Helping farmers innovate to harvest more from less

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KNOWLEDGE FOR LIFE
Helping farmers innovate to harvest more from less

- The problem
- Potential solutions
- Creating awareness
- Enabling change
The perfect storm......

Growing world population

Climate change

Dwindling mineral resources

Water shortage
.... in the face of greater competition for land use
Man cannot live by cereals alone.....
Food vs Feed

- Land
- Water
- Inputs
- Outputs
- Value
- Demand
- Emissions
Higher temperatures, lower yields

- $< 3 \, ^\circ\text{C}$ increase: higher yields in temperate zones
- $> 3 \, ^\circ\text{C}$ increase: lower yields in temperate zones
- Any increase: lower yields in tropics

adapted by Norgrove from IPCC (2007), summarising 69 studies
The promise of biotech….

✓ Drought tolerance
✓ Submersion resistance (Scuba rice)
✓ Disease resistance
✓ Salt tolerance
✓ Temperature resilience
✓ Nutritional value (Golden rice)
✓ Nitrogen fixation (John Innes/BMGF)
✓ Transforming photosynthetic efficiency (ANUPI)
Food Security – build or buy

Make more food available

Produce more

New land
New varieties
Better agronomy
New water resources

Lose Less

Competition from weeds
Pests and diseases
Transit and storage losses
Better water usage

Buy more

Earn more

Produce more
Move to higher value crops
Higher value markets

Use reserves Or savings

Move from subsistence to commercial farming

Valuable quick wins

Essential long term gains
Rice in the Philippines
(Millions of Metric Tonnes, 2010)

<table>
<thead>
<tr>
<th>Category</th>
<th>Value (Millions of Metric Tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Production</td>
<td>15.8</td>
</tr>
<tr>
<td>Imports</td>
<td>1.0</td>
</tr>
<tr>
<td>Consumption</td>
<td>16.8</td>
</tr>
<tr>
<td>Halve Pest and Disease Losses</td>
<td>2.4</td>
</tr>
<tr>
<td>Adopt Hybrids</td>
<td>1.6</td>
</tr>
<tr>
<td>Export Potential</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Source: IRRI, Philippines Department of Agriculture, CABI Analysis
Helping farmers innovate to harvest more from less

- The problem

Potential solutions

- Creating awareness
- Enabling change
Sustainable agriculture

- Environmentally sound
- Climate smart
- Economically viable
- Socially responsible
- Non-exploitive
- Serves as foundation for future generations
Systematic Impacts

Climate change

rising temperature, air humidity, CO$_2$, N$_2$O, CH$_4$., rainfall, fire risks

Pest complex

Crop

Weed community

changes in soil water / nutrient dynamics
Integrated Crop Management

- focus on managing crops profitably but with respect for the local environment and conditions
- aims to minimize dependency on inputs
- integrates production practices to optimize crop health
- selection and adaptation to local situation
- rooted in good understanding of interactions between biology, land management and environment
Water – a precious resource

Potential usage savings of 15 – 50 %:

- Better storage
- Fix the leaks!
- Improve drainage systems
- Use of grey water
- Mulching
- Alternate wetting and drying (rice)
- Aerobic or drought tolerant varieties
- Improved irrigation systems (e.g. drip)
- Water accounts/water pricing
- Telemetry and precision agriculture
Integrated Soil Fertility Management

- Mineral fertilizers
- Organic inputs (manure, compost, legumes)
- Improved seed (pest/drought resistant)
- Good agricultural practices (spacing, timing, weeding, pest management)
- Local adaptation (suited to local conditions; economically efficient)
- Decision tools to predict where to use fertilizer for greatest economic return
Conventional breeding can deliver much of what we need…

- Heat tolerance
- Drought tolerance
- Salt tolerance
- Submergence resistance
- Nutritional value
- Pest and Disease resistance

…provided we have accessible and well-maintained germplasm collections
Content from CABI and partners

Expertise from CABI and partners

Knowledge Bank

Plant Clinics

Data for prevention, identification and management

Public good: trade, knowledge, food security

Practical assistance for farmers
Global reporting network
How the clinics work

• Set up at local meeting places
• Free at the point of use
• Farmers come with problems and samples
• Receive a diagnosis and a ‘prescription’ from the plant doctor.
Welcome to the Plantwise Knowledge Bank

Choose your country  -- Please select --

The Plantwise knowledge bank brings together key plant health information from across the world, including a useful diagnostic tool and factsheet library to help diagnose and manage plant health problems. The Plantwise map allows global pest and crop distribution to be mapped alongside other key information such as climate zones. If you want quick access to information for a particular country, select a country from the dropdown above to see a custom-made information portal for that region and click Continue.

IDENTIFY A PEST PROBLEM

Country
-- Please select --

Crops
-- Please select a crop --

FIND A FACTSHEET

Recently added factsheets
Xanthomonas wilt
Sweet potato weevil
Attract and kill: fruit fly control
Attracting snails away from garden plants
Avoiding leeches in rice paddies

Go to diagnostic tool...

Go to factsheet library...

PEST DISTRIBUTION

Go to distribution map page...

NEW PEST REPORTS

PLANT HEALTH NEWS

PLANTWISE BLOG
274 clinics in 22 countries

Over 1200 plant doctors trained

Estimated 170,000 farmers helped

Open Access Knowledge Bank
Healthy landscapes – making rural communities more viable

**Reducing risk**
- Crop/fertilizer/water mix for better nutrition and yield
- Crop types and practices for resilience to change
- Improved knowledge of and access to markets
- Control of invasive species

**Increasing sustainability**
- Lose less to increase output/quality with fewer inputs
- Protection of biodiversity on and off farm
- Management of ecosystem services, practices and use
- Involvement of women

**Result**
- Reduced food insecurity, improved quality of life
- Reduced or reversed rural migration
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- Potential solutions

Creating awareness

- Enabling change
Communicating with farmers

- Individual farm visits
- Farmer field schools
- Mass media
Seed health videos - Bangladesh

In Bangladesh, poor seed health is associated with rice yield losses of 10 to 15%.

Video communication increased the number of women in rural communities using new techniques for improving seed quality.

A survey showed that after seeing the video 94% of women were aware of the need for proper seed drying as opposed to just 41% before.
Case study

Africa Soil Health Consortium

- Acts as the interface between developers of integrated soil fertility management knowledge (e.g. projects) and those who use the knowledge - extension workers, agrodealers and farmers
- Works with partners to design information materials that are customised for the target audiences
- Materials include policy briefs, booklets, radio and TV programmes

Sub-Saharan Africa

2010 – 2014

Funded by the Bill & Melinda Gates Foundation
India – Africa partnerships

Mobile Agro-Advisory services

India and Africa

- India – successful pilot project with IKSL (IFFCO/Airtel)
- Over 3 million users – receive 5 free “push” messages each day, follow up enquiries charged at local rates
- CABI created ‘Direct 2 Farm’—database of farmer centred actionable information
- Africa: leveraging on work in India – working with GSMA projects to develop mobile agro advisory services with Airtel in Kenya; with ESOKO in Ghana.
Communicating with farmers ..... many more options

- Individual farm visits
- Farmer field schools
- Plant clinics
- Videos
- Mobile
- Internet & Social Media
- TV, Radio
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Enabling change
Case study

Creating value for Tanzanian farmers

- IPM technical guide produced for outdoor tomatoes
  - 88% farmers reduced frequency/quantity of pesticides
  - Yields increased; health risks to farmers and consumers reduced

- Branding of IPM tomatoes achieved

- Farmer field schools transformed into functional producer clubs
  - Establishment of information cards on IPM tomato crates for sale
  - Sound farmer-trader relationships developed for sustainable marketing

IPM in High Value crops

Funded: SDC
Partners: HORTI-Tengeru & (RLDC)
Perking up coffee in Africa

Farmers in Ethiopia, Rwanda and Cameroun get a better return for their coffee crop after learning new processing techniques that improve the quality of their coffee:

- Farmer field schools teach new processing techniques to deliver higher quality
- Marketing helps farmers stimulate demand for coffees produced by the new approach, with premiums of over 30% above the usual prices being realised.
- Microfinance initiatives help more farmers buy equipment to adopt the new techniques

Funded by:
- CFC
- World Bank
- Rabobank
Micro-insurance to protect Kenyan farmers against weather risk (drought or extreme rainfall)

- Covers all input costs – seeds, fertilizer and chemicals
- Network of remote solar-powered weather stations to monitor rainfall
- Farmers can arrange premiums and claims via mobile phone
- Coverage in 2010 12,000, target for 50,000 by 2012
Creating a virtuous circle

- **Economic Analysis**: Assurance of economically viable solutions
- **Concept Development**: Creation of customised ICM conceptual frameworks
- **Policy Guidance**: Establishment of regulatory guidelines and policy tools
- **Capacity Building**: Development of skills and strengthening of institutions through knowledge exchange
- **Technical Support**: Facilitation of activities and provision of expertise

**Sustainable ICM Solutions**
“you cannot tackle hunger, disease, and poverty unless you can also provide people with a healthy ecosystem in which their economies can grow.”
-- Gro Harlem Brundtland

Thank you ...... Questions?