Expert Group Meeting
Innovative Finance for Sustainable Development
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Session 1: Financing agricultural R&D
- a private sector perspective

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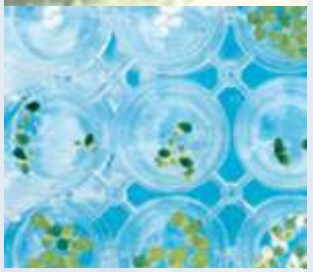
www.bayercropscience.com

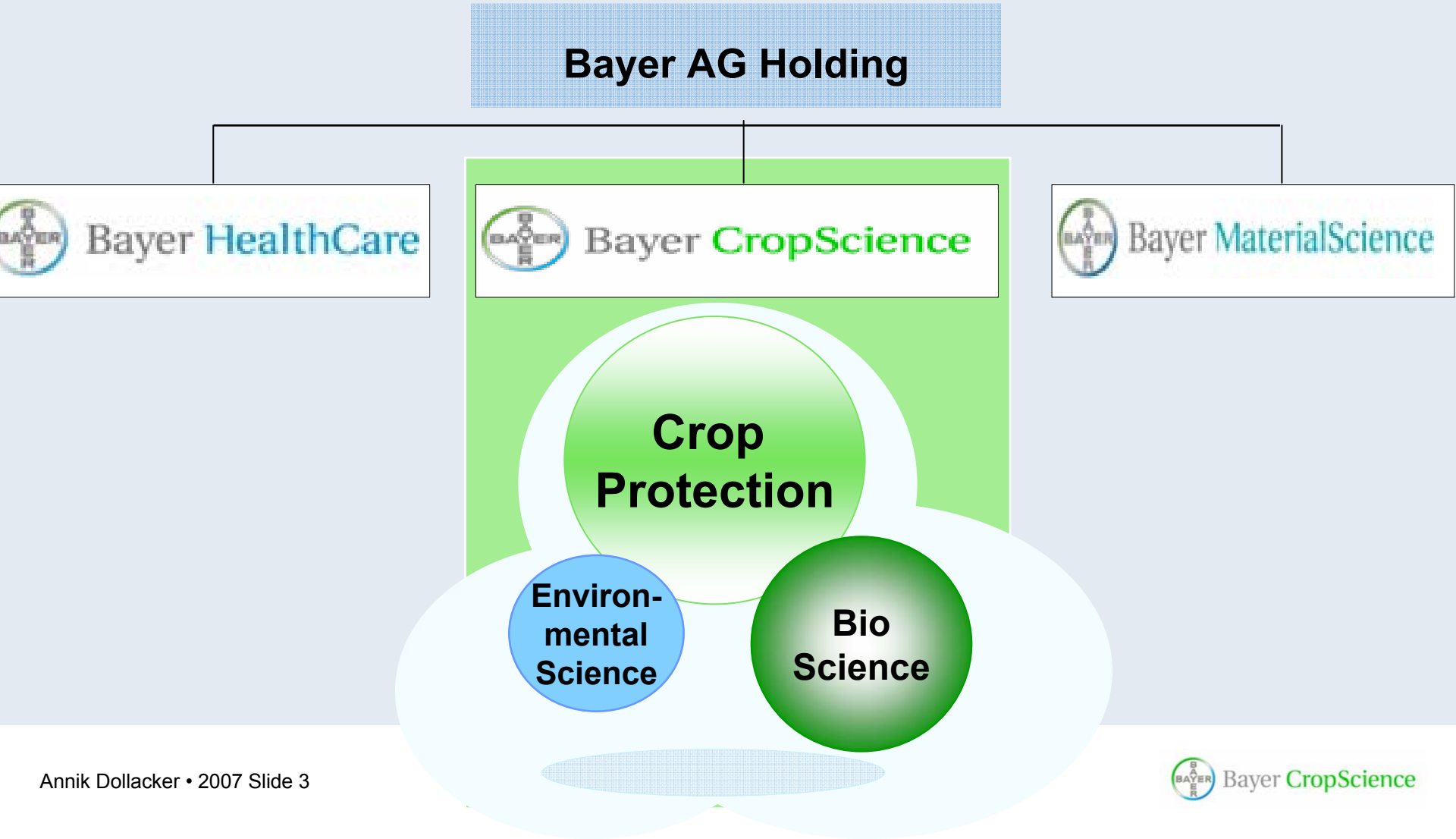
Bayer CropScience

Slides outline

- Who we are
- Agricultural technologies & their benefits
- New agricultural economy: raising demands
- The way forward for R&D investment

Bayer CropScience: part of the Bayer Group



Bayer CropScience HQ Monheim, Germany

- **HQ: ~ 1.800 employees (Focus: R&D, marketing, administration)**
- **Global workforce: ~ 17, 900 in > 120 countries**

Bayer CropScience‘s R&D sites worldwide

R&D sites:

Germany (4),
France (3),
Japan (2),
US (2)
Belgium,
Netherlands,
UK, Spain, Italy,
Poland,
South Africa,
Mexico,
Costa Rica
Columbia,
Brazil,
Argentina
Thailand
Philippines

➲ 25 R&D sites with 3.600 scientific staff: 20% of BCS’s workfor
➲ In all climate zones & both hemispheres (two testing seasons

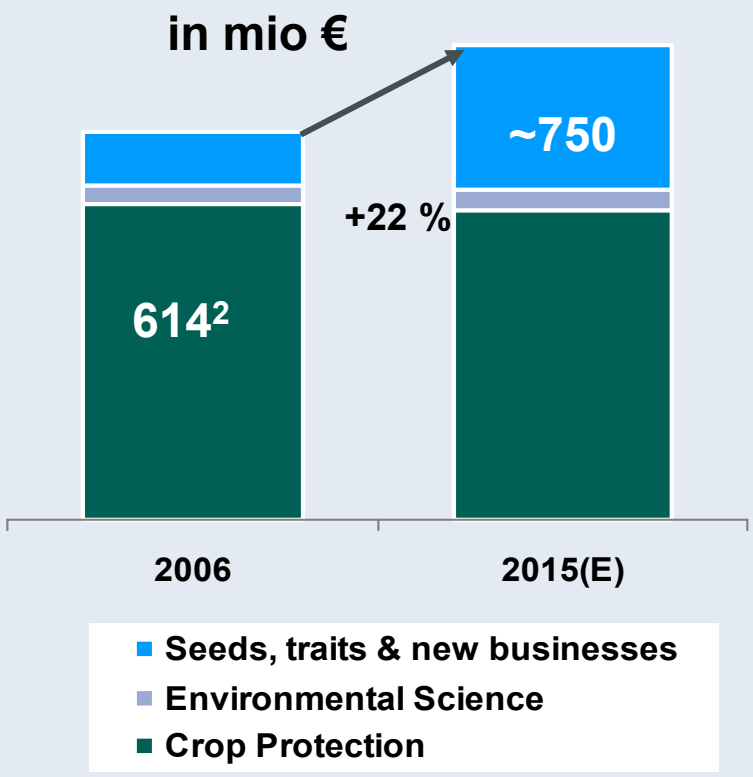
Innovate to meet future farming needs

- New modes of action
- Better biological efficacy & efficiency
- Improved environmental & health profiles
- Improved plant health[1]
- Increased yield & vigor
- Herbicide tolerance & insect resistance
- Improved quality (nutritional, fiber)
- Adapted plants for varying growing conditions[1] (stress tolerance: heat, drought, cold, soil salinit

➲ Move from products to crop technology packages & services
➲ Address Climate Change: e.g. adaptation

[1] under developement

Planned increase in Bayer CropScience's R&D budget by 2015[1]



- Crop protection:
  ~ € 500 mio p.a.
- Seeds & traits:
  expansion > € 200 mio
- Overall:
  expansion to ~ € 750 mio
- Top 10 companies[3]:
  € 3,014 mio (BCS: 20%)

Top 10: Syngenta, Bayer CropScience, Monsanto, Dupo
BASF, DOW, Makteshim, Sumitomo, Nufarm, F

➲ Strengthening innovation power to push the science further

1 Source: F. Berschauer, PR 2007
2 Bayer AG Annual Report 2006
3 Company reports, Cropnosis

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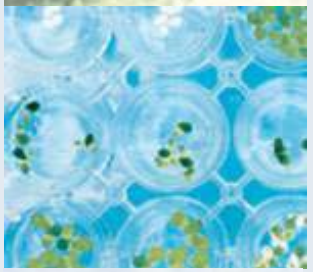
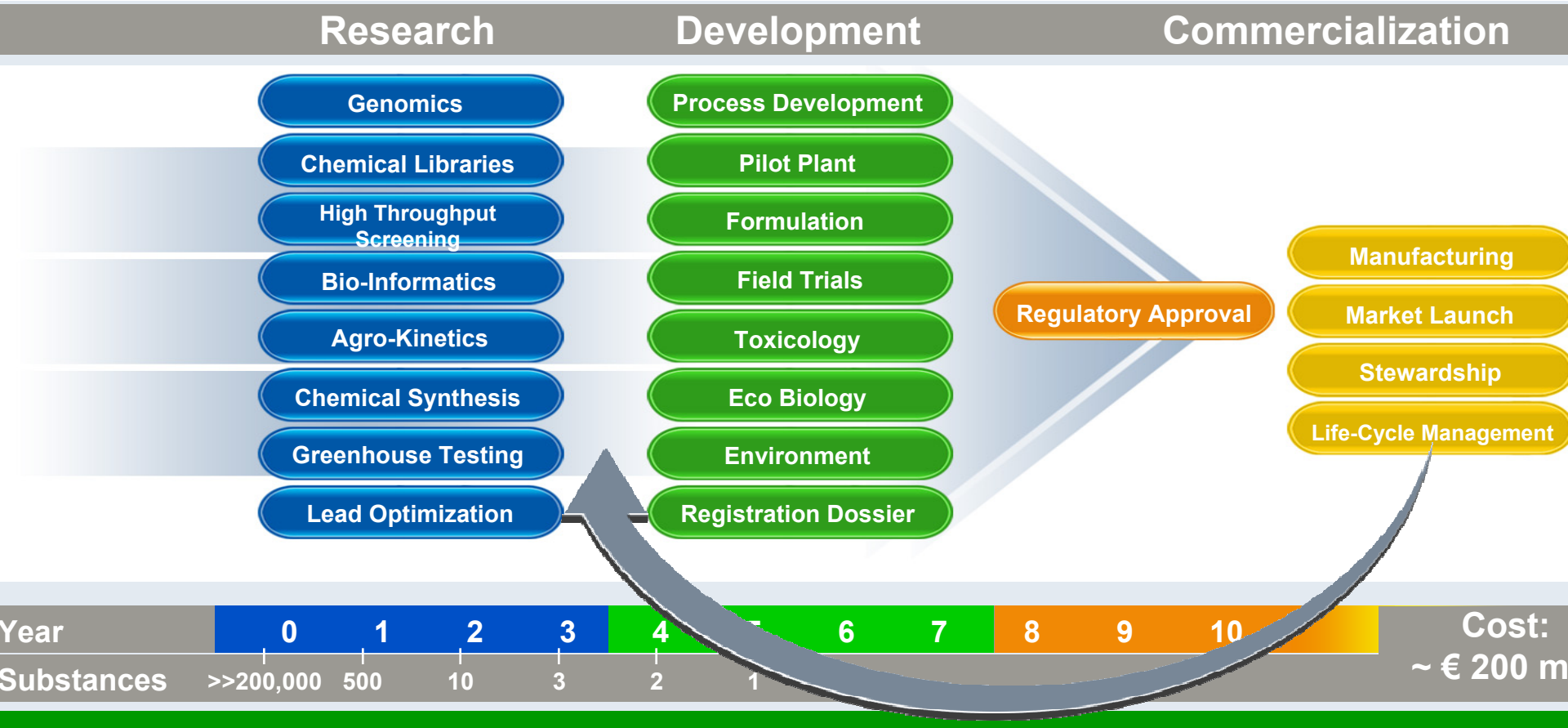


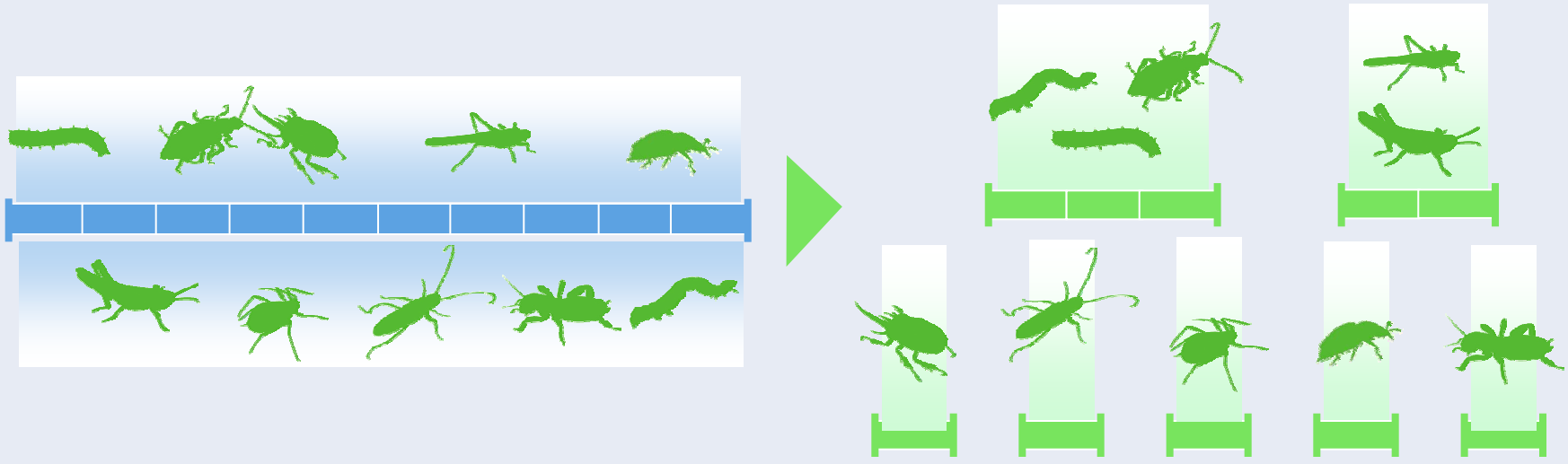
R&D for a new crop protection product (cpp)



➲ It takes about 10 years & € 200 mio to develop one new cpp lead
➲ Cpps are the best researched chemicals worldwide

Regulatory requirement on a crop protection products

First generation products	New generation product



One broad-spectrum product

Several narrow-spectrum products

➲ From broad-spectrum to highly targeted, specific products

More is less

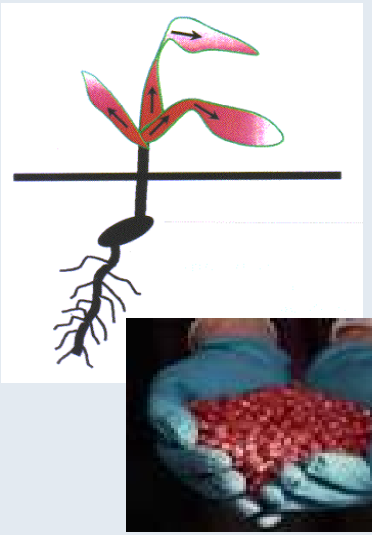
Whole area treatment

2 to 3 treatments can be replaced (10 000 m² x 2 or x 3)

Seed or furrow treatment

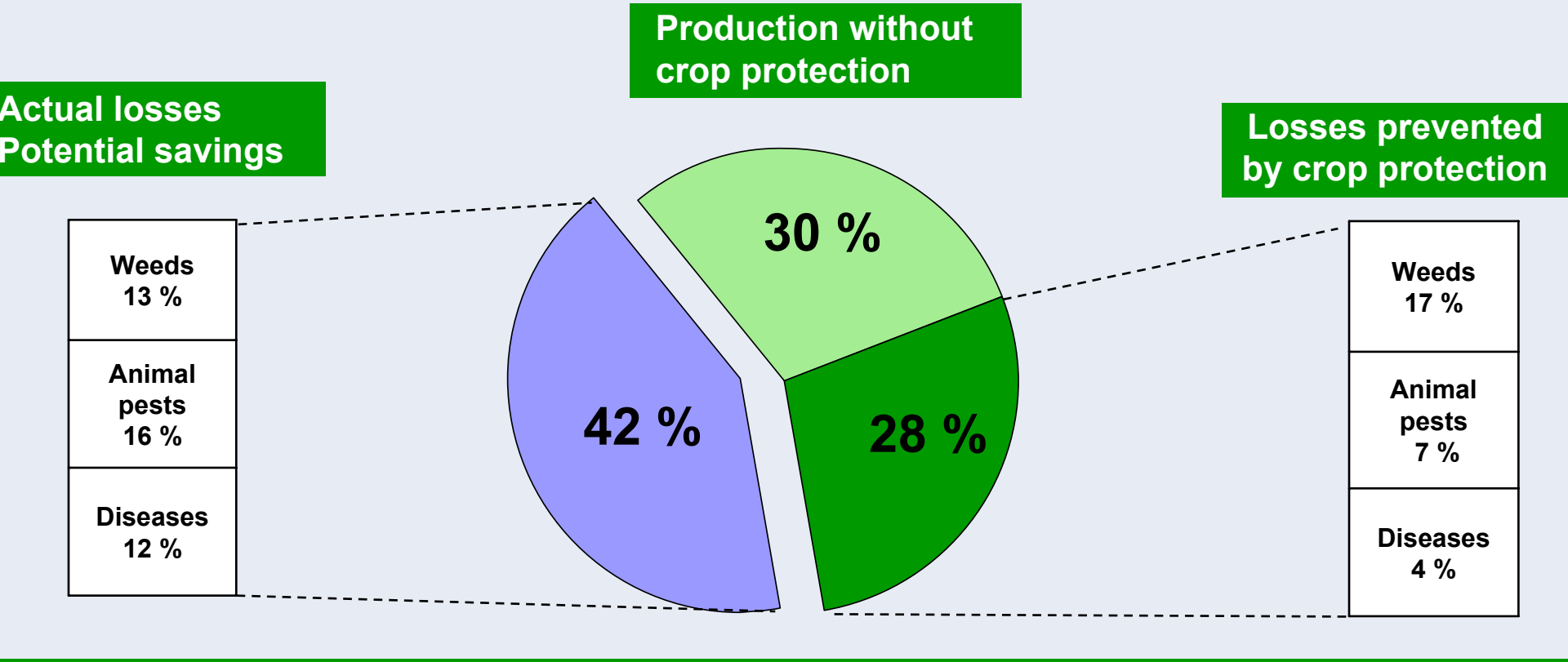
Seed treatment (~ 58 m²)

Furrow treatment (~ 500 m²)



➲ More targeted crop protection benefits the environment

Crop protection: vital for effective agricultural production



➲ 28% of crop losses[1] are prevented through crop protection (~ half the yiel
➲ 42 % further potential crop savings

Major crops analyzed: rice, wheat, barley, corn, potatoes, soybeans, cotton and coffee: ~50 % of crop area worldwide

Source: Oerke et al., 1994

Seed breeding & plant biotechnology

Agricultural crops

Development & marketing of seeds with improved quality and yields

InVigor FiberMax Arize

Canola **Cotton** **Rice**



Vegetable seeds

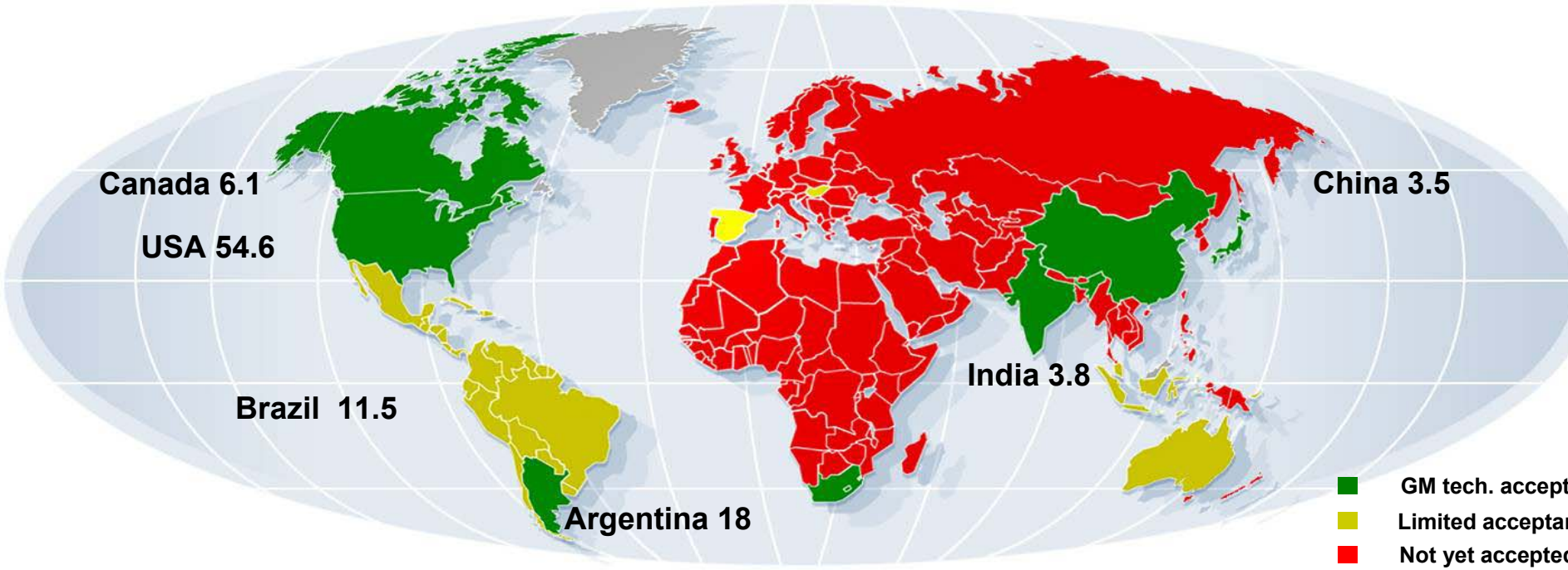
Breeding & marketing of high-quality vegetable seeds

nunhems

~2500 varieties in 28 vegetable crops

- More high-quality yield per land conserves resources
- Increasing # of crop varieties add value to human & environmental health

The global plant biotechnology market, 2006



Only top 6 (out of 22) countries highlihted in mio hecta

- **Global market value: € 4 bn (21% out of €21.25 billion seed market)**
- **Overall 102 mio hectares planted, rapidly expanding**

Source: James, C. et al ISAAA, 2006
(**I**nt. **S**ervice for the **A**cquisition of **A**gri-biotech **A**pplications)

Benefits of enhanced seeds (plant biotechnology)

- Economic benefits for the farmer
- Limited land use / conserving biodiversity
- Adapted plants: stress, drought, salinity etc.
- Enhanced plant yield & nutritional value
- Pest resistance (lower external costs)
- Soil protection (conservation tillage)
- Energy from renewable resources
- Climate protection (mitigation of GHG)

➲ Overall: conserving natural resources, while increasing efficacy

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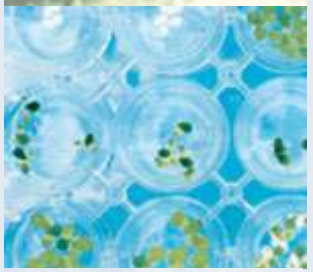
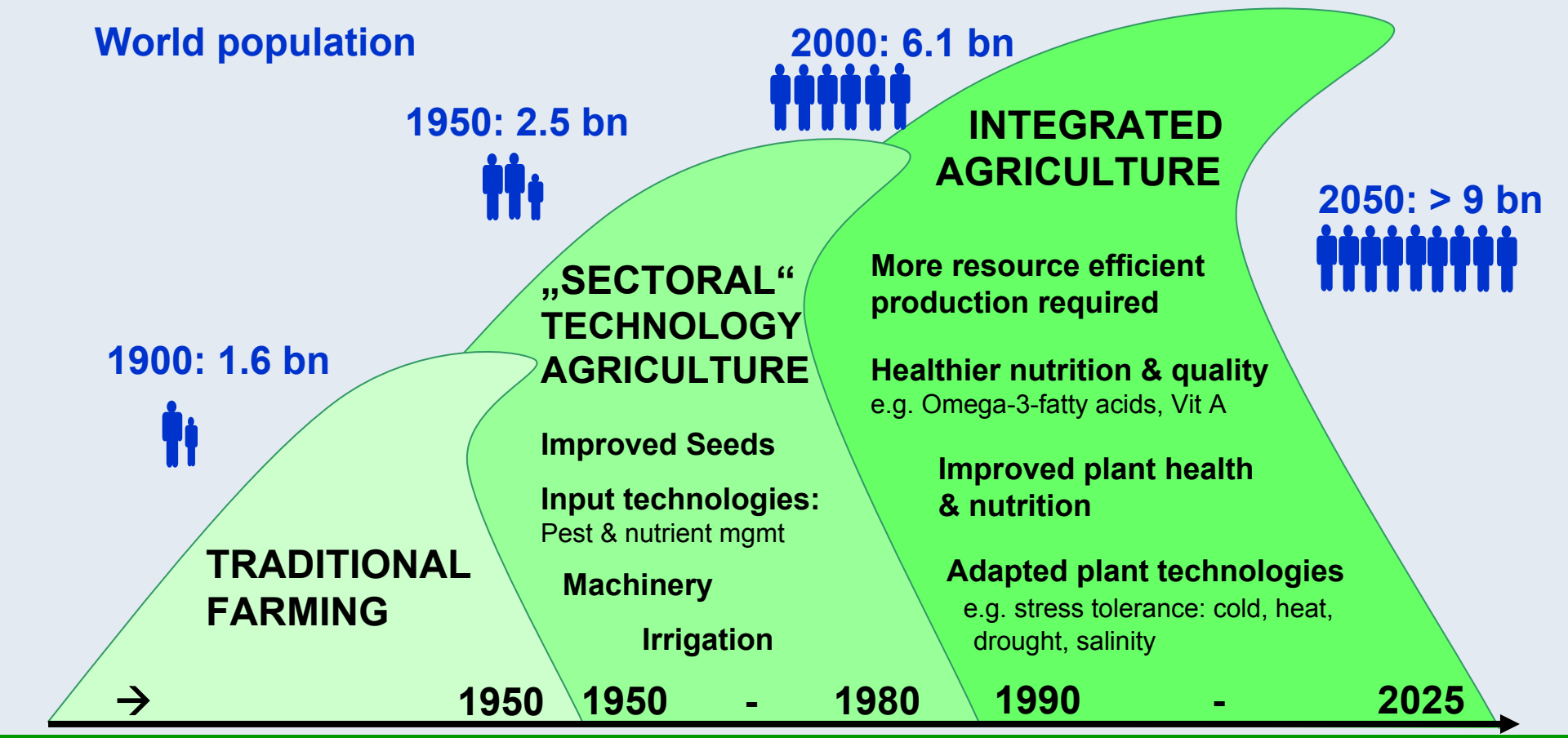


New agricultural economy: raising demands

- Increasing demand for food, feed, fibre, fuel …
- Changing consumption patterns (more meat)
- Limited natural resources: water, biodiv, soil …
- Rural development (e.g. infrastructure, investment, capacity building needs)
- Market framework conditions (national/international)
- Climate change (extreme weather events)
- Bio-energy quest
- Limited land area

➲ **R&D investment in agricultrue needs to address the challeng**

Agriculture on the verge towards more holistic approaches



➲ **Overall: sense of urgency to sustain demands**

Source: www.weltbevölkerung.de

UN Millennium Development Goals (MDGs)

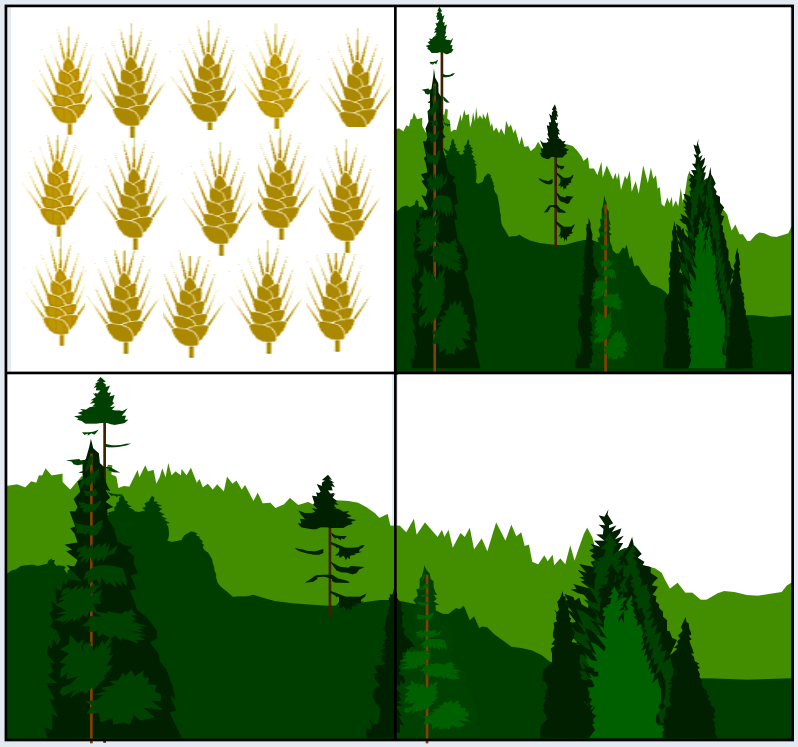
In 2000 the UN Member States pledged to achieve by 2015:

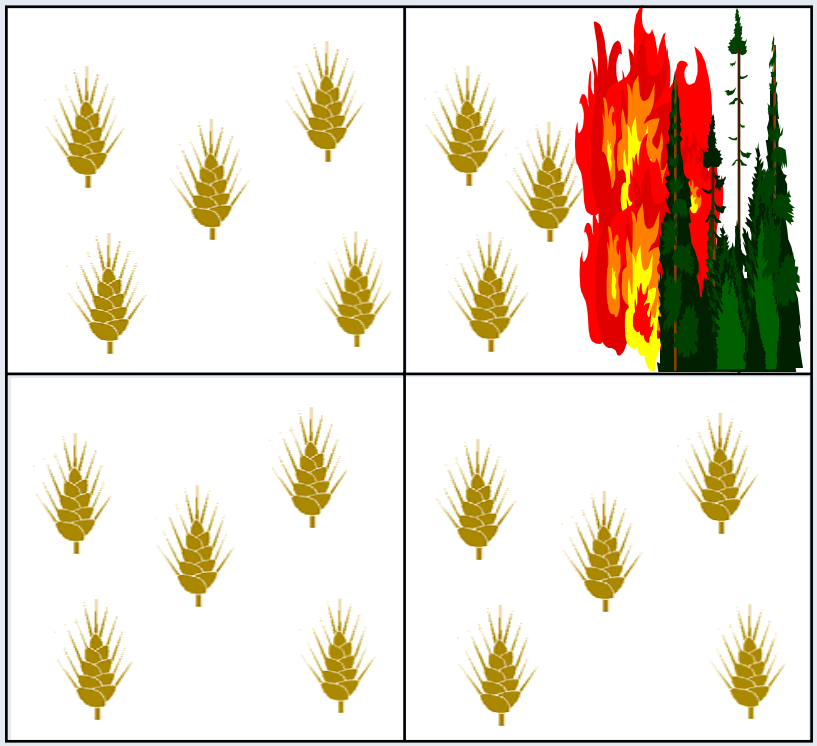
1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

➲ **Agriculture uses 40% of the land worldwide**

➲ **Environmental sustainability has to be integrated into ag mgr**

Addressing the pressures put on land: Maximizing productivity while assuring environmental health





- High productivity on land already ploughed rather than low productivity
- This conserves wildlife habitats & biodiversity

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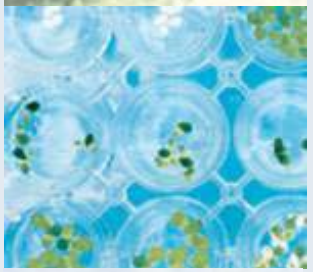
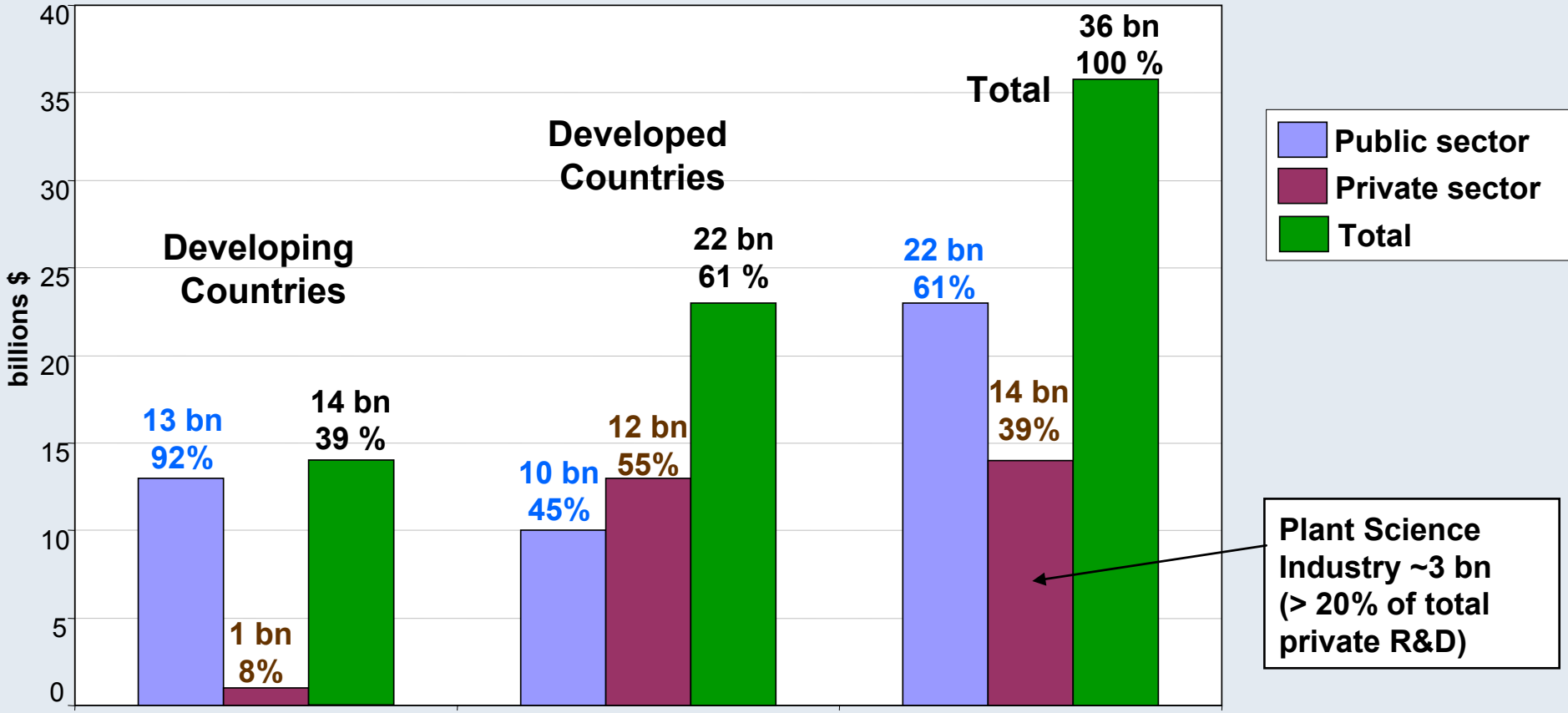


Total global agricultural R&D expenditures, ~ 2000



➲ Total global private sector R&D expenditures: $ 14 bn

➲ Plant Science Industry R&D highly sophisticated

Sources: Pardey, P.G. et al ASTI adapted, 2006
Company Reports

How is private sector R&D different?

- based on economic decisions (ROI)
  - not paid by charity or tax money
- creates market value by generating economic gains
  - for farmers & consumers –
- understands the needs of its customers: local farmers
- needs to be innovative to attract investment
- creates jobs & wealth by paying employees
- transforms basic research into applied science
- varies by form of right (patents)

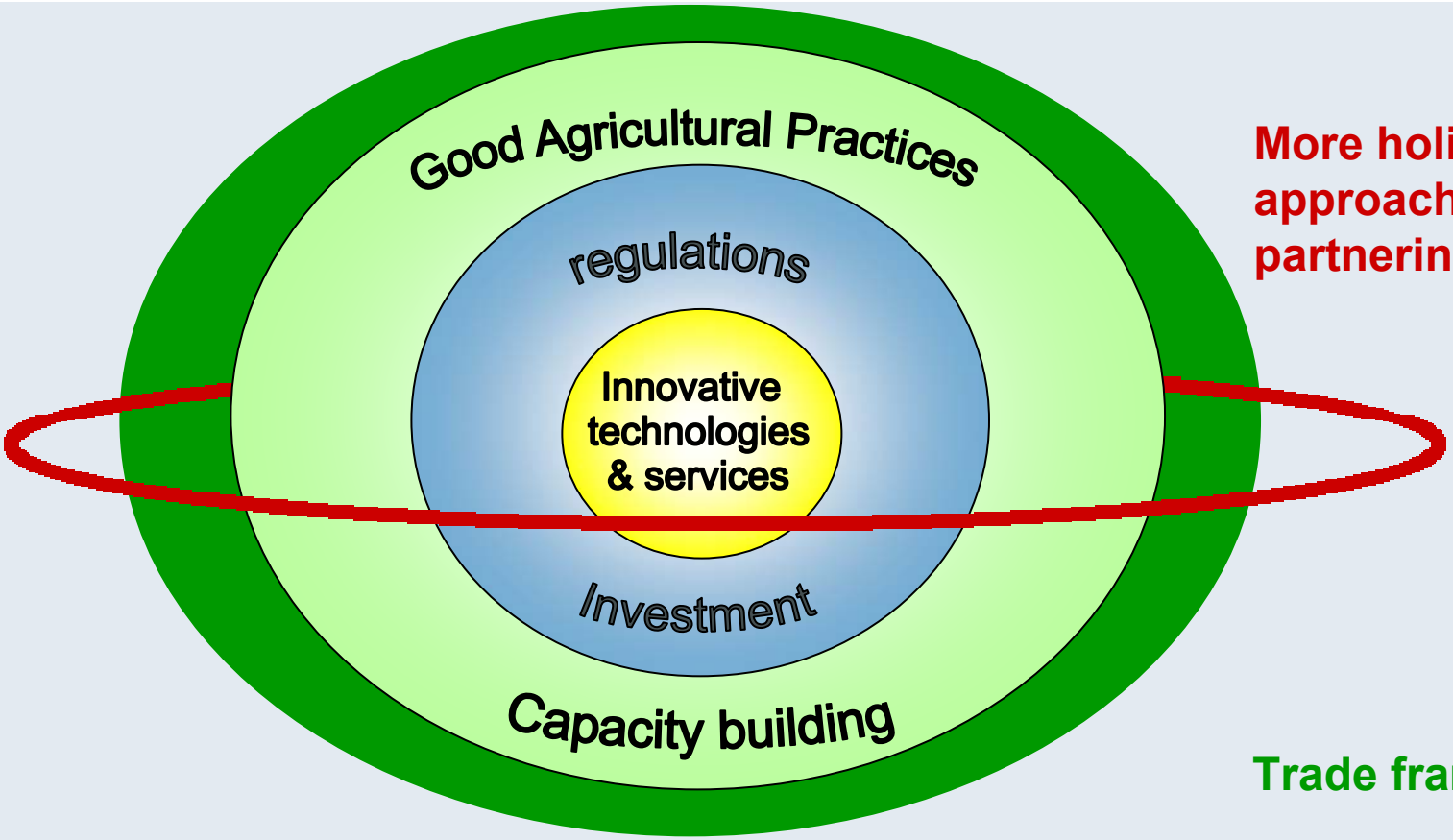
➲ Creating market value through innovations & technologies

What is needed to support agricultural R&D?

- focus on increasing efficacy in **mainstream agriculture**
- **science-based** & **stringent regulatory framework,** incl. **IPR**
- **invest in agriculture** (infrastructure, capacity building, R&D, extension services) **to scale-up solutions**
- **foster cross-sectoral** (agri & food) **and inter-departmental** (ministries of ag, finance, economy, R&D etc) **approaches**
- **adapt national R&D** to future local & global market needs
- **raise awareness** for and **give clear guidance** on how to manage the agricultural challenges ahead

➲ **Governments to create an enabling framework for ag investments**

Enabling framework for agriculture

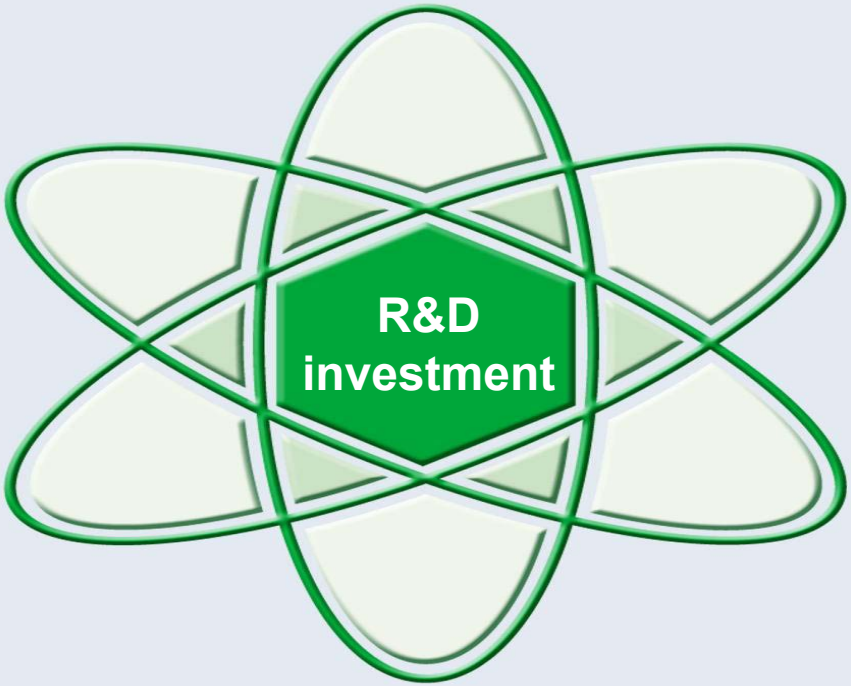


More holistic approaches throug partnering

Trade framework

➲ Enhanced co-operation to address complexities

PPPs[1] an important way forward for agricultural R&D



- Redefining roles of partners in PPPs
- Integrate PP R&D strengths to be sustainable
- More market orientation of PPPs
- Increase responsibilities of countries:
  - capacity building
  - infrastructure etc.

➲ Enhanced co-operation of Public-Private R&D

[1] PPPs: Public Private Partnerships

BCS's contributes to the raising demands put on agriculture by:

- ***developing*** innovative technologies & services, which enable effective agricultural production
- ***partnering***, "glocally" to produce healthy, affordable & predictable agricultural produces
- ***promoting*** integrated crop management
- ***building*** capacity by sharing expertise

➲ Pushing the science further to address the challenges ahead

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Science for a better life