A view from the UK: predictions, foresight or policy choices - and the Global Food and Farming Futures Project

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Prologue

What is the nature of our discourse here? Is it:

- ***predictions***
- ***foresight or***
- ***policy choices?***

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In 2008 the FAO estimated that in aggregate the world's total production of cereals was ~2,285,000 million tonnes.

The FAO also estimated the world's population in 2008 at ~6.7 billion.

To a good first approximation in 2008 the average *per capita* food availability was ~340kg/cap/year, or ~1kg/person/day.

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If those cereals had been uniformly distributed across all of humanity they would have been sufficient to support healthy lives for all who were not otherwise unwell. One kilogramme of cereals is sufficient to provide more than 2,300 Cals/day/cap.

There are post-harvest losses of cereals, but people also eat fruits, vegetables, nuts, fish, meat and dairy products.

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Food insecurity: a technical or social problem?

Consequently, prevailing patterns of food insecurity are not a consequence of a net scarcity, but of inequity in access and affordability. Chronic under-nutrition is more a socio-econo9mic problem than technological one.

Moreover, technological changes (esp. without socio-economic changes) can amplify inequalities and aggravate hunger, even when they are ‘successful’.

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The Green Revolution showed that technologies can be technically successful but a socio-economic failure, by amplifying inequalities.

More food was produced in eg Punjab, but more people suffered chronic hunger, because the rich got richer and the poor got poorer.

In Kerala and Taiwan, there was a more beneficial outcome.

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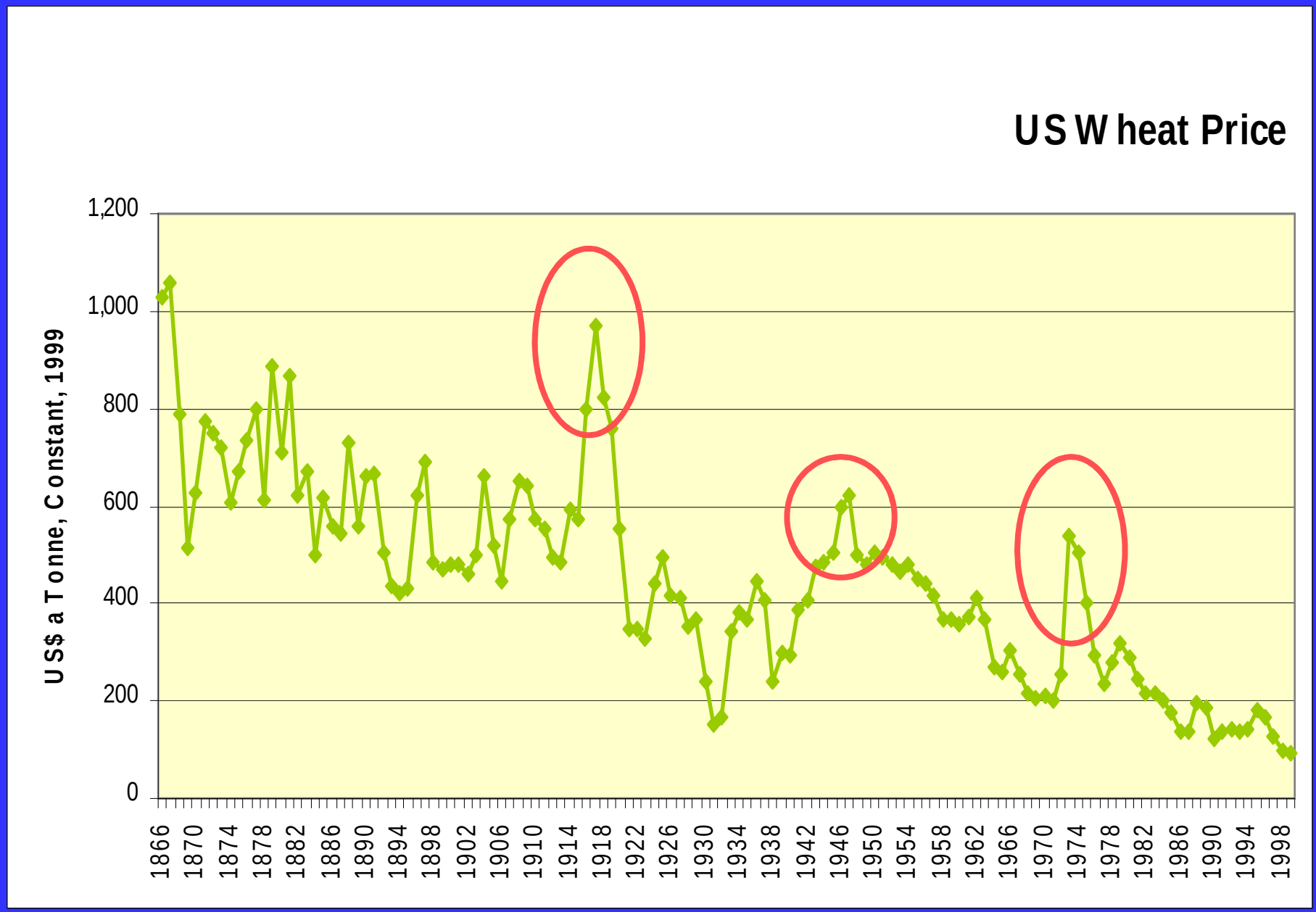

Source: USDA [via S Maxwell & S Wiggins; & T Lang]

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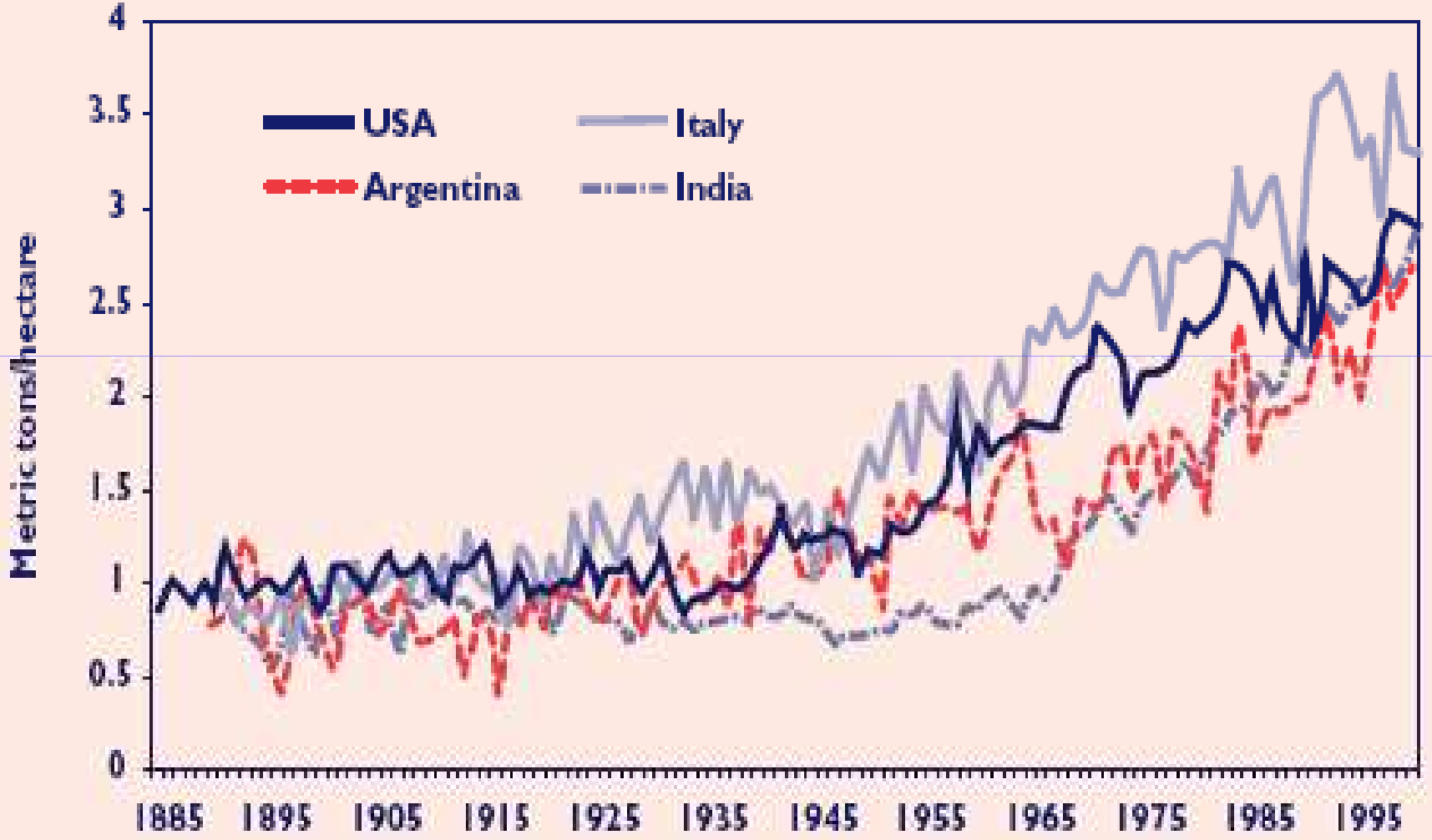
Technological innovation and (in)stability?

Figure B1 Wheat yields



SOURCE: Pardey, Chang-Kang, and Alston (in preparation).

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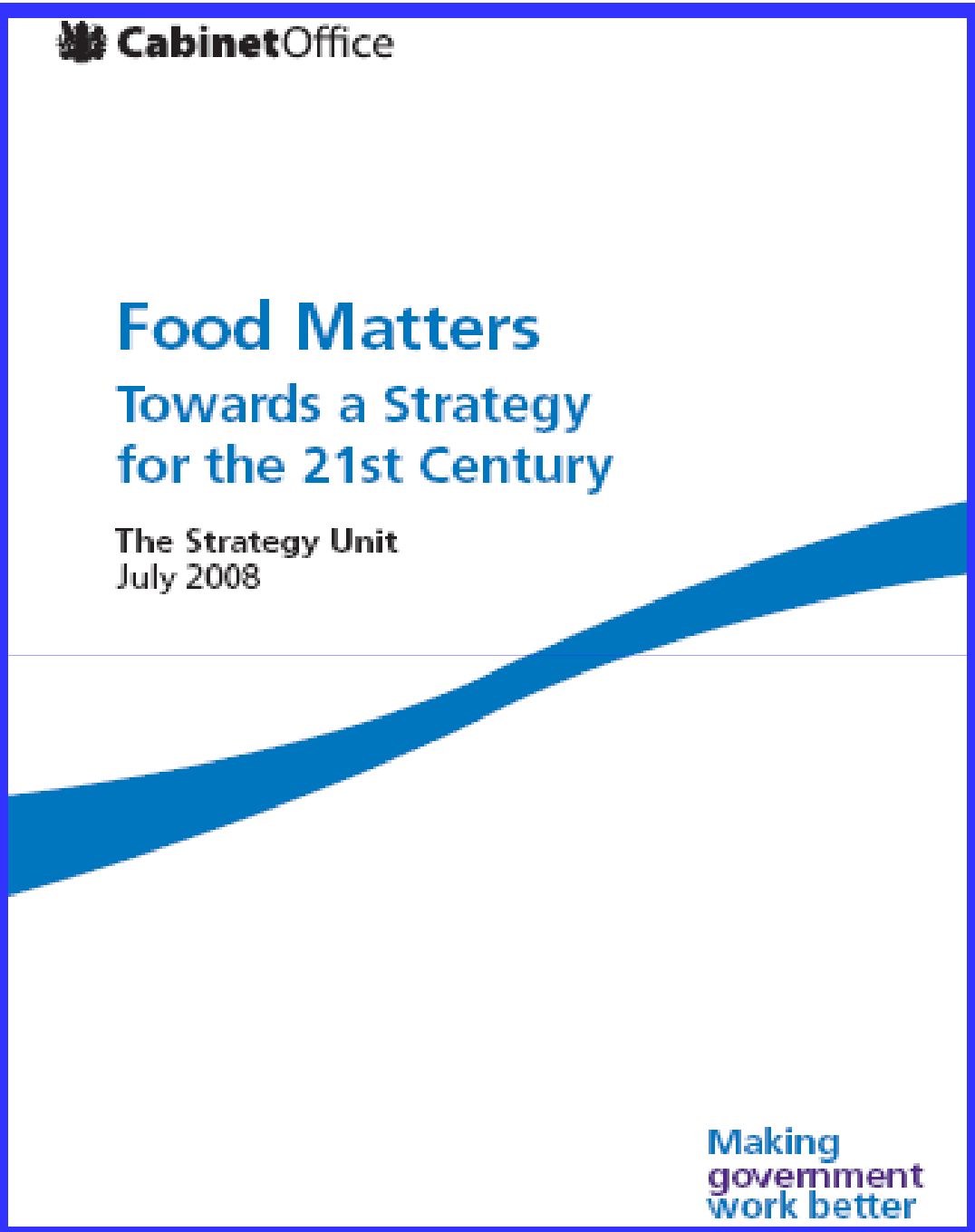

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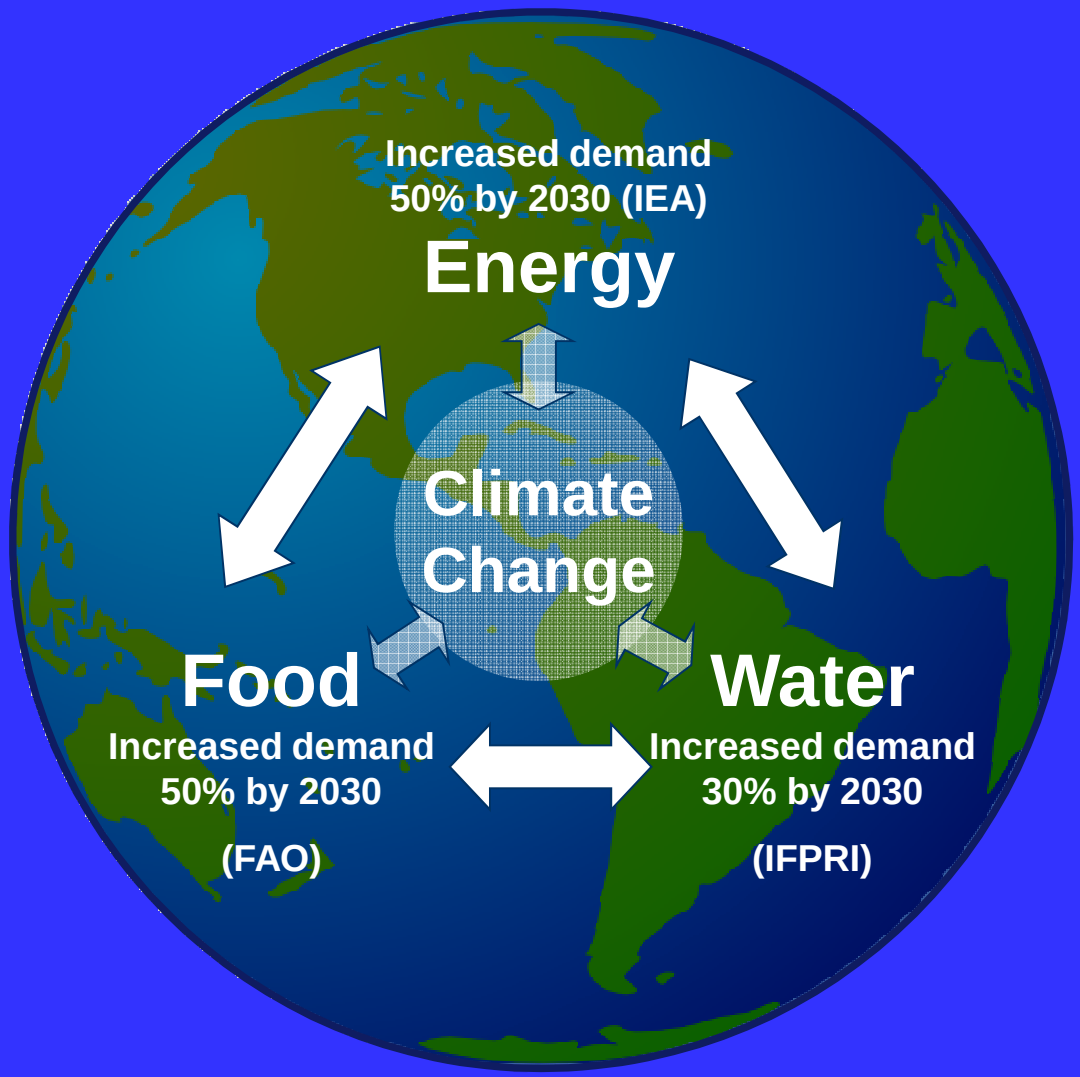
Key questions to 2030*



**Slide reproduced from 'The Perfect Storm?' presentation by Professor John Beddington, June 2009*

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John Beddington asked:

Can future populations be fed equitably, healthily and sustainably?

Can we cope with future demands on water?

Can we provide enough energy to supply the growing population coming out of poverty?

Can we do this whilst mitigating and adapting to climate change?

How does science and engineering help in preventing and adapting to this '**perfect storm**' scenario?

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Foresight Project: Food and Farming Future

How can a global population of 9 billion people all be fed healthily and sustainably?

Looks forward to 2050:

- includes the whole food system
- terrestrial and aquatic food
- sustainability issues very important
- global outlook

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In this project f*ood security* is defined as:

- **sufficiency**,
- **safety**,
- **sustainability**
- and **equity**,

at a time of rapid economic, social and environmental and technological change.

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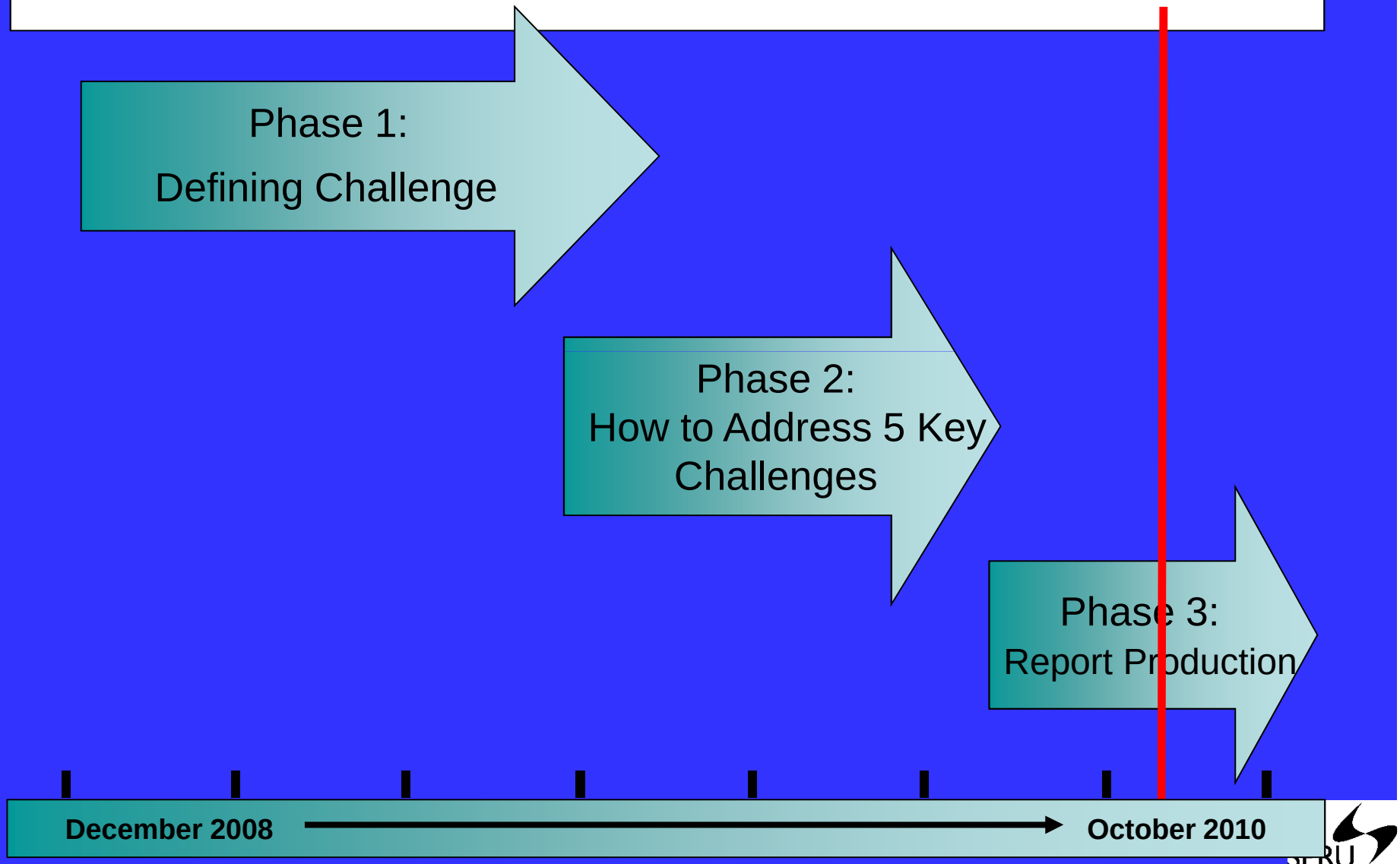
Project overview



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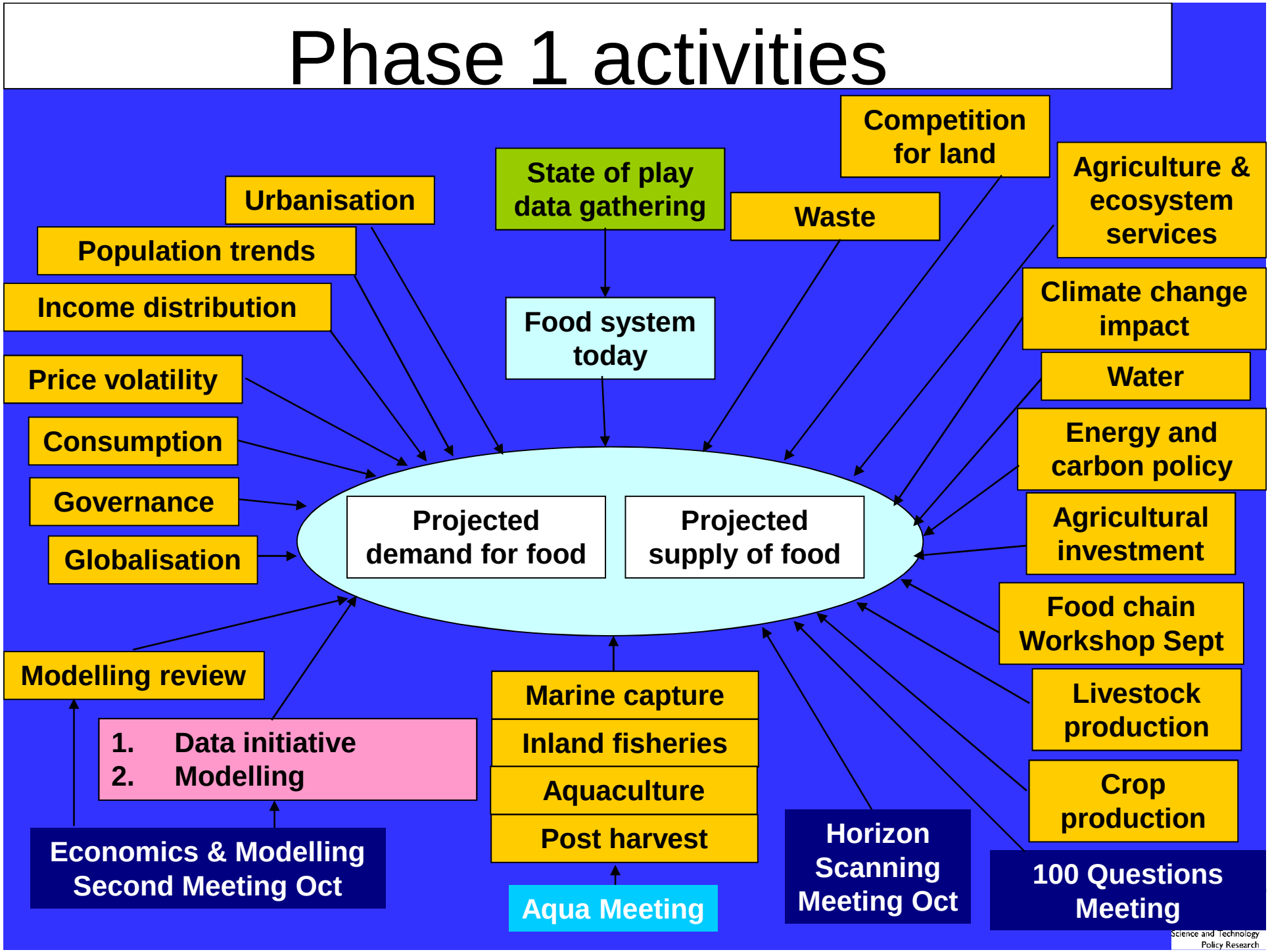
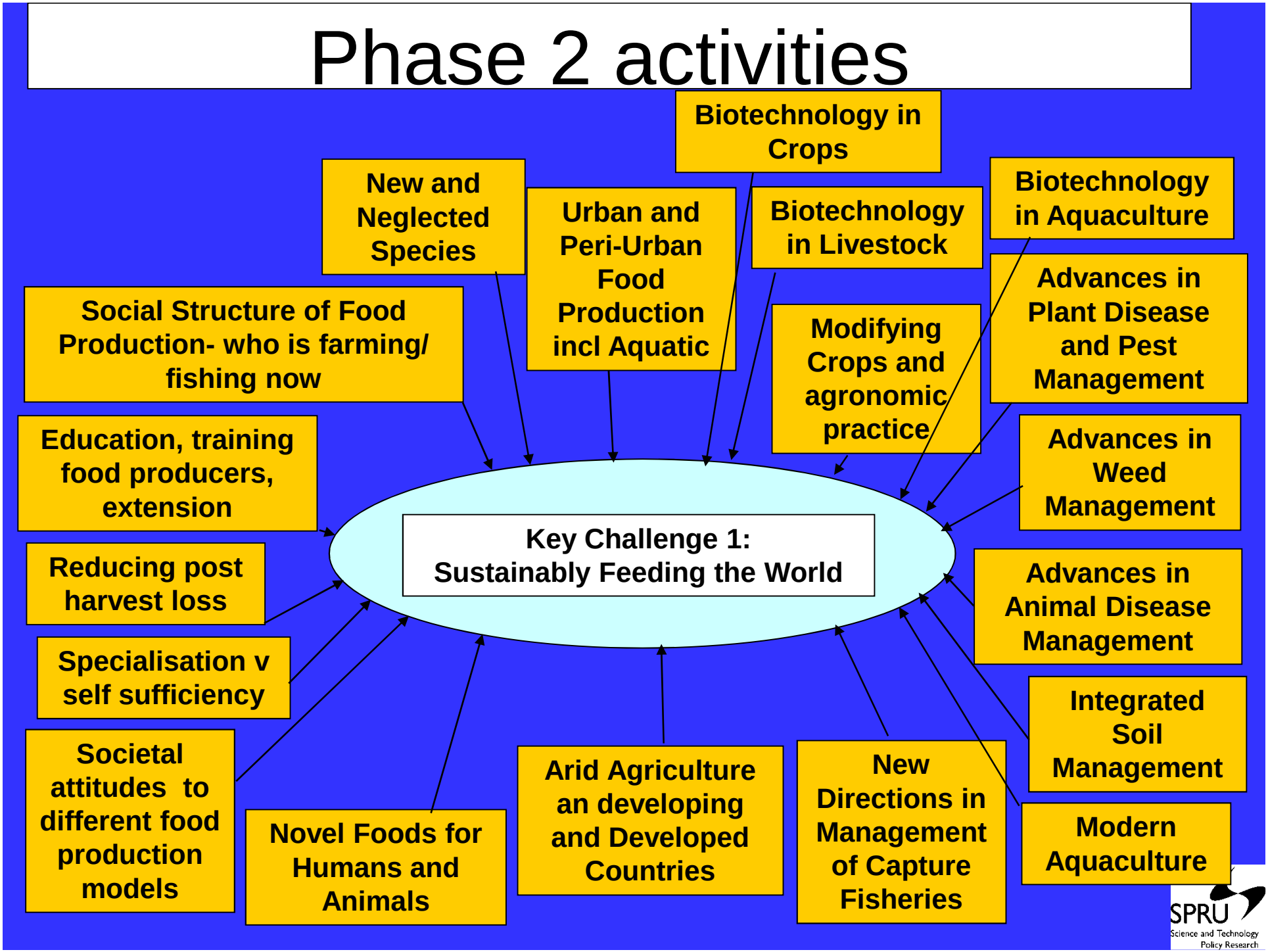
Phase 1 activities



Phase 2 activities



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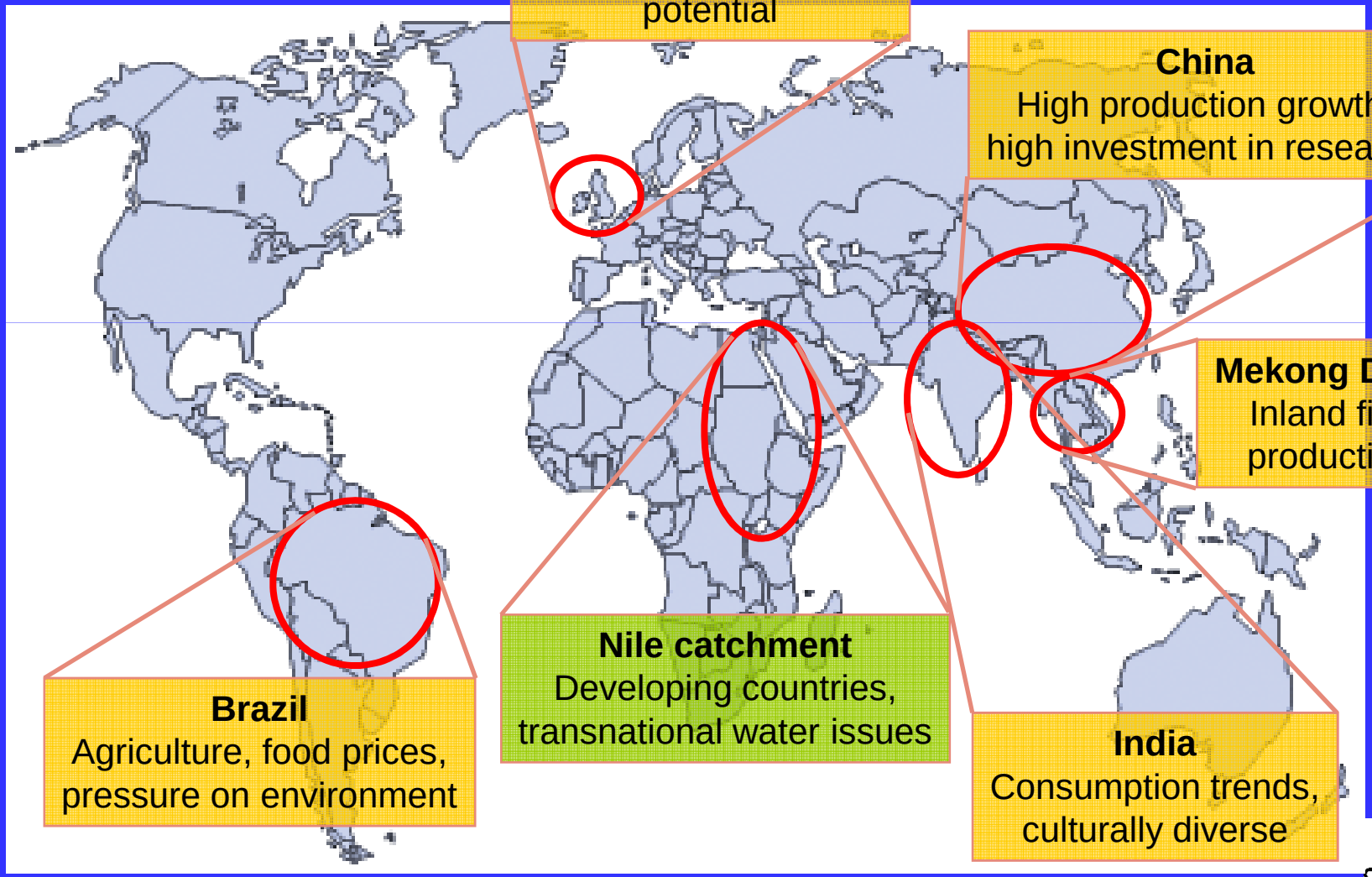
Regional studies



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In October 2009, the Royal Society introduced the concept of 'sustainable intensification' which may well re-emerge in the conclusions of the Foresight project.

See: http://royalsociety.org/Reapingthebenefits/

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What to expect?

Modest strategic shift from unsustainable pathway to another that may be more robust and resilient to shocks and stresses.

EM & STEPS approach is different from F^4 and official UK and UK policies, we assume uncertainties, non-linearities, and food & ag. systems are located in multi-causal and multi-functional chains.

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Agriculture GHG emissions by source (including CO_2)

N_2O- Agricultural Soils 44%

N fertilizers, manure

Eructed by ruminants (80% cows)

CH_4- Enteric Fermentation 26%

N_2O- Manure management 6%

Storage, manipulation of sludge (50% pigs, 45% cows)

CH_4- Manure management 9%

Fuel (tractors, machinery…), electricity…

CO_2- Energy use 15%

European Commission
Agriculture and Rural Development

Source: AEE

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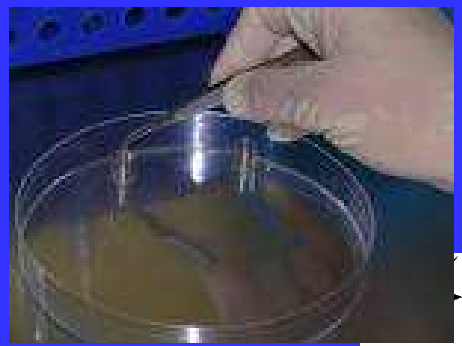
The STEPS Centre

Core concern: Identifying and building pathways to sustainability in complex, dynamic, social-ecological-technological systems

Three themes: dynamics, governance, designs

Three domains: agriculture and food; health and disease; water and sanitation – and their interactions

An interdisciplinary approach: social and natural sciences



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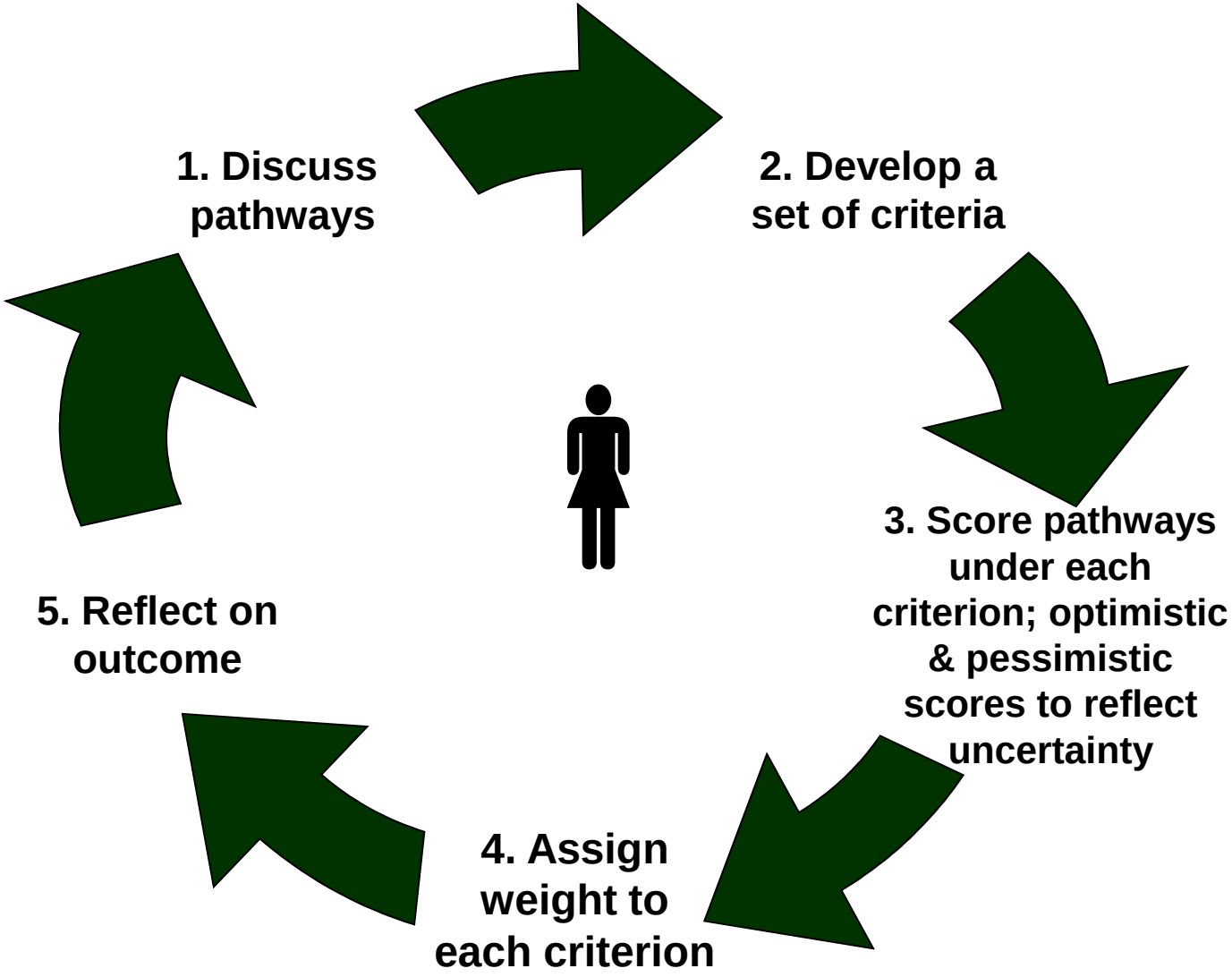
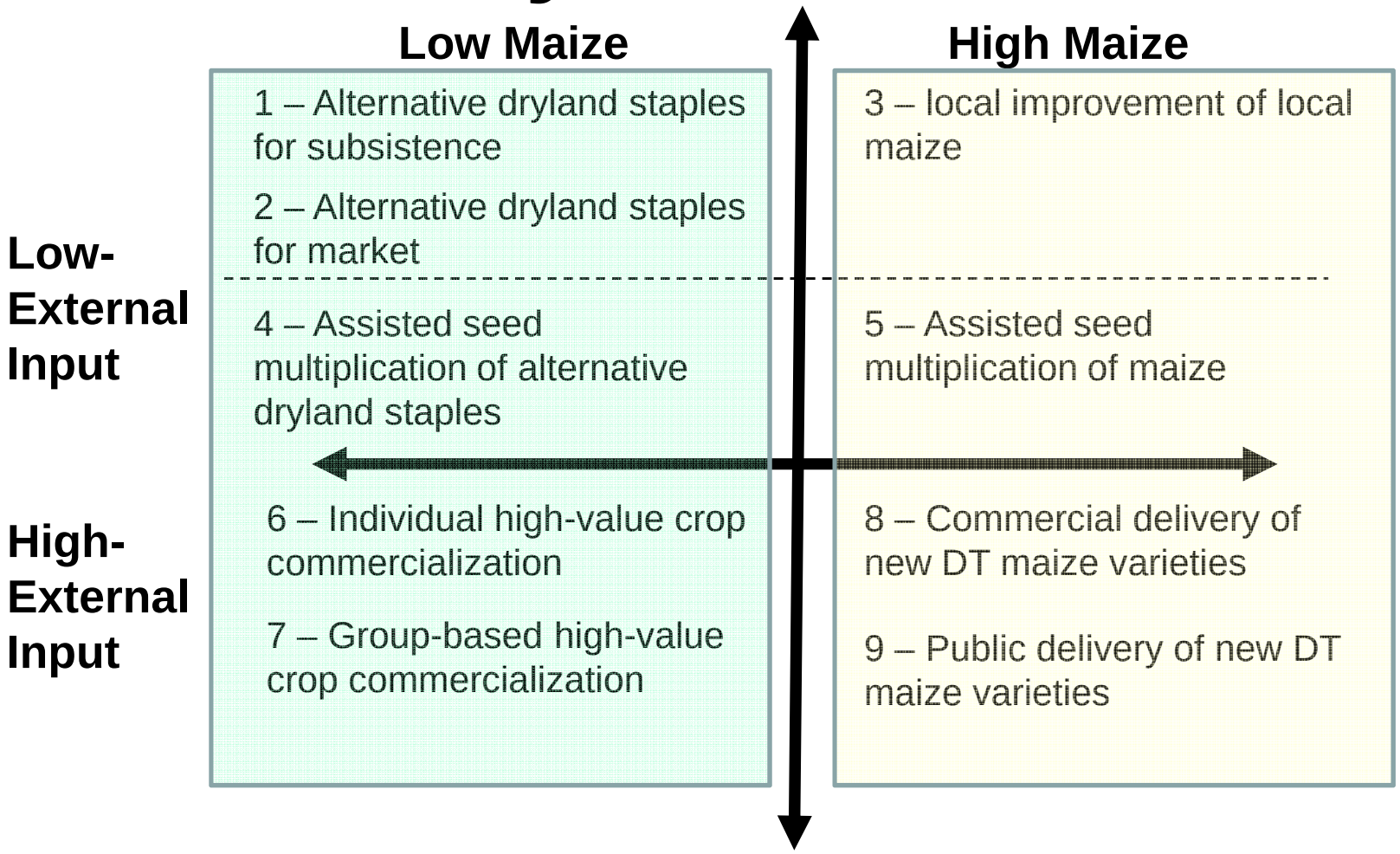
Multicriteria Mapping (MCM): The Interview Process



Typology of Pathways



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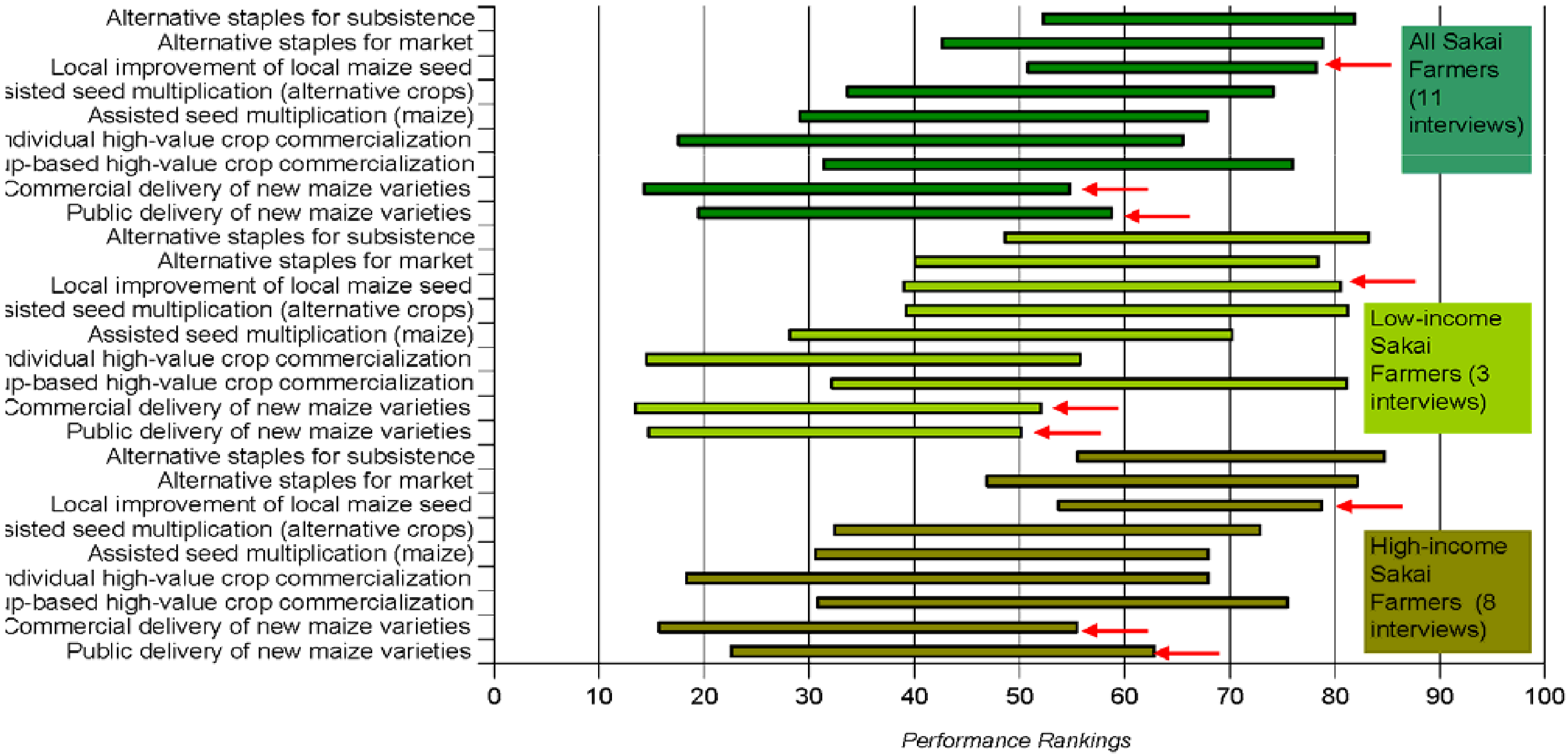
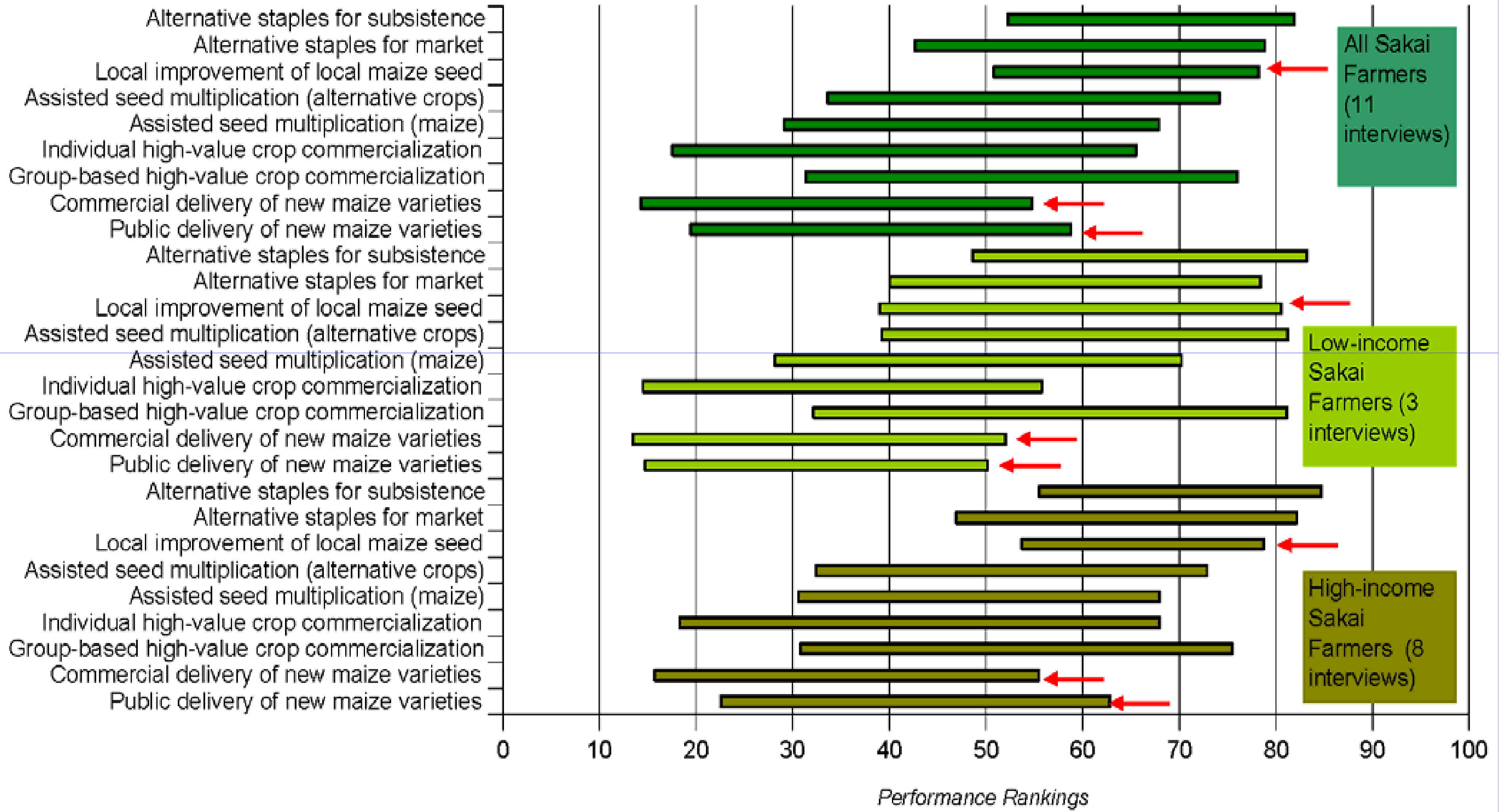
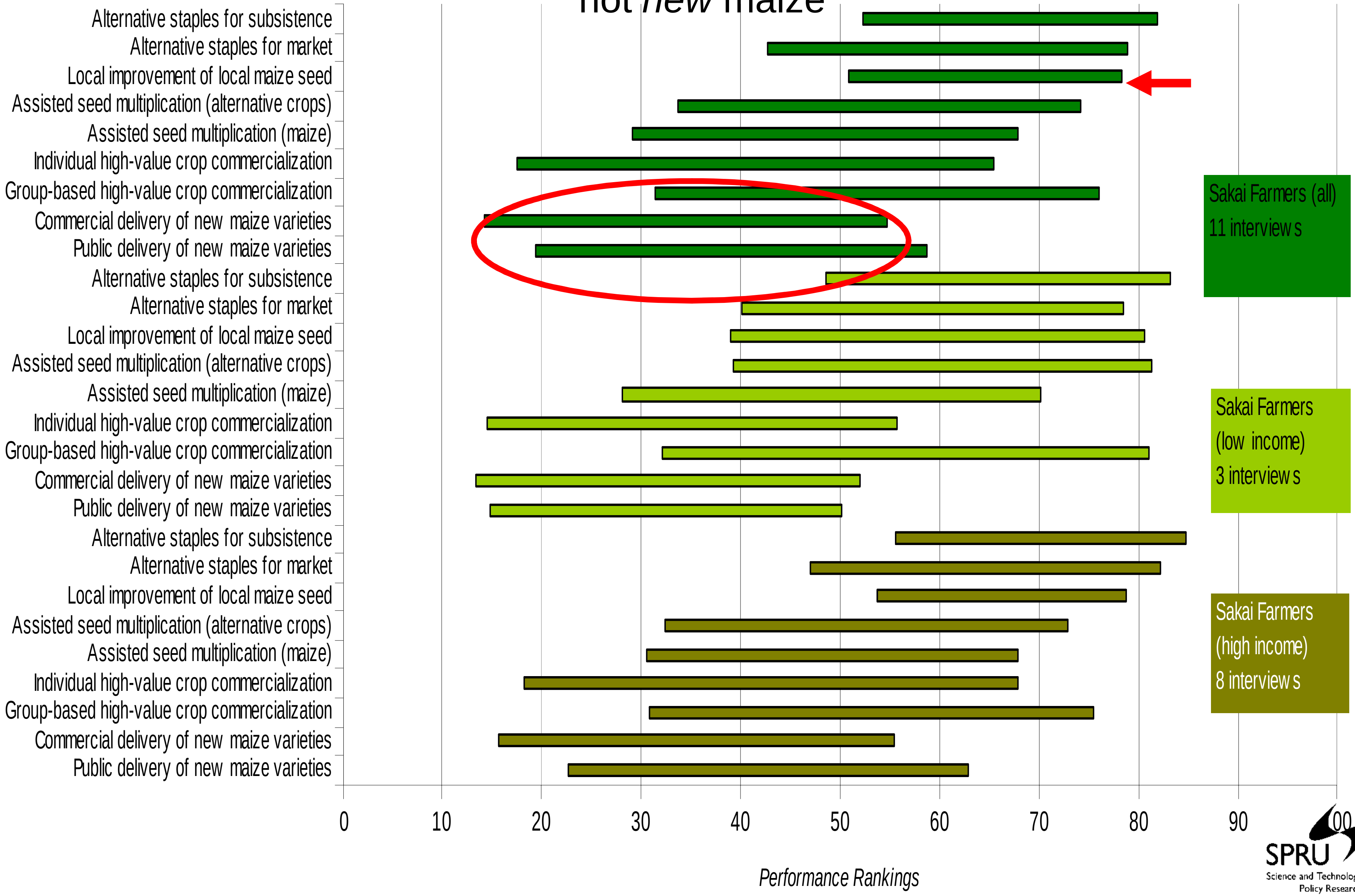


Multicriteria Mapping (MCM): The Interview Process - 2



Pathways in maize:
Sakai farmer performance rankings show a preference for *local* maize, not *new* maize



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Pathways out of maize (1)
Orphans or siblings?
Alternative dryland staple crops

- **'Traditional' crops, new pathways**
- **Climate change as an opportunity: time to re-think 'orphan crops'**
- **Focus on markets, not taste preferences**
- **Challenges: market barriers and opportunities**

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Pathways out of maize (2)
Getting the high value without the high risk? Horticultural crops

- **New crops, traditional constraints (access to water, cost of inputs, post harvest storage/markets)**
- **Much potential, much uncertainty**
- **Challenges - reducing the risk:**
  - ***Drought tolerant trees (mango, citrus)?***
  - ***Cooperate to compete (group-based)?***
  - ***Water – the deal breaker?***

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Pathways within maize
Living in parallel words? Bridging informal and formal seed systems

- **Informal seed systems: not just a last resort**
- **Building on the informal? Assisted seed multiplication and storage**
- **Farmer seed selectors: vital link in the chain**
- **Challenges: quality control and continuity of supply**

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Thank you for giving me the opportunity to contribute to this meeting.

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