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Can demand-driven breeding increase smallholder adoption?

Dr. Viv Anthony, TropAg, 17th November 2015

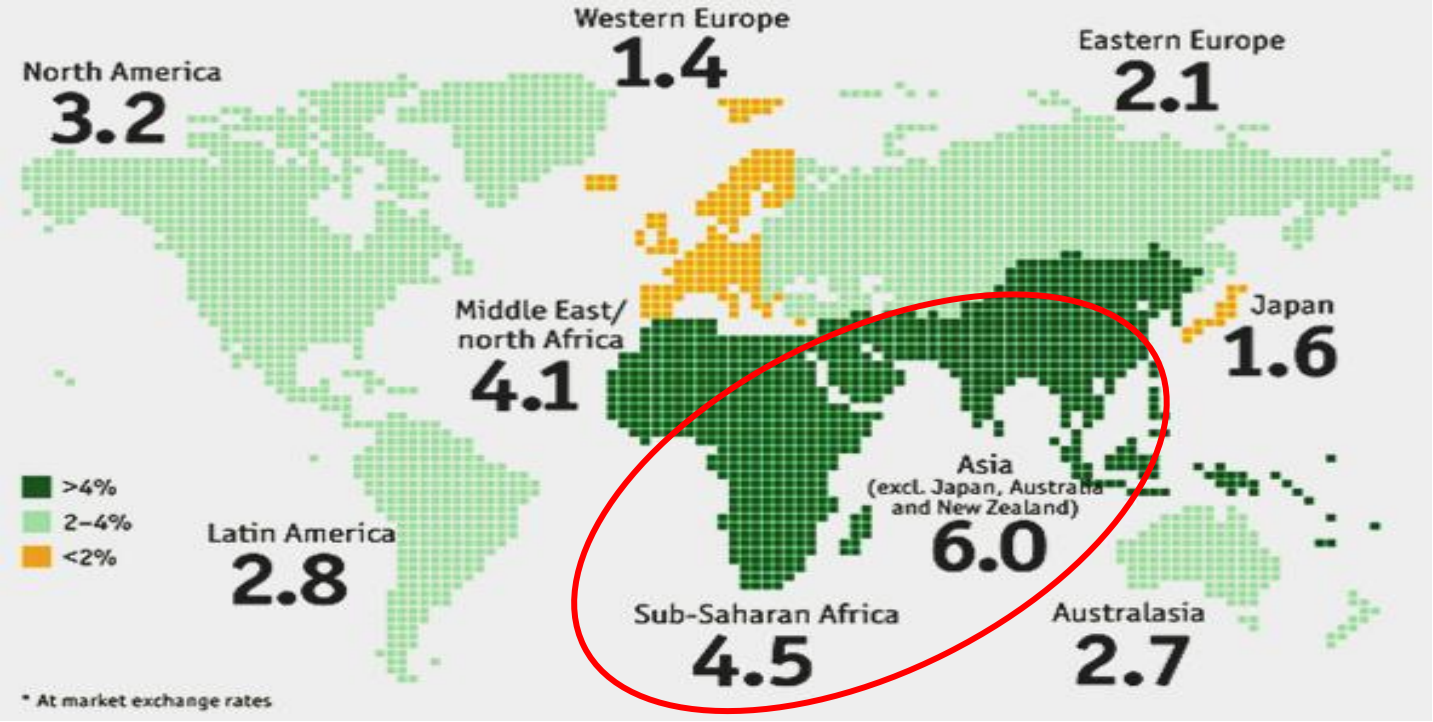
Syngenta Foundation for Sustainable Agriculture

"Create value for resource-poor smallholders in developing countries through innovation in sustainable agriculture and activation of value chains"

Introduction

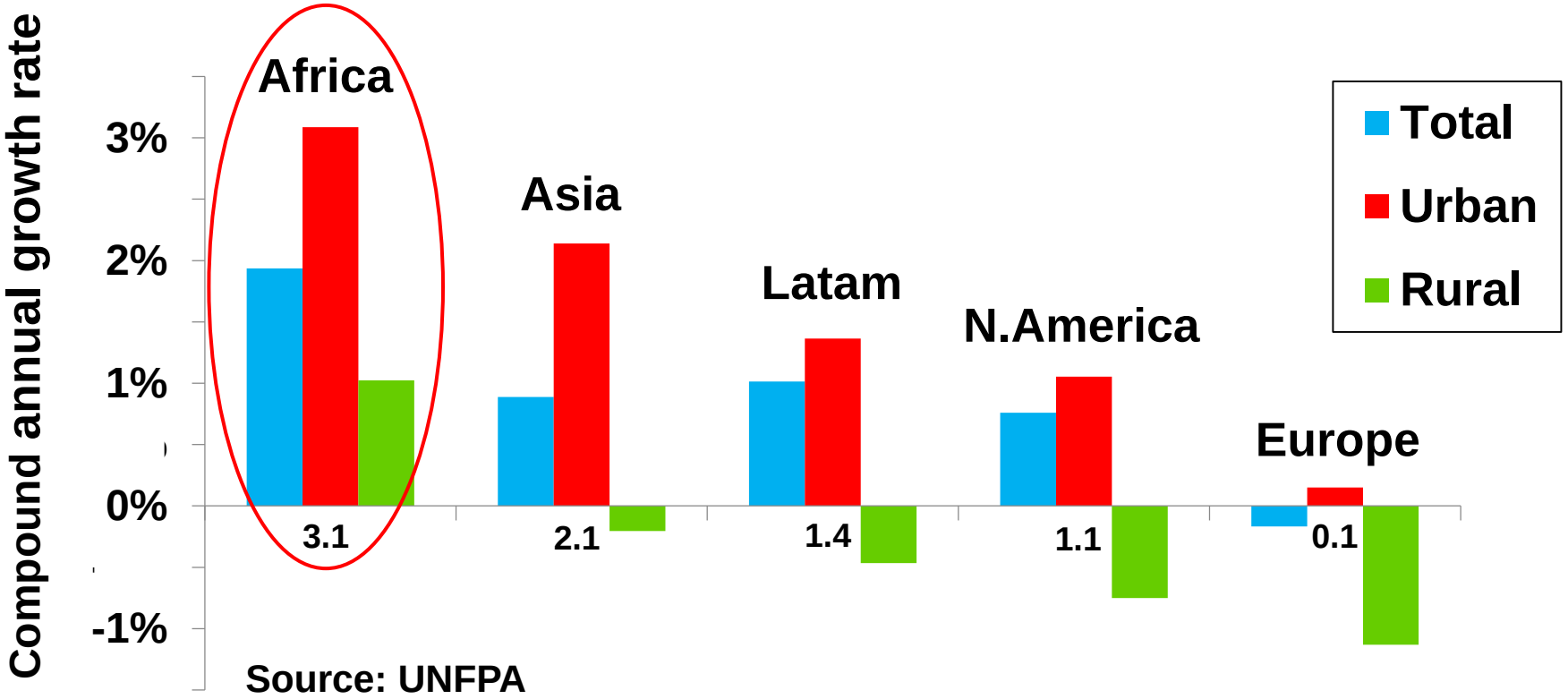
- Agriculture transformation and drivers
- African modern variety adoption
- Demand vs. supply-driven breeding
- Demand-led variety design and capacity building in Africa for plant breeders
- Conclusions

% GDP growth forecasts for 2015



‘The World in 2015’, The Economist

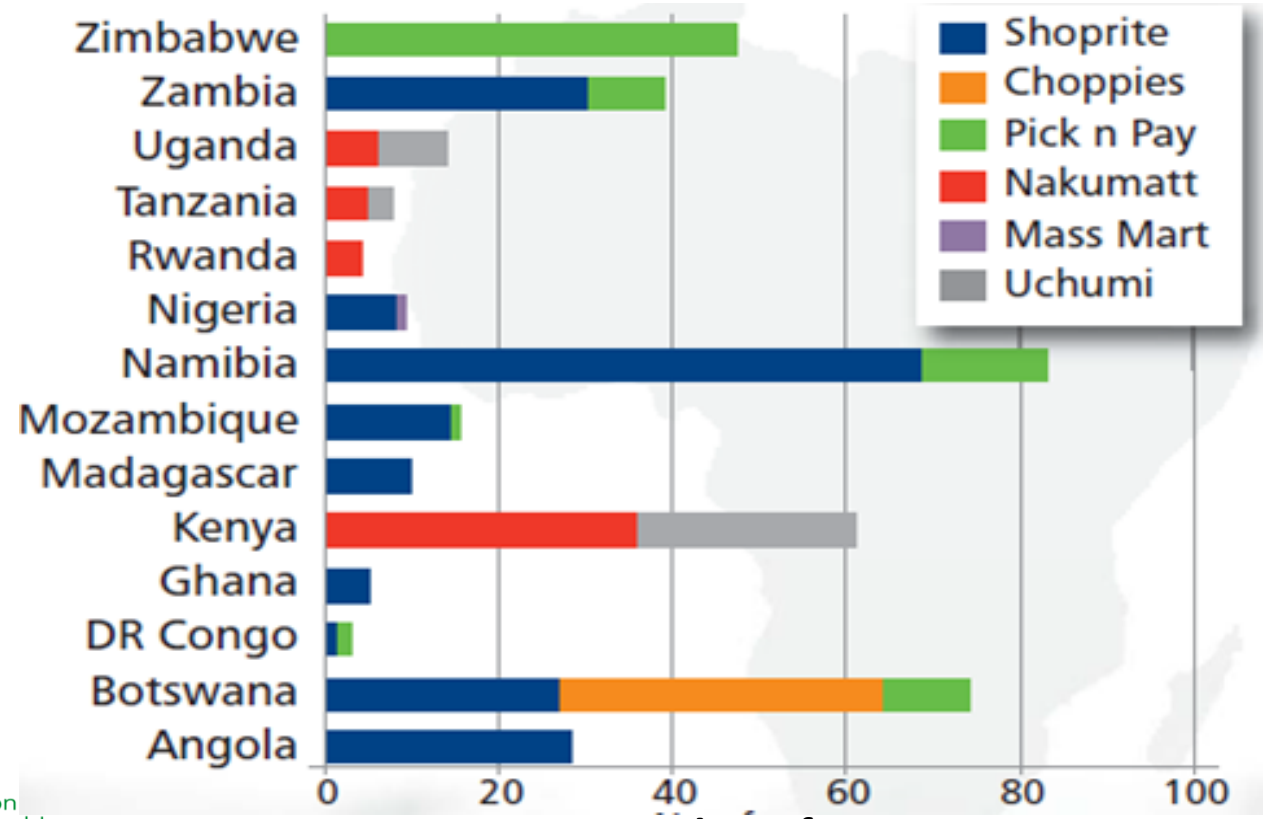
% Population growth 2010-2050



Africa's agriculture is changing

- From subsistence to more **market-led** systems
- Smallholders are generating **surpluses** to sell in local, regional and international markets
- **Demand** is rising with urbanization, growth of middle classes, and changing lifestyles
- **New breed of consumers**- focused, choosy and ready to pay for quality

Multi-country retailers in Africa

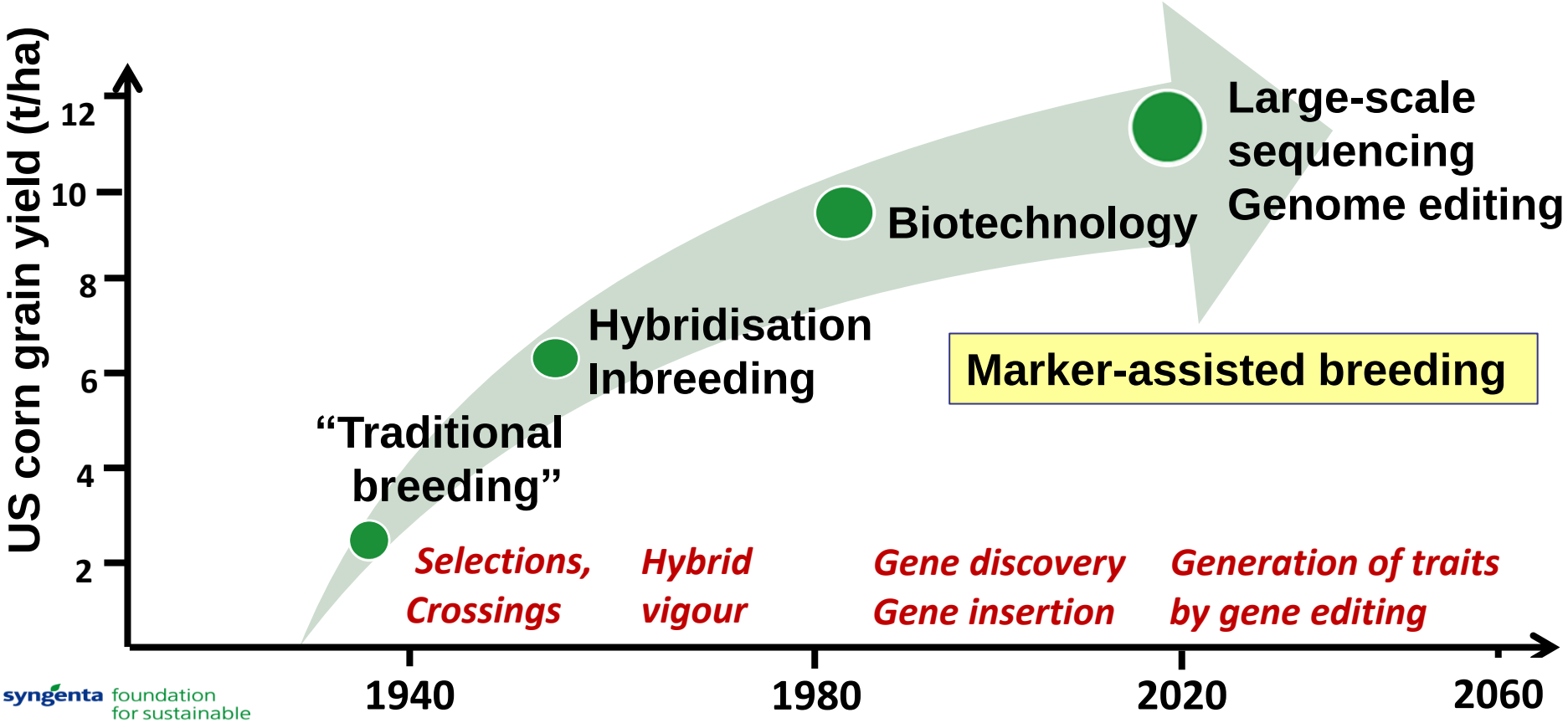


Promar, Insight June 2014

Consumer preferences

- Local chicken breeds
- Taste and texture preferred
- Price premiums
- High producing genetics adapted to low input production systems required

Crop breeding evolution



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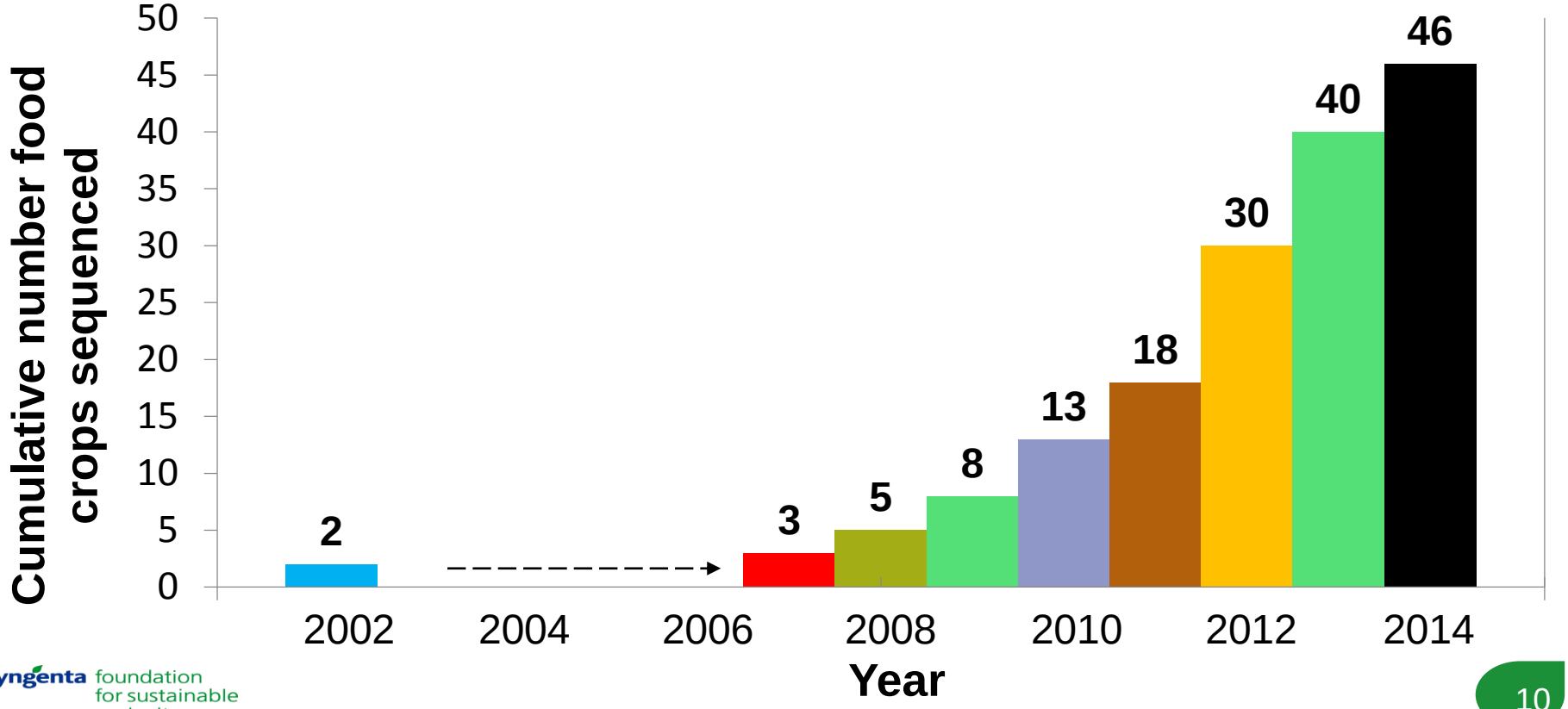
Genome sequencing revolution



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Genome sequencing revolution

- Over 50 food crops and animal species sequenced
- African orphan crops consortium (AOCC)
- 100 indigenous African crop species (100 diverse lines each)

Variety adoption in Africa

Crop	Survey area (million ha)	% Modern varieties
Maize (WCA)	9.9	66
Cassava	14.6	40
Groundnut	6.3	29
Bean	2.5	29
Cowpea	11.4	27
Pearl millet	14.1	18
Sweet potato	1.5	7
Banana	0.9	6

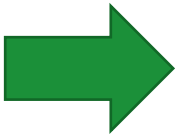
Walker *et al* (2014)

DIIVA study
20 crops
30 countries
1150 cultivars

< 35% modern variety adoption

Smallholder farmer decisions
Variety adoption

- Awareness
- Availability
- Profitability
- Risk



- Extension service
- Seed distribution
- Lack quality seed
- Credit/cash flow problems
- Technology perception
- Socio-economic factors

Mwangi and Kariuki (2015)

Smallholder farmer decisions
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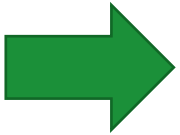
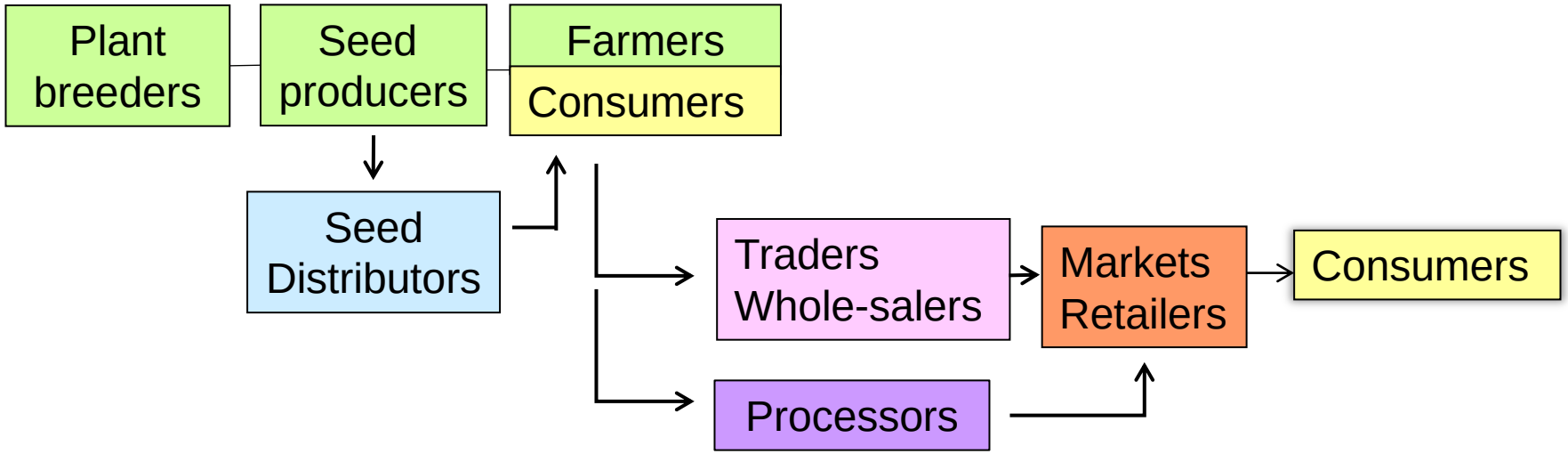


Variety performance

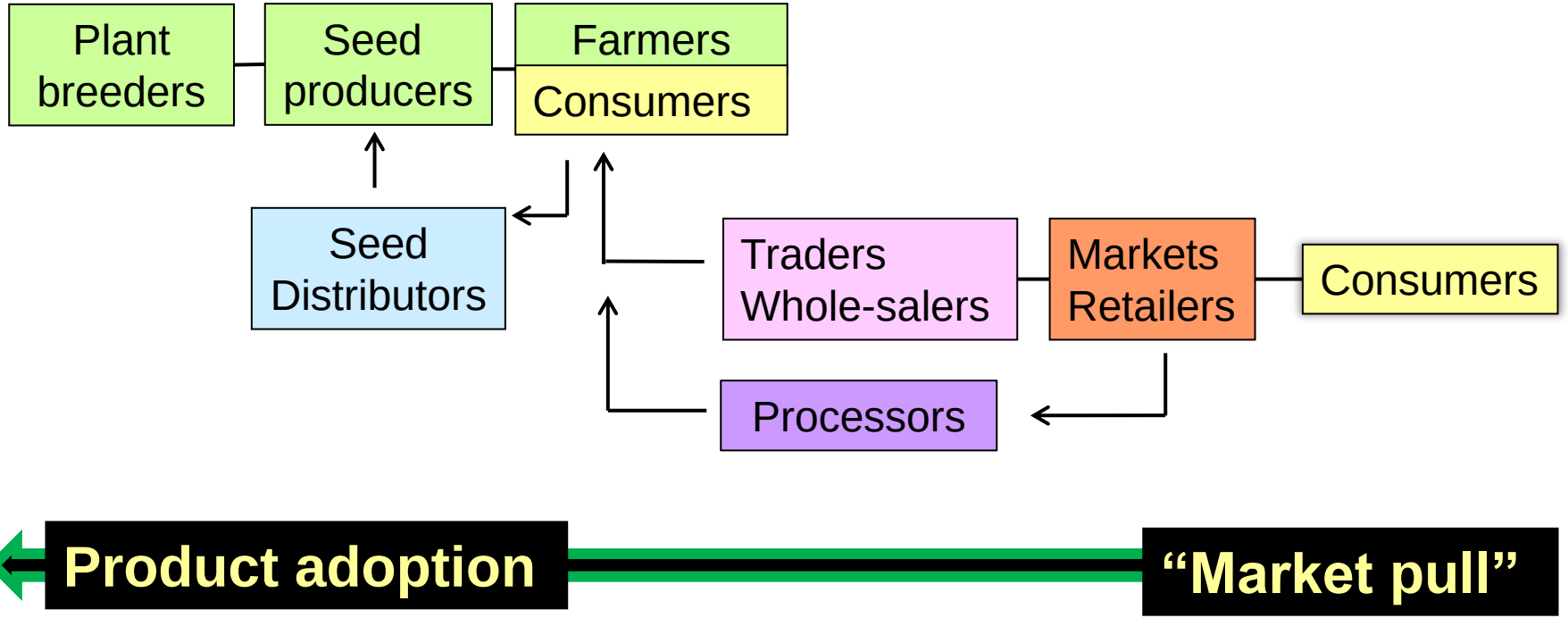
Mwangi and Kariuki (2015)

Supply-driven production

“Science and technology push”



Demand-driven



Demand-led principles

- Client preferences
- Value chains
- Market drivers
- Market research
- Public and private partnerships
- Multi-discipline teams

Swiss-Australian-African PPP
International partners

- Syngenta Foundation for Sustainable Agriculture (SFSA)
- Crawford Fund (CF)
- Australian International Food Security Research Centre (AIFSRC/ACIAR)
- University of Queensland (UQ)
- African R&D partners

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THE CRAWFORD FUND
For a Food Secure World

Australian Government
Australian Centre for International Agricultural Research

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

Swiss-Australian-African PPP
African partners

- West African crop improvement centre, Ghana (WACCI)
- Biosciences Eastern and Central Africa, Kenya (BecA)
- African crop improvement centre, South Africa (ACCI)
- University of Makerere, Ruforum, Uganda
- University of Nairobi, Kenya
- Rwanda Agriculture Board
- CIAT Tanzania, Malawi
- ASARECA

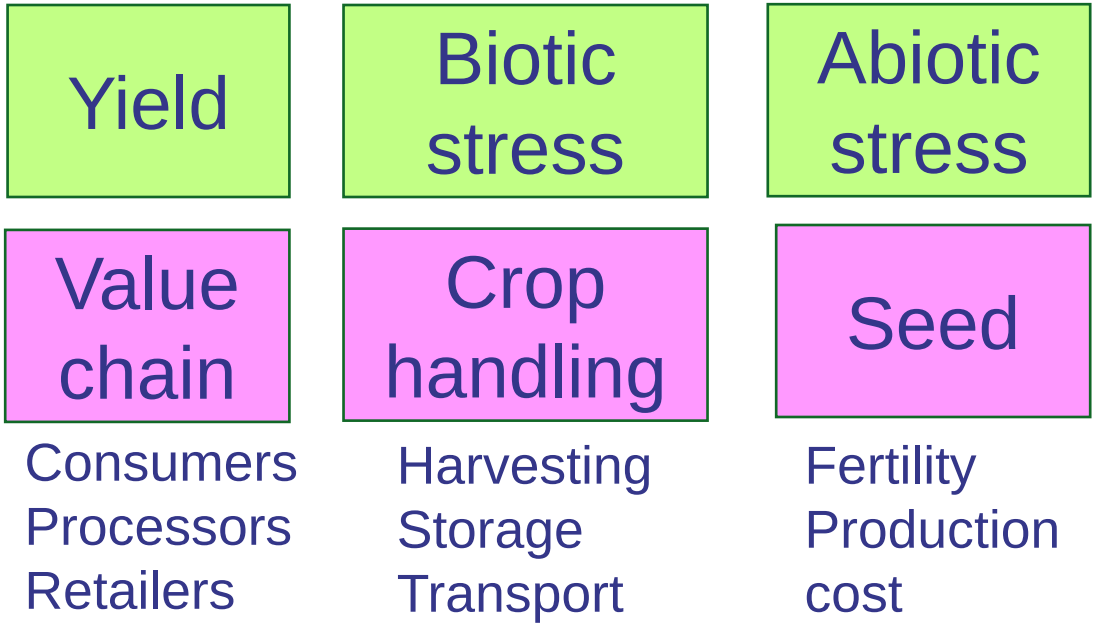
Demand-led crop variety design for emerging markets in Africa

- Post-graduate education module for plant breeders
- Msc/PhD and continuing professional development
- Best practices from public and private sectors
- Implementation in National breeding programmes
  - Ghana/tomatoes
  - Rwanda/beans
- Policy research and advocacy – managers,government officials, stakeholders

Demand-led training module

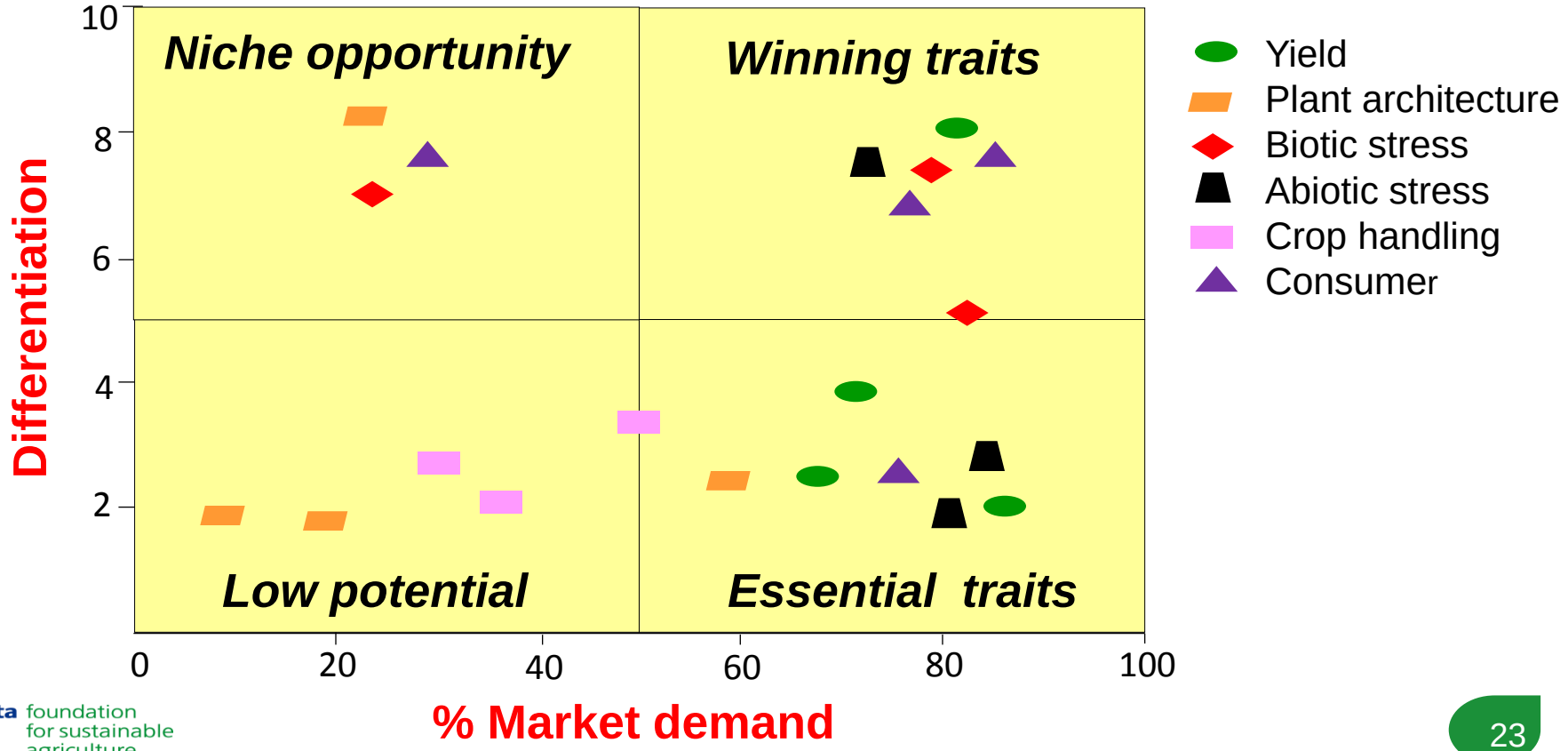
1. Principles of demand-led breeding
2. Visioning and foresight
3. Clients' needs and value chains
4. Variety design
5. Development strategy and planning
6. Breeding investment decision-making
7. Monitoring, evaluation and learning

Variety design specification



> 60 traits quantified vs. lead varieties

Trait importance



Conclusions

- Compelling benefits are needed for smallholders to adopt new varieties and breeds
- Demand-led product design is a key methodology to achieve greater use of genetics
- PPPs and multi-disciplinary teams required
- Genomic science needs to be utilised in demand-led breeding approaches to serve smallholders and their value chains

Invitation
Demand-led breeding forum

- Thursday morning 09.30-12.30
- Global Change Institute

  University of Queensland

  Building 25, Staff House Rd
  St Lucia campus

Prof. Gabrielle Persley
Prof. Pangirayi Tongoona
Prof. Shimelis Hussein
Mr. Augustine Musoni
Dr. Viv Anthony

All welcome

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Thank you

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Demand-led variety design