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Closing the yield gap: Can we help? Should we help?

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• The challenges facing agriculture.
• Why is there a yield gap?
• Can we help?
• Should we help?
• Conclusions.
Who are we and why should we care?

• 'WE' -- External organisations in the public, private sectors and civil society - interested in sustainable development.

• Interdependence – food prices are rising, stocks are declining - climate change is happening.

• Renewed interest in agriculture – but more for the products, ecosystem services, solutions or choices it can provide.
Challenges for agriculture - 1

- Demand for most goods and services – cereals, livestock products, fish, timber and other forest products will double over the next generation – (IFPRI and FAO)
- **Population growth** - developing world – Asia and Africa
- **Economic growth** – volume, choice and diversification
- **Catching up** – reducing hunger, poverty, malnutrition etc
- **Urbanisation** - half the world’s population will live in cities
- **Globalisation** – interconnected, interdependence, competitiveness and trade (suspension of Doha Round)
Challenges for agriculture - 2

• **Climate Change** – drought, heat, bugs
• **Biofuels**
• **Consumerism** – market power and forces – food safety
• **Education** – diversification of services and choice
• **Cultural changes** – diversification and sovereignty
• **Structural changes**
Challenges for agriculture - 3

- **Delivering**
  - More ecosystem services
  - More income
  - More people
  - Greater diversity and choice

- **Using**
  - Less water
  - Less land
  - Less energy
  - Less environmental damage
Structural Changes

- Farmers declining in numbers
- Farmers ageing, sickening
- Increasing proportion of women headed farming families
- Consolidation in the value chain and changes in economic power
- Consumers increasingly interested in supply chain issues
Why is there a yield gap?

- Is there a yield gap?
- Beware of generalisations?
- Yes – but what are the possible causes?
  - Unrest
  - Infrastructure – transport
  - Institutions
  - Information – lack of it or confused messages
  - Incentives – policies and market failures
  - Environmental and asset degradation
  - Climate and weather - water
  - Unhelpful aid
  - Technology – inappropriate, unavailable, unaffordable
Maize research in Kenya in 1970’s

- Plant on time
- Weed early
- Get the optimal plant population
- Plant an appropriate variety
- Add nutrients
- Pre- and post-harvest crop protection
- Assure market
Challenges for crop protection - 1

• Pathogens – more numerous, breed faster, mutate more often and do so 24hrs a day

• Need to increase and sustain production and productivity.

• The imperative to stay ahead of movements, mutations and resistance.

• Globalisation of diseases and relative ineffectiveness of border controls.

• Growing concern over food quality and post-harvest disease eg mycotoxins.
Challenges for crop protection - 2

• **Growing list of and costs of regulations** - restricting options and slowing introduction of innovation.

• **Retail/consumer concerns over residues and processes** - now reflected in markets

• **New systems for the control of old and new pathogens needed.**

• **Expect the unexpected – climate change, biofuels.**
Spread of Asian soybean rust

Author: Annalisa Arlatti, May 2005

Source: Bromfield K.R., Frederick R., Hartman G.L., Levy C., Miles M.

APHIS
Can we help? Yes, but!

- Appropriate, robust and affordable solutions or choices
  - Use all the tools – policies, awareness, capacity, infrastructure, institutions, markets and technologies
  - Invest in training and know-how.
  - Facilitate market access
  - The importance of ownership and sustainability
  - Building on local knowledge
  - The need to have an exit strategy.
Should we help – and how?

• Raises moral, ethical and practical issues and whether the demand is real or 'proxy'.

• Partnerships and alliances

• Engagement of beneficiaries

• Avoiding dependency or techno-fix approaches
Delivering results
- partnership will be essential.

- Science will be judged by what it delivers and to whom.
- Increasing the speed at which solutions and new technologies come forward
  - Investment, coherence, critical mass – new tools eg MAB
- Realism and trust
- Continuous delivery of information, technologies and choice will be essential to meet the challenges
- Current funding and policy framework is disfunctional.
Conclusions - 1

- Agriculture is in the limelight.

- Farming is a business not a charity, it must deliver a greater volume of ecosystem services for more people.

- Closing the yield gap is in all our interests.

- Plant protection challenges will continue as production systems intensify.

- As climate changes pest and disease outbreaks will become more likely.

- Outbreaks will be increasingly global in spread or impact.

- Need to greater and more intelligent use of genetic variability.
Conclusions - 2

- Genomics, bioinformatics and marker assisted breeding are valuable tools and could be used more widely if practical and institutional constraints can be resolved.

- Integrated systems – will be needed, but locally developed.

- Greater coherence between research, development and consumers.

- We can help – but will need partnerships for critical mass, speed and delivery.

- We must keep consumers informed and engaged.