A scenic landscape photograph showing a valley with terraced fields and mountains under a cloudy sky. The foreground features rolling hills with patches of green vegetation and reddish-brown soil. In the distance, a small town is nestled in the valley, surrounded by more hills and mountains. The sky is filled with large, white, fluffy clouds.

# **ACIAR - Overview of the Horticulture Program**

**Richard Brettell and Richard Markham**

**8 September 2016**



# Outline

- Snapshot of Australia's aid program, and the role of the Australian Centre for International Agricultural Research (ACIAR)
- Linking Research to Development
- Overview of the Horticulture Program
- Value chain interventions, drawing on learnings and examples from Indonesia





# What is ACIAR

- A statutory authority within the Australian Government's Foreign Affairs and Trade portfolio
- Part of Australia's Aid Program, with the objectives of advancing Australia's national interest through poverty reduction and sustainable development
- A research funder and manager



Promoting Australia's national interests by contributing to sustainable economic growth and poverty reduction

To achieve

Private sector development

Human development

We maximise  
impact by being innovative  
and leveraging knowledge  
and finance

Infrastructure,  
trade facilitation  
and international  
competitiveness

Agriculture,  
fisheries and  
water

Effective governance:  
policies, institutions  
and functioning  
economies

Education  
and health

Building resilience:  
humanitarian assistance,  
disaster risk reduction  
and social protection

Gender equality  
and empowering  
women and girls

We invest in

For each country, the balance of investments will be tailored to country context and reflect Australia's national interest

# ACIAR

## Vision

- ACIAR looks to a world where poverty has been reduced and the livelihoods of many improved through more productive and sustainable agriculture emerging from collaborative international research

## Mission

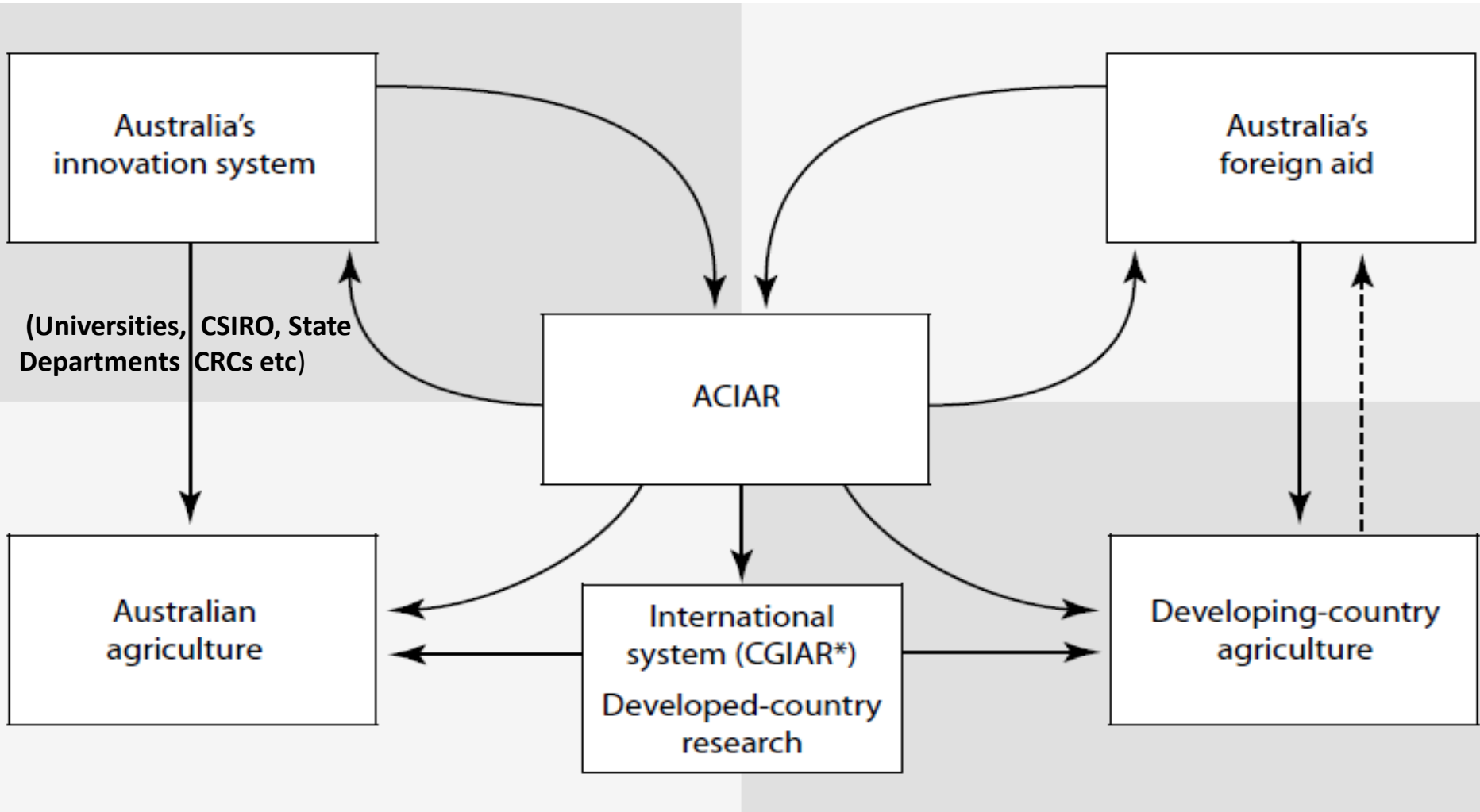
- To achieve more productive and sustainable agricultural systems for the benefit of developing countries and Australia through international agricultural research partnerships





# What we do

- Commission research into improving sustainable agricultural production in developing countries
- Fund project related training
- Communicate the results of funded research
- Conduct and fund development activities related to research programs
- Administer Australia's contribution to the IARCs







# Our operations

- Program clusters

- Livestock and fisheries
- Crops
- Natural resource management
- Economics and social sciences

- Regional Offices

- Mekong (Lao PDR)
- North Asia (China)
- South Asia (India)
- Sub-Saharan Africa (Kenya)

- Country Offices

- Indonesia
- Pakistan
- Philippines
- PNG
- Việt Nam





# Our operations

- Programs

- Agribusiness
- Agriculture Development Policy
- Agriculture Systems Management
- Animal Health
- Crop Improvement and Management
- Cropping Systems and Economics
- Fisheries
- Forestry
- Horticulture
- Land and Water Resources
- Livestock Production Systems
- Pacific Crops
- Soil Management and Crop Nutrition



# Bilateral budget

| Region                  | 2016 |
|-------------------------|------|
| Pacific (including PNG) | 22%  |
| East Asia               | 47%  |
| South and West Asia     | 15%  |
| Sub-Saharan Africa      | 16%  |

# Linking Research to Development

Commissioning model. ACIAR does not run projects

Emphasis is 'Research for Development'

Most projects are designed to be taken to a pilot development level

Only 20% or so of projects are not tested in an economic and/or social context.

# Linking Research to Development

Successful projects may be taken up into a development project, with support from DFAT (Australian Government) or other agencies

Examples:

1. Sweet potato research in Papua New Guinea
  - virus diagnostics
  - virus therapy
  - clean seed system
2. Cocoa in Papua New Guinea
  - commercialisation, scaling projects in PNG, Bougainville



# Linking Research to Development

Successful projects may be taken up into a development project, with support from DFAT (Australian Government) or other agencies

Examples:

## 3. Pacific project on Integrated Crop Management

pesticide reduction, through rotating chemical pesticides,  
applying BT  
research outputs providing inputs into development  
teamed with FAO project

# Linking Research to Development

Successful projects may be taken up into a development project, with support from DFAT (Australian Government) or other agencies

Examples:

## 4. Kiribati

Outer Islands Food and Water Project  
\$1 million project with IFAD

# Linking Research to Development

## **Working closely with Government in the partner countries**

Example: Seeds of Life program in Timor Leste

The program was established in the early 2000s with Australian Government funds, to introduce new high-yielding varieties of staple crops (maize, sweet potato) and provide farmers with access to seed.

Although Seeds of Life formally came to an end in June 2016, the legacy of the program continues. The foundations of Timor-Leste's National Seed System have been established

ACIAR is now working on new initiatives in agroforestry and livestock sectors

# Linking Research to Development

## Influencing policy

Participation in high levels policy groups, for example in India and Pakistan

Example of the Agriculture Sector Linkages Program (ASLP) in Pakistan

Includes policy project, social project, in addition to research for development projects in mango, citrus, dairy and vegetables

Reference committee with high level government representation meets twice a year





# **ACIAR Horticulture Program**

**AUSTRALIAN CENTRE FOR INTERNATIONAL AGRICULTURAL RESEARCH**

# ACIAR Horticulture Program

Varietal evaluation and registration

Diagnostics (techniques and partnerships) – for viruses, bacteria and fungi

Farmer field schools/participatory action research vs conventional training

Plant Clinics

Information support materials – paper, hand-held devices or internet-based

Pesticides – resistance management and pesticide safety

Novel pest control products – the good, the ineffective and the downright dangerous

Biological control – classical and innovative

‘Soil health’ and other ecological approaches

Crop nutrition and water – compost, fertilisers, fertigation

Protected cropping – at various scales and complexities

Harvesting and ripening – timing, ethylene generators

The road to market – data-loggers

Consumers and marketing – targeting

Farmer organisation for training, production and marketing



## **Crop Protection**

### **New initiatives – broader approaches**

- Longer-term, ‘programmatic’ approach
  - PC/2010/090  
Strengthening integrated crop management research in the Pacific Islands in support of sustainable intensification of high-value crop production
  - With SPC, UQ, AVRDC, Fiji-MPI, SI-MAL et al.
  - Closely linked with FAO TCPs
  - Improved diagnostics, Plant Clinics, diagnostic research and IPM





## **Crop Protection New initiatives – broader approaches**

- **Adding the ‘business’ dimension**
  - **PARDI PRA/2011/003**  
Developing an integrated participatory guarantee system for high-value vegetable crops.
  - **PARDI PRA 2012.01**  
Evaluating protected cultivation and irrigation technologies for improving climate resilience of vegetable production systems





## Nutritious vegetables –

**Left: Indigenous leafy vegetables in a supermarket in Fiji – many such veggies have short shelf life and post-harvest work is needed to assure availability**

**Below: As part of an ACIAR-AVRDC project in Solomon Islands – a theatre group preparing to take to the streets with their message about healthy veggies... local radio was also used to spread the word.**



# Livestock integration

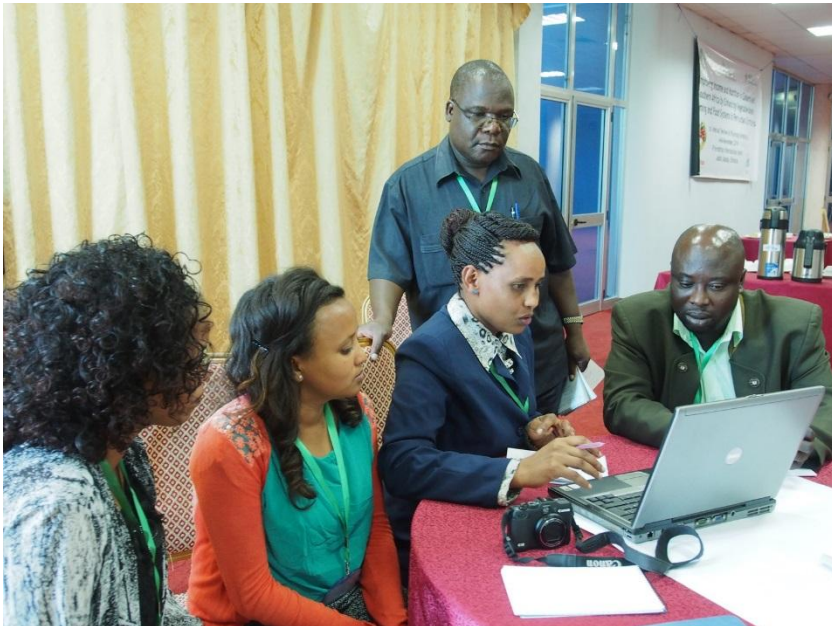


- Value of compost from manure
- Animal traction



# Gender perspectives

- Importance of considering women's roles – in planning/managing, research, extension, enterprise development
- (planning VINESA regional project)



# Participatory learning

- Young farmers – ‘learning by doing’ in a season-long course at a ‘best-practice hub’ in Ethiopia
- (VINESA regional project)





# Soil health and soil ecology



- Multi-factor trials to understand and manage Fusarium
- (Visayas State University in Philippines)

# Excessive use of inputs

- Shallot production in Java – application of 5x recommended rates of nitrogen by farmers, indiscriminate use of mixed fungicides/insecticides



Cirebon, Indonesia





# Control of virus diseases

- Shallot production in Java – virus diseases are perpetuated by farmers
- Farmers keep 'small' bulbs for planting... selecting for virus





# Control of virus diseases

- Screening the national genetic resources collection of chillies for resistance to viruses – John Thomas, Queensland
- Development of diagnostics



Java, Indonesia



# Control of virus diseases

- Introducing IPM for chillies in Indonesia – barrier rows, intercropping
- Scope for improvement ... plots too small, design too complex



Java, Indonesia





# Post-harvest handling and processing

- Employment for women... but low paid



(Java, Indonesia – fried onions to Nigeria!)

# Input suppliers – private sector

- Providing reputable products (labelled in local language), training and safety equipment



UCA, a start-up company in Cambodia





# Appropriate extension approaches?

- Crop pests class in a church and plant pathology under a tree



southern Philippines



# Organic production

- Driven by consumer demand or politics?

Southern  
Philippines





# Organic production

- Numerous Trichoderma products are being offered – here being tested against Fusarium on tomatoes in the Philippines





# Farmer training

- Ethiopian mustard (promoted as a healthy leafy vegetable) in IPM trial (mulching), with conventional farmer training at 'best practice hub' (background)

VINESA project,  
Malawi



# Networking for expert diagnostics

- Training in Pestpoint and remote microscopy – forming a biosecurity network in Laos, Cambodia, Thailand and Myanmar





# Breeding for stress resistance

- Phytotron trials and molecular methods used in combination with field screening for heat tolerance in okra for Pakistan



# Multiplying seed

- Role for public sector initially? Or straight to farmers and/or commercial seed companies?
- Working with WorldVeg in Solomon Islands and Tanzania



Pakistan



# ACIAR Horticulture Program

Value chain interventions, drawing on learnings and examples from Indonesia



## ACIAR Horticulture Program

The conclusions of Humphrey and Navas-Aleman (2010) are instructive. Their study published by the Institute of Development Studies undertook a review of 30 value chain interventions funded by a range of donor organizations.

Concluded that while interventions were often effective in promoting market orientated growth, there was little evidence of their direct impact on poverty reduction.

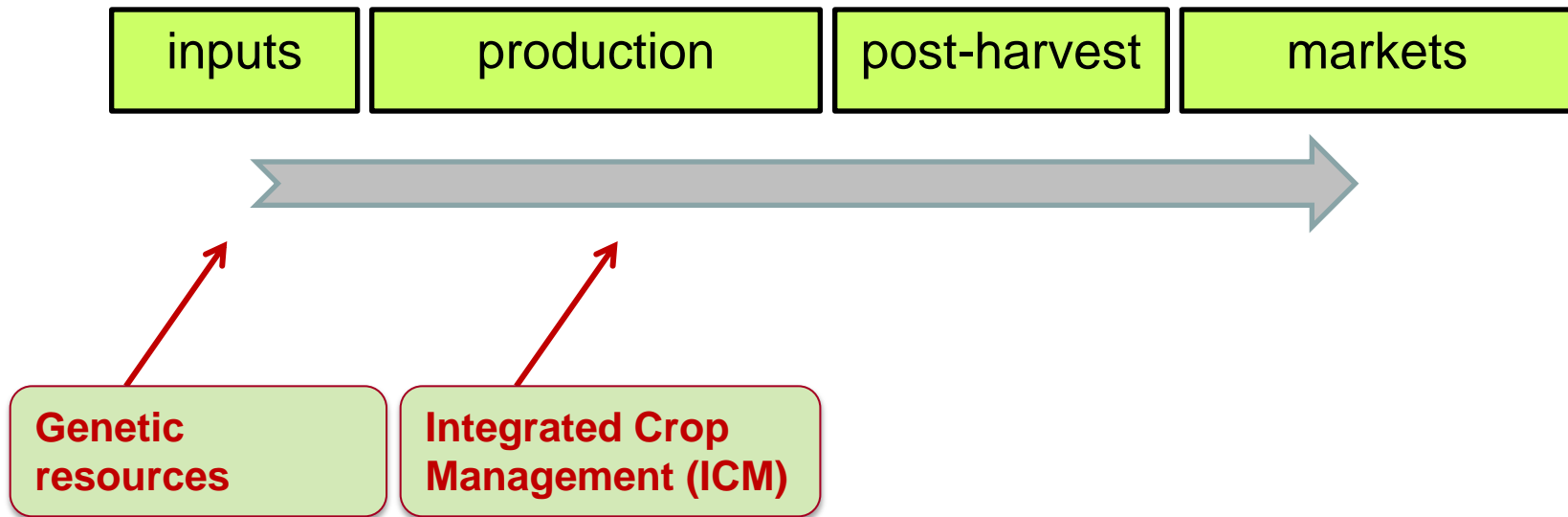
# ACIAR Horticulture Program

Salient points in the report:

Most opportunities for poverty reduction come from the development of niche markets for raw or minimally processed products, and

The poor struggle to gain market access because of a lack of knowledge of such opportunities, the market requirements associated with such opportunities or a mismatch between the market requirements and their capabilities to meet these requirements.

# ICM and GR in the Context of the Horticulture Value Chain



# Conventional drivers of IPM



- **Maintain productivity and profitability in the face of pest and disease attack**
- **Reduce excessive pesticide use**
  - To manage pesticide resistance
  - To maintain profitability
  - To protect the health of workers and the environment





# Current drivers of ICM



- **Sustain productivity in vulnerable systems (soil, water, nutrients...)**
- **Sustain or increase profitability in the context of evolving markets and opportunities**
- **Respond to market and consumer demands**
  - for improved food safety
  - for reduced environmental impact
  - for specific social outcomes

# Conventional drivers of GR selection



- **Productivity under optimum growth conditions**
- **Appearance**



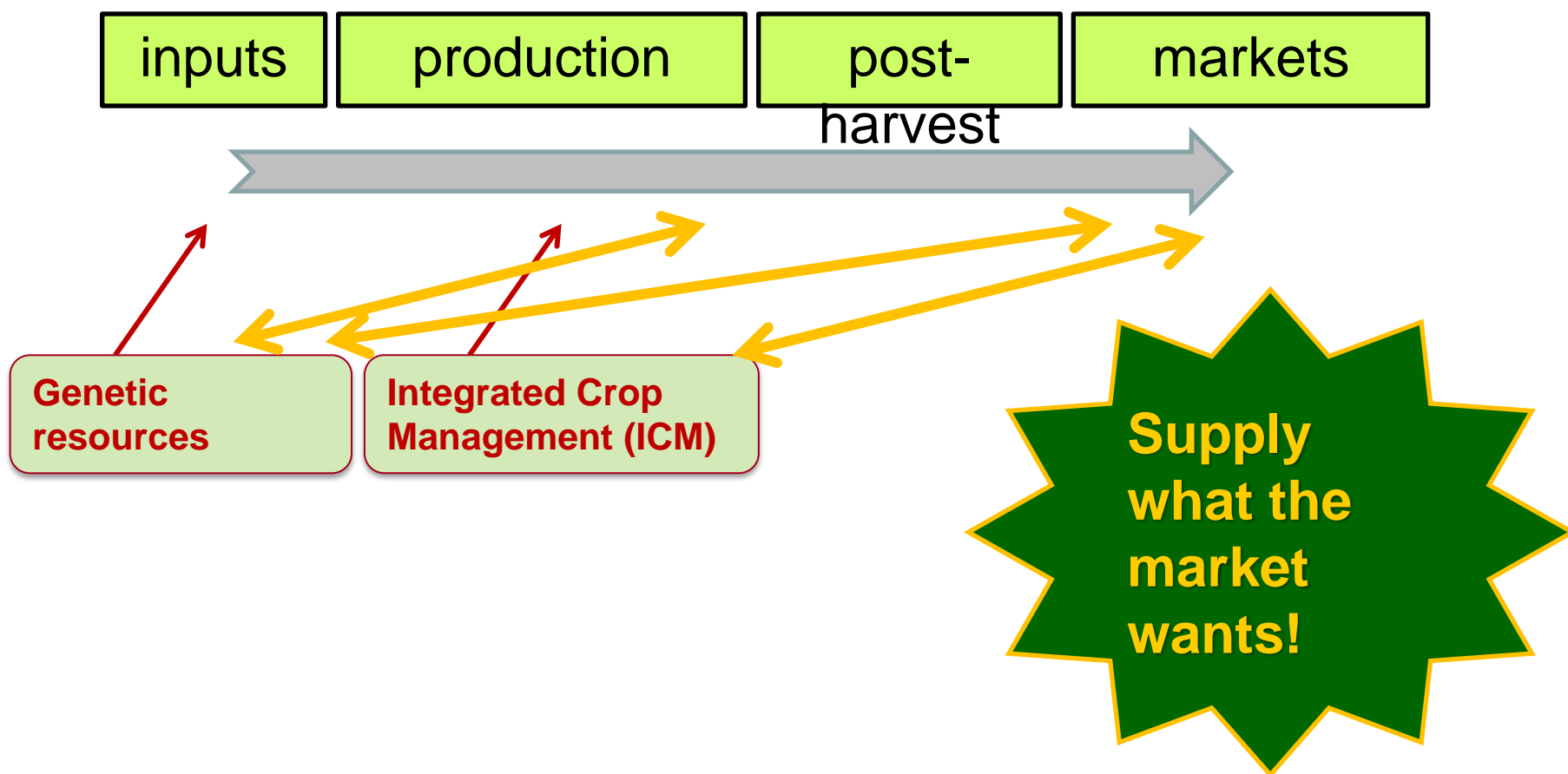
# Current drivers of GR selection



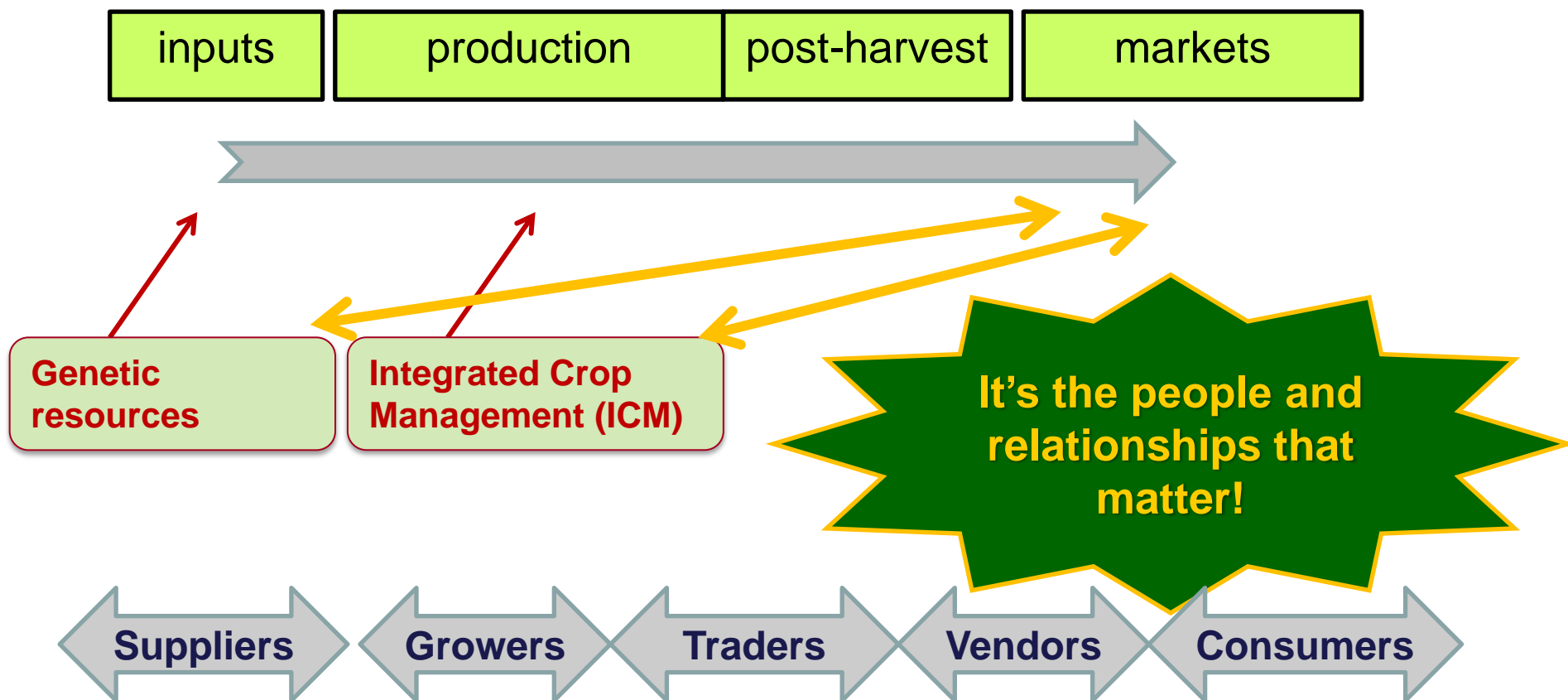
- **Productivity that is stable and sustainable under variable conditions (including stress)**
- **Response to consumer demands**
  - for diversity and traditional cultivars
  - for taste and texture
- **Response to market chain demands**
  - for transport and shelf life
  - for biosecurity demands



# IPM and GR in the Context of the Horticulture Value Chain



# IPM and GR in the Context of the Horticulture Value Chain



# Market demands and opportunities



**Supply  
what the  
market  
wants!**

- Robust in transport
- Ripening and shelf-life
- Response to chilling





# New research demands (in value chain context)



- Understand market demands and opportunities
- Evaluation by consumers, vendors and traders, as well as growers
- Improve post-harvest handling
- Understand biosecurity constraints (and opportunities)
- Business skills and enterprise development

# Feedback from market to farm

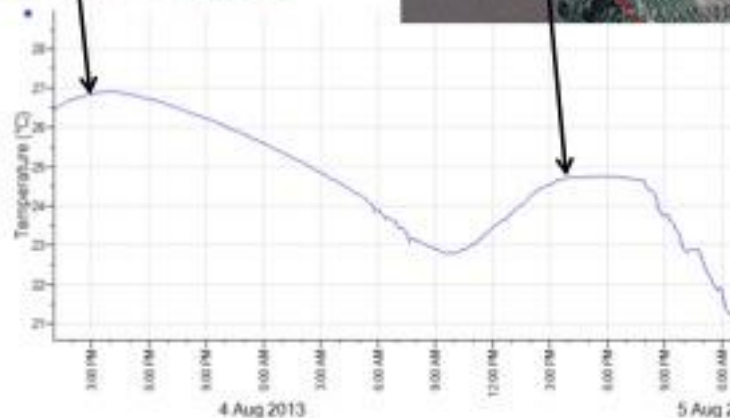


- Rots in transit and in market – losses
- Select resistant varieties?
- Reduce inoculum in the field?
- Attend to temperature during ripening and transport
- Handling and washing as a source of infection?

# Sensor technology and farmer interactions



**GPS tracking  
Temperature  
Shocks  
Time**



**More compelling  
for farmers than  
'good practice'  
training**





# Acknowledgement

- To Dr Richard Markham (ACIAR RPM Horticulture), colleagues and collaborators who have contributed material for this presentation

**Thank you for your  
attention!**

