Institute of Development Studies

UNIVERSITY of GUELPH

CHANGING LIVES IMPROVING LIFE

Overview of Multi-Criteria Decision-Making Framework for Establishing SPS Capacity-Building Priorities

Spencer Henson

Date: 12th November 2012

Structure

- Aims of the framework
- Nature of the framework
- Practical implementation of the framework
- Framework outputs
- Implications/issues

Aims of the framework

- Provide structured approach to establishing priorities between alternative SPS capacity-building options
- Enhance transparency of SPS capacity-building decisions
- Facilitate inputs to priority-setting from diverse stakeholders

- Greater resource efficiency
- Demand-driven capacity-building
- Enhanced trade and social outcomes and impacts

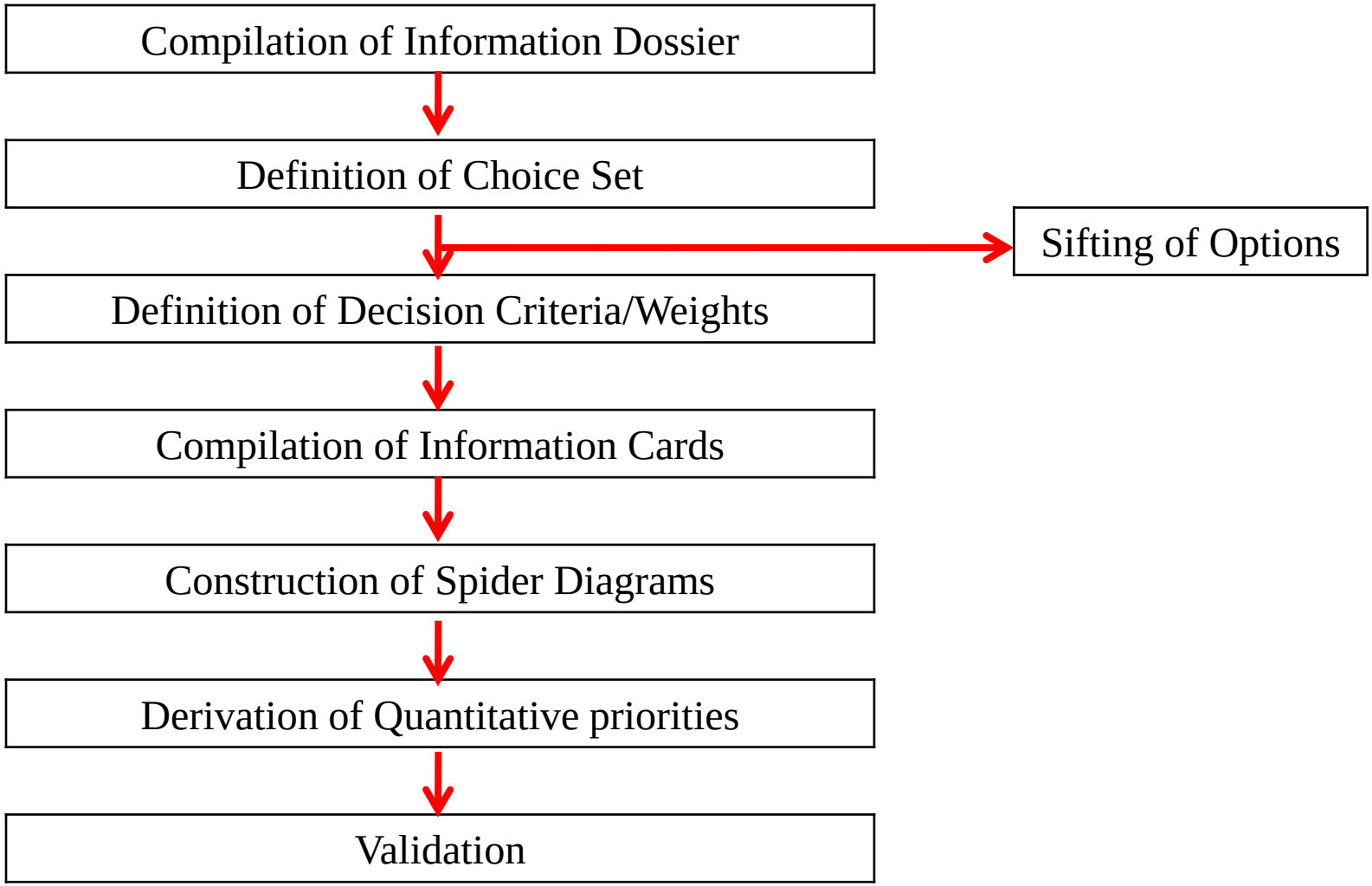
Nature of the framework

- Based on multi-criteria decision analysis (MCDA)
- Sequenced process for compilation, collation and analysis of information on SPS capacity-building needs
- Aims to mimic formal decision-making processes
- Highly flexible
- Decision support tool

Basic framework structure

Criteria	Weights	Options				
		Option1	Option 2	Option 3	Option 4	Option 5
Cost	20%	$3 million	$500,000	$2 million	$250,000	$3 million
Growth in Exports	30%	30%	20%	50%	10%	15%
Small farmers	30%	No	Yes	No	Yes	Yes
Poverty impacts	20%	Minor	Major	Moderate	Minor	Major
Ranking		5	1	3	2	4

Stages in prioritisation process



Compilation of information dossier

- Build on and provide opportunity for input from previous capacity assessments
- Ensure priority-setting exercise based on full set of existing and pertinent information
- ‘Level playing field’ across stakeholders
- Enhance transparency

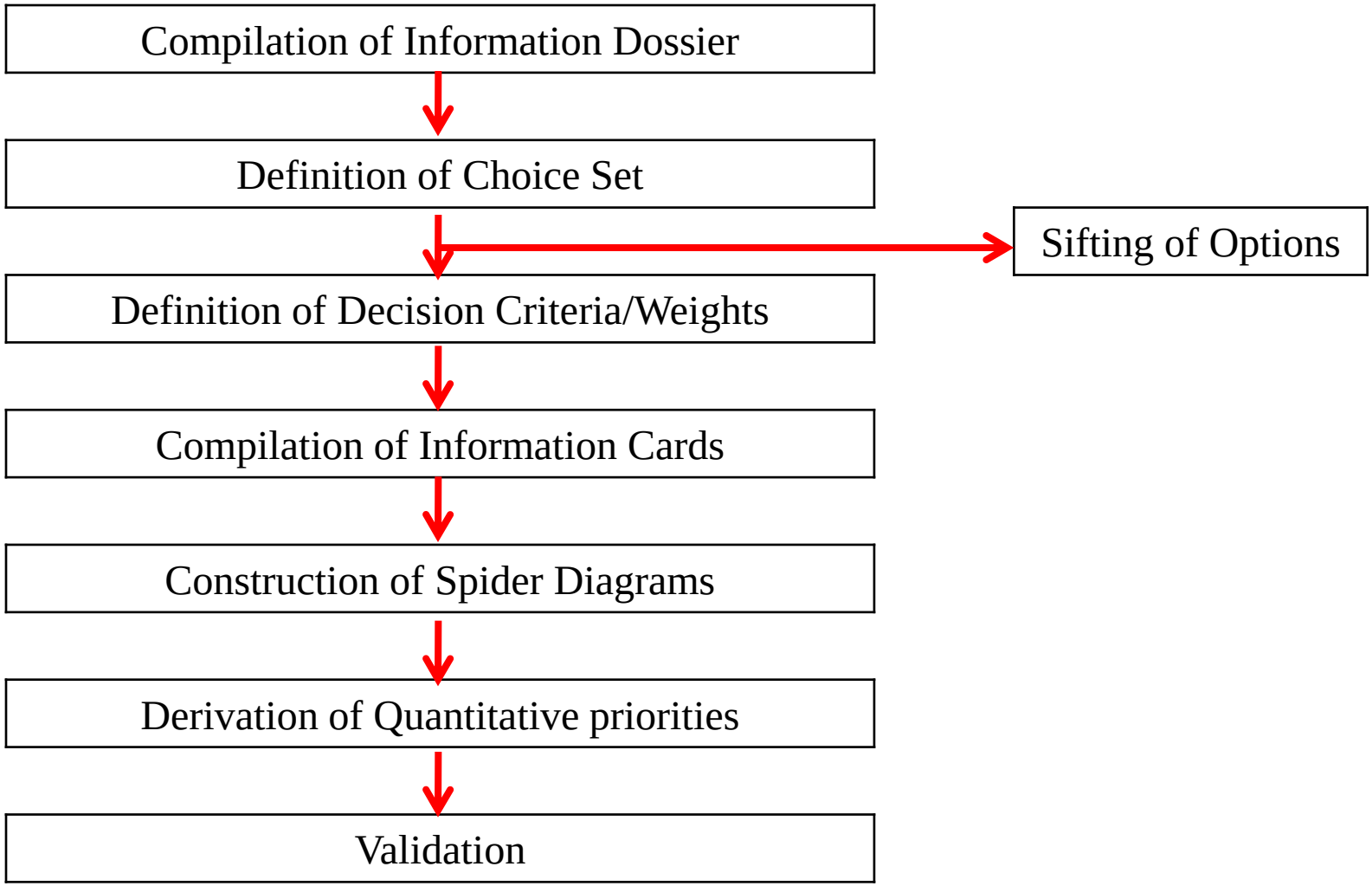
Compilation of information dossier

- Consists of ‘plausible’ indicators of weaknesses in SPS capacity linked to trade
- Aims to ‘build a picture’ from spectrum of information available
- Sources:
  - Primary/Secondary
  - Qualitative/Quantitative
  - Rigorous/Superficial
- Important to maintain connections between identified weaknesses and indicators
- Not perfect…..important to use triangulation

Possible SPS capacity indicators

Type	Examples
Capacity-based	Formal capacity evaluations and benchmarking *Ad hoc* capacity assessments
Compliance-based	Inspection reports Approved importer lists in export markets Pest interception reports
Trade-based	Border rejections in export markets Inventories of SPS requirements in export markets Trade flow trends and disruptions Official restrictions/actions in export markets Reports of trade problems from exporters Exporter and/or importer interviews and surveys *Ad hoc* problem reports/questionnaires

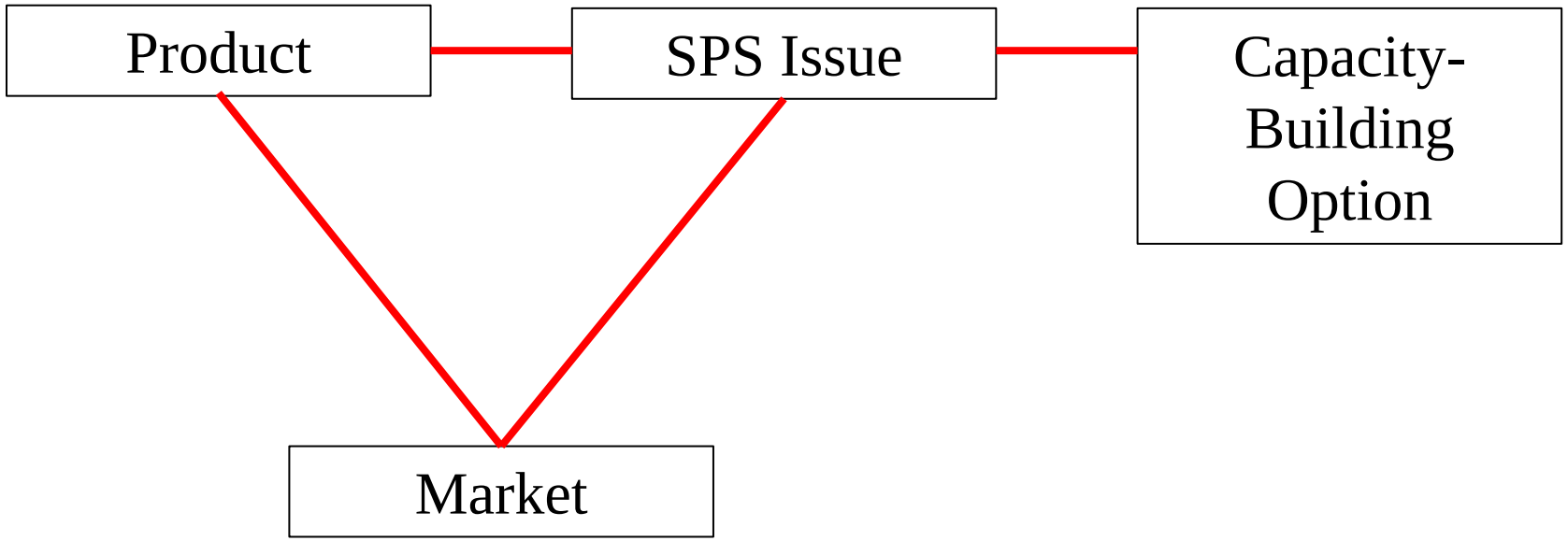
Stages in prioritisation process

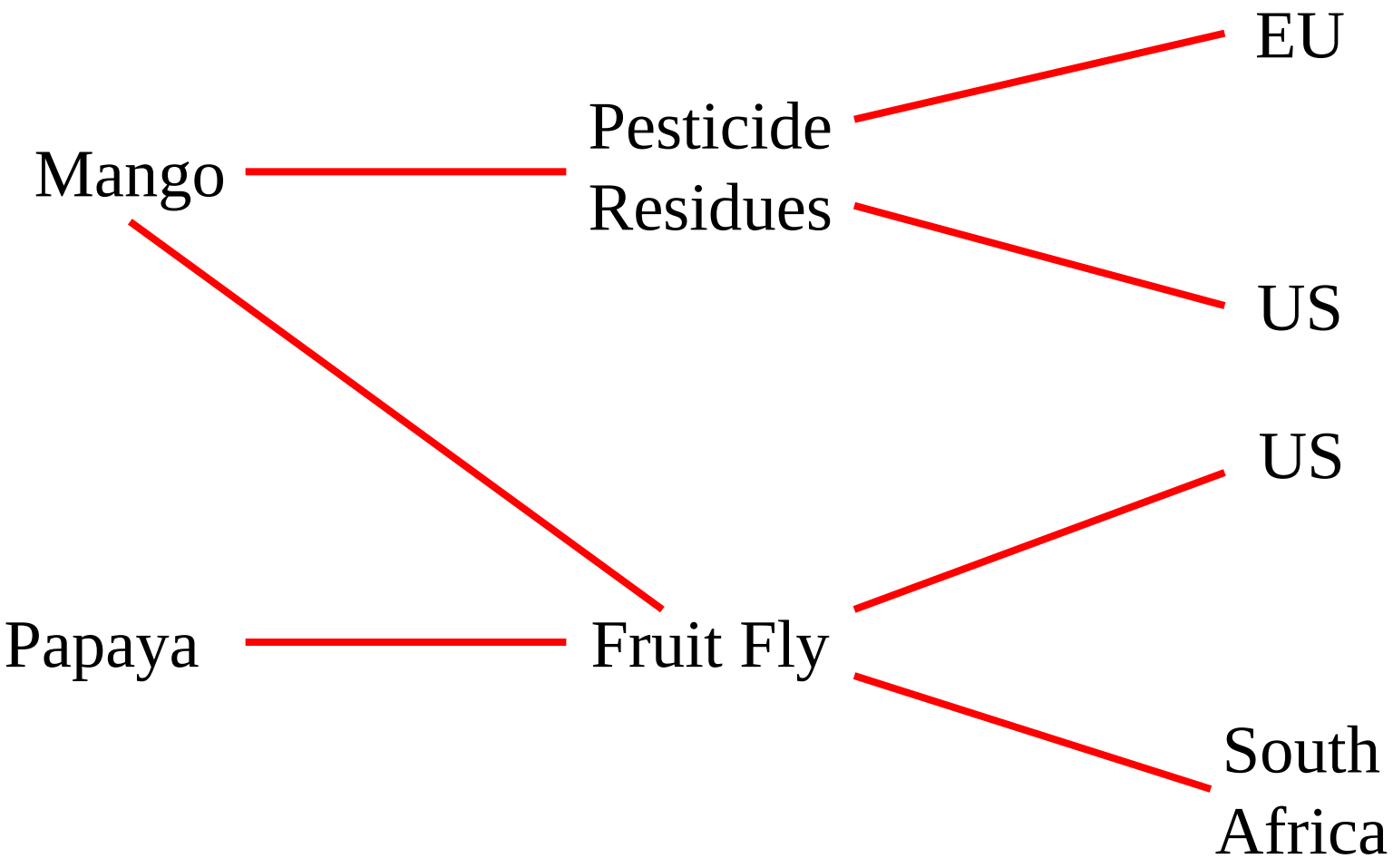


Definition of choice set

- Identification of SPS capacity-building options to be considered
- Nature of capacity-building options:
  - Mutually-exclusive
  - Linked to specific capacity weaknesses
  - Can assign flow of costs and benefits
- Focus on current and nascent issues
- Focus on existing, latent and potential exports
- Trade-off between comprehensiveness and practicality
- Once have defined choice set need to sift out ‘redundant’ options

Definition of capacity-building options

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Mango
US
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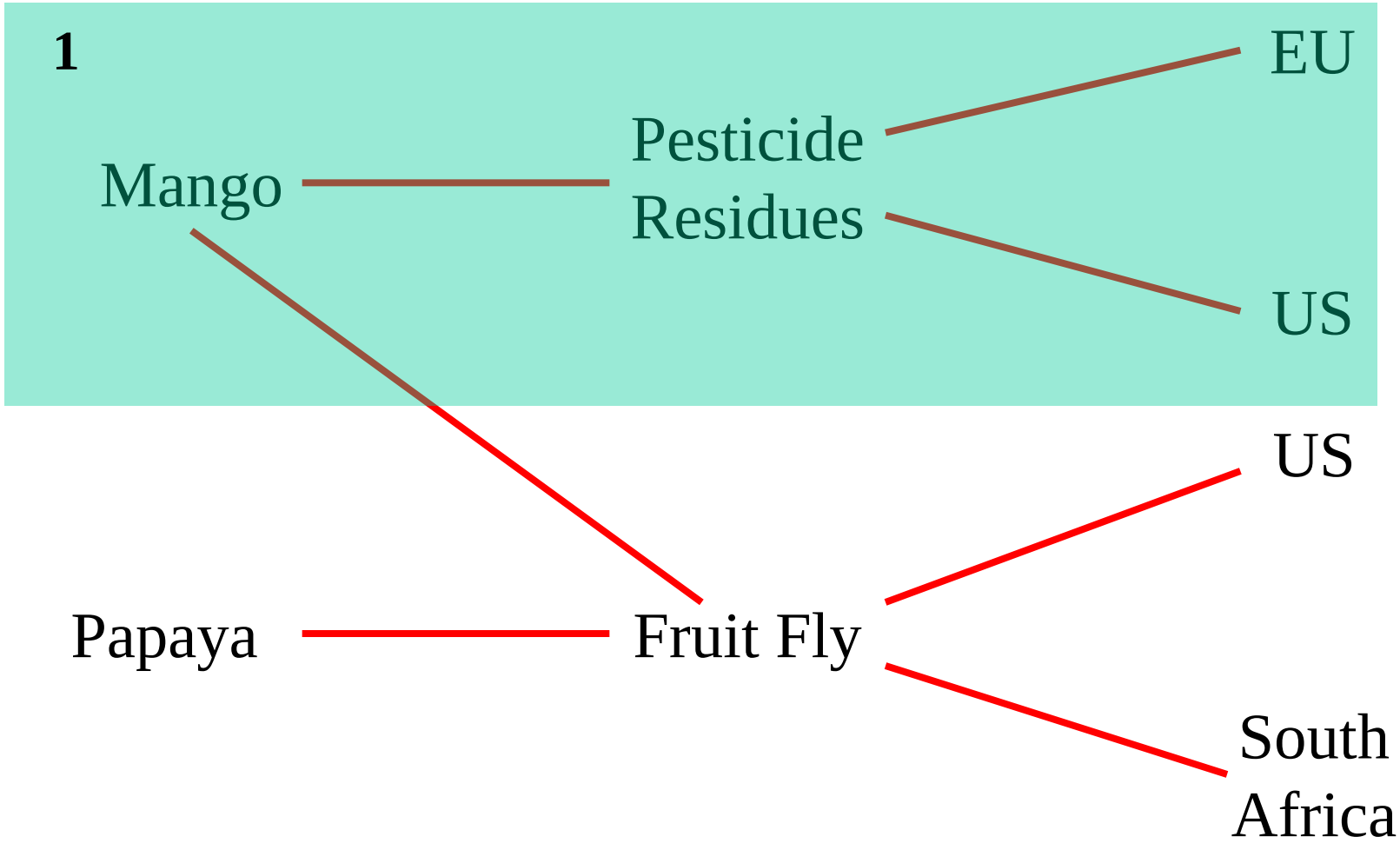
Papaya
Fruit Fly
South
Africa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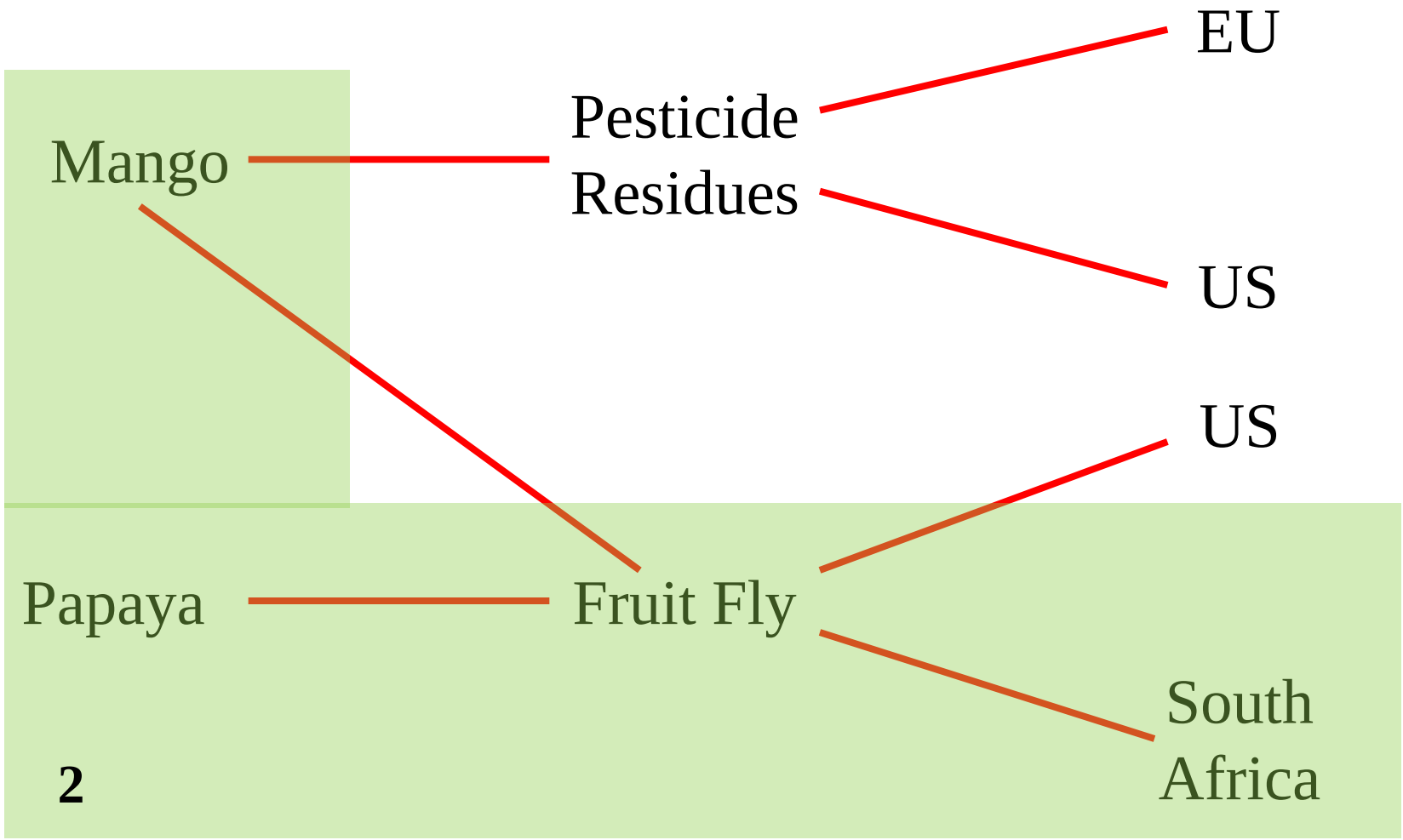
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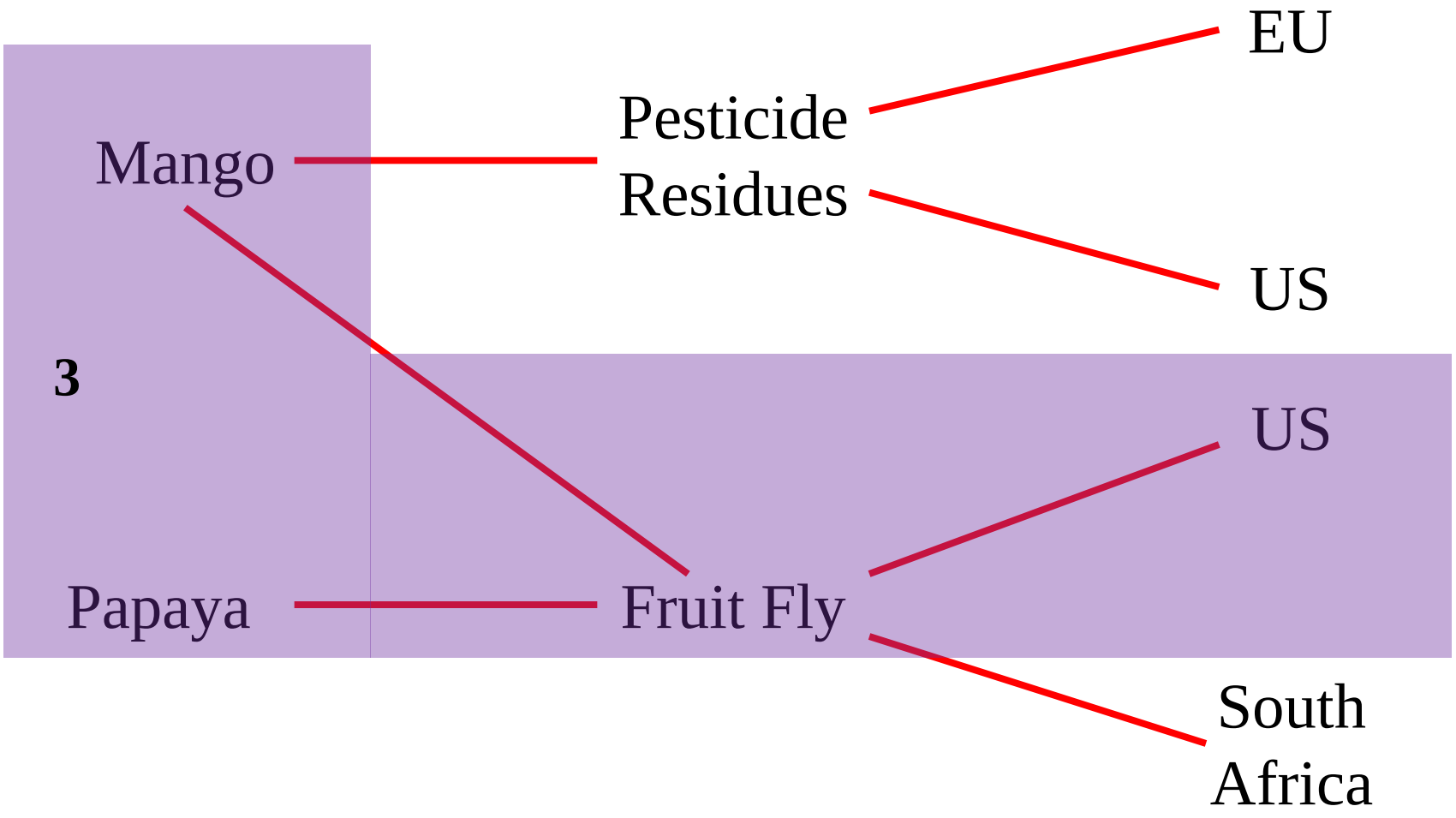
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Pesticide
Residues
Mango
US
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US
Papaya
Fruit Fly
South
Africa

Eliciting the choice set

- Approaches:
  - Workshop using Nominal Group Technique
  - Delphi survey
- Procedure:
  - Private elicitation
  - Feedback
  - Development of consensus
- Guiding principles:
  - Inclusiveness
  - Transparency
  - Practicality
  - Cost/time

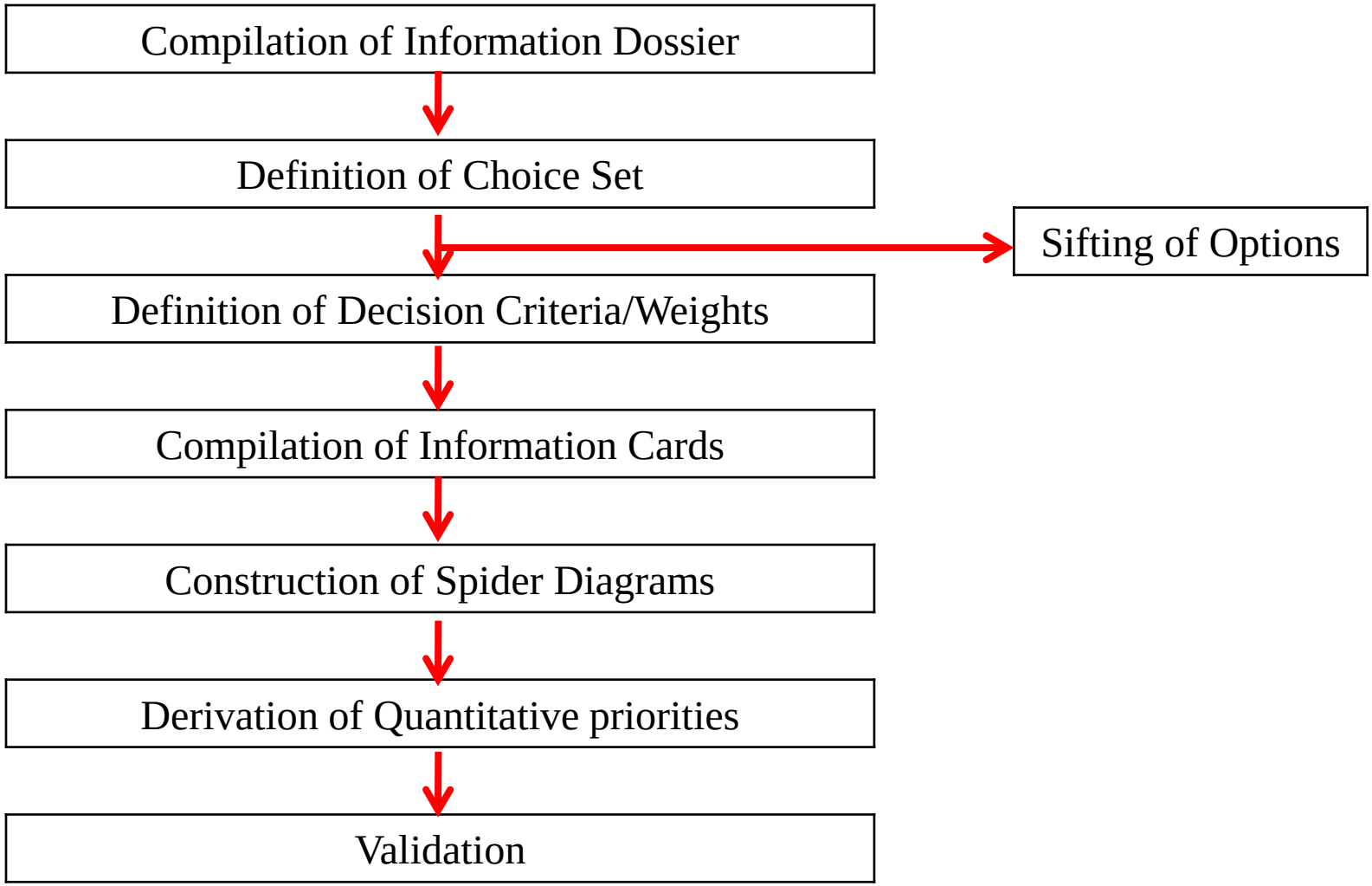
‘Sifting’ the choice set

- Is it an SPS issue?
- Does the option relate to a current/potential and substantive compliance problem?
- Is the option economically viable aside from the SPS constraint?
- Are the sectors concerned and the level of existing/potential exports substantive?

Identified capacity-building options - Belize

- Animal health controls for live cattle exports
- Hygiene controls for beef exports
- Animal health and hygiene controls for chicken exports
- Plant health controls for pitahaya exports
- Food safety controls for papaya exports
- Laboratory testing capacity for pesticide residues and veterinary drug residues
- Laboratory testing capacity for heavy metals
- Plant health controls for citrus pulp exports

Stages in prioritisation process



Definition of choice criteria/weights

- Elements:
  - Criteria to be used to establish priorities amongst members of choice set
  - Weights attached to each decision criterion
- Issues:
  - Attribution
  - Spill-over effects
- Approaches:
  - Workshop using Nominal group Technique
  - Delphi survey

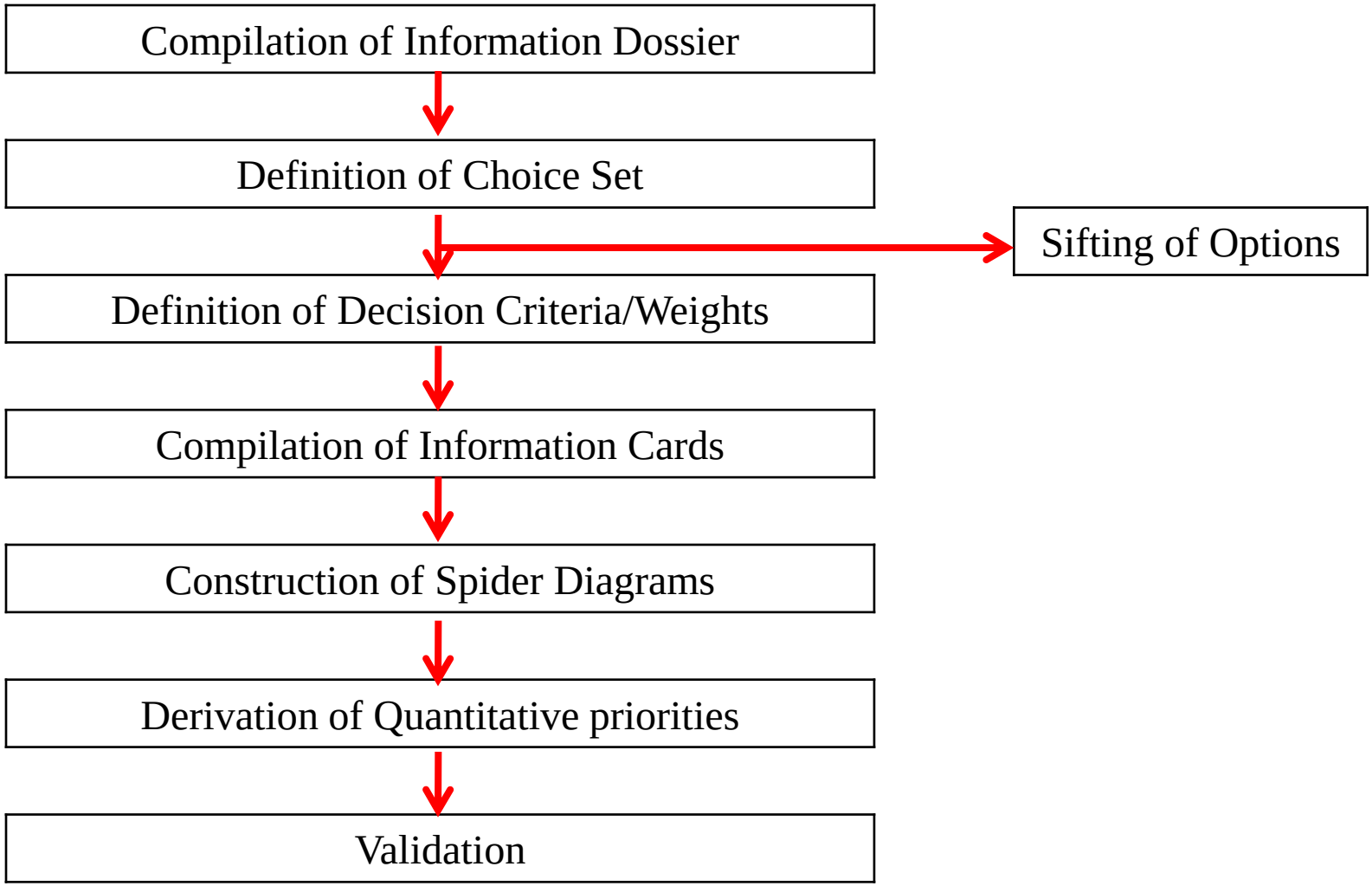
Possible decision criteria….?

- Cost and difficulty of implementation:
  - Up-front investments
  - On-going costs
  - Difficulty of implementation
- Trade impacts:
  - Growth/avoided losses in value of exports
  - Diversification of exports
  - International reputation
  - Capacity to prevent future problems
- Wider impacts on agri-food sector
  - Agricultural productivity
  - Public health
  - Environmental protection
- Social impacts:
  - Poverty
  - Vulnerable groups - women, small farmers, disadvantaged areas, etc.
  - Employment impacts

Decision criteria and weights - Belize

Criterion	Weight
Cost and difficulty of implementation	
Up-front investment	10%
On-going costs	9%
Difficulty of implementation	9%
Trade impact	
Change in value of exports	15%
Trade diversification – new products	8%
Trade diversification – new markets	9%
Domestic agri-food impacts	
Agricultural/fisheries productivity	8%
Domestic public health	8%
Environmental protection	5%
Social impacts	
Employment impacts	7%
Poverty impacts	7%
Impact on vulnerable groups	5%

Stages in prioritisation process



Compilation of information cards

- Bring together data on each capacity-building option
- One card for each capacity-building option
- Elements:
  - Brief description of each option
  - Quantitative measure of each decision criterion
  - Note of assumptions, basis of estimate, etc.
  - Indicator of confidence in estimate
- ‘Living’ documents

Compilation of information cards

- Information sources:
  - Prior assessments of capacity-building needs
  - Extrapolations from prior assessments or costs estimates for other sectors and/or countries
  - *Ad hoc* or structured consultations and/or surveys of national stakeholders
  - *Ad hoc* or structured consultations and/or surveys of international experts
- Choice of data:
  - Availability
  - Quality

Data that can be used in information cards

Type	Description	Example
Discrete	Yes/No	Impact on the poor Increases exports
Ordinal	Scaling	-2 = ‘Large negative impact’ -1 = ‘Small negative impact’ 0 = ‘No impact’ +1 = ‘Small positive impact +2= ‘Large positive impact’
Count	Number	Number of small farmers impacted Number of new markets accessed
Continuous	Absolute value/change	Absolute increase in value of exports Percentage increase in costs

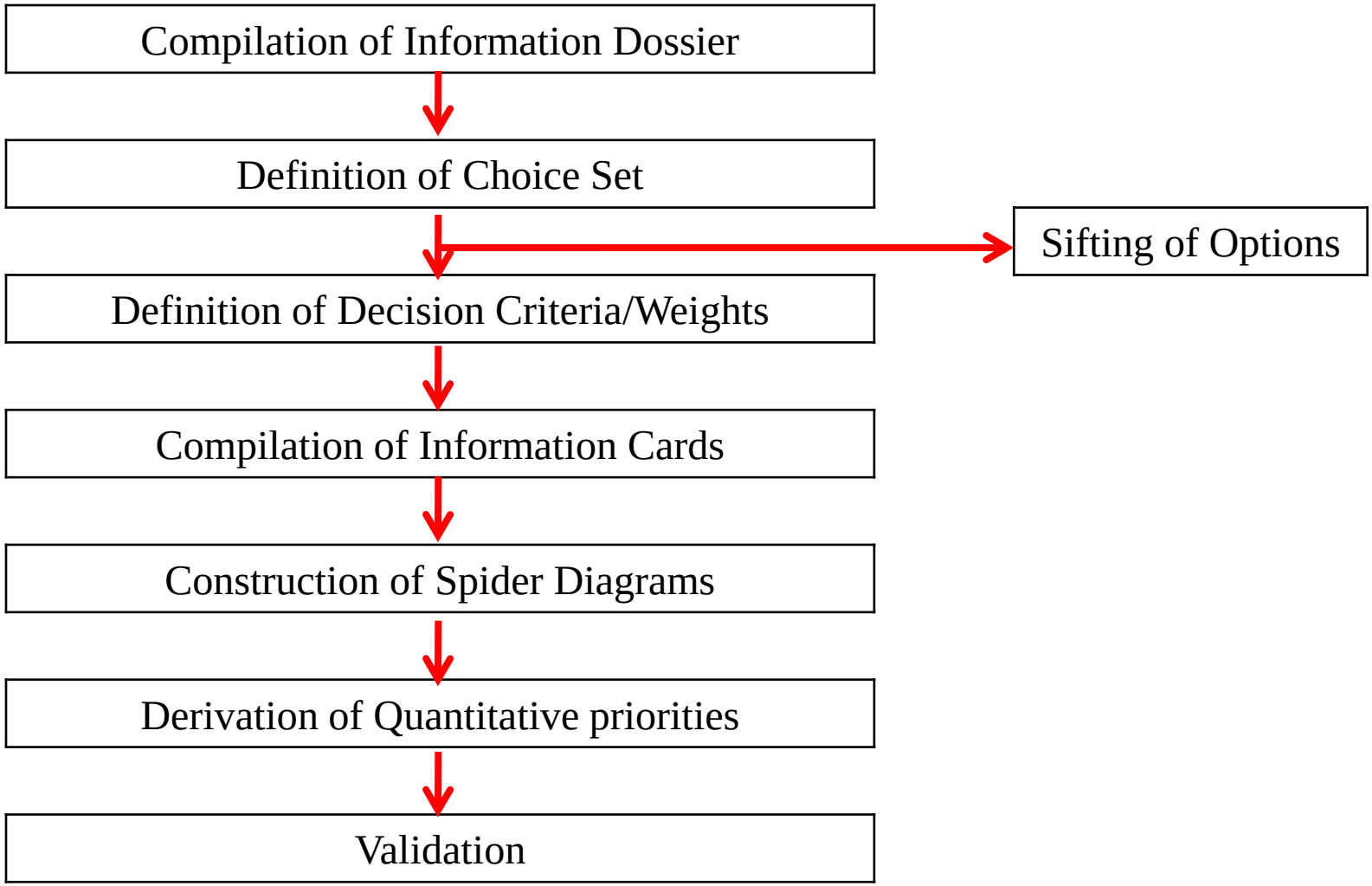
Measurement of decision criteria - Belize

Criterion	Measurement
Cost	
Up-front investment	Absolute value ($)
On-going costs	Absolute value ($)
Difficulty of implementation	'Very easy' (1) to 'Very difficult' (5)
Trade impact	
Absolute change in value of exports	Absolute value in 2017 ($)
Trade diversification – new products	'Large negative' (-2) to 'Large positive' (+2)
Trade diversification – new ,markets	
Domestic agri-food impacts	
Agricultural/fisheries productivity	'Large negative' (-2) to 'Large positive' (+2)
Domestic public health	
Environmental protection	
Social impacts	
Employment impacts	'Large negative' (-2) to 'Large positive' (+2)
Poverty impacts	
Impact on vulnerable groups:	

Capacity-building option profile – animal health controls for live cattle exports

Decision Criterion	Value	Details	Confidence
Cost and difficulty of implementation			
Up-front investment	US$6.12 million	Estimates from EU project proposal...	High
On-going cost	US$440,000	Estimates from EU Project proposal.	High
Difficulty of implementation	5	Very difficult. Identification system needs to cover entire cattle population in Belize. Surveillance system needs to be maintained. Needs cooperation of Mexican government.	High
Trade impact			
Change in absolute value of exports	US$13.6 million	Currently the informal trade with Mexico is estimated at US$500,000 per annum but is estimated to increase to US$14,062,500 per annum once trade is formalised	Medium
Trade diversification – products	0	Currently, exports occur to Mexico and Guatemala, but all informal	High
Trade diversification – markets	0	Currently, exports occur to Mexico and Guatemala, but all informal	High
Domestic agri-food impact			
Agricultural/fisheries productivity	+1	Bovine Tuberculosis and Brucellosis are not known to be major problem in cattle production in Belize. Returns to cattle production likely to increase	Medium
Domestic public health	0	No impact	High
Environmental protection	-1	Could lead to deforestation. Likely to be shift to semi-intensive or intensive systems of production.	Medium
Socio-economic impact			
Impact on employment	0	Negligible. Likely to be increased production, but not very labour intensive	Medium
Poverty impact	0	Even small cattle producers are not poor.	Medium
Impact on vulnerable groups/areas	0	Cattle producers predominantly men. North not a marginal area.	Medium

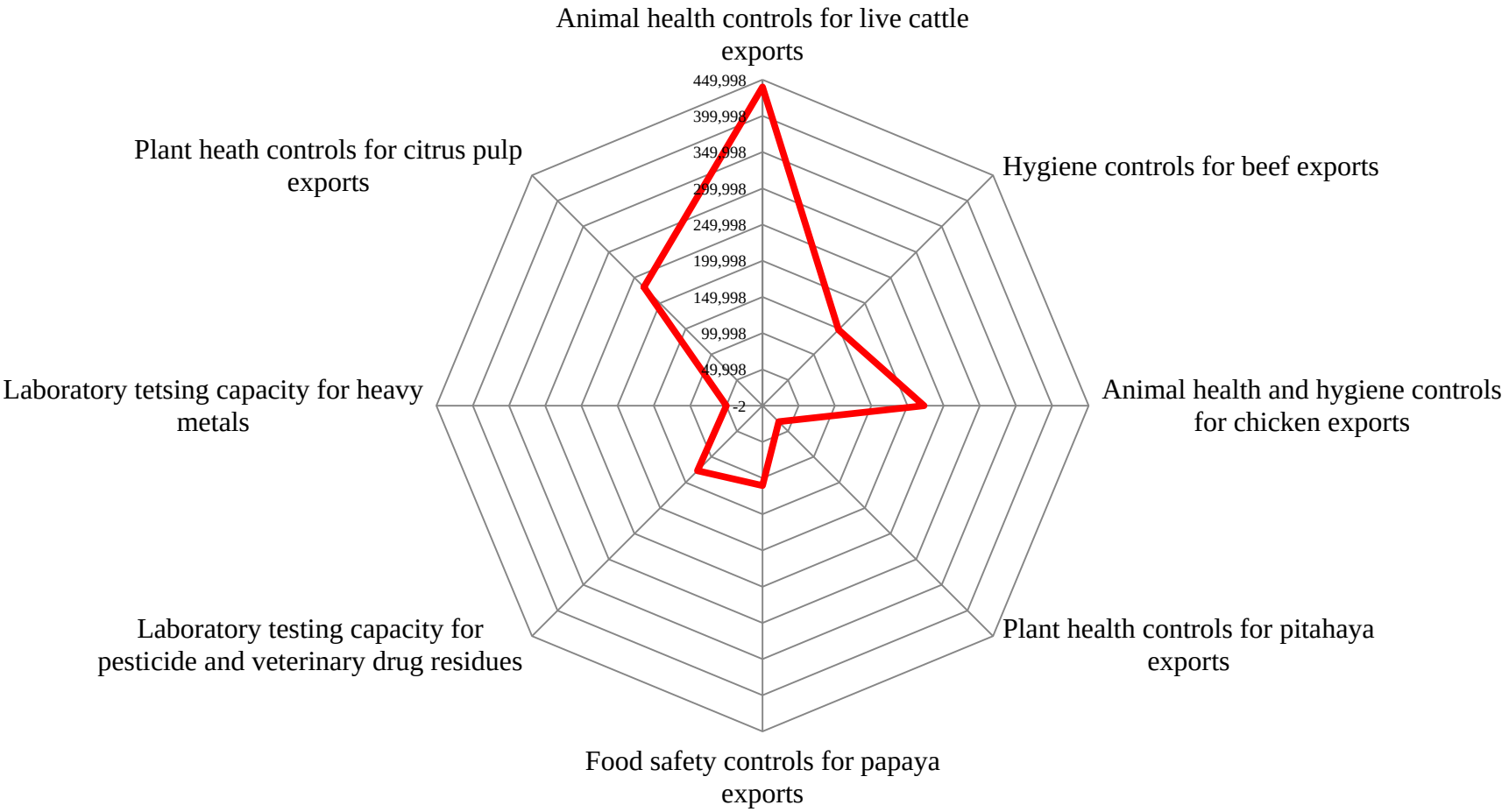
Stages in prioritisation process



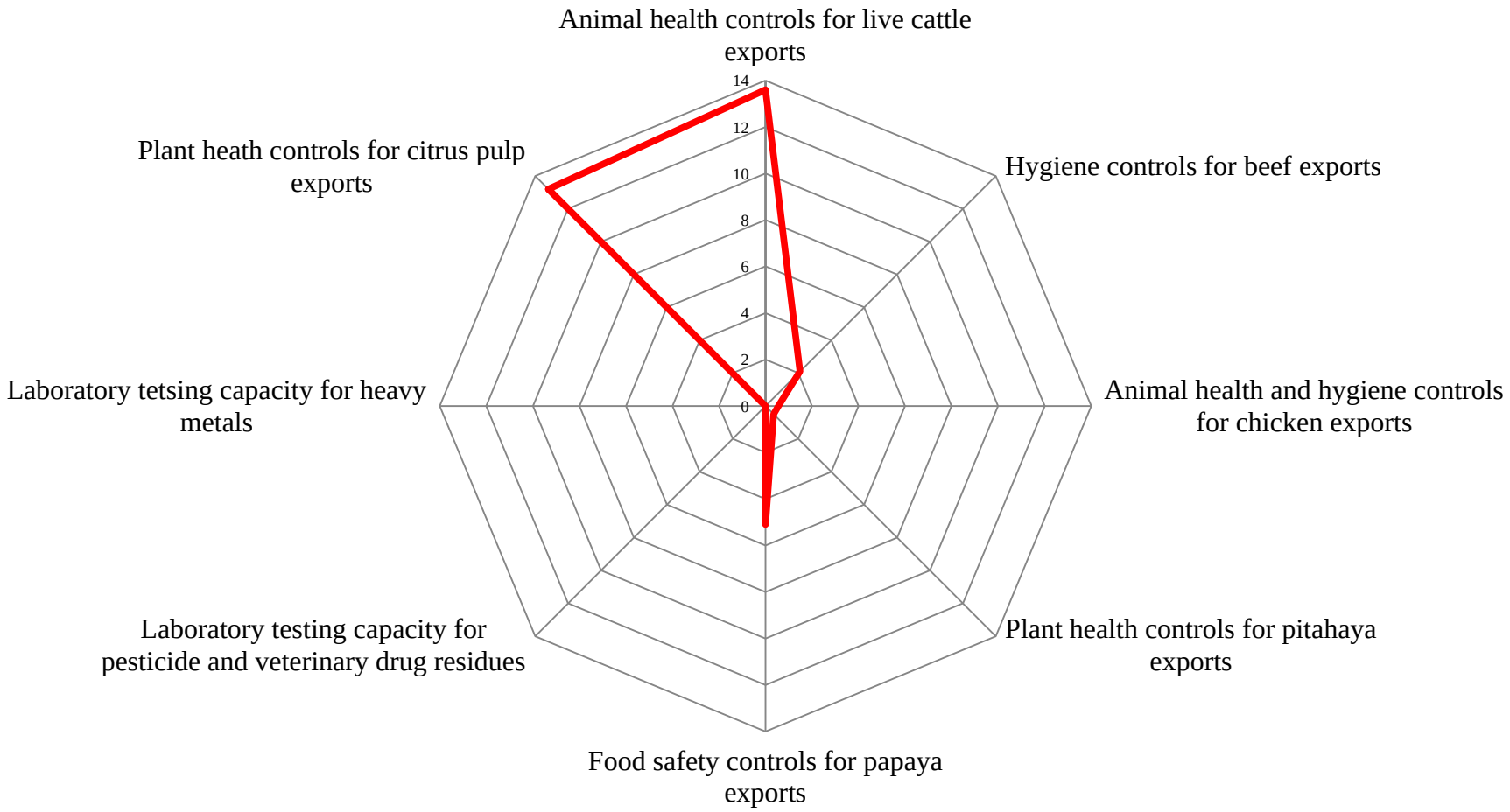
Compilation of spider charts

- Facilitate comparison of capacity-building options across single decision criteria
- Can be used to compare capacity-building options across multiple criteria
- Aims:
  - Communication
  - Assembly of information for ‘traditional’ decision-making
  - Initial assessment of capacity-building options before formal prioritisation

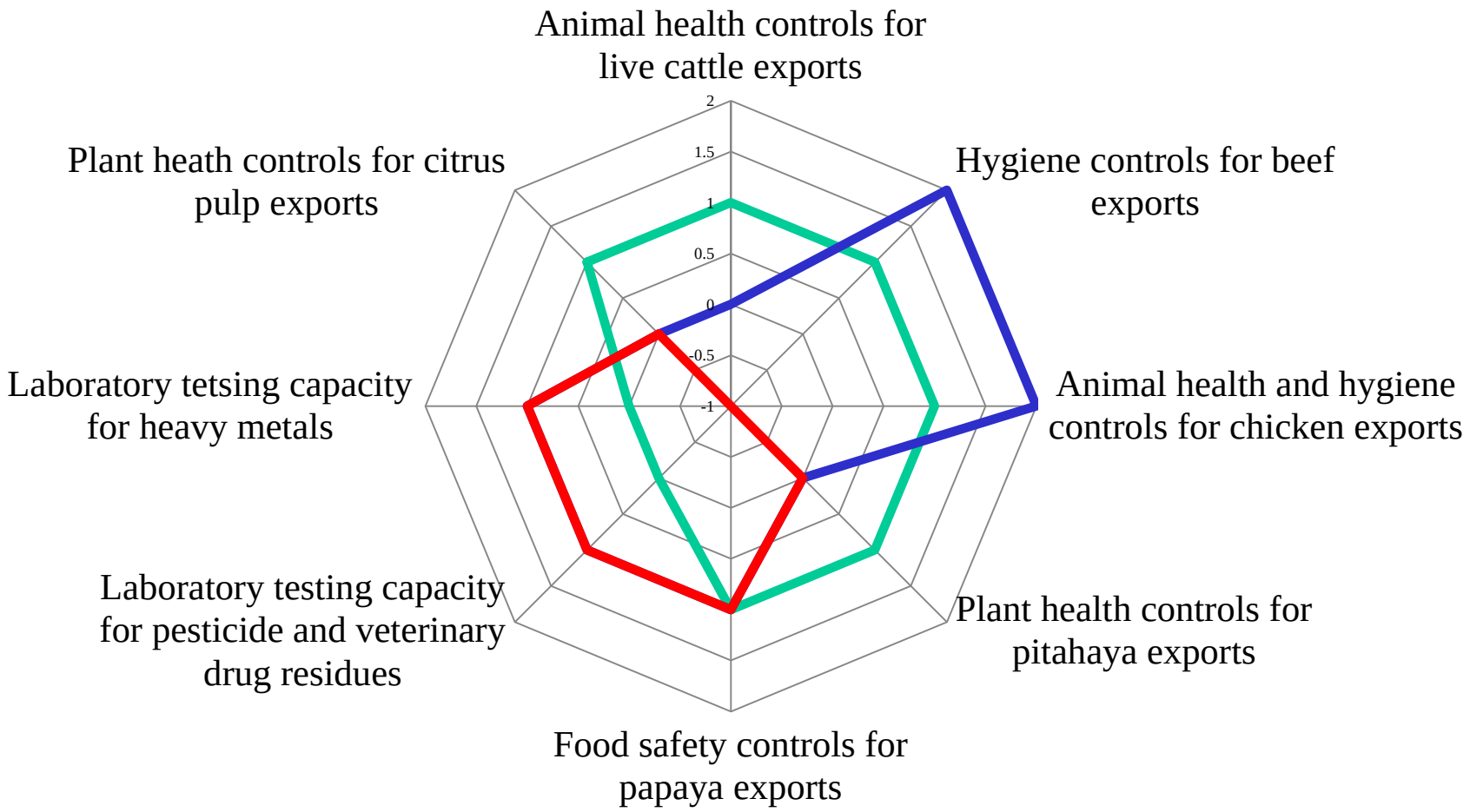
Decision criteria measures scores: on-going costs ($)



Decision criteria measures scores: growth in value of exports ($)



Decision criteria measure scores: domestic agri-food impacts



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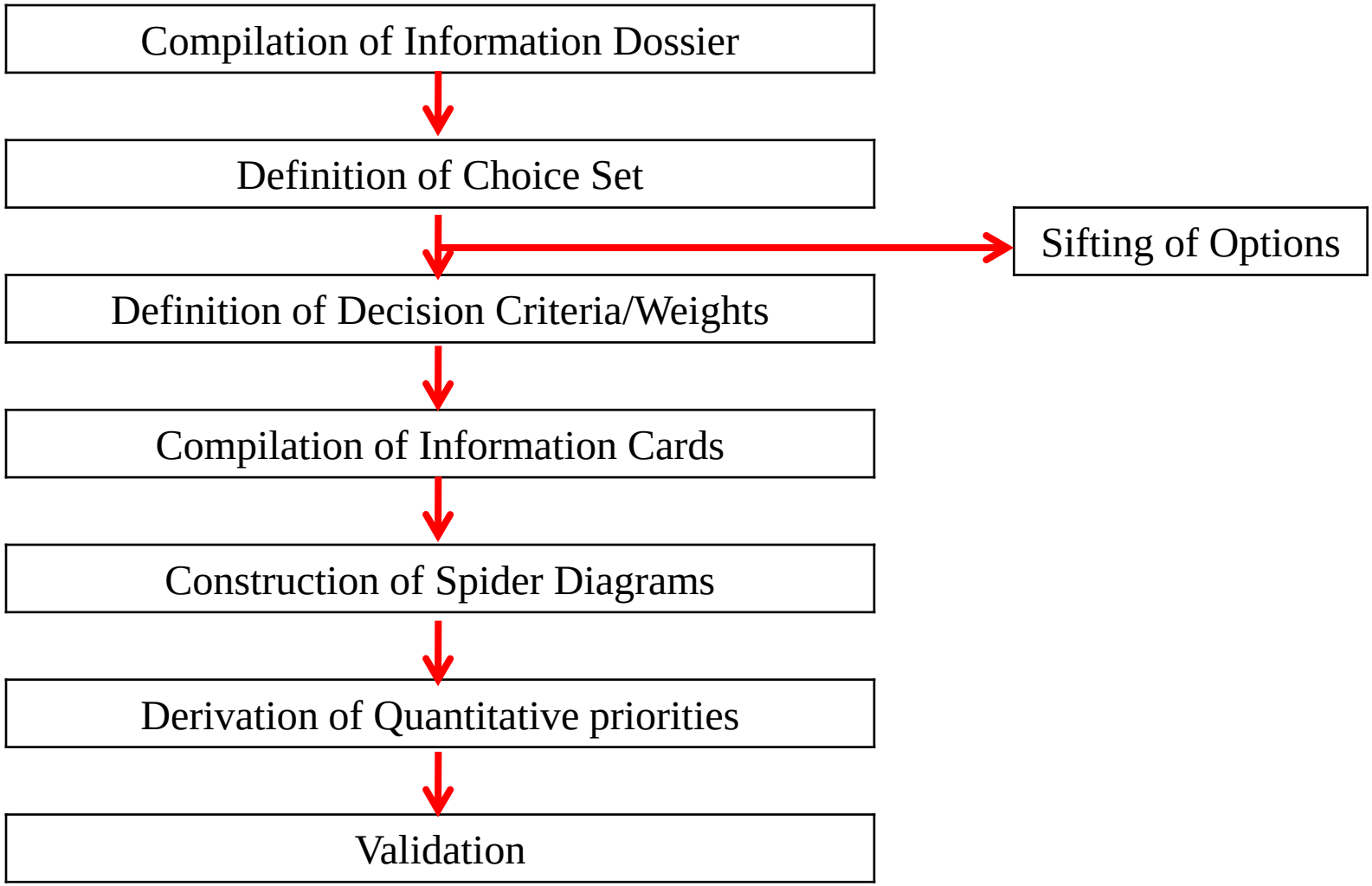

Nature of prioritisation process

- Outranking approach
- Inputs:
  - Decision criteria measures
  - Decision weights
  - Preference functions
- Options compared in pair-wise fashion
- Calculates:
  - Positive flow
  - Negative flow
- Ranking on basis of net flow

Basic framework structure

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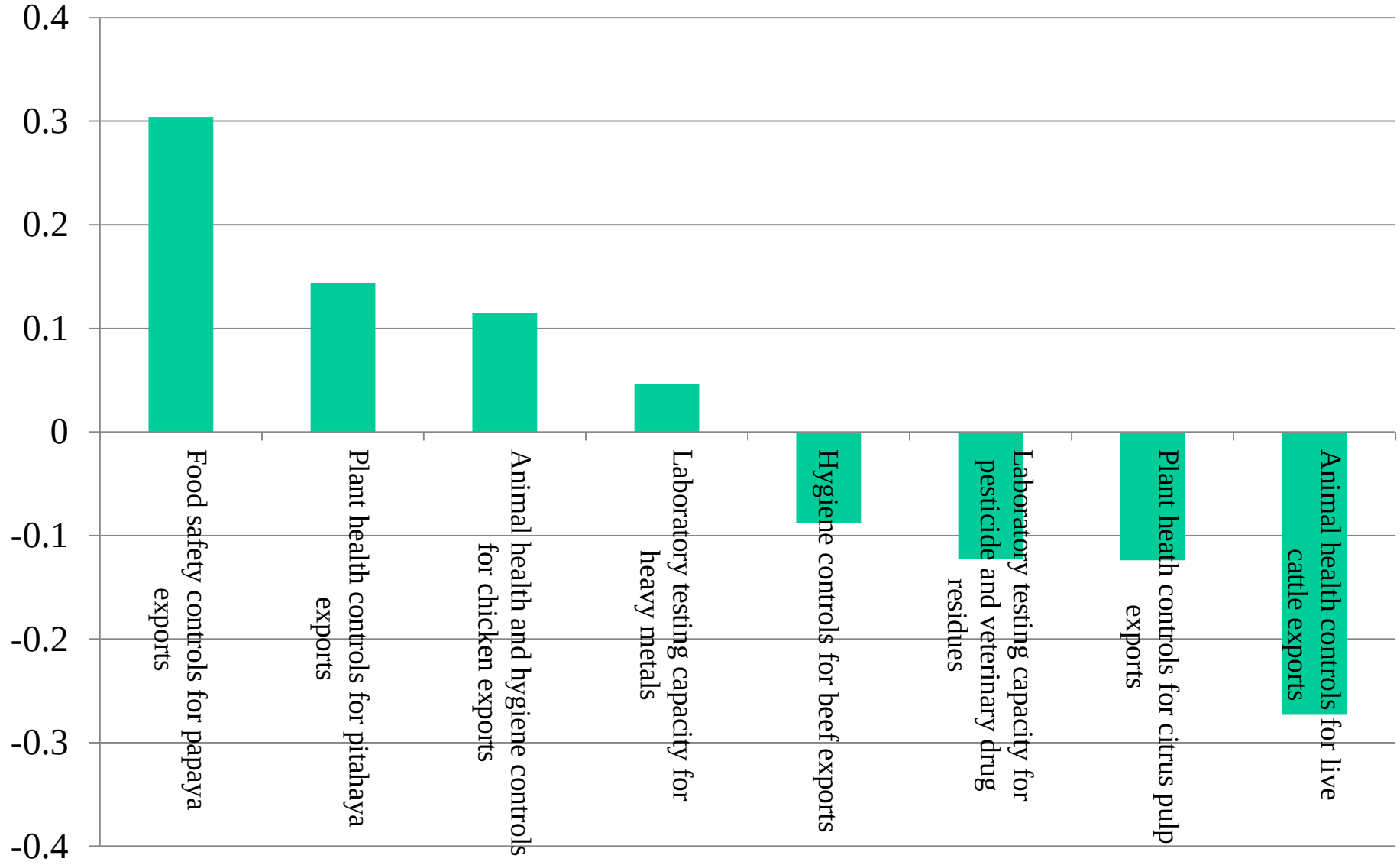
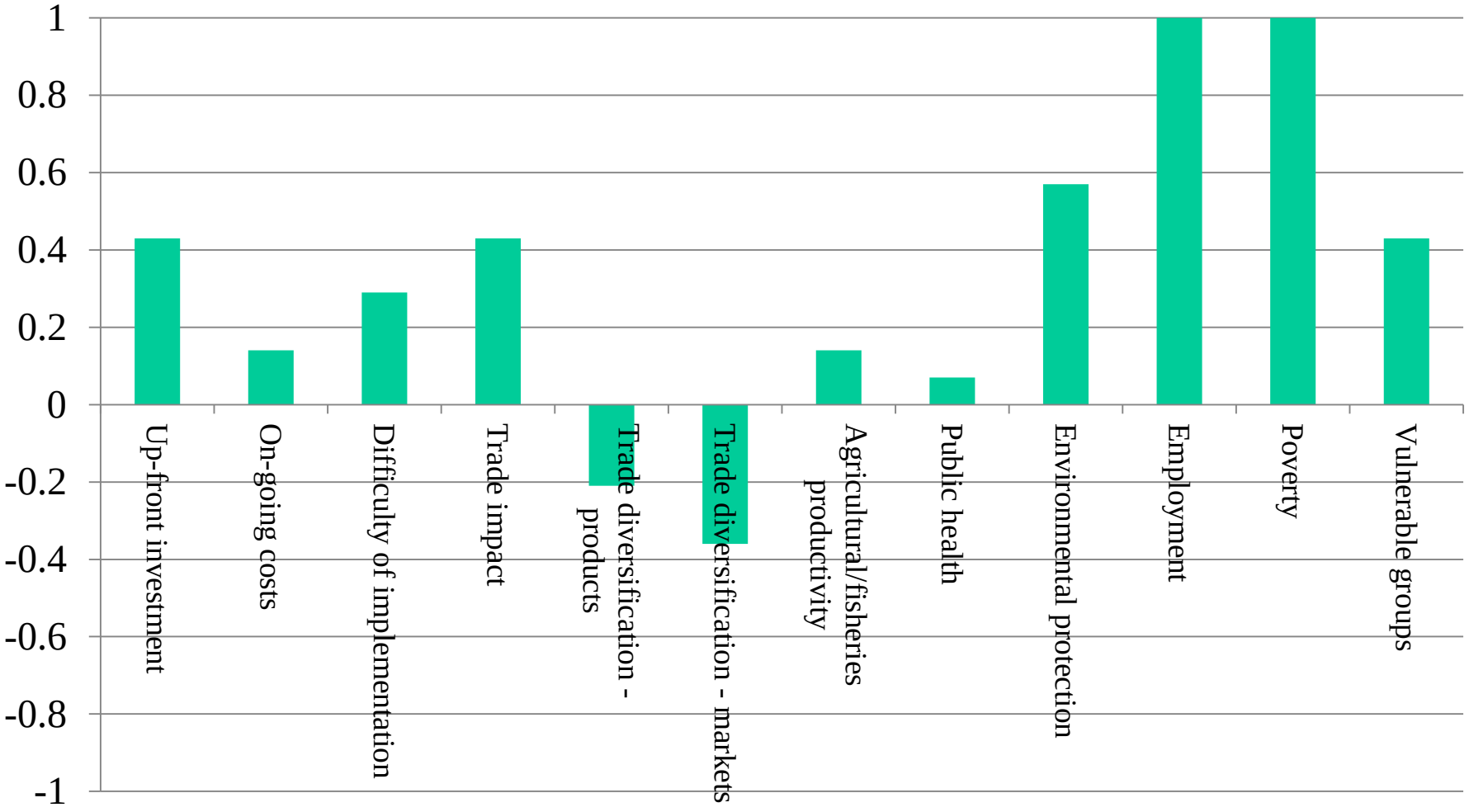
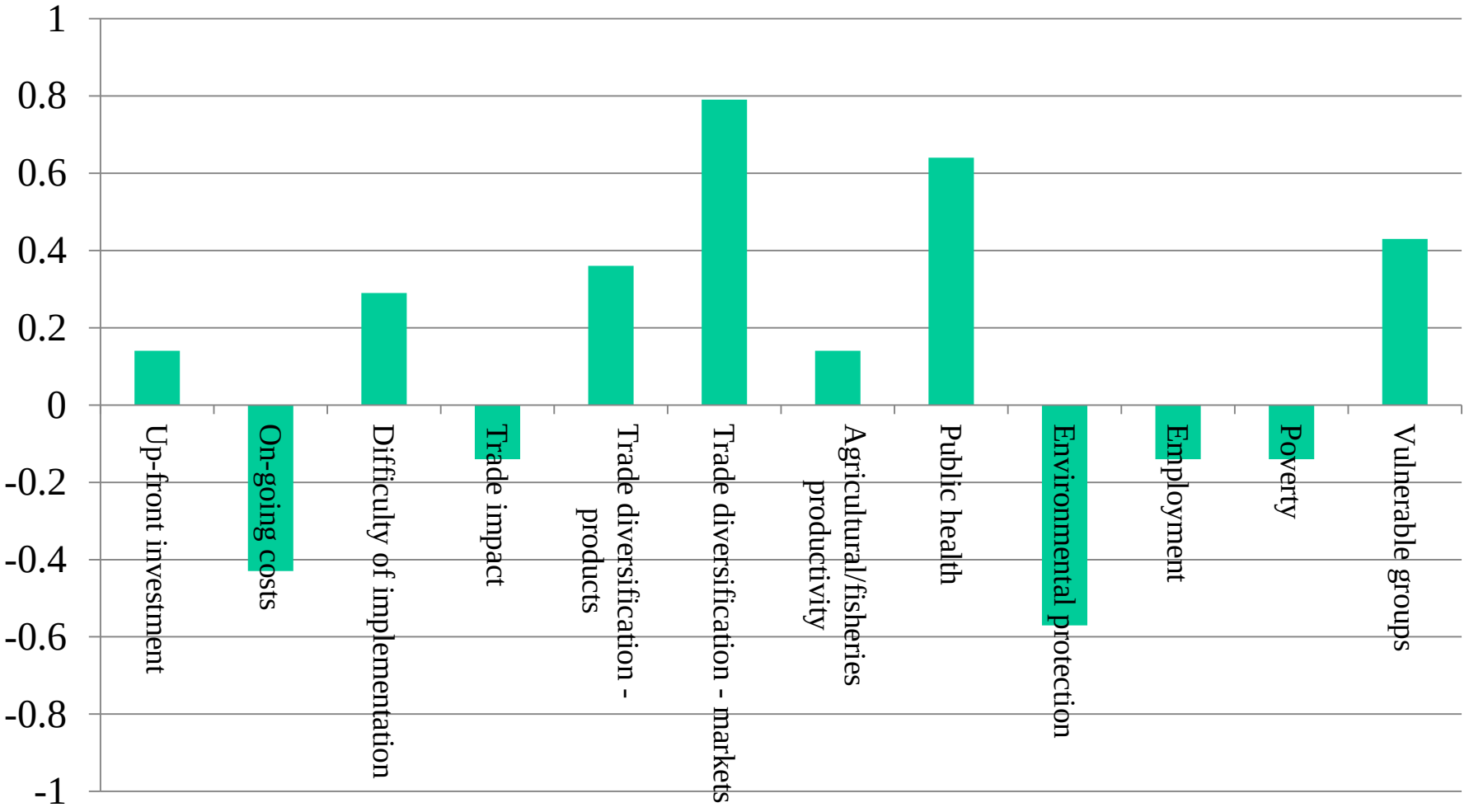
Belize Prioritisation - Baseline model



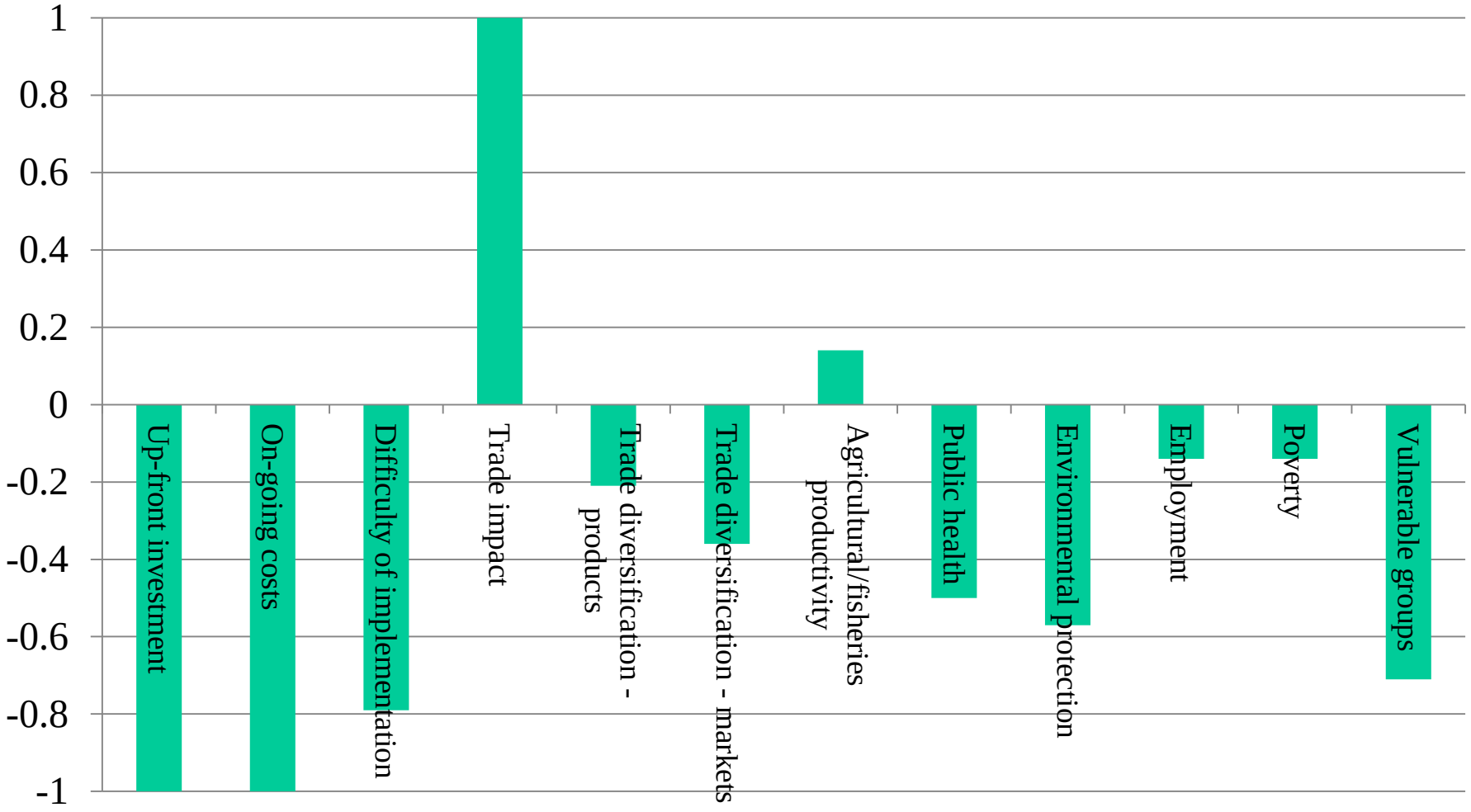
Decision criteria scores – food safety controls for papaya exports



Decision criteria scores – animal health and hygiene controls for chicken exports



Decision criteria scores – animal health controls for live cattle exports



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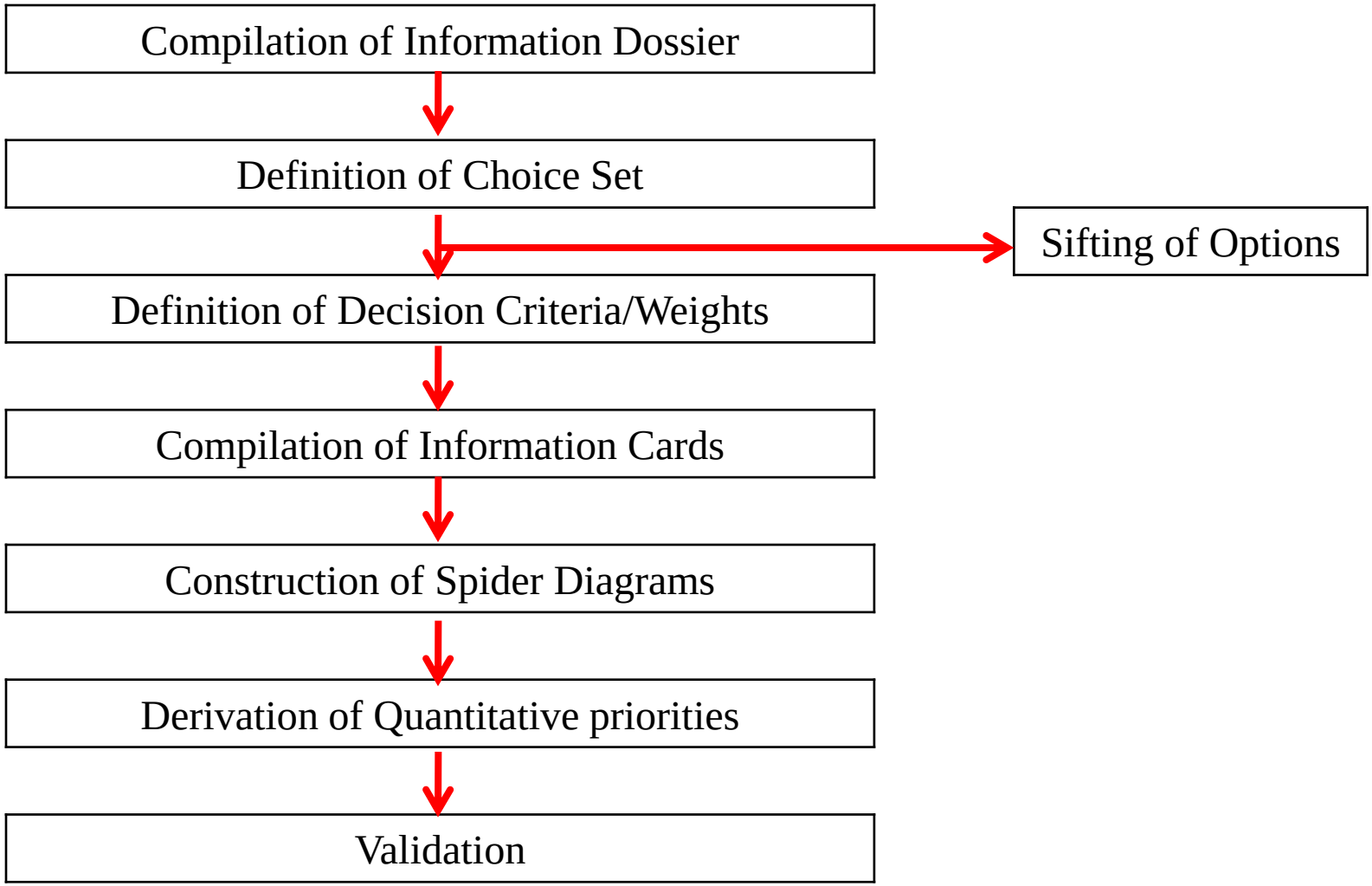
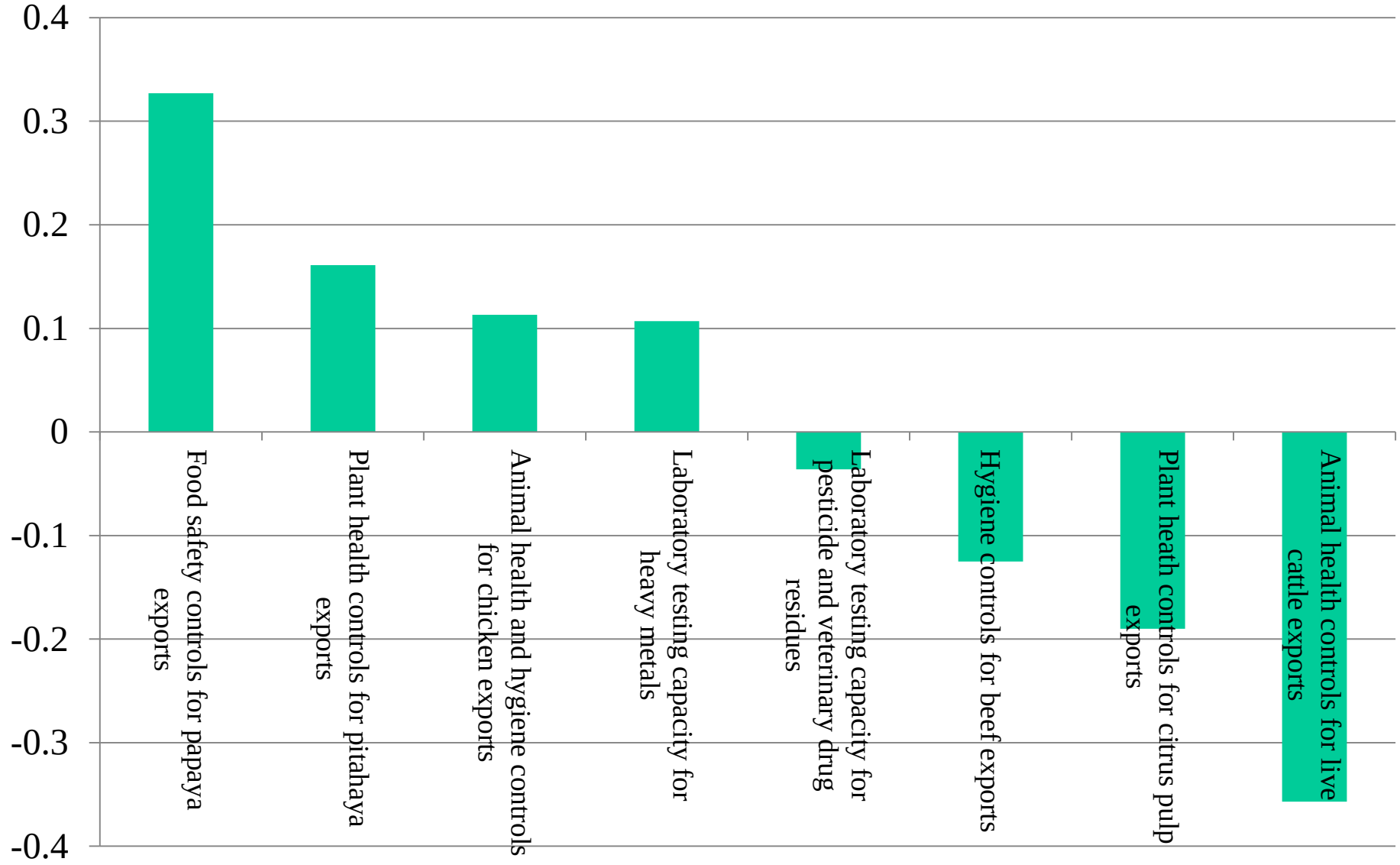


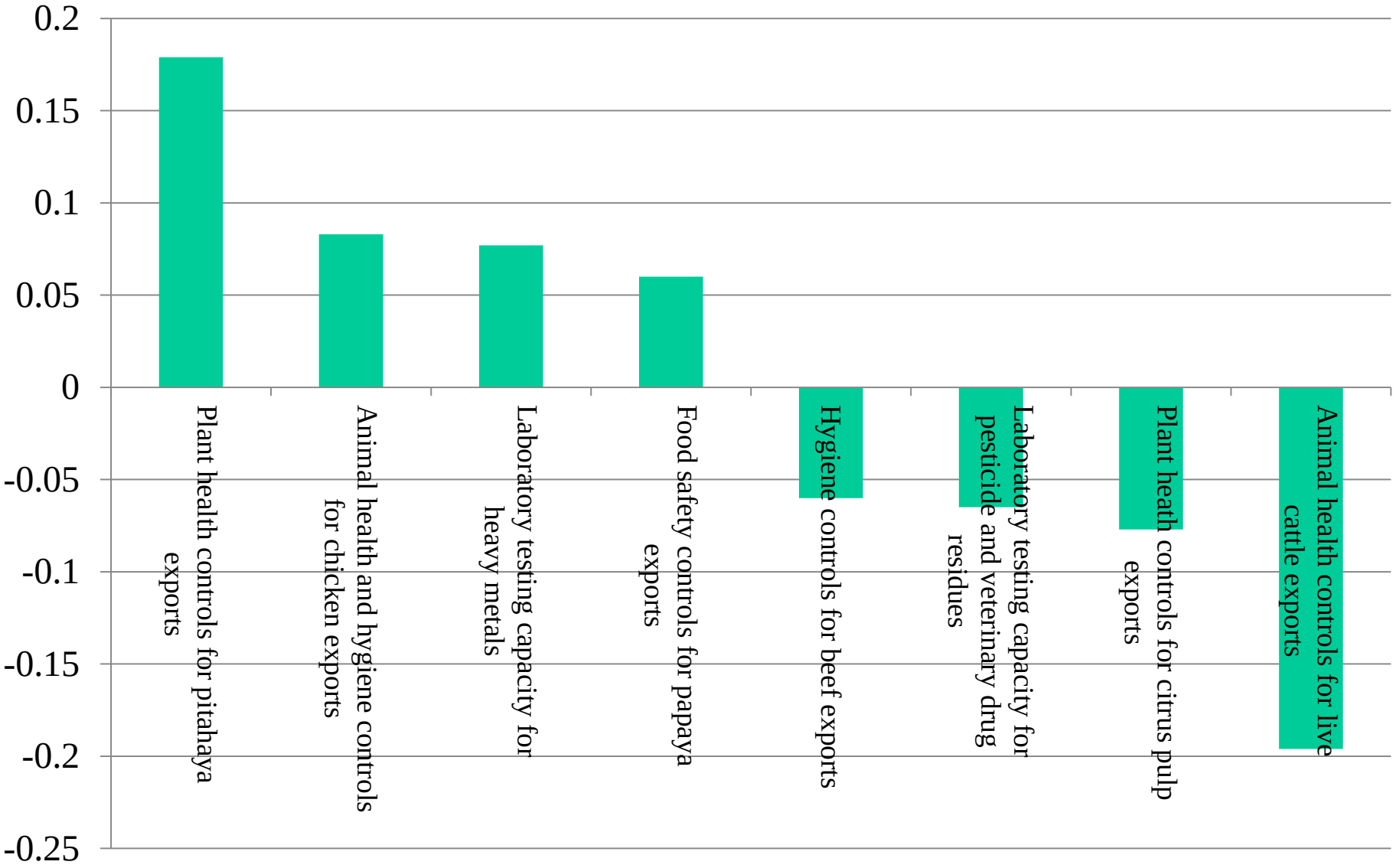
Validation process

- Aims to assess robustness and acceptability of derived priorities
- Sensitivity analysis:
  - Decision weights
  - Decision criteria
  - Decision criteria measures
- Stakeholder consultation:
  - Dissemination
  - Workshop

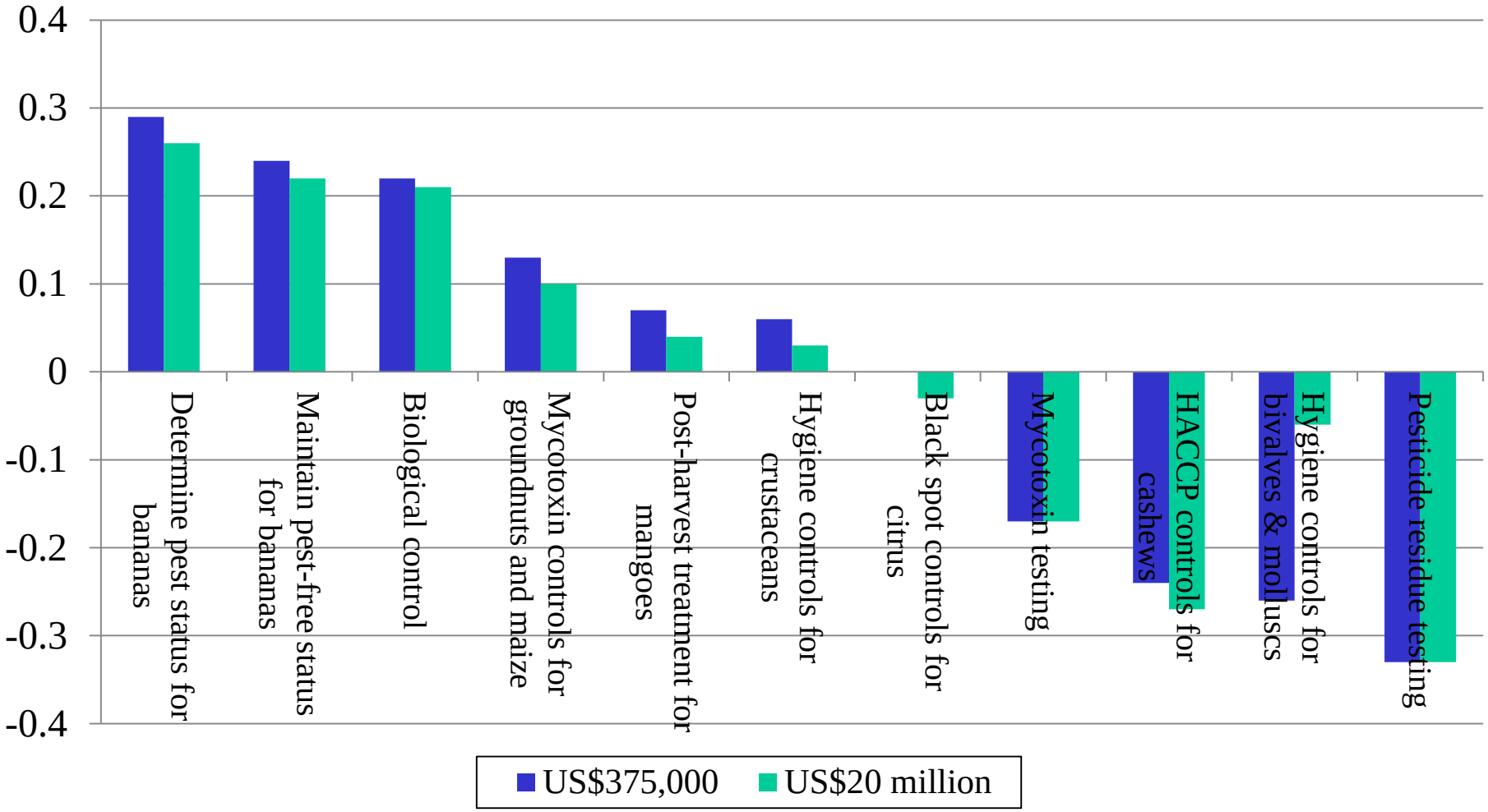
Belize Prioritisation – Equal weights model



Belize Prioritisation – Cost/difficulty of implementation and trade only model



Mozambique baseline model varying trade impact of hygiene controls for bivalves and molluscs



Outputs of the framework

- Key outputs:
  - Choice set
  - Information cards
  - Spider diagrams
  - Formal prioritisation
  - Prioritisation model
- Aim is for the framework to be used on a routine basis:
  - Disagreements over priorities
  - New data
  - New capacity-building needs
  - Capacity-building needs solved

Implications/issues

- Aims to *aid* decision-making and not to be used to *make* decisions
- Has implications for nature of decision-making processes:
  - Structure
  - Transparency
  - Cost
- Confines of the analysis can be adjusted:
  - SPS issues not related to trade
  - Non-SPS issues
- Are complementarities with other assessment frameworks:
  - PVS
  - PCE

Implications/issues

- Need attention and time to collect and synthesise information – avoid ‘rush’ to the software
- Need an inter-disciplinary team:
  - Technical SPS experts
  - Trade expert
  - Applied economist