-breeding – material pillars for partnerships
- Funding challenges
- Private sector breeding remuneration models
- Pre-breeding funding models – ideas
- Conclusions

SFSA mission

- To create value for resource-poor small farmers in developing countries through innovation in sustainable agriculture and the activation of value chains
- SFSA is a not-for-profit organisation, independent board and governance
- Advocate and catalyser of PPPs in R&D and getting improved seeds to farmers

Public- private partnership definition

- PPPs for pre-breeding are those that **really leverage the combined assets and know-how of the parties:**
- **Organizations** – the partnership involves at least one public and one private entity. Entities can also be Foundations, NGOs or other non-profits.
- **Contributions** – both parties provide material inputs. These can be technologies, expertise, know-how, market access or other aspects that are not just financial donations or contract arrangements for goods or services.
- **Governance and risk** – parties hold regular reviews, share decision-making and responsibility and risks associated with delivery of the outputs

SFSA and PPPs

- Affordable, Accessible Asian drought tolerant corn, harvest plus and carotenoids in cassava and corn



Drought tolerant corn

Golden
cassava

- Wheat stem rust resistance to UG99

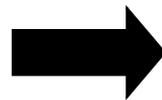
The wheat rust Ug99 technology partnership

POSSIBLE MIGRATION ROUTES OF WHEAT RUST Ug99

Based on prevailing winds and areas of wheat production, route A via the Arabian peninsula is considered the more likely route for the continuing advance of the disease



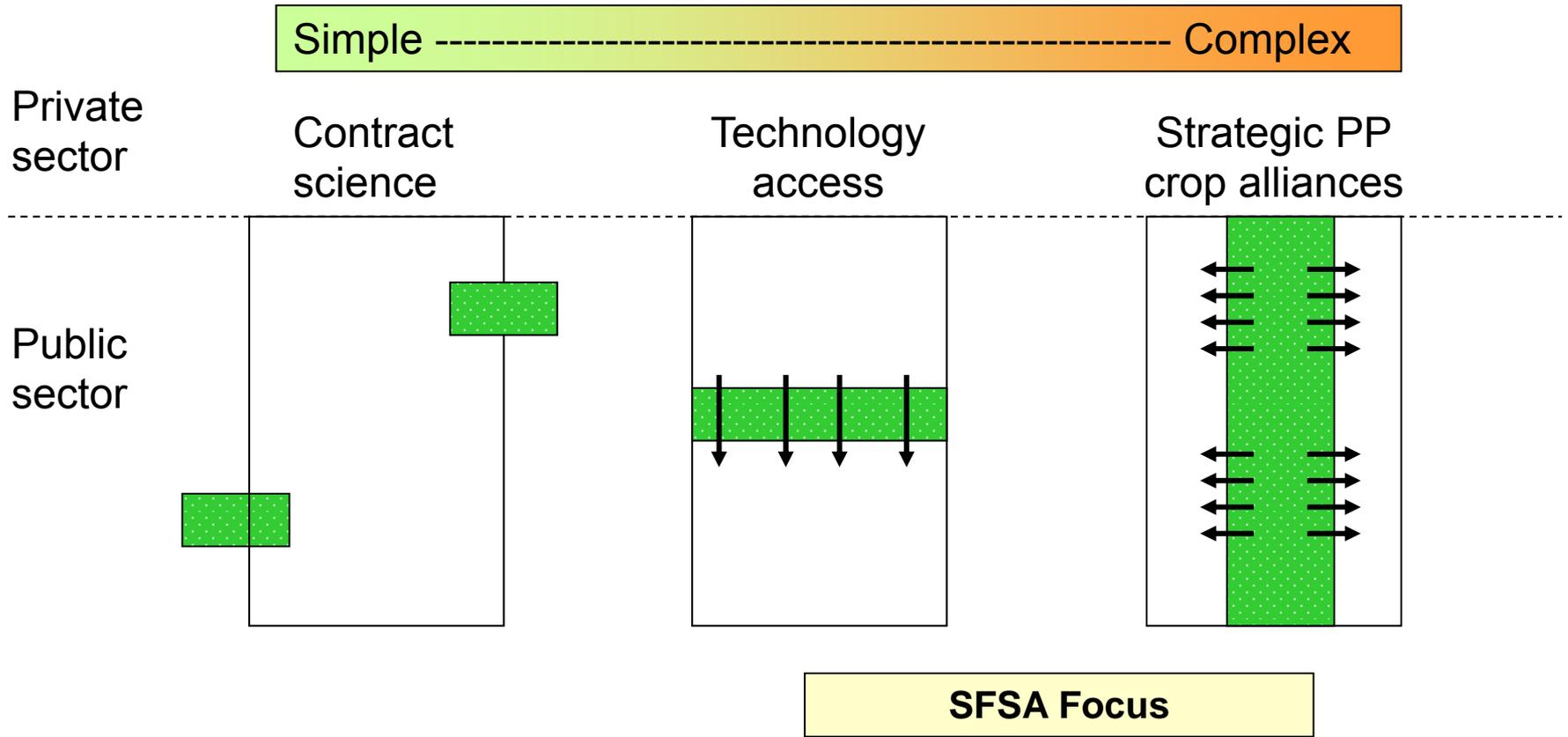
Brokered by SFSA



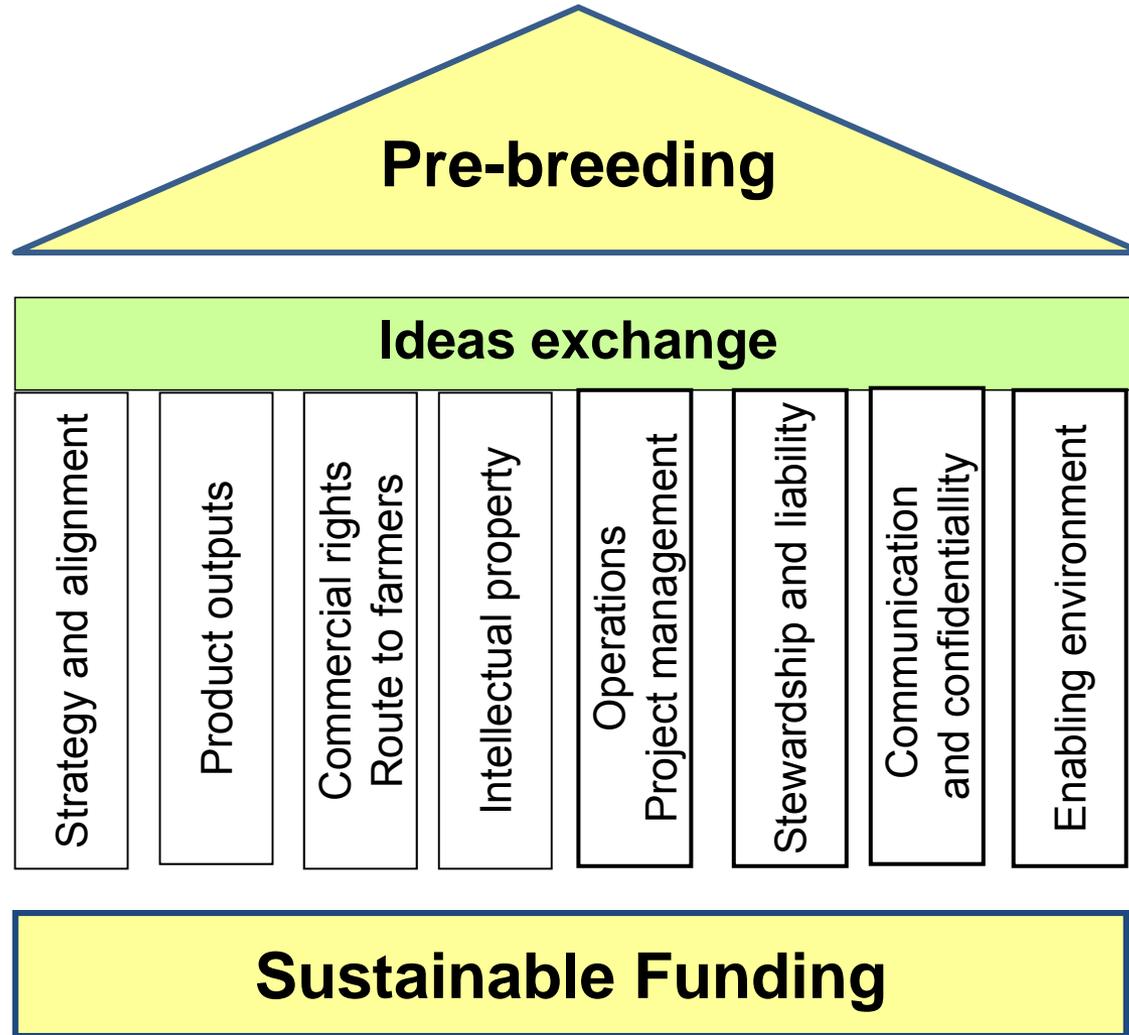
Strategic alliance
CIMMYT / SYNGENTA
wheat

- ### CIMMYT / SYNGENTA
- Identified, characterized and mapped QTLs to stem rust
 - Markers for use in marker assisted trait selection
 - Characterized known gene complexes and interactions with other important genes in wheat
 - Pre-breeding information in the public domain

Public-Private partnerships...the future



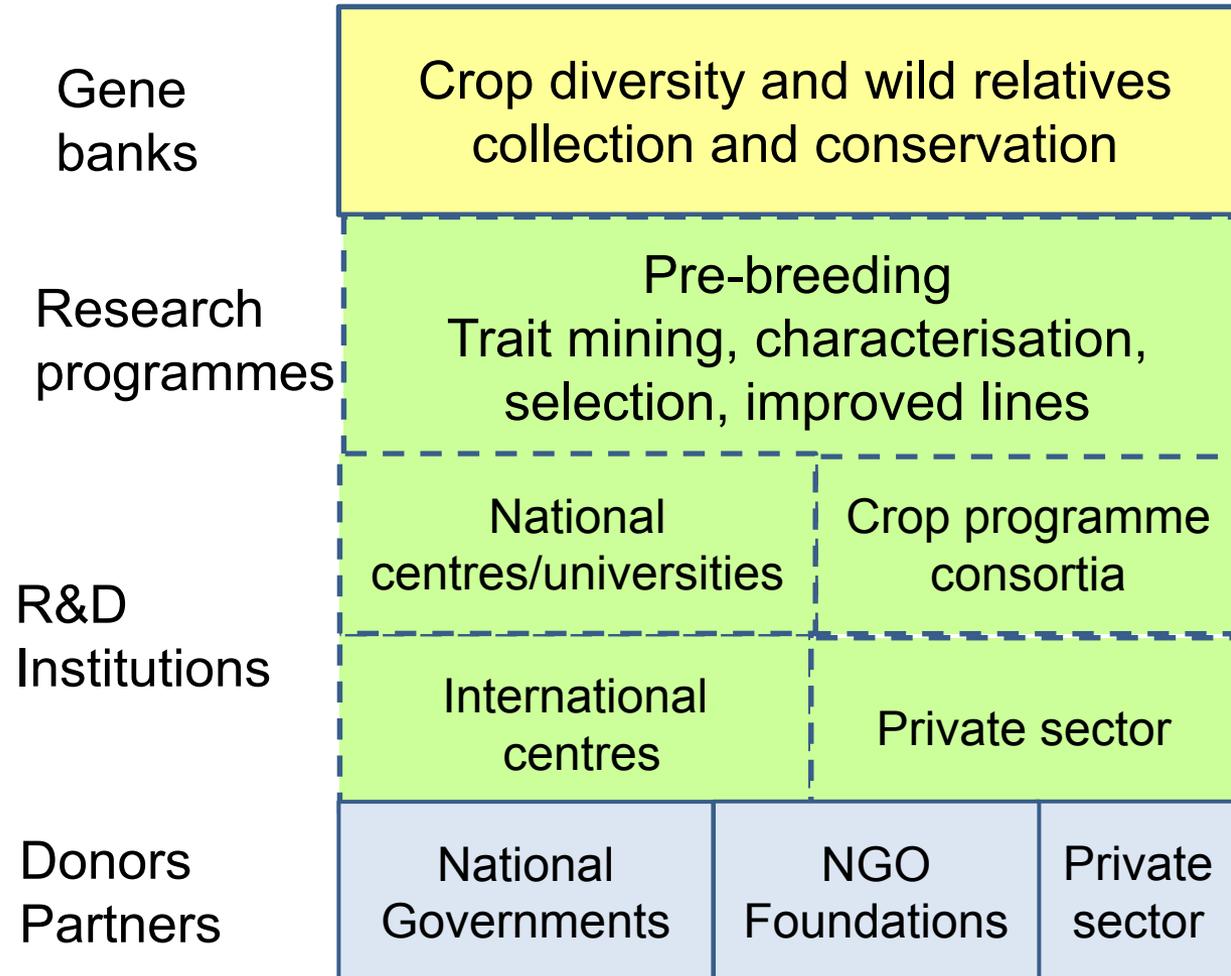
Material pillars - public-private partnerships



Observations and funding challenges

- Broadening genetic diversity in most key food crops is an imperative
- Genomics, informatics and high throughput systems have changed the scientific landscape for gene identification, characterisation and introgression – challenges can be tackled now: previously too technically difficult, slow or just prohibitively expensive
- Funding for pre-breeding is typically too low or inconsistent for many food crops or non-existent for under-utilised crops in developing countries
- It is a false assumption to believe private sector will fill the funding gap for most crops
- Private-sector engagement is patchy and often characterised by ‘in-kind’ contributions

Funding models – systematic co-operation



Wheat PPP research landscape

International wheat
genome sequencing
Consortium

FAO PP platform
pre-breeding

Global Crop
Diversity Trust
Wheat wild relatives

Wheat Initiative

- Broad research scope
- Coordination and communication
- Launched Sept 2011
- 11 country signatories
- 17 public research organisations
- 7 private seed organisations

International Wheat Yield Partnership (IWYP)

- Raise yield potential by 50% in 20 years
- \$50-75m (5 years)
- Launched 2011
- Public sector researchers
- Private seed organisations

Wheat Yield Consortium (WYC)

- Raise yield potential 50% by 2030
- CIMMYT led crop research programme
- Started 2009
- 31 partner organisations

Bilateral R&D: e.g. CIMMYT/Syngenta wheat technology platform

Multi-lateral commercialisation: e.g. Intergrain (WA Gov, GDRC, Monsanto)

AGT (S Aus. Gov, GRDC, Uni Adelaide, Limagrain)

Private sector breeding remuneration models

- Return on investment is essential for sustainable breeding programmes and innovations driven seed businesses
- Hybrids, technology fees, certified foundation seeds and end-point variety royalties for farmer saved seed
- Systematic, results and cost-based frameworks
- Competitive advantage and exclusivity always sought
- Clarity on ownership of traits and germplasm is vital for private sector. Uncertainty or potential loss of parental lines cancels out ROI and will be deal-breakers
- Key risks for investing company is also 'free-riding' by competitors or 'lock-out situations'

Australian wheat breeding

Breeding investment challenge

- Large farms, low yields
- Low inputs
- Farmer saved seeds dominate
- Rain/fed agriculture
- Poor soils

Public breeders absorbed by companies

Farmer production levies

Public pre-breeding only



Public- private partnerships

Intergrain (WA Gov, GDRC, Monsanto)
AGT (S Aus. Gov, GRDC, Uni
AdelaidLimagrain)

Sale of certified foundation Seeds

Variety specific production end-point royalties

Public breeding
ARC
CSIRO
Universities



Private sector seed companies



Government funding

Grains R&D Council

Funding models – core principles

- Crop specific
- Country and region specific
- One size does not fit all
- Beneficiaries are farmers and seed companies – both constituencies are commercial businesses with know-how and potential contributions
- Pre-breeding should feed into breeding programmes that have create new varieties with measurable value

Funding models – clarity of leadership roles

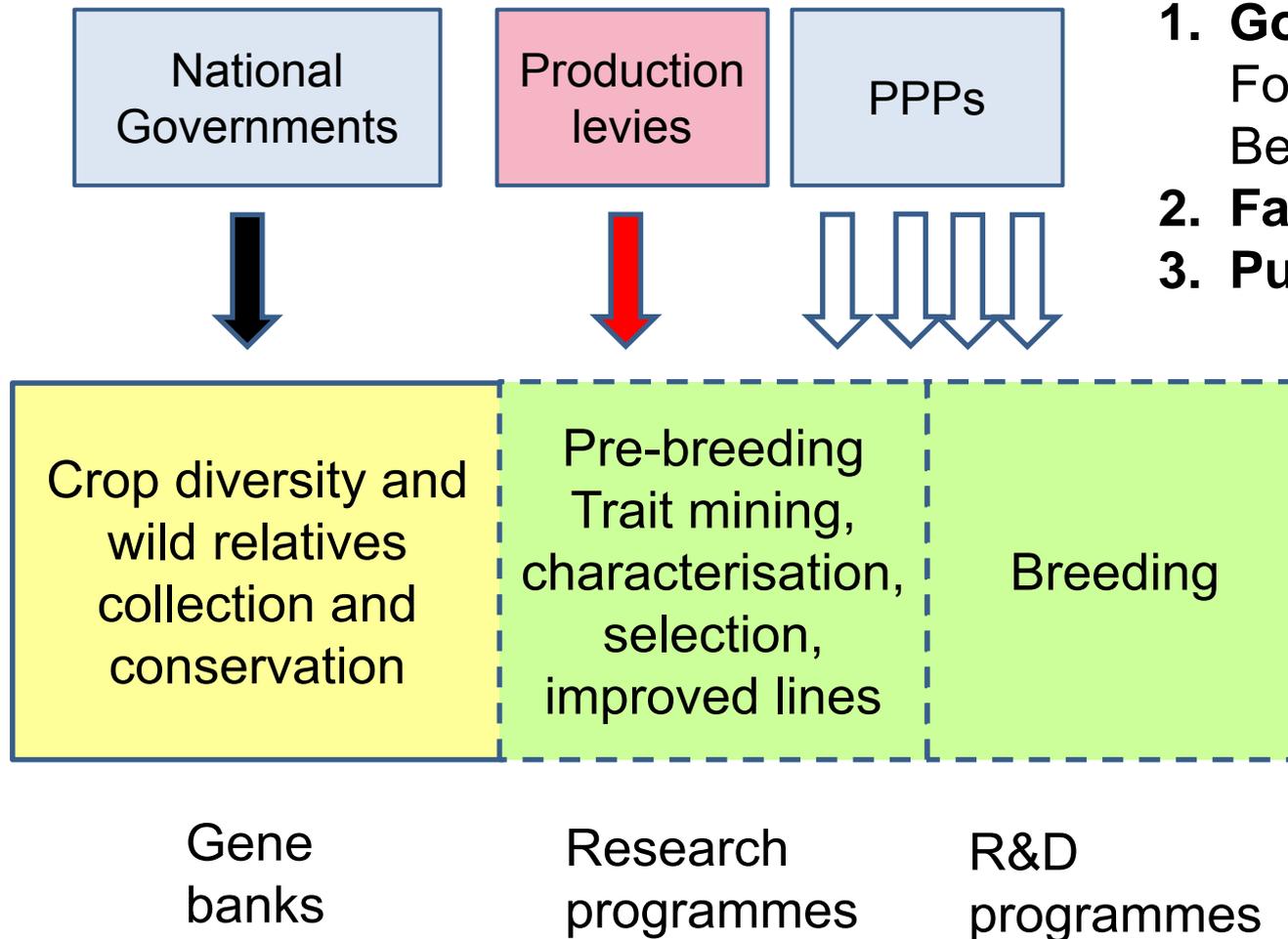
Public sector

- Collection, conservation and enabling utilisation of sovereign germplasm and wild relatives
- Characterisation of gene bank collections
- Fundamental crop diversity research and methodology creation for pre-breeding

Private sector

- Systematic, rapid development of new varieties
- High-throughput testing
- Demand-led best practices
- Seed systems and deployment of new varieties to reach farmers

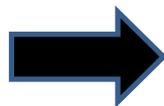
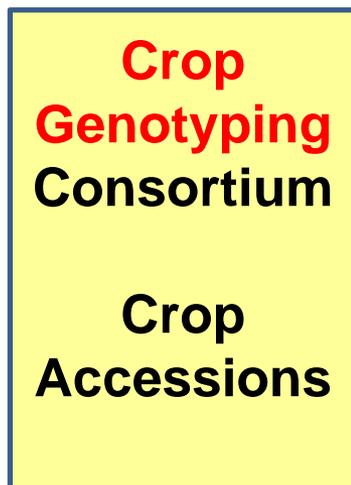
Funding sources



- 1. Governments**
Foundations/NGOs
Benefactors
- 2. Farmer levies**
- 3. Public-Private PPP**

Pre-breeding funding model

Multi-government
regional
cooperation



Public private partnerships



PPP1

PPP2

PPP3

PPP4

PPP5

PPP6

PPP7

PPP7

- Inter-government regional funding for common crops of interest
- Genotyping crop consortia
- Cost-effective
- Consolidation and removal of duplicates diversity
- Phenotyping/breeding programmes = PPPs

Conclusions 1

- Crop focused funding approaches recommended
- Single funding solution or model for pre-breeding unlikely to succeed
- Genotyping all core accessions in genebanks is in theory attainable and securing funding should be the target
- Comprehensive profiling -genotyping and phenotyping....currently methodologies are just too expensive ...should be carefully targeted to ensure outputs can be actively used in breeding programmes
- Financing mechanisms must encourage collaboration between all pre-breeding professionals – public and private

Conclusions 2

- Public and private platforms to encourage multi-country/regional government cooperation
- PPPs will enable crop diversity to reach farmers:
 - demand-led approaches will assist research groups to address core priorities for farmers and the value chain
 - bring multi-functional thinking and rigour to programmes
 - accelerating deployment of new varieties
 - needs a mind set change by governments/public organisations
 - For most crops private sector is unable to finance research funding shortfalls in public sector
- Every PPP and contributions will be different
- PPP guidance framework: an experience based tool for practitioners

www.syngentafoundation.org/index.cfm?pageID=696

Thank you for your attention

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for sustainable
agriculture