



Advancing Wheat through Integrated Technology in Partnerships

Derek Cornes
R&D Crop Lead Cereals

Challenges for Global Agriculture

- Limited farmland, acreage not likely to increase
- Wheat demand to double by 2050
- Needs an increase of 1.6% a year in yield currently 0.9%
- Limited water supplies, fertilizer use restrictions

**We must do more
with less**

**The only sustainable approach is
to unlock the potential of plants
through innovation**



Current Wheat Situation



Today, a crop under economic pressure

- Low yield growth, low intensity acres
- Quality issues
- High variability, high risks, low profitability
 - Displaced by more profitable crops
 - Being grown on more marginal acres
- High share of farm saved seeds
 - Low private sector investment in breeding



... but important, largest single crop

- Truly global, 220+ mha
- Most important food crop, but also feed, fuel use
- High yielding intensive areas
- Steady demand growth, population driven
- High potential for technification

Recent Changes Leading to Paradigm Shift in Technology

- “Food crisis”: food security, self-sufficiency, yield imperative
- Commodity price volatility, but higher average price
- Sustainability agenda: increased demand for input effectiveness (water, nitrogen, carbon)

Paradigm shift in technology:

- More pull for Yield +...
- More acceptance: biotech, GM for food
- Better viability: hybrids, markers

Wheat Needs and Technology – Yield +

Input Efficiency

- Weed Control
- Disease Control
- Insect Control

Sustainability

- Water use efficiency
- Nutrient use efficiency
- Heat tolerance

Outputs

- Reduced mycotoxins
- Quality
 - Milling, biofuels, nutritional value

Integration of Technologies

- Agronomy
- Chemicals – CP / CE / ST
- Genetics
 - Marker assisted breeding
 - Double haploids
 - GM
 - Hybrids

Current Toolbox and Issues

Seeds / Biotech

- No hybrids, No GM
- Marker assisted breeding, double haploids
- High share of farm saved seed
- Limited yield increases
- Not attractive R&D investment

Seed Treatment / Crop Protection

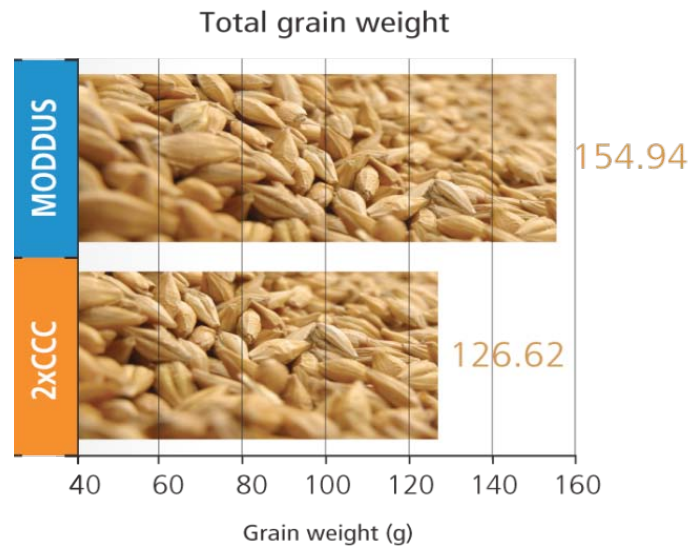
- Good toolkit
- Regulatory revisions may remove key AIs
- Affordability in developing world
- Gaps Fusarium, weed resistance

Crop Enhancement

- Relatively new field
- High potential

Agronomy

Crop Enhancement - Trinexapac



Standard



Moddus

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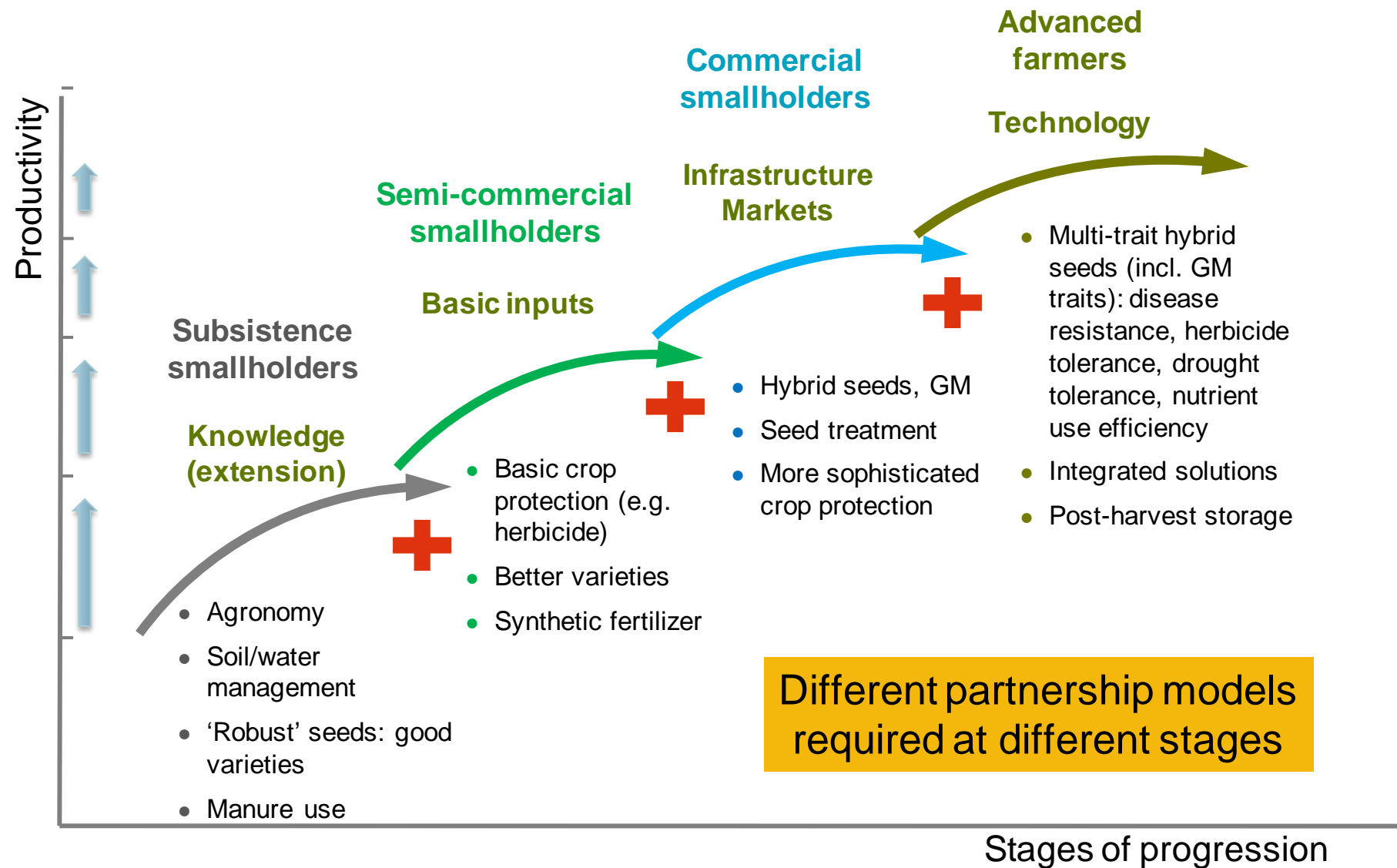
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Agronomy

- Developed world generally good
- Developing world – potential for large increases in yield

Advancing Productivity in Wheat



Partnerships are Key

- No single player has access to all technology or growers
- Requires partnership to share risks and costs (and rewards)
- Partnerships accelerate innovation and give synergies in R&D
- Different target growers, similar technologies
- Need partnerships to work towards GM acceptance
- Need to have partnerships throughout the production chain
 - Seed companies, CP companies, research institutes, growers, grain traders / handlers, millers, bakers, brewers, retailers, consumers, governments
- Clear understanding of what individual needs are
- Must result in „win /win“
- Wide range of partnership models



CIMMYT / Syngenta Partnership

- A common vision that development and deployment of technology in wheat is key to food security and sustainable agriculture
 - CIMMYT developing world focus
 - Syngenta developed world focus
- Joint development of growing systems which optimize yield in an environmentally sustainable manner
 - Combining varieties, agronomy and inputs, such as seed treatment, herbicides, fungicides and crop enhancement products
- Longer term development of new technologies such as hybrids and traits (both GM and native traits) against abiotic and biotic stresses
- Both Syngenta and CIMMYT will continue to work with other partners

Syngenta's Unique Position & Toolkit in Cereals (wheat, barley)

Crop Protection



- Global #2 – market share 19%
- Fungicides, herbicides, insecticides, PGR & crop enhancement
- Global reach

Seed Care



- Seed protection & seedling vigour

Seeds



- Global #1 – market share 16%
- 22% share in NAFTA
- Accelerated breeding: markers & DH
- Unique geographic breadth

Genetics & traits



- First commercial hybrid barley (CMS)
- GM capability: Fusarium trait
- Leading wheat gene map & genomic tools for native (non GM) trait discovery
- Experience in other crops

The Syngenta Vision

*To transform wheat production worldwide,
by creating new technology platforms,
which set unprecedented standards for
yield, quality and sustainability*

Bringing plant potential to life

