Public-Private Partnership for Pre-Breeding - A Nordic model -

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• Challenges – what do we need/want to achieve?

• Think "seed value chain"! – who is doing what? Are all doing what they should?

• Engaging stakeholders – resuming responsibility, respecting roles and limitations

• Pre-breeding – crop & market specific definitions

• Setting frames – meeting expectations & being realistic

• Nordic examples: Ryegrass, Barley, Apple
Challenges:

– Adaptation to **climate change**
– Meeting **environment** goals
– Consumer & market **demand**
– Maintaining productivity

• Increasing **gap** between research, breeding & conservation – need public re-engagement
• **Sustainable intensification** – ”green agriculture” agendas
• Maintain **competitiveness**, maintain agricultural production & exploit opportunities, maintain rural livelihood
• **Day length** remains stable, everything else changes
• Location **NORTH** – market size; - noone else will do the job
Seed value chain: Intact and in working order? For all relevant crops?

Seed value chain analysis!
Seed value chain
Seed value chain
Seed value chain
- Stakeholder interviews & analysis

- Farmers/Farmers organisations

- Which are the main future challenges for Nordic agriculture?
- Sustainable food production, adaptation to climate change and reducing environmental impact – Do you have access to seeds of the right varieties?
- Do you have access to seeds adapted to Nordic growth conditions in all relevant crops?
- What will be the impact if this is not the case?
• Stakeholder interviews & analysis

– Plant Breeders

– Are you able to meet future challenges?
– Which crops are you breeding? How sustainable are your breeding programs?
– Do you have access to the required genetic variation for your breeding germplasm?
– Do you have access to the required technology?
– Do you have access to the required expertise?
– Are you able to apply relevant research results?
• **Stakeholder interviews & analysis**
  
  – **Universities / Science**
    
    – Do your research results have societal impacts in Nordic agriculture?
    – Are you carrying out research in Nordic crops?
    – Are relevant research results applied by plant breeders? And do they result in access to more/better varieties for Nordic agriculture?
    – Do you collaborate with Nordic plant breeders?
    – How can you contribute to solving future challenges?
• Stakeholder interviews & analysis

- Ministries

- Which are the main future challenges for Nordic agriculture? How do they affect society?
- Sustainable food production, adaptation to climate change and reducing environmental impact – who should do what? What is the role of the society?
- How shall society meet/adapt to these?
- How should/Should society engage/influence/encourage/direct changes?
”Base lines”

- Understand the current situation re. food security & climate change
- Accept and respect strengths & limitations btw. public/private sector; science/breeding; conservation/use
- Obtain a realistic view of possibilities

• Plant breeding becoming concentrated to few crops ...
• Breeders ”horizon” ~ 1 – 1½ breeding cycle...
• Public engagement in plant breeding significantly reduced ...
• Funding engagement beyond ~ 3 years not political viable
• Define role of plant breeding in context of political / societal agendas
• Communication requirement!
Prerequisites:

- Understand the challenge & impact if no action
- Funding! - Public resume responsibility & long term engagement
- Central contact point! – Nordic collaboration providing secretariat & channel funding
- Variety production (plant breeding)! – understanding the seed chain & link to variety, if not = no impact
- Willing to change habits – adopt seed chain view, focus on the weak links of the chain
Pre-Breeding definition

1) base broadening of Nordic crops
2) introduction of specific traits in adapted germplasm
3) development of efficient tools & methods

Line between pre-breeding and breeding differs between crops & markets

- Commercial/large crops vs. minor crops
- Large markets vs. marginal markets
- Existing/ongoing breeding vs orphan crops
PPP

• Nordic collaboration in pre-breeding, Public – Private Partnership for Pre-breeding, PPP
• Involving Nordic plant breeders, Nordic agricultural universities, NordGen - secretariat
• Co-funded by the 5 Nordic ministries of agriculture
• 50/50 funding
• Pilot phase, 4+4 mill DKK – increasing
• Calls: Collaborative pre-breeding projects (2nd call in process)
• PPP steering committee of ministries, academia & breeders + observer
• External scientific evaluation, evaluation for relevance
• Precompetitive ~ >50% of breeders in a crop participating
PPP Project 1: NordApp

- Pre-breeding for Future Challenges in Nordic Apples
- Breeding for resistance against storage rot and apple canker
- SLU, Graminor & MTT (all Nordic Apple breeders)
- Coordinator: Prof. Hilde Nybom
- Total budget: 3.384.302 DKR (2012-2013)
- Link to EU project Fruitbreedomics (www.fruitbreedomics.com)
- Gene introduction, disease resistance
- Perennial, outcrossing, woody crop
- More screenings than anticipated, strong data, Nordic-Baltic network
PPP Project 2: Barley

- Combining Knowledge from Field and from Laboratory for Pre-breeding in Barley
- Validation, testing, developing of molecular markers for disease resistance
- Nordic Seed, Sejet, Graminor, Lantmännen, Boreal, LBHI, NMBU & KU (all Nordic barley breeders)
- Coordinator: Dr.Prof. Ahmed Jahooor
- Total budget : 9.302.331 DKR (2012-2013)
- Tools and method adaptation
- Annual, inbreeding cereal crop
- Markers identified and integrated in breeding routines – nematode, daylength
PPP Project 3: Ryegrass

• PPP for pre-breeding in perennial ryegrass (Lolium perenne L.)
• NMBU, Graminor + Lantmännen + DLF, UÅ + LBHI + Boreal + Jõgeva (all Nordic forage grass breeders + Estonia)
• Coordinator: Prof. Odd Arne Rognli
• Total budget: 3.143.700 DKR (2012-2013)
• Linked to NOFOCGRAN, VARCLIM
• Base broadening project
• Perennial, outcrossing forage crop
• Good trial results, winter hardiness data of high quality
Thank you for your attention!

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