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THE MODELING COMPONENT

Inception Workshop of the African Growth and Development Policy (AGRODEP) Modeling Consortium
October 28-29, 2010 · Dakar, Senegal

Setting the Stage

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The Modeling Component

- Why quantitative analysis is needed in Africa?
- Already a long history, but still important needs
- Why modeling efforts should be tied to a coordinated effort on data?
- Why modeling efforts should be embedded in a network approach of research?

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GOALS

- Providing the state of the art tools to build a dynamic research community that can respond to the emerging and long-term needs of CAADP growth and poverty reduction agenda
- Developing a library of state of the art modeling tools
- Having methodologies implementable in Africa
- Supporting innovation joint efforts by leading research groups on the world stage and African researchers

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Main Topics

- Agricultural production and consumption
- Commodity Prices
- Trade negotiations
- Infrastructure
- Natural resources management
- Climate Change
- Governance and institutions

Developing a Library of State of the Art Models

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Typology of Models

- Simulation Models
  - Partial Equilibrium
    - Spatial
    - Non Spatial
  - General Equilibrium
    - Single-Country
    - Multi-Country
  - Recursive Dynamic / Inter-temporal
  - Deterministic / Stochastic

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Typology of Models

- Econometric and Statistics models
  - Parametric
  - Non Parametric
  - Other methodologies (frequency based analysis, categorical analysis, polling techniques…)

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A HARMONIZED FRAMEWORK

- Each model will be fully documented
- Several models (when possible) for one research question
  - Pros and Cons matrix for guiding the users
- Harmonization of concepts and explanation of differences when needed
- Limited number of languages (GAMS, STATA…)
- Data packages for each model developed with the Data component
- Capacity building on each methodology developed with the Network component
  - Training
  - Guided implementations

Goals for the First Year (I)

- Having a significant set of models ready for implementation/use. Fully documented and "adapted"
- For simulation models:
  - Deterministic
  - Partial Equilibrium models
    - Tariff line analysis for trade negotiation
    - Multi markets for agricultural production/consumption (e.g. BFAP model)
    - Spatial trade models

Goals for the First Year (II)

- General Equilibrium models
  - Single country (PEP & IFPRI models)
  - Multi country (MIRAGE model)
- For estimation models:
  - Parametric
  - Gravity like models (trade oriented)
  - Estimation of supply and demand (different approach: panel, cross section etc.)

Promoting Innovation

An Innovation Window to address 3 goals

Tailor-made modeling tools for policy analysis

- Adapting existing models to deal with Africa challenges
  - General limits of such models
  - African specificities (agronomics, social)
- Developing new methodologies to solve new/unresolved issues
- Bringing African researchers on the front stage of international research
  - Promoting joint research among African researchers
  - and between African researchers and international networks
- Mix of short/medium/long term initiatives:

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ADVANCED TOPICS

- Agronomic specificities
  - Why African yields are low?
  - Crop production: water, nutritients, land degradation
  - Animal production: disease, pastoralism behaviour
- Social specificities
  - Household decisions (consumption & production)
  - Formal/Informal social safety nets
- Institutional specificities
  - Markets, Non markets and Market segmentations:
  - Missing markets? land, self sufficiency consumption, spot vs future markets.
  - Spatial segmentation and the role of infrastructure (where, when and how?)
  - Natural resources: water management, contracts, Dutch disease, rent sharing
- Monitoring policies and implementation

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TOOLS

- Large scale spatial models
- Advanced partial equilibrium models
- CGE with relevant household decomposition, microsimulations, behavior descriptions, physical linkages etc.
- Integrated CGE/PE (math. program.) approach
- Integrated analysis of real and discrete survey data and geographical maps
- New statistical techiques (Non parametric techniques, Quantile regression, Support Vector Machines, impact assessment/policy treatment)

Expanding Existing Capacities

The Example of the Bureau For Food And Agricultural Policy in South Africa

BFAP: BACKGROUND AND GENESIS

- Founded in 2004
- Virtual network to inform decision making within Food Systems
- Multidisciplinary team: 28 people (15 full time core)
- Affiliation with SA institutions: Universities of Pretoria & Stellenbosch, Dept of Agriculture Western Cape
- Affiliation with international institutions: FAPRI (Missouri), FAO-OECD, agribenchmark,
- Clients: A wide number of governments, companies and institutions (local and international)

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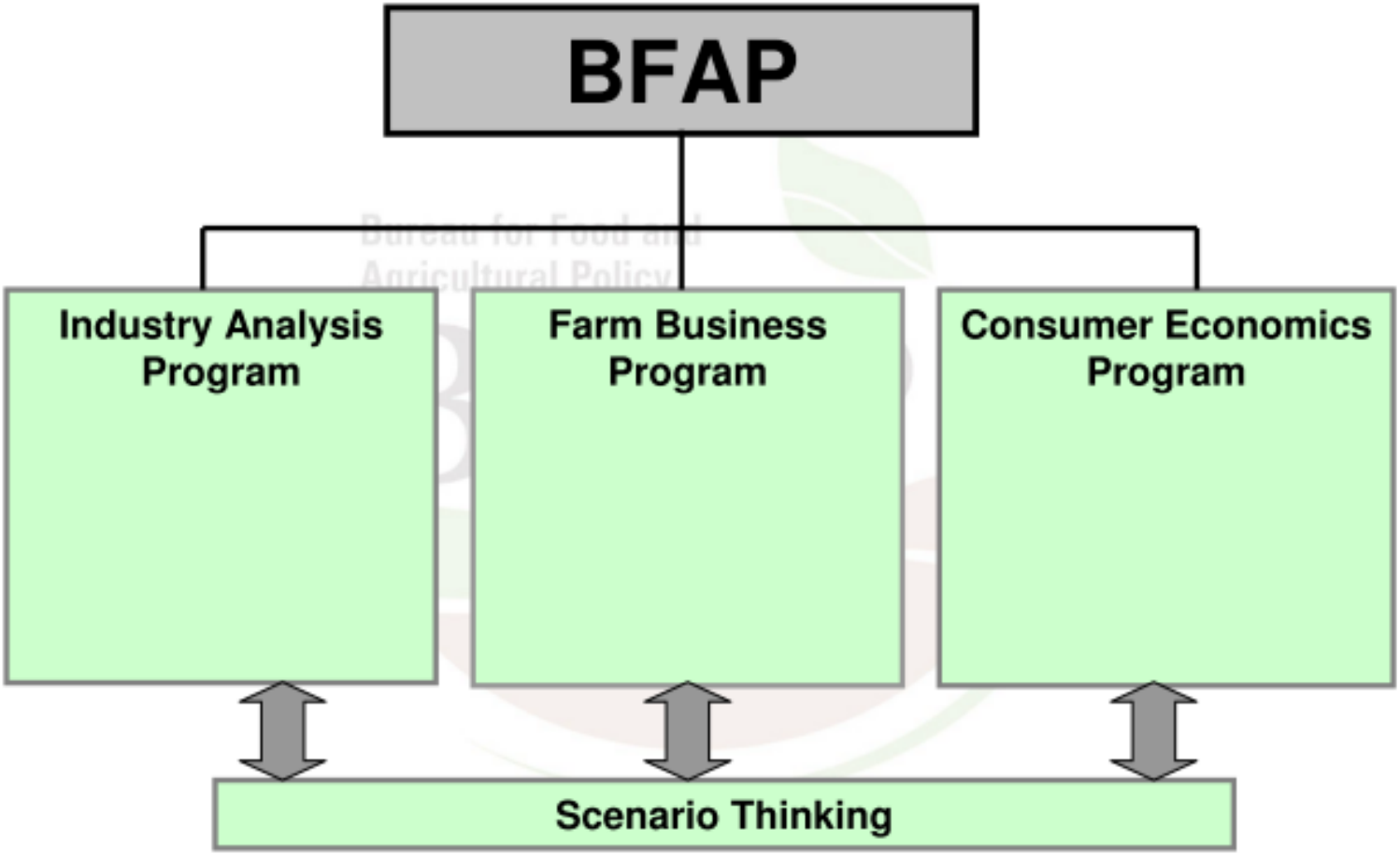
ANALYTICAL FRAMEWORK



Main Features

- Development and maintenance of intelligence network to provide timely and accurate analysis and projections of **Food Systems.**
  - **General industry analyses** – commodity balance sheets, supply chains, prices, marketing margins etc.
  - **Commodity market analyses** – equilibrium pricing conditions, future markets, trade flows etc.
  - **Policy analyses** – understanding the impact of policies on the value chains
  - **Modelling:**
    - Multimarket partial equilibrium models
    - Farm level simulation models
  - **Consumer economics** – consumption trends and patterns
  - **Scenario planning** - Risk and Uncertainty

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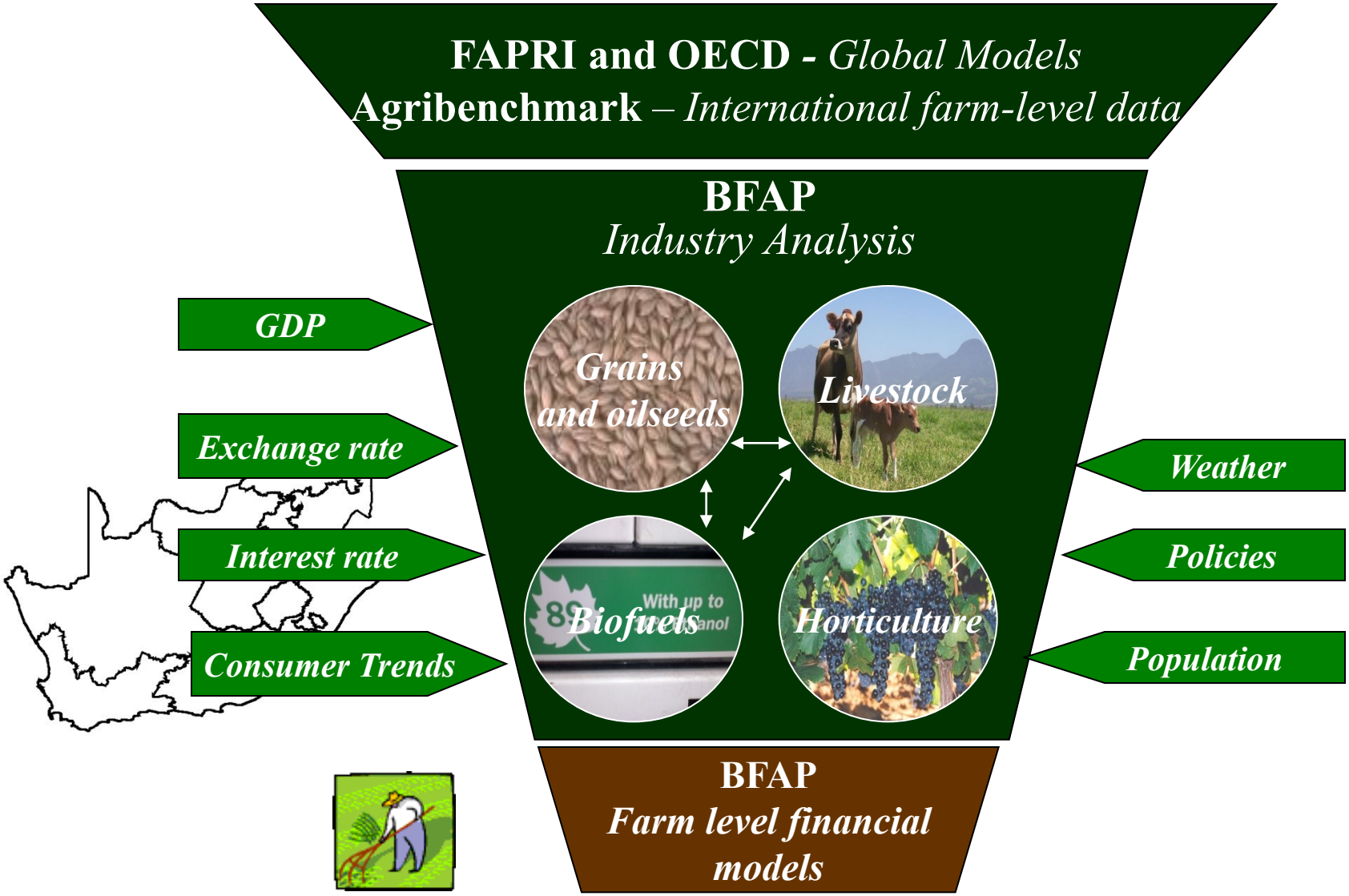
MODELLING FRAMEWORK



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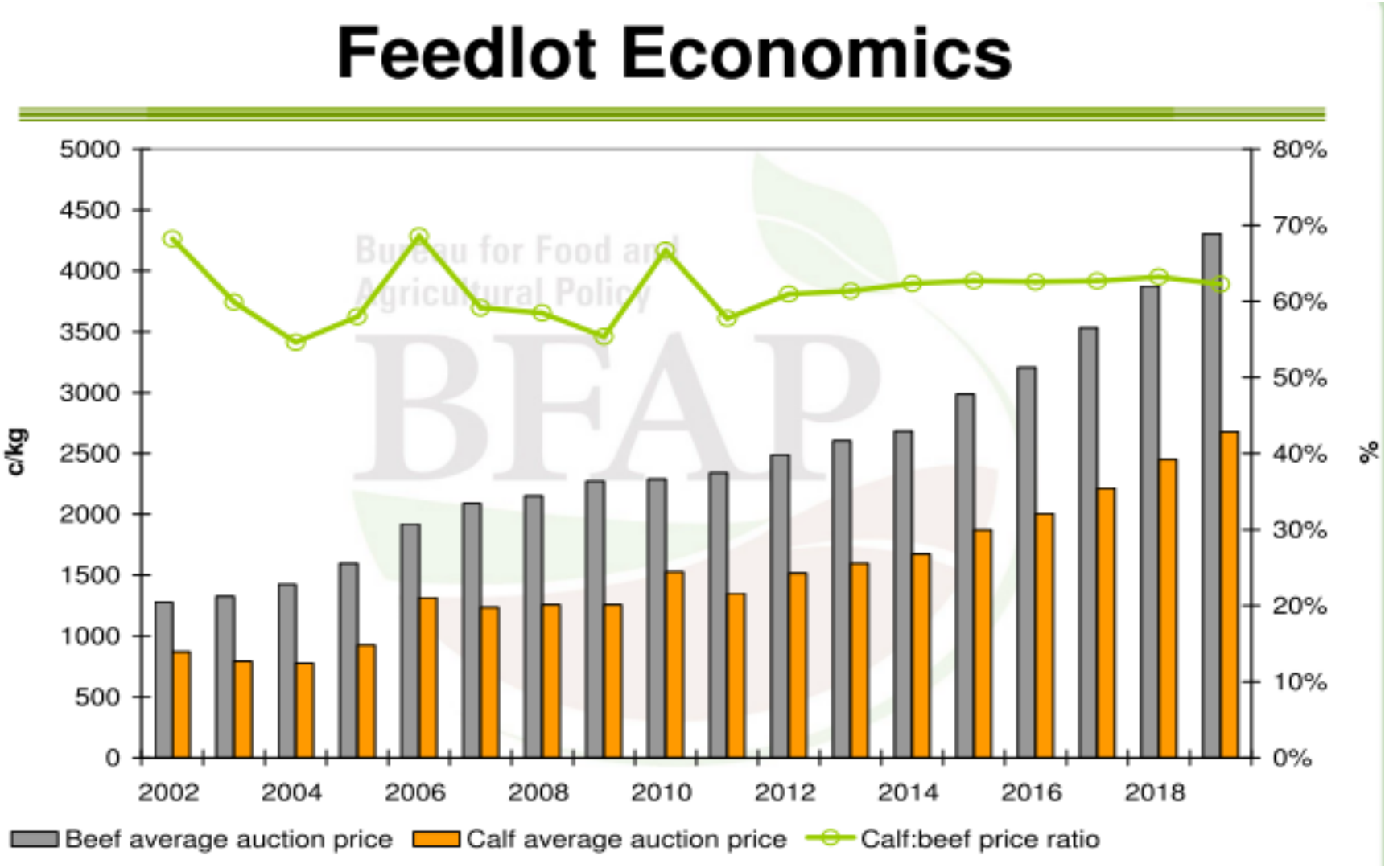
AN EXAMPLE OF FORECAST ANALYSIS



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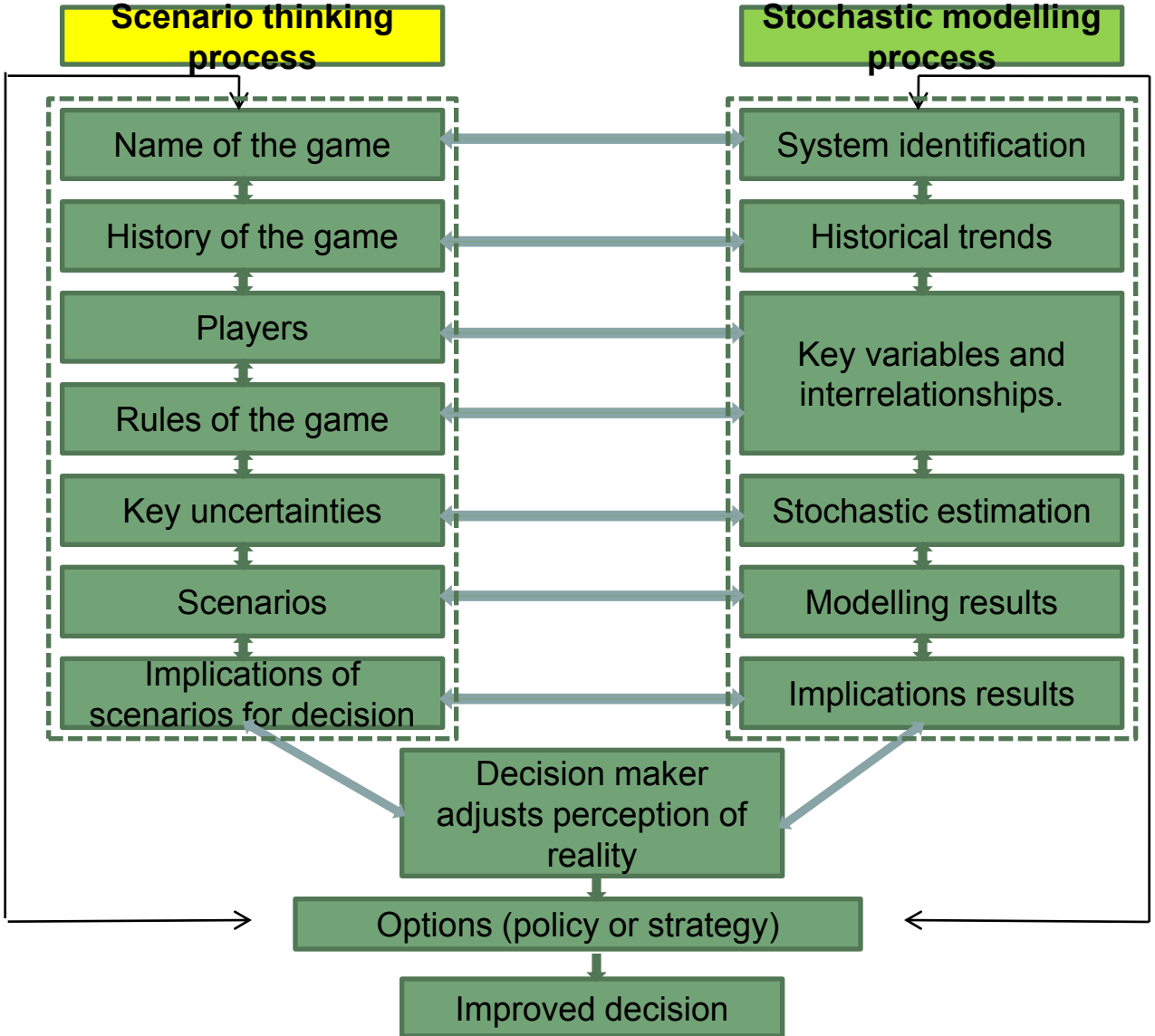
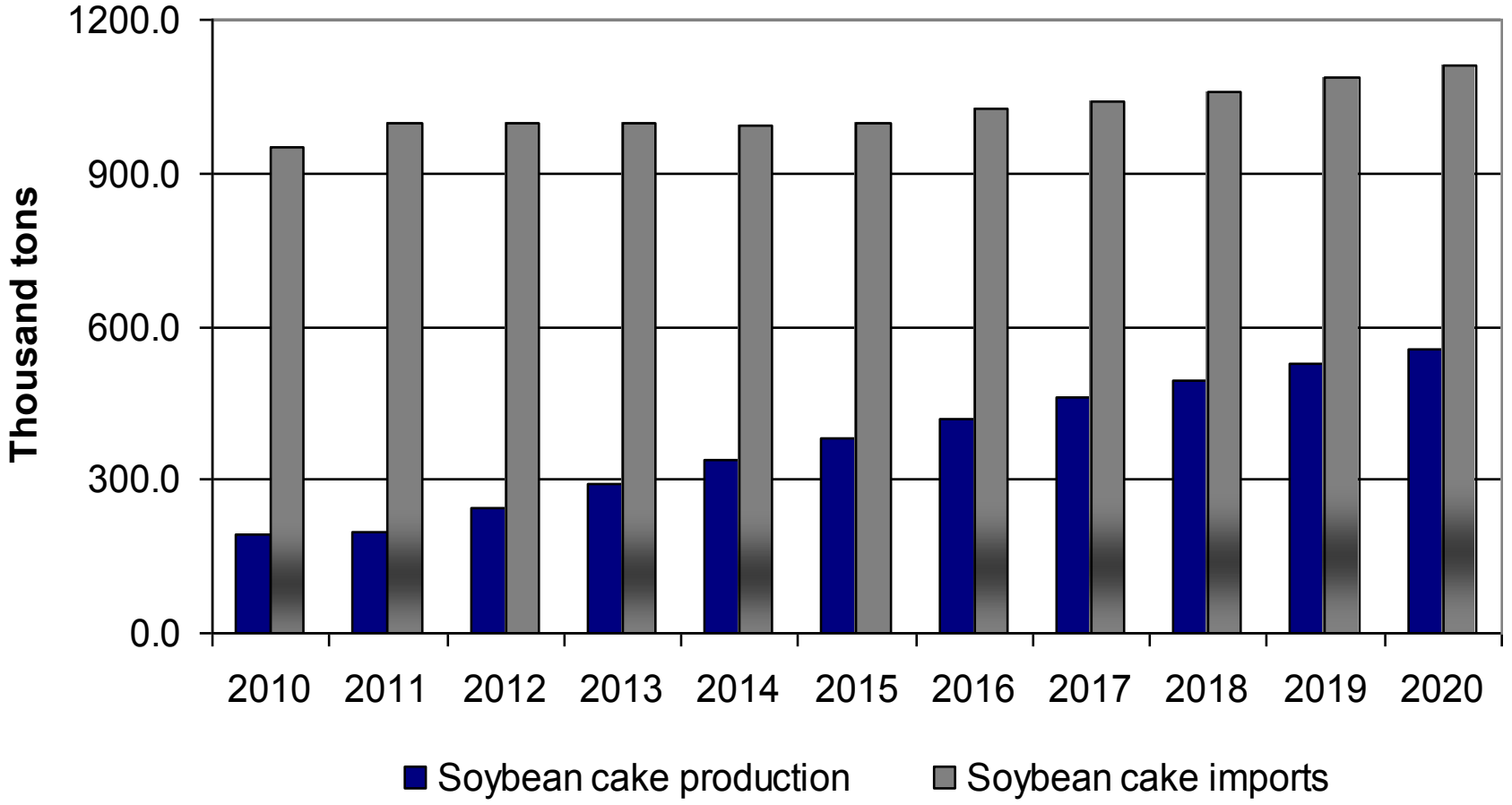
SCENARIO ANALYSIS



SCENARIO ANALYSIS

PROTEIN FOR ANIMAL FEED: 2020 SCENARIOS



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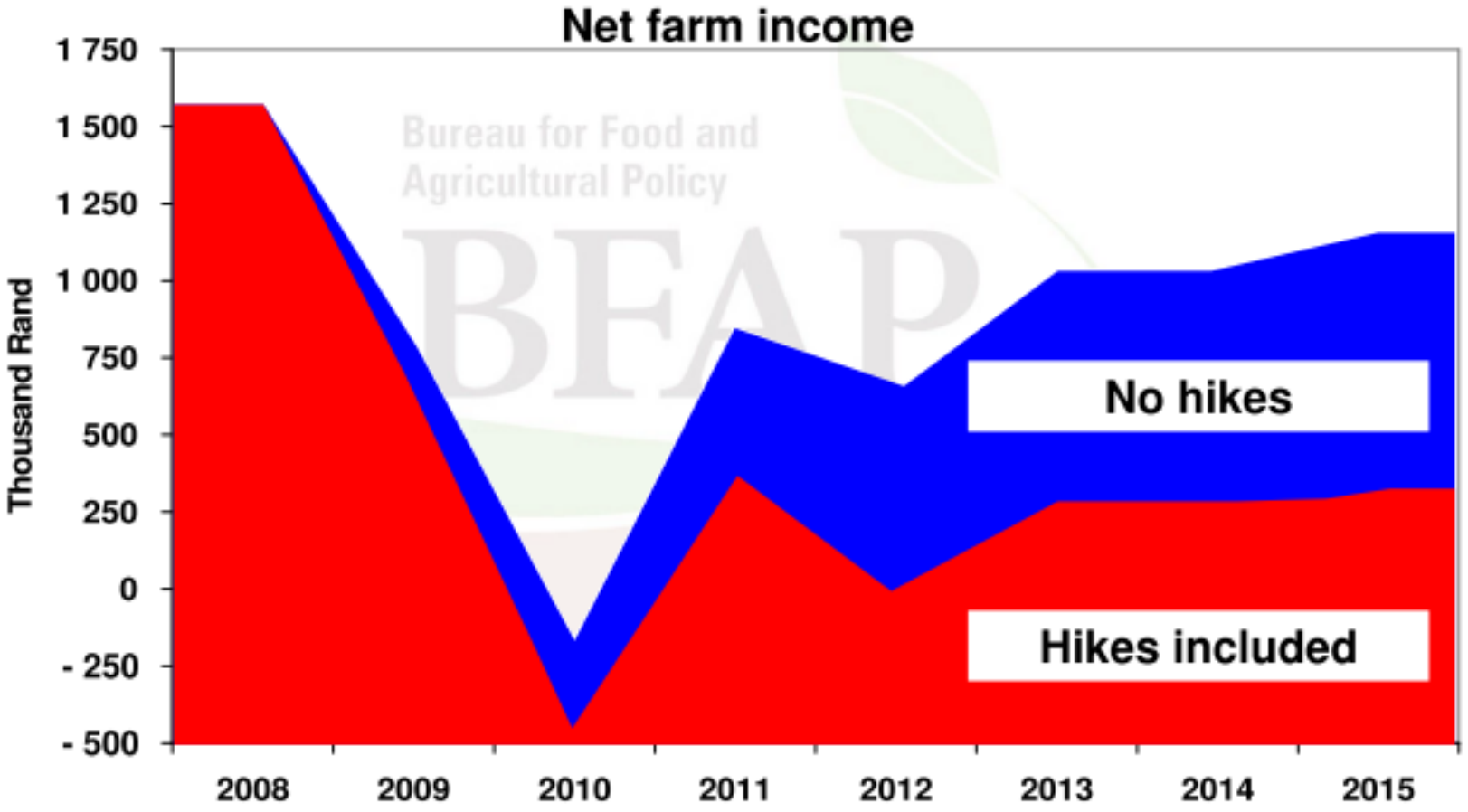
SCENARIO ANALYSIS

Scenario: Electricity



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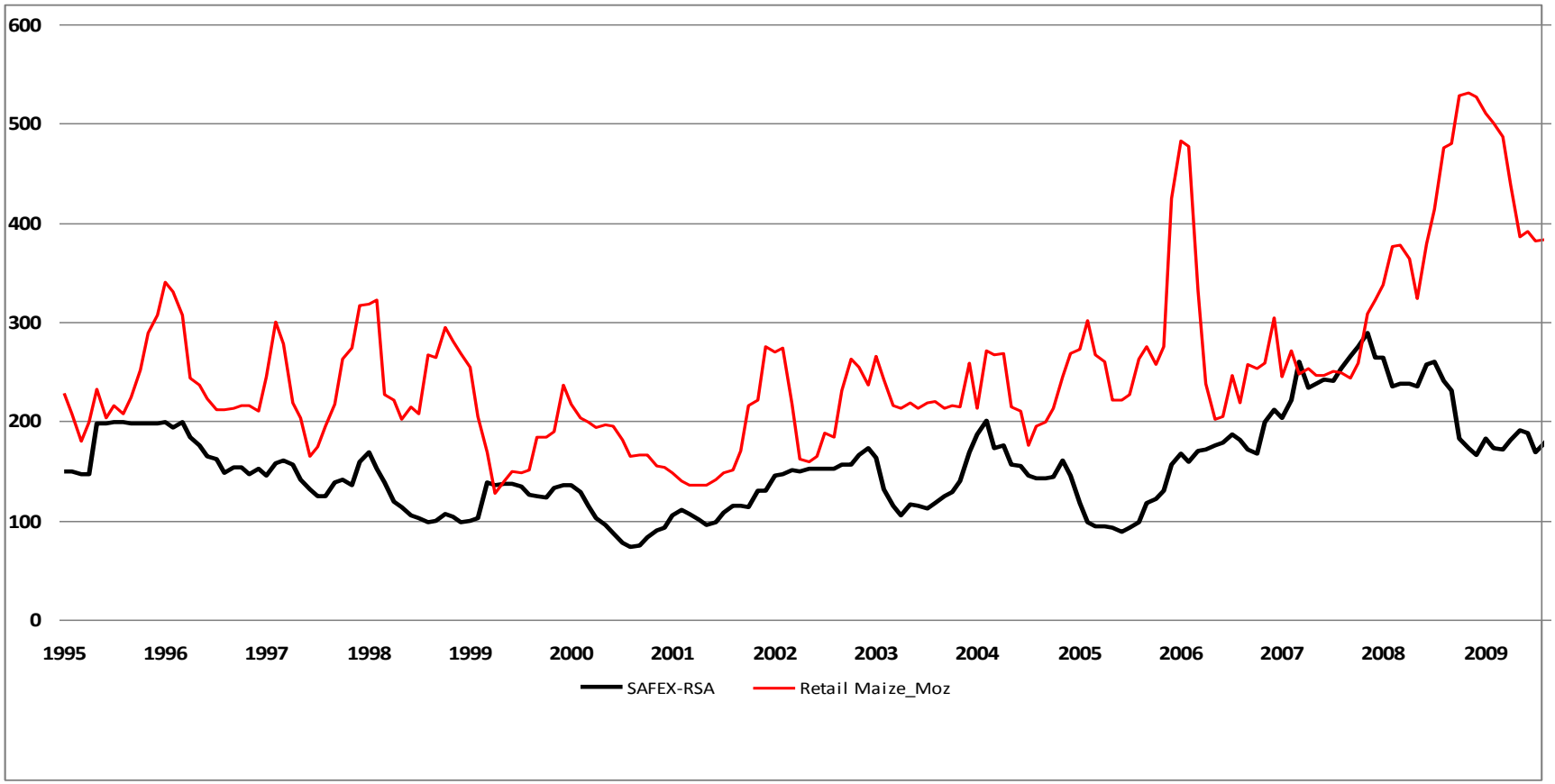
EXPANDING IN SOUTHERN AFRICA

Cointegration of Staple Food Markets - Southern Africa



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LINKING WITH AGRODEP

New Projects and Planning: Southern African Outlook

- Collaboration between BFAP, FAPRI, MSU and FAO
- Involves:
  - Build on existing capacity
  - Training of African modellers & market analysts – leverage on Collaborative Masters Program (Gates Foundation)
  - Data collection & validation, market analysis, model development,
  - Refine the Aglink – Cosimo modelling programme at the FAO

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What should be done to deliver effectively? – Lessons learned

- Dynamic nature of virtual network – key to have focused outputs
- Design standarised products to be delivered annually – ensures update of all components and provides momentum and branding.
- Build public-private partnerships – improved understanding of food systems…especially with lack of data (South African experience)
- Managing risk – loosing intellectual capacity due to rapid expansion of agricultural industry in region.
- Building networks into region essential to maintain capacity

Open Discussion