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A multi-criteria decision-making framework for setting priorities in SPS capacity-building

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Structure

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

Background

- Many countries face challenges complying with SPS measures in international trade
- SPS capacity-building needs are often substantial
- Challenges establishing priorities in face of resource constraints
- Process of priority-setting often lacks coherence and transparency
- Efforts to develop more rigorous framework for setting priorities

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

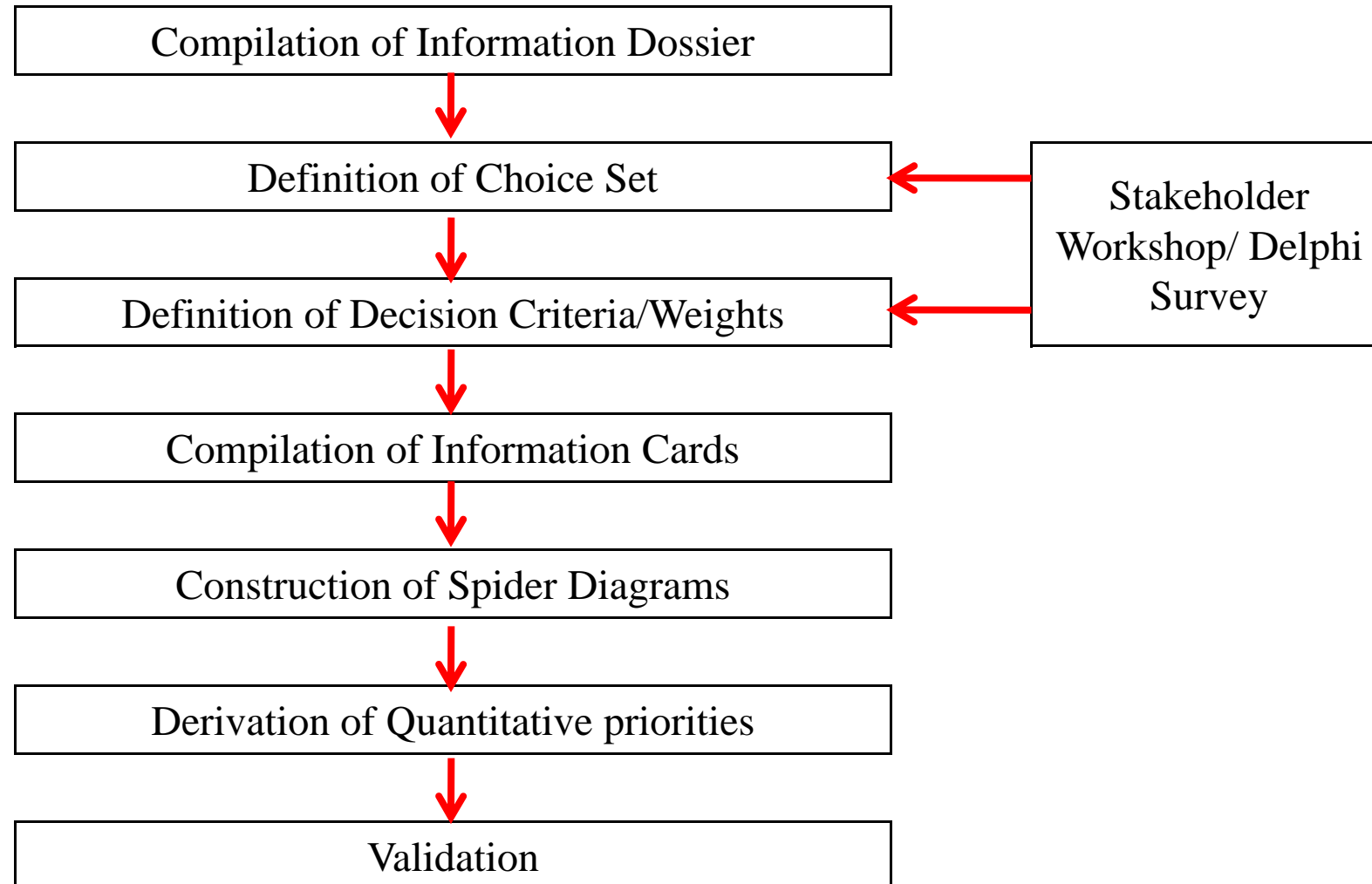
Nature of the framework

- 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

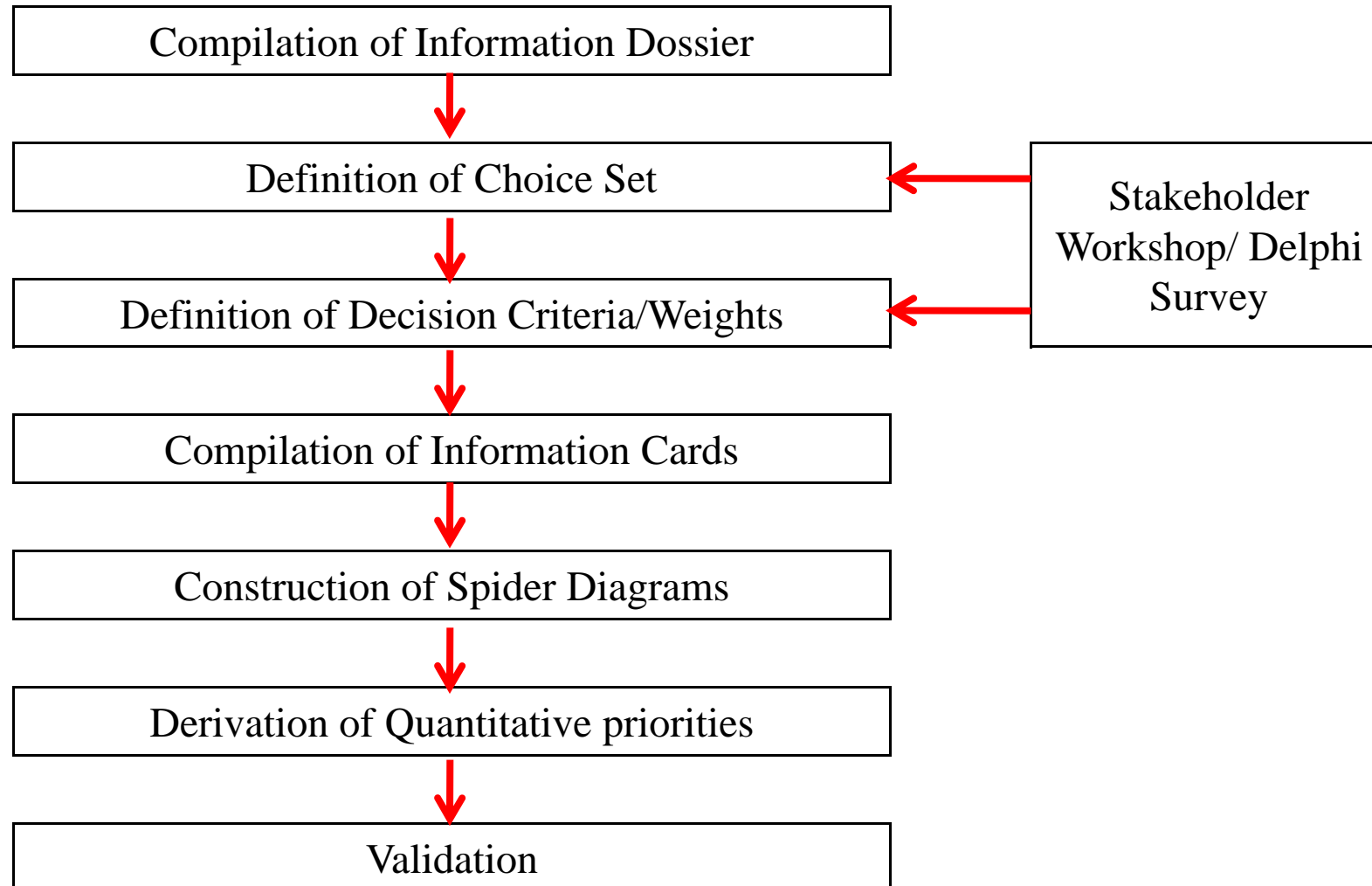
Compilation of information dossier

- Consists of plausible indicators of weaknesses in SPS capacity
- 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
- Important to use triangulation

Possible SPS capacity indicators

Type	Examples
Capacity-based	Formal capacity evaluations and benchmarking <i>Ad hoc</i> 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 <i>Ad hoc</i> problem reports/questionnaires

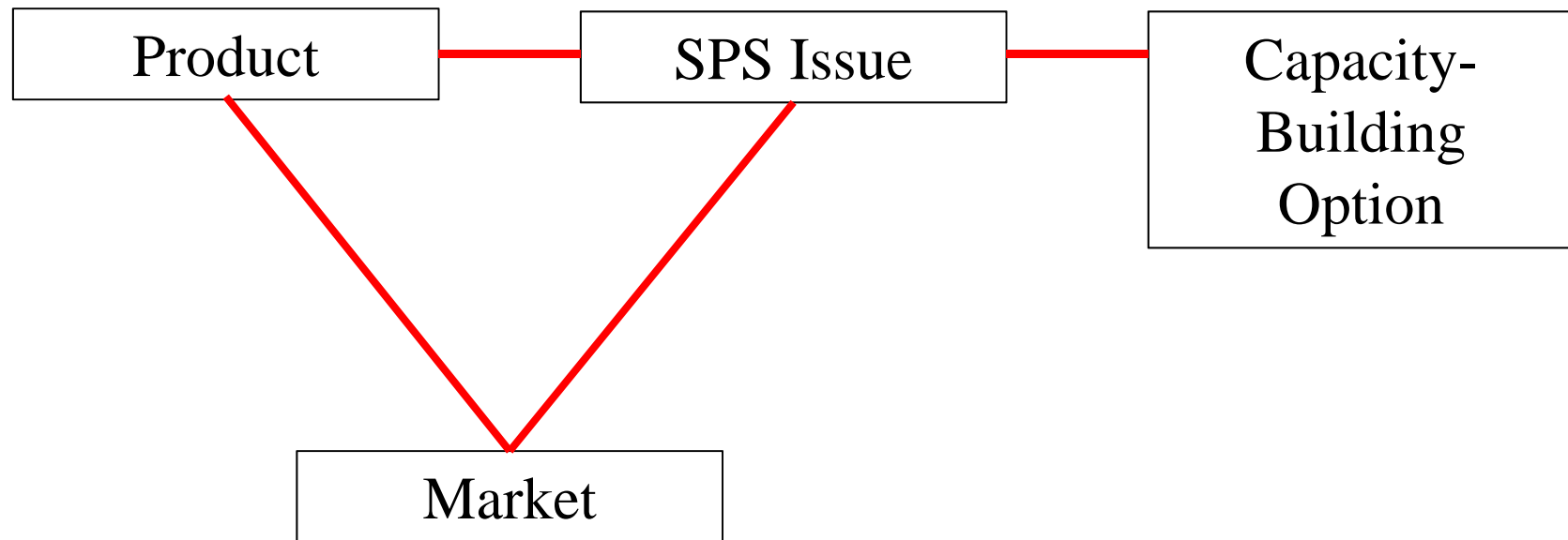
Stages in prioritisation process

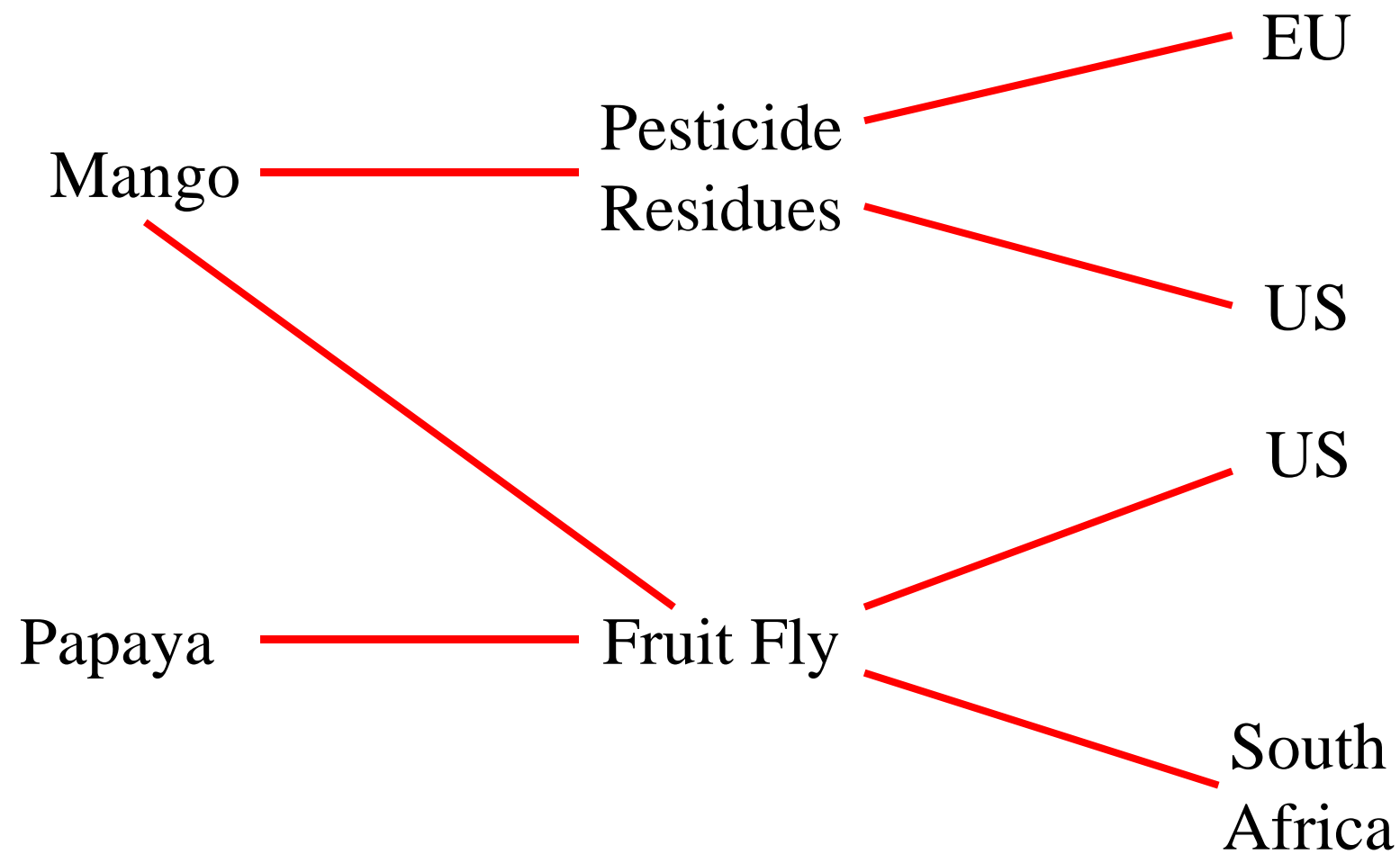


Definition of choice set

- 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





1

Mango

Pesticide
Residues

EU

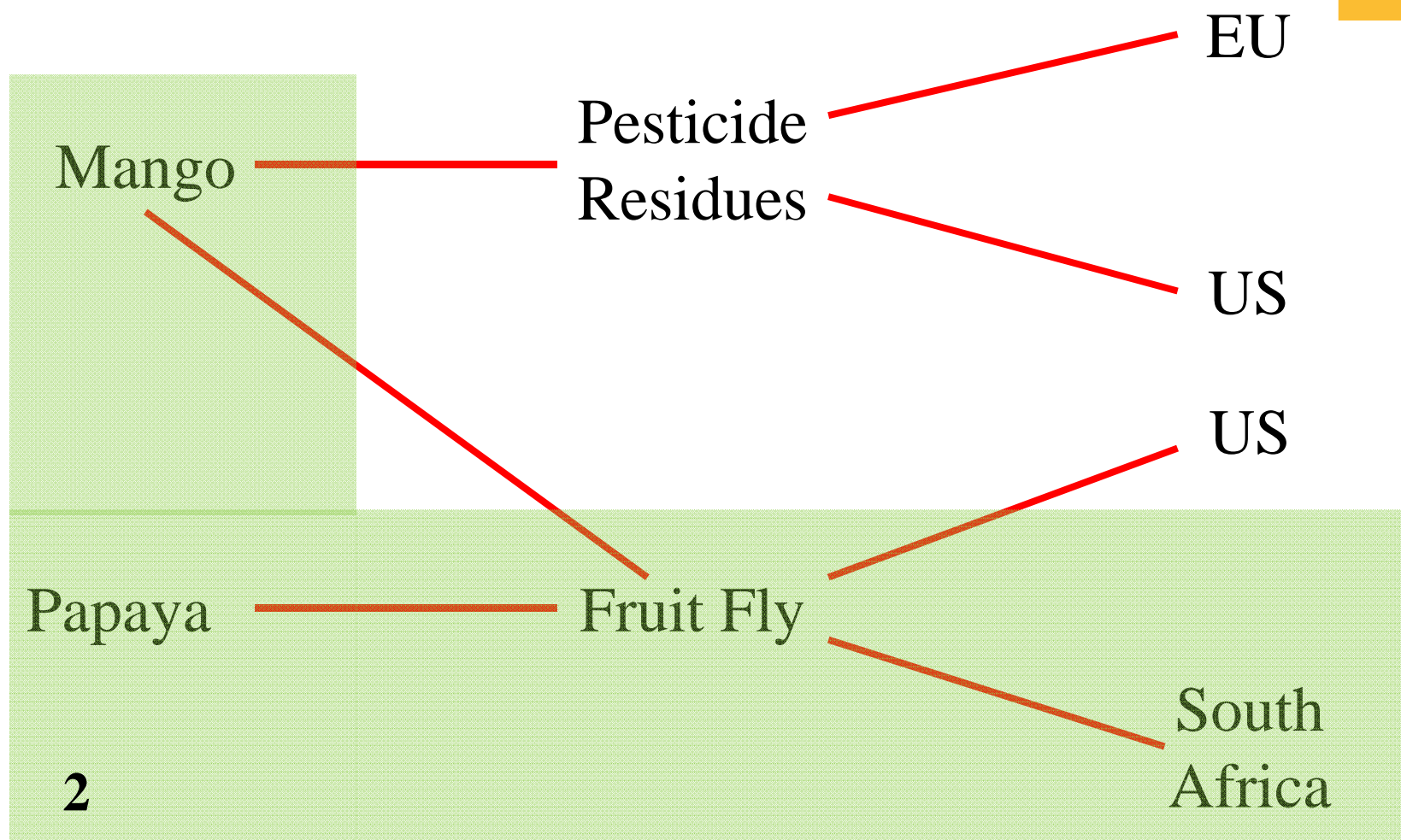
US

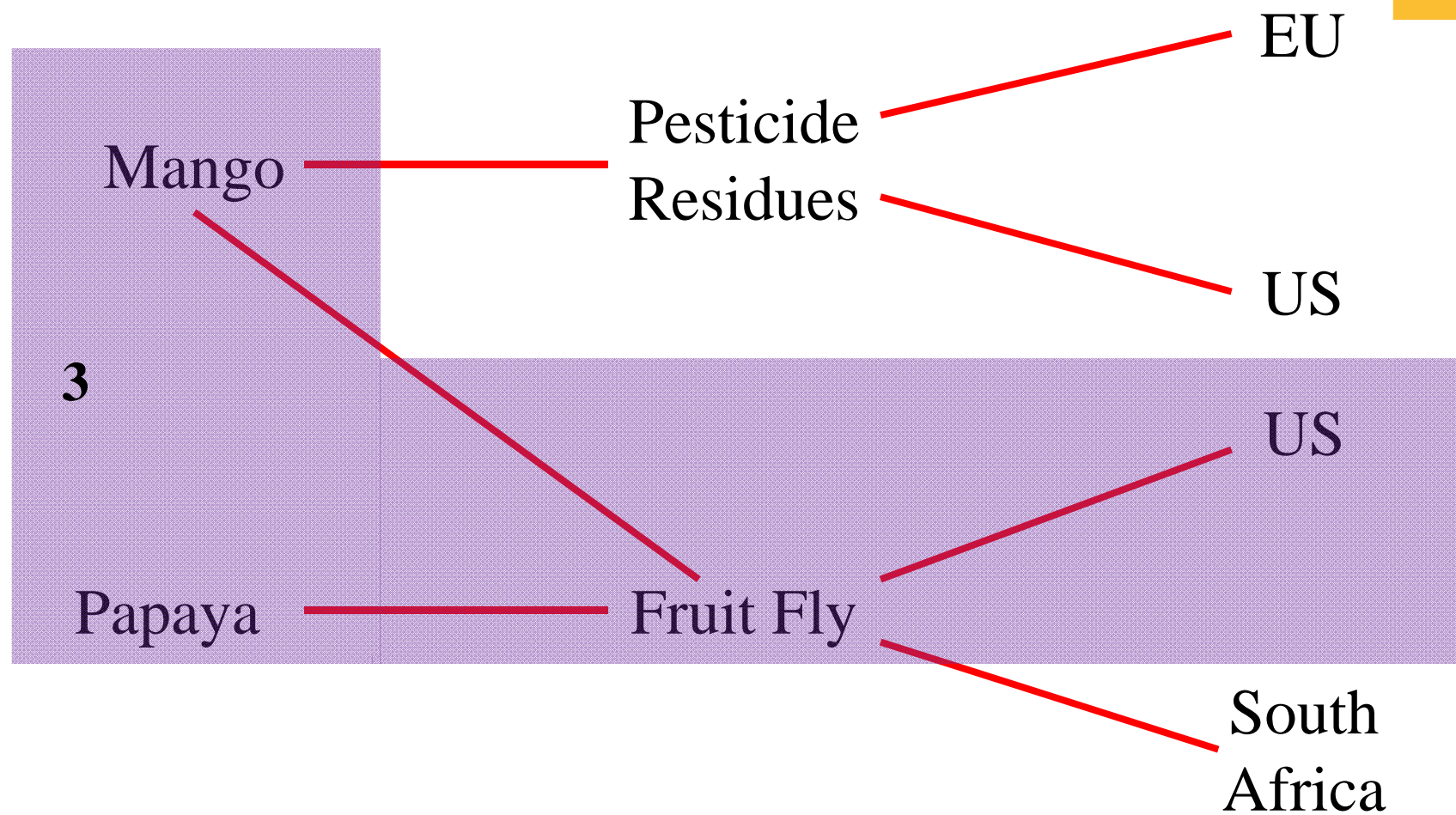
Papaya

Fruit Fly

US

South
Africa





Eliciting the choice set

- Approaches:
 - Nominal group technique workshop
 - Delphi survey
- Procedure:
 - Private elicitation
 - Feedback
 - Development of consensus
- Guiding principles:
 - Inclusiveness
 - Transparency
 - Practicality
 - Cost/time

‘Sifting’ the choice set

- Does the option relate to a current/potential and substantive compliance problem?
- Is the option economically viable?
- Are the sectors concerned and the level of existing/potential exports substantive?
- Are there other SPS capacity gaps that also need to be fixed?

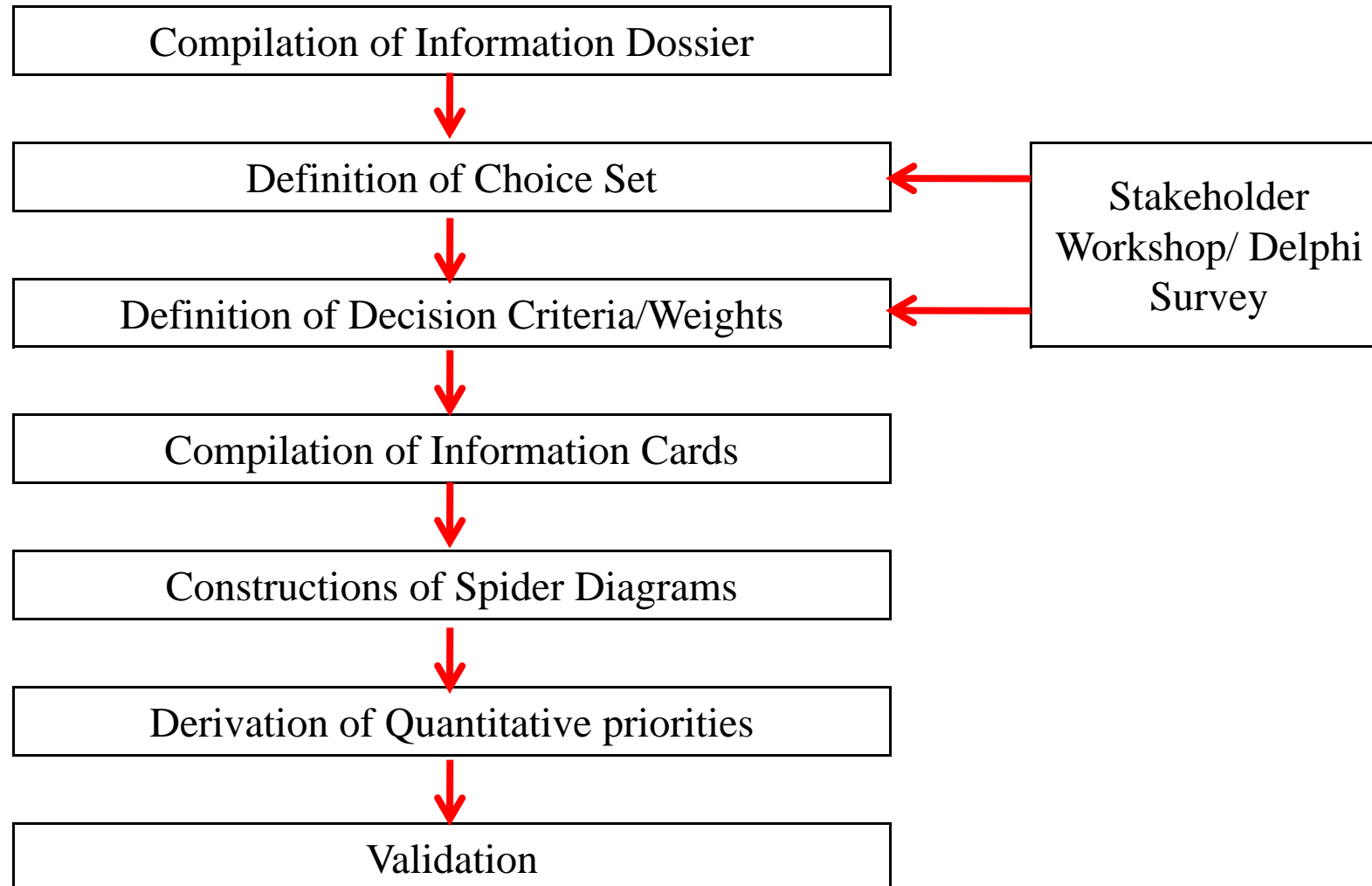
Zambia capacity-building options: *final selection*

- Pest controls on honey exports **South Africa**
- Aflatoxin testing for groundnuts and maize **Regional & EU**
- Pest status of bananas **Regional**
- Pest risk assessment and fresh vegetable exports **USA/South Africa**
- Pesticide residue testing **EU & Regional**
- Compliance with Codex standards for milk and dairy products
Regional
- Animal health status and beef/maize bran exports **Regional**
- Pest status for maize and bean seeds **Regional**

Zambia capacity-building options: *excluded*

- Antibiotic controls and honey exports **International**
- Antibiotic testing and crocodile meat **International**
- Animal disease controls and day-old chicks **Regional**
- Certification of wooden packaging **International**
- Bananas and plant pests **International**
- Plant pest controls and fresh vegetable and cut flower exports **EU**
- Imports of potentially invasive plants **Regional**
- Plant health controls and pot plants
- Plant pest controls and banana planting materials **Regional**

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:
 - Nominal group technique workshop
 - Delphi survey

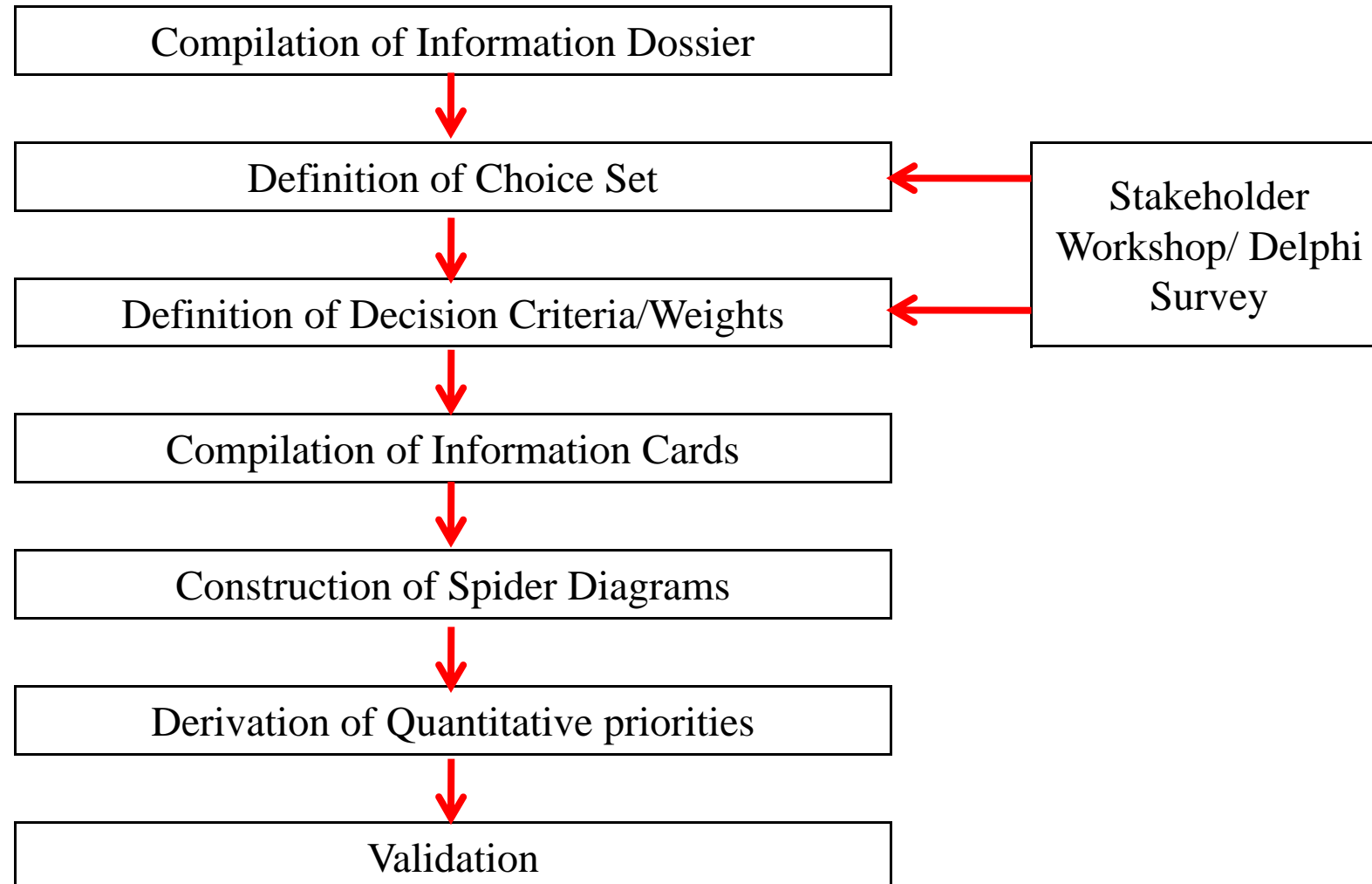
Potential decision criteria

Objective	Decision Criteria
Cost	Up-front investment
	On-going costs
Trade impact	Change in absolute value of exports/export losses avoided
Domestic agri-food impact	Impact on agricultural/fisheries productivity
	Impact on public health
	Impact on local environmental protection
Social impacts	Impact on poverty
	Impact on vulnerable groups

Mozambique: decision criteria and weights

Criterion	Weight
Cost	
Up-front investment	13%
On-going costs	10%
Trade impact	
Change in value of exports	14%
Domestic agri-food impacts	
Agricultural/fisheries productivity	21%
Domestic public health	14%
Environmental protection	10%
Social impacts	
Poverty impacts	10%
Impact on vulnerable groups: <ul style="list-style-type: none"> • Women • Children • Vulnerable areas • Smallholders/Artisanal fishers 	8%

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 uncertainties with data
 - References and sources
- ‘Living’ documents
- Provide measures of impact of each capacity-building option compared to a ‘calculation base’

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 types 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

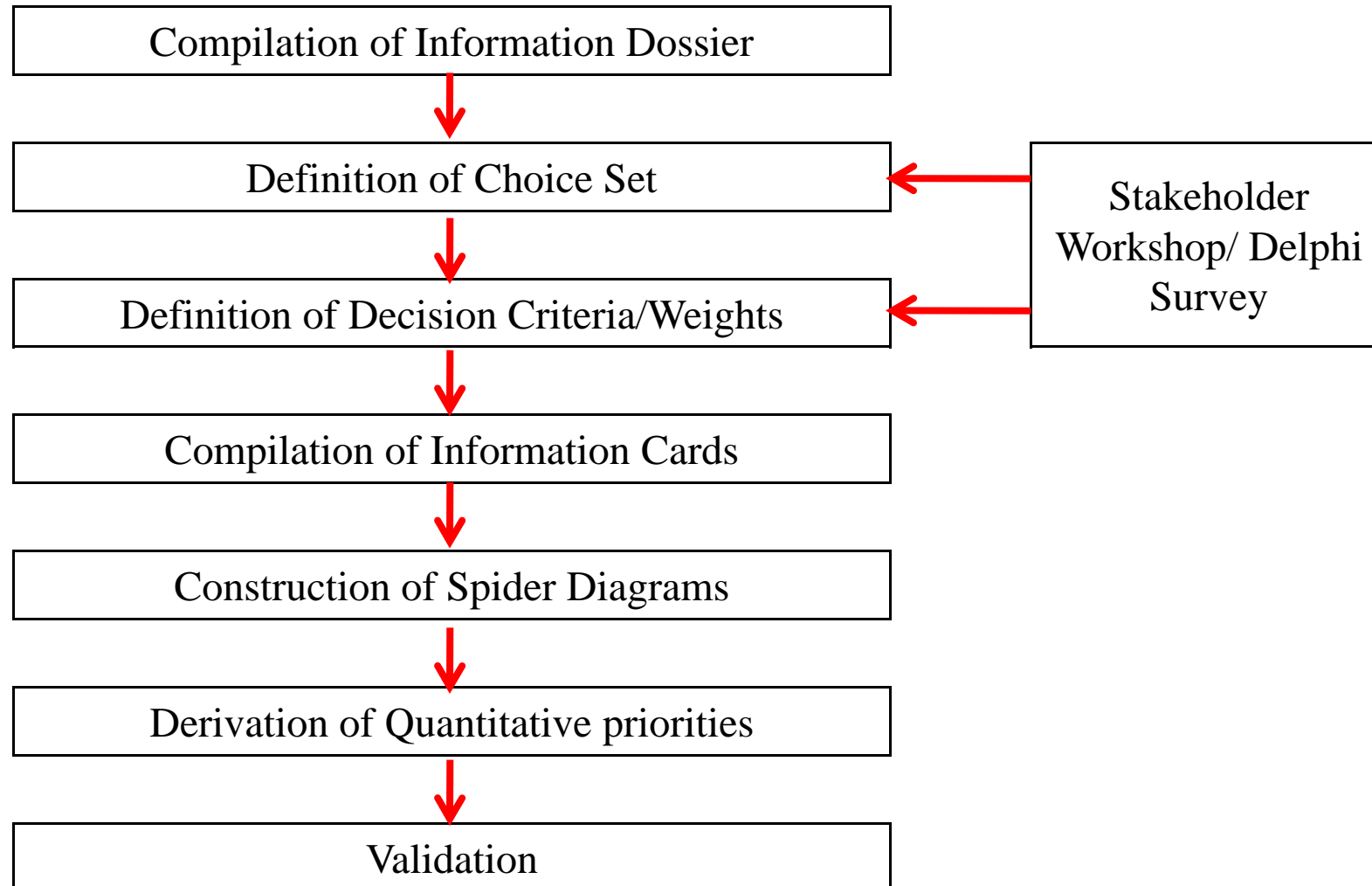
Measurement of decision criteria: Mozambique and Zambia

Criterion	Measurement
Cost	
Up-front investment	Absolute value (\$)
On-going costs	% value of exports
Trade impact	
Absolute change in value of exports	Absolute value (2015)
Domestic agri-food impacts	
Agricultural/fisheries productivity	Large negative (-2) to Large positive (+2)
Domestic public health	
Environmental protection	
Social impacts	
Poverty impacts	Large negative (-2) to Large positive (+2)
Impact on vulnerable groups: <ul style="list-style-type: none">• Women• Children• Vulnerable areas• Smallholders/Artisanal fishers	Large negative (-2) to Large positive (+2) for each group aggregated into single measure

Capacity-building option profiles – Pesticide residue testing in Mozambique

Decision Criterion	Value	Details	Confidence
Cost			
Up-front investment	\$300,000	Estimated cost of pesticide laboratory in 2005 is \$200,000. Updated to 2010 at 8% gives approximately \$300,000.	Medium
On-going cost	0.1%	Estimated cost of maintaining laboratory accreditation \$17,000. Estimated value of exports of bananas and mangoes in 2015 is \$15,167,000, on basis of trend over period 2001 to 2010. Thus, on-going costs are around 0.1% of the value of exports. No significant difference in unit costs of test between South Africa and new facility in Mozambique.	Medium
Trade impacts			
Change in absolute value of exports	\$0	Exporters already have samples tested in South Africa. No additional exports created.	High
New markets	N	No access to new markets – pesticide testing already undertaken using laboratories in South Africa.	High
Market position	N	No change – pesticide testing already undertaken using laboratories in South Africa.	High
Domestic agri-food impacts			
Agricultural/fisheries productivity	0	No change – pesticide testing already undertaken using laboratories in South Africa.	High
Domestic public health	0	No change – pesticide testing already undertaken using laboratories in South Africa.	High
Environmental protection	0	No change – pesticide testing already undertaken using laboratories in South Africa.	Medium
Social impacts			
Poverty impact	0	Small number of producers. Mainly medium-sized farms.	High
Impact on vulnerable groups	0	Little or no involvement of women (0); Little or no impact on children (0); Production largely in less vulnerable areas (0); Little or no involvement of smallholders/artisanal fishers (0).	High

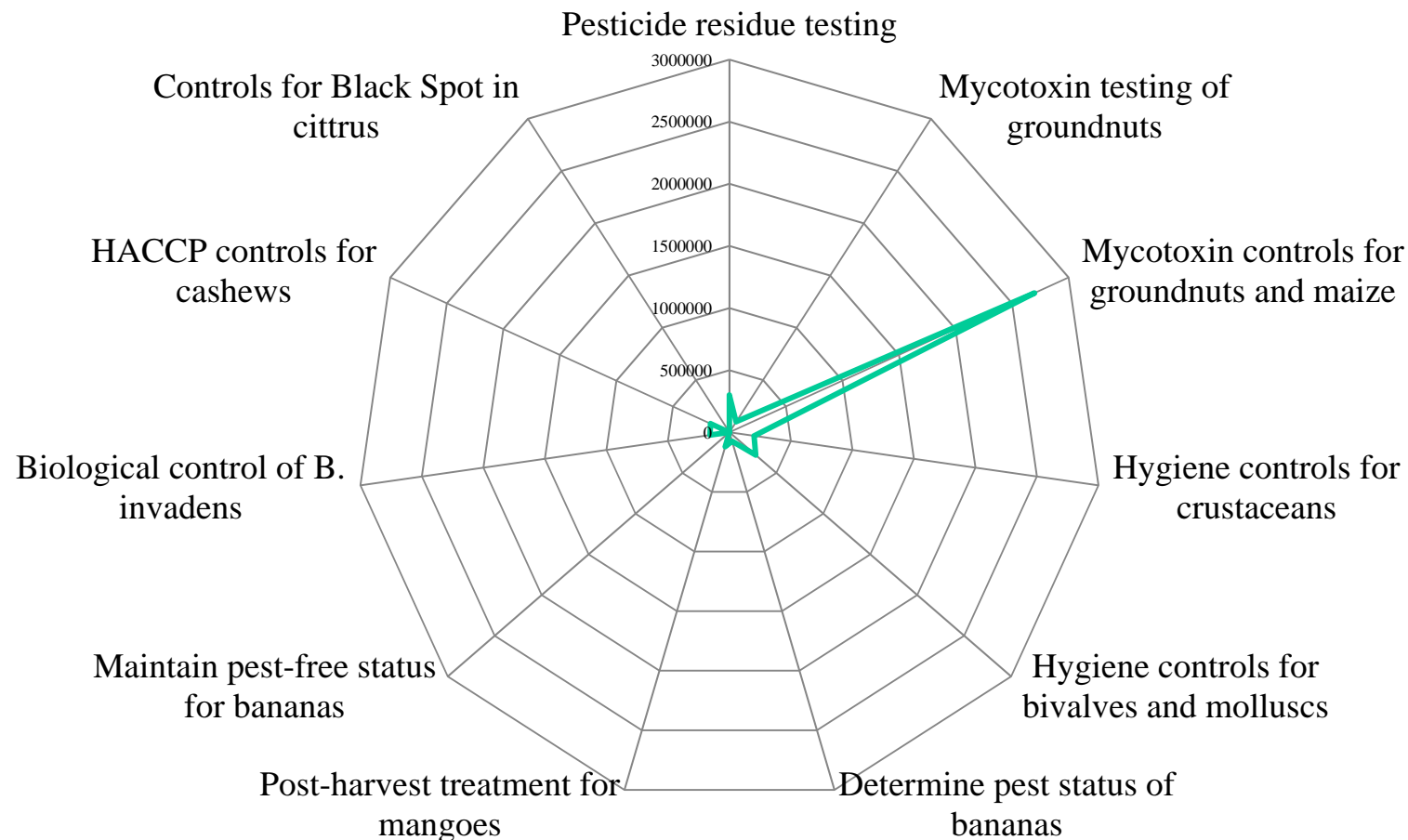
Stages in prioritisation process



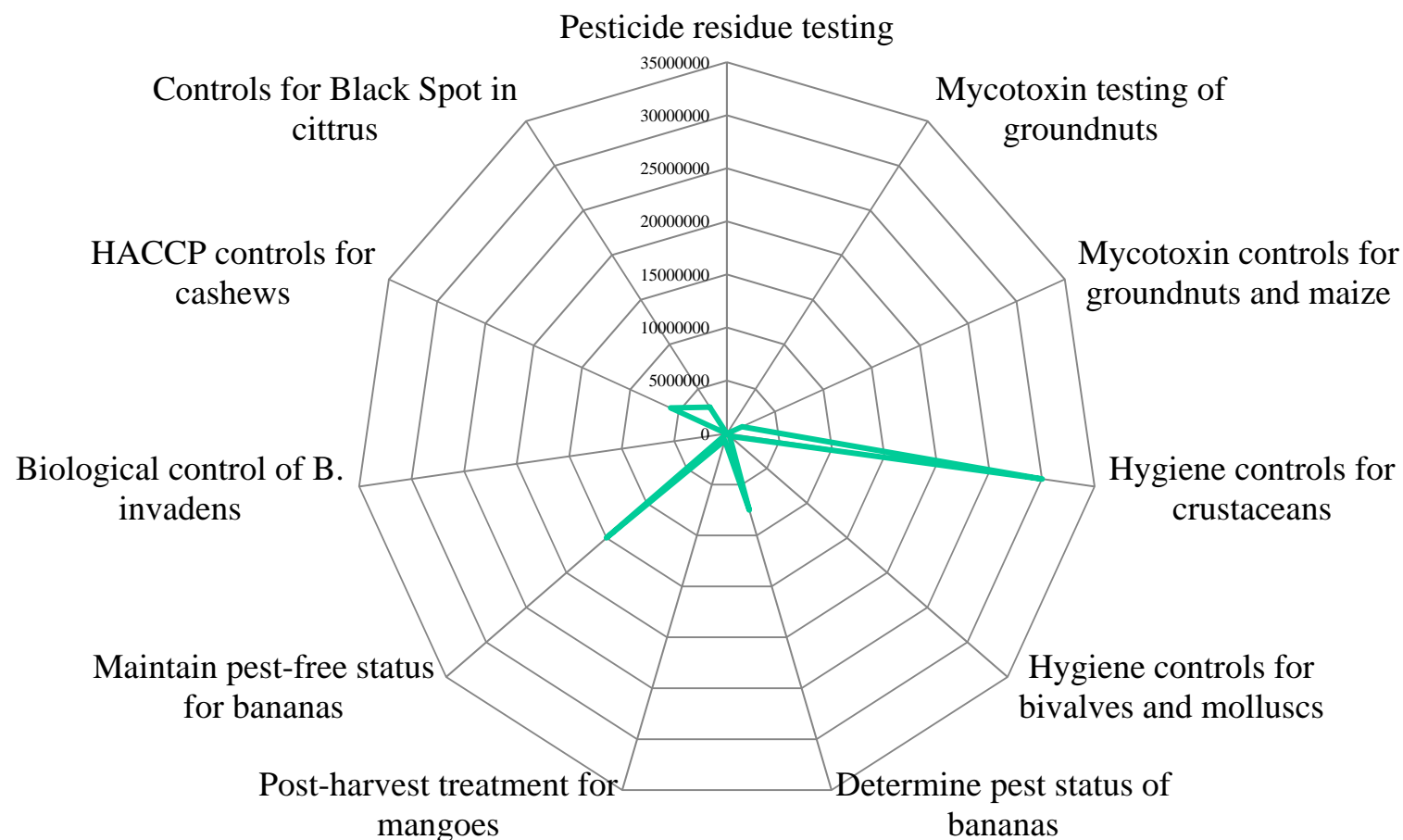
Compilation of spider charts

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

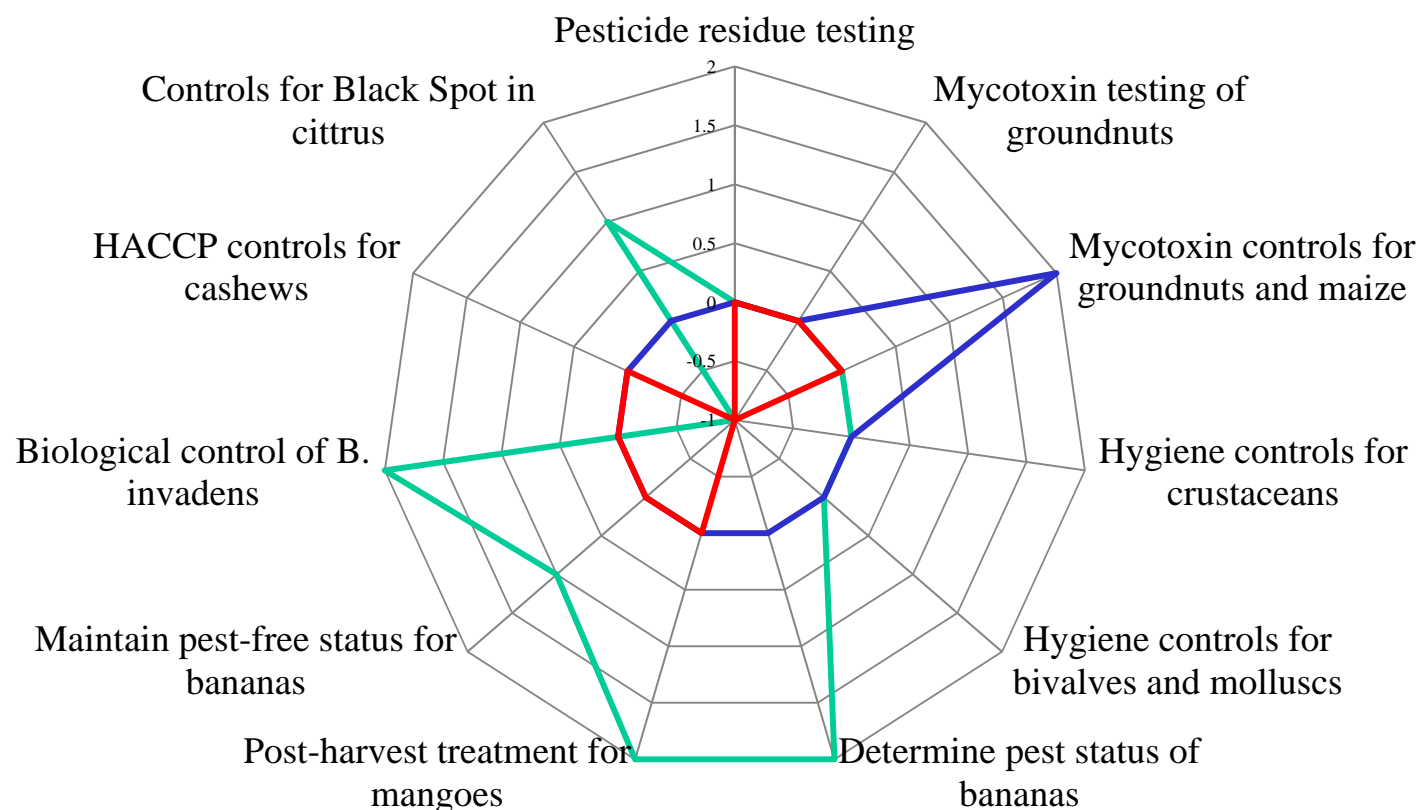
Mozambique decision criteria measures: up-front investment



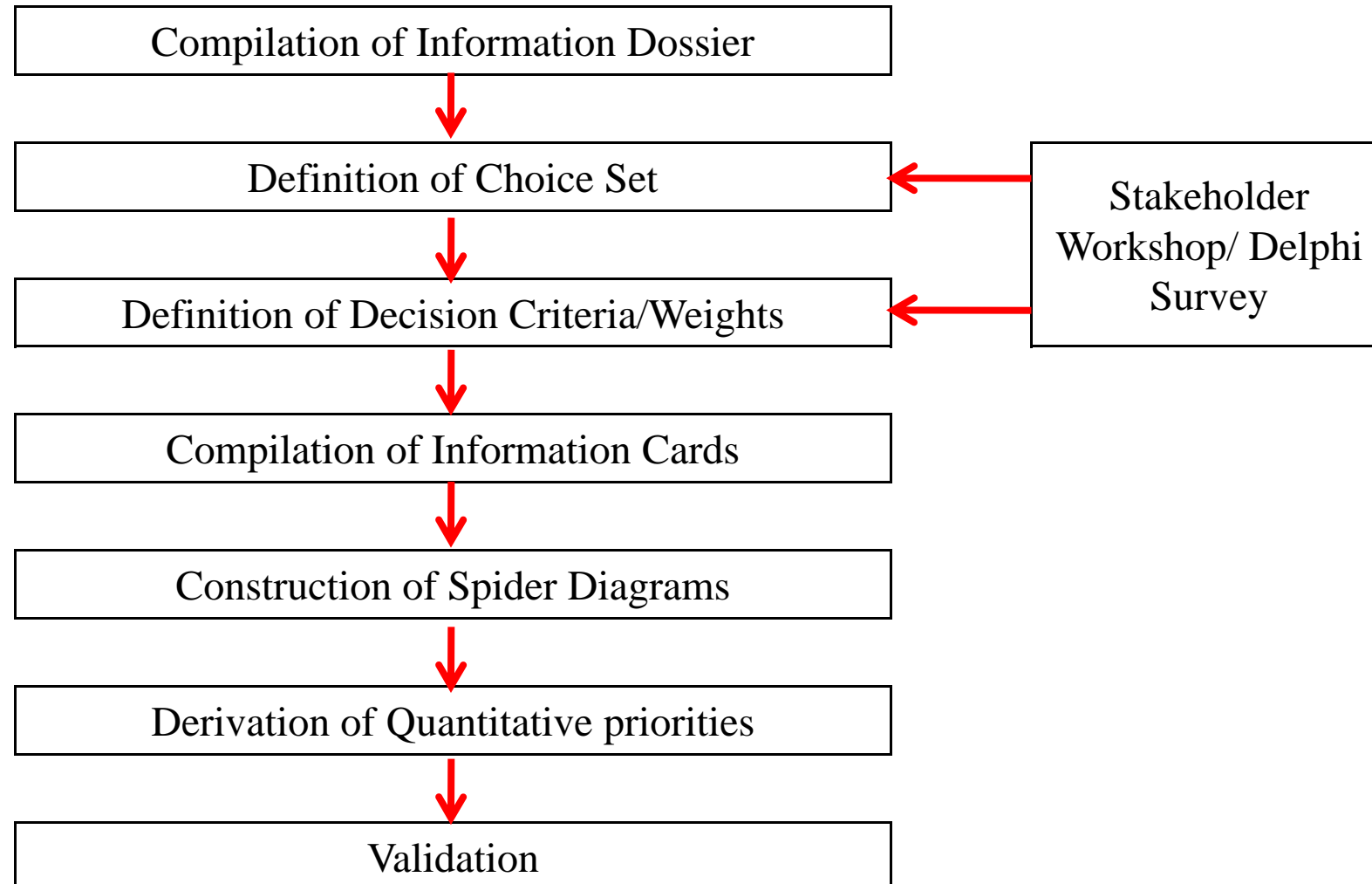
Mozambique decision criteria measures: up-front investment



Mozambique decision criteria measures: domestic agri-food impacts



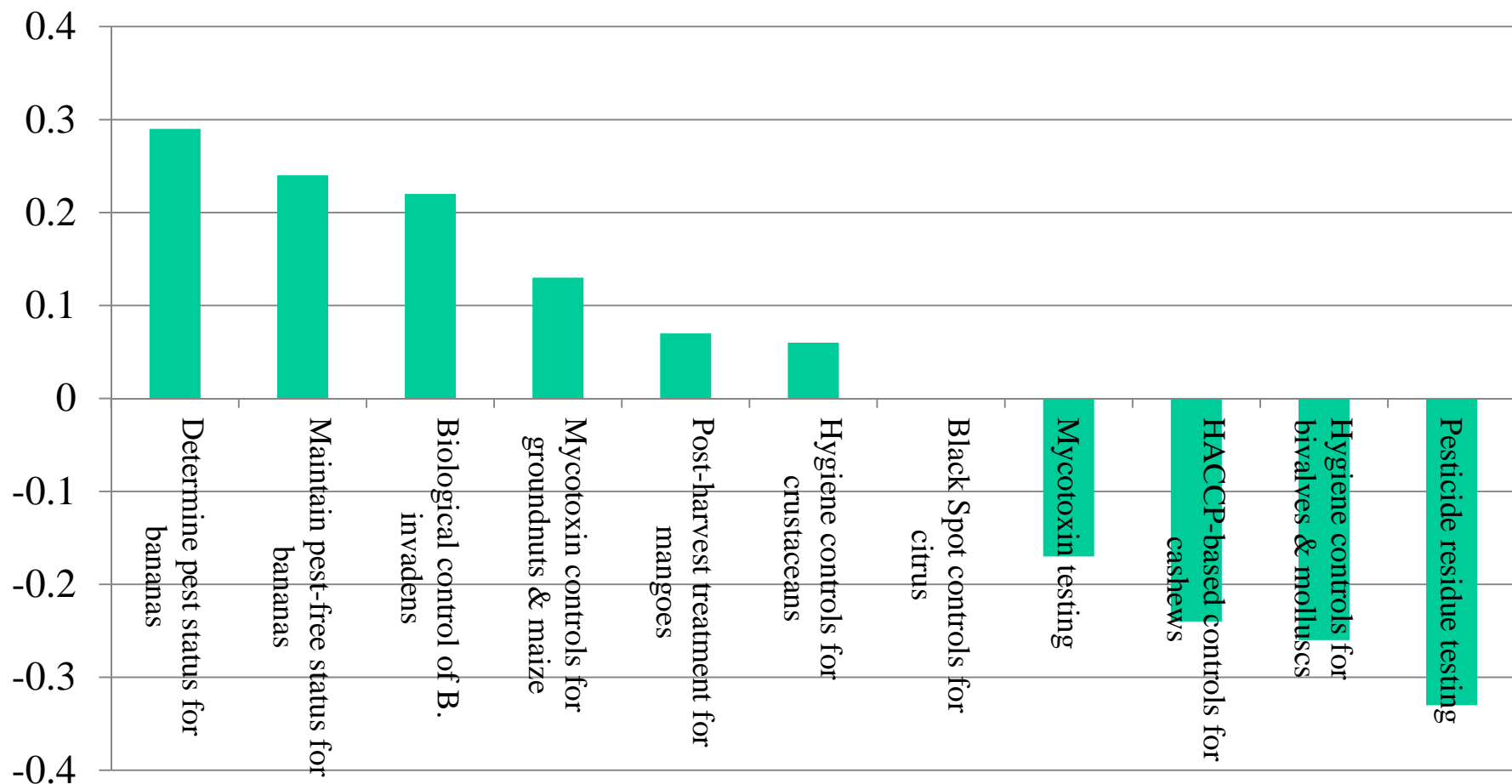
Stages in prioritisation process



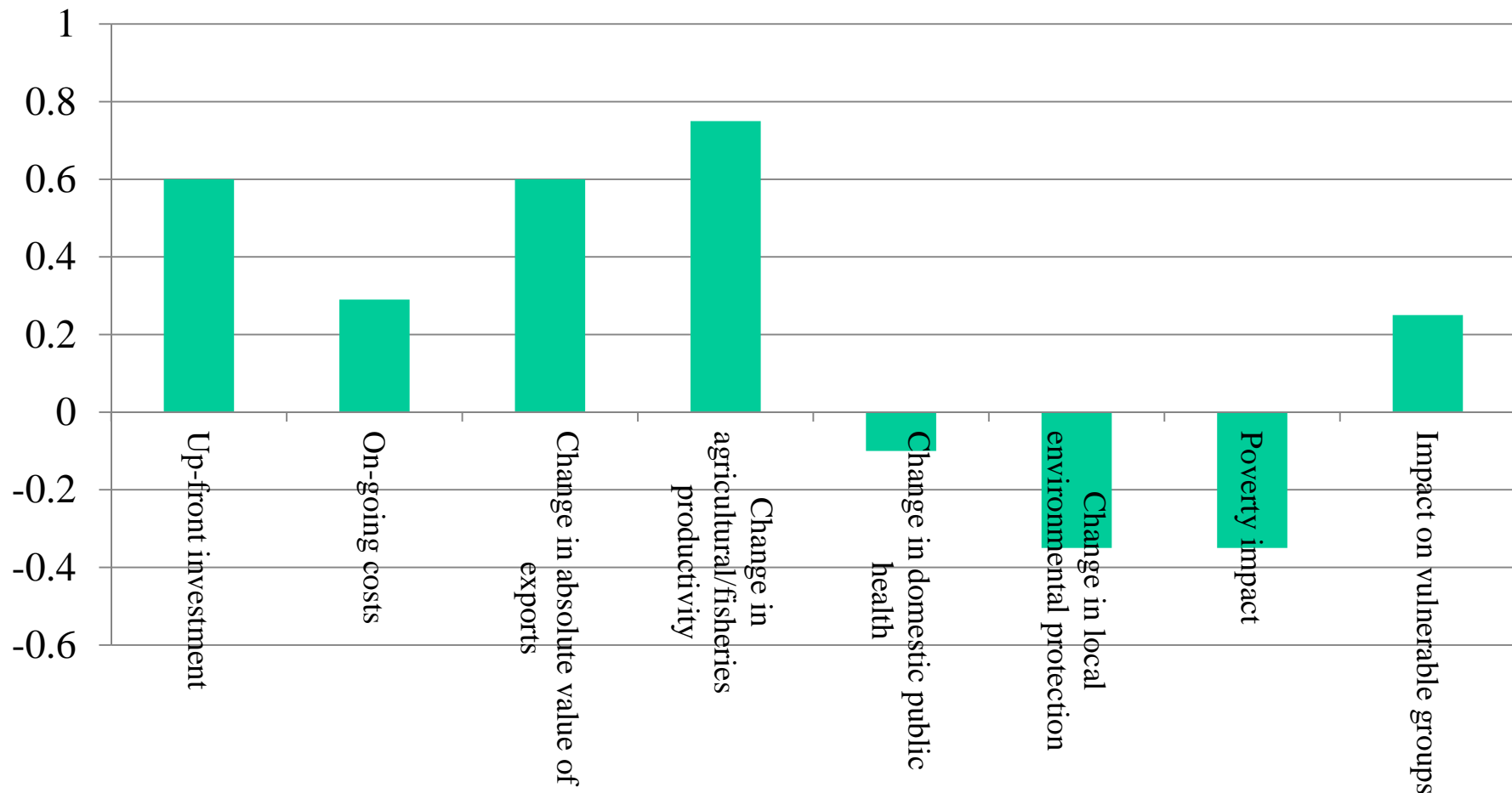
Nature of prioritisation process

- 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

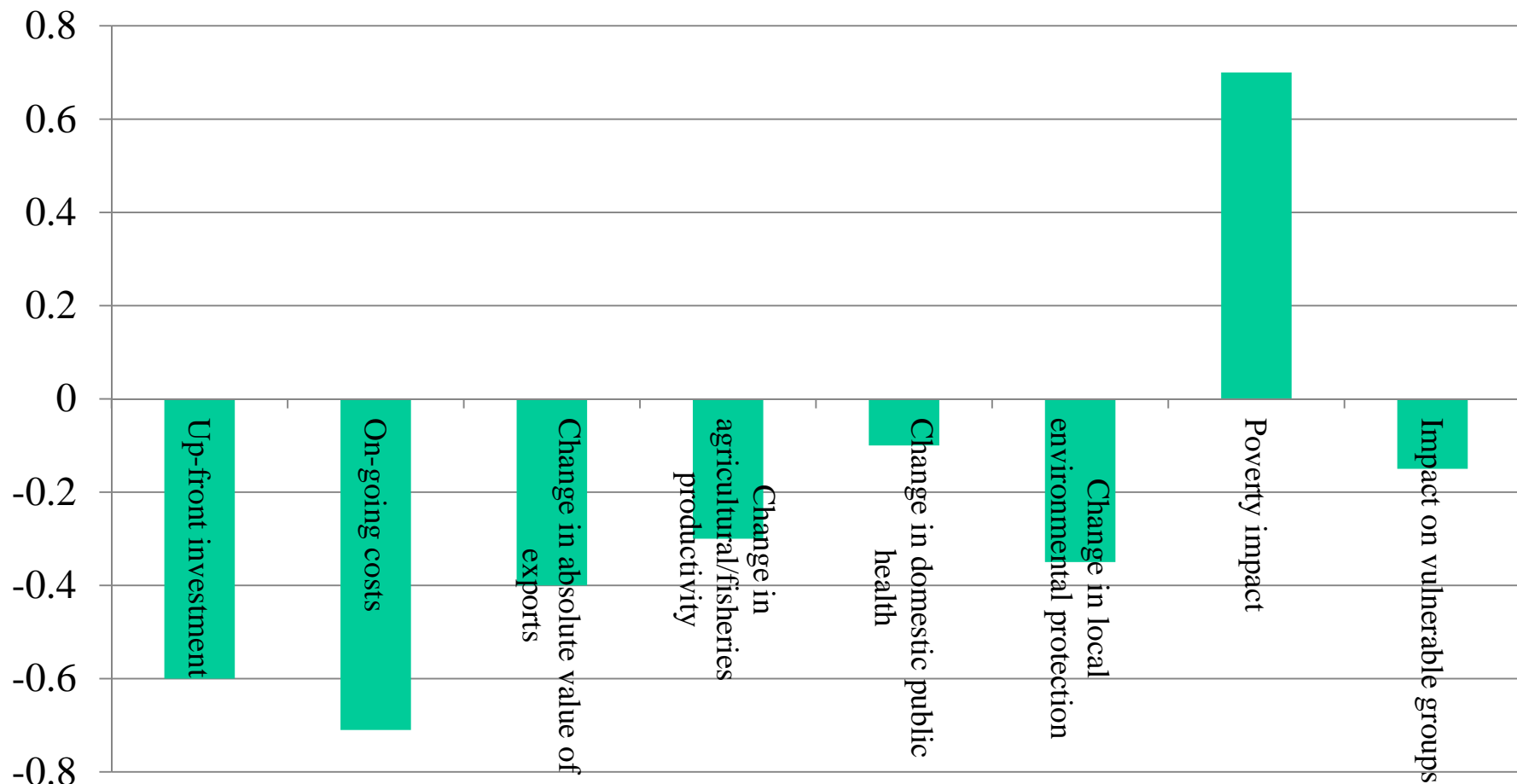
Mozambique baseline model



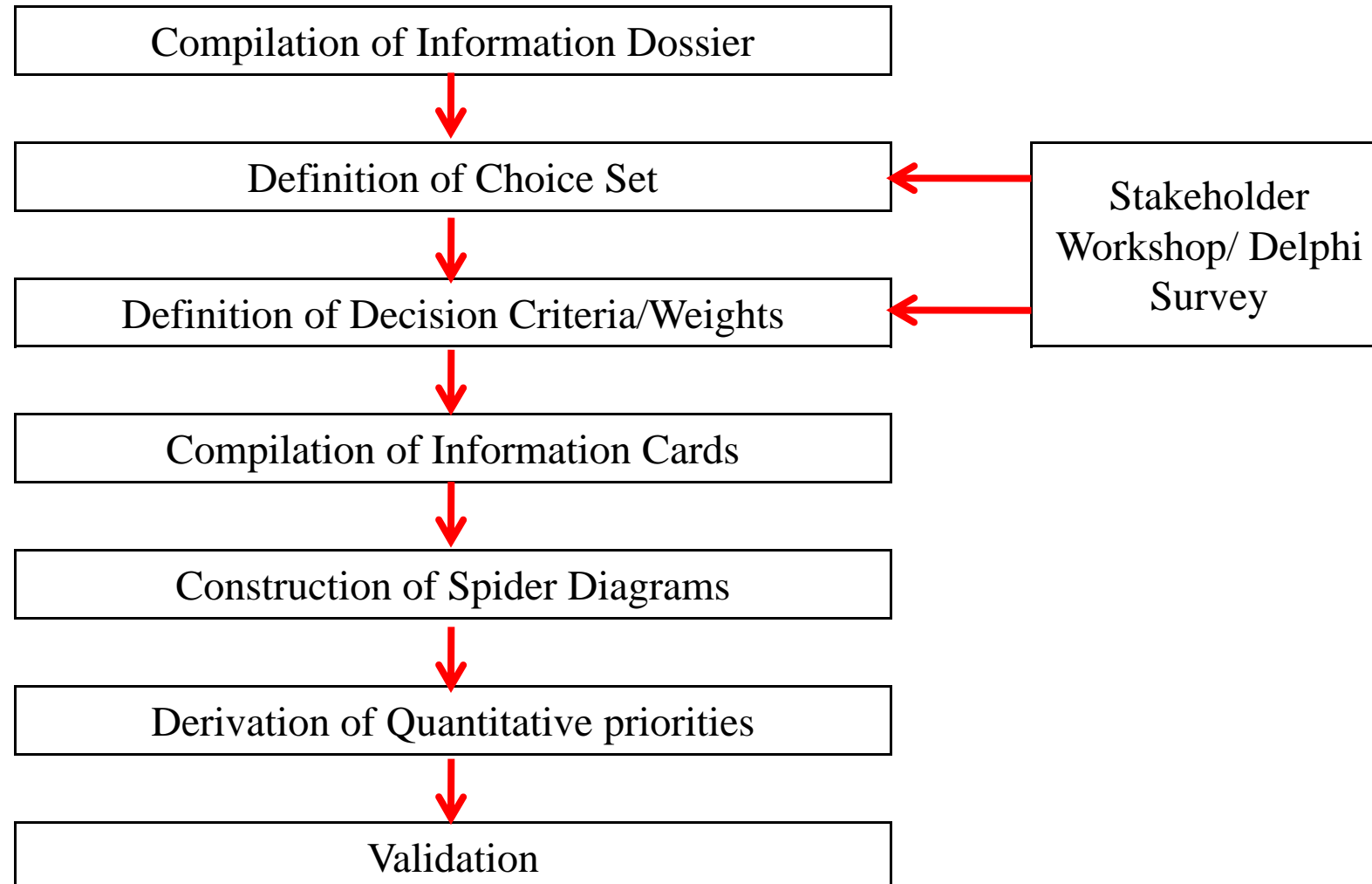
Mozambique decision criteria scores: pests status of bananas



Mozambique decision criteria scores: hygiene controls for bivalves/molluscs



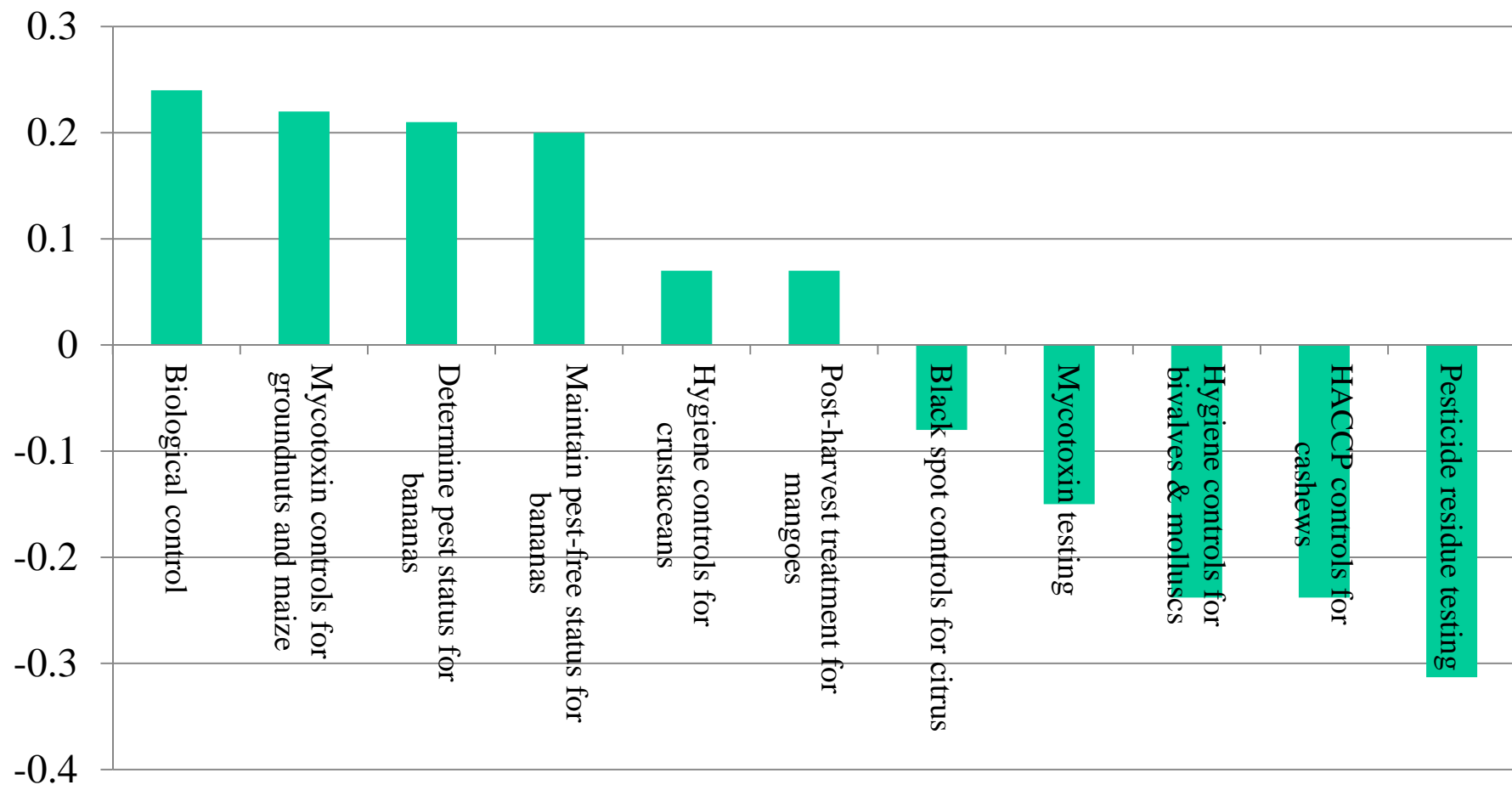
Stages in prioritisation process



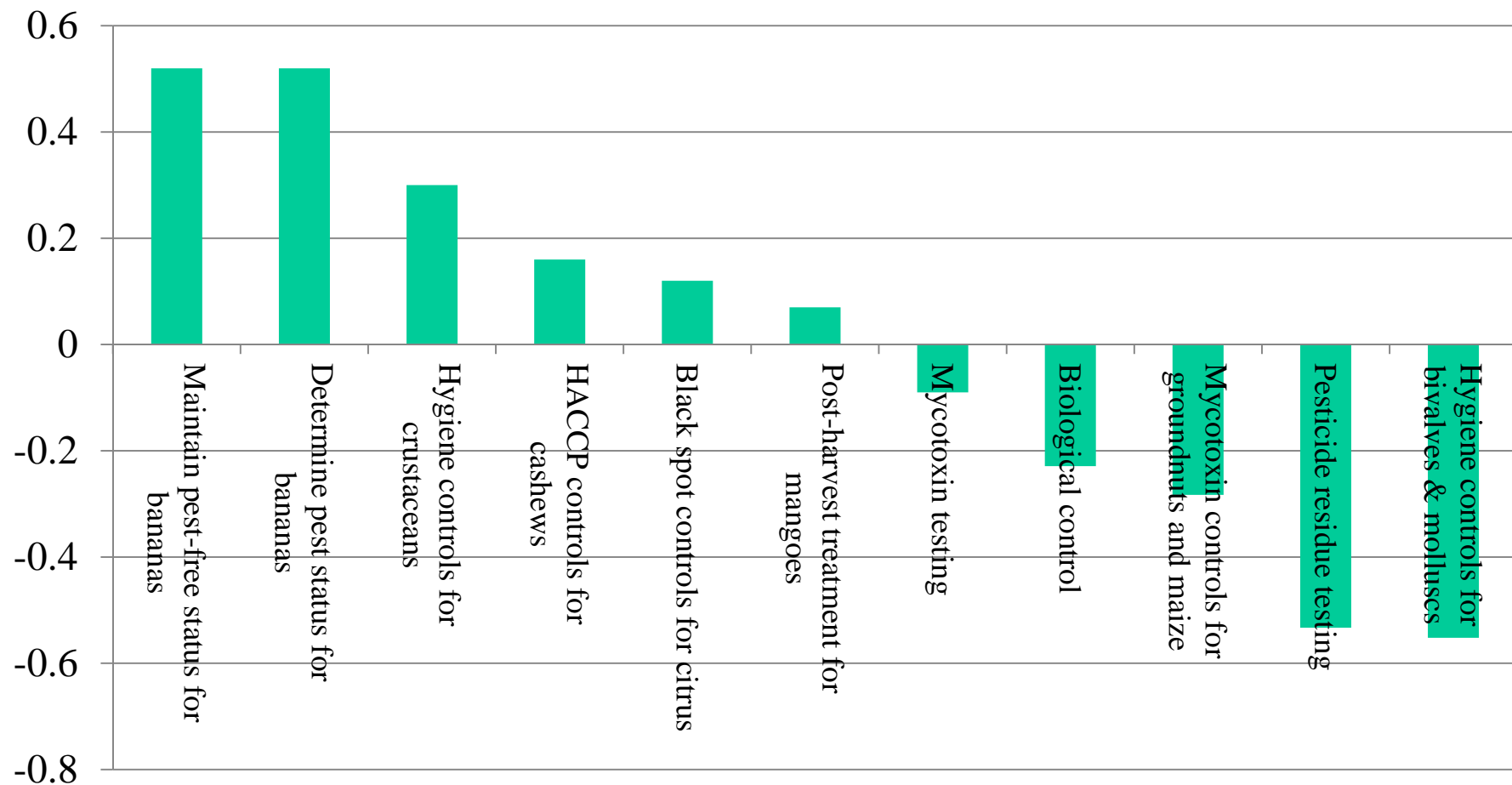
Validation process

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

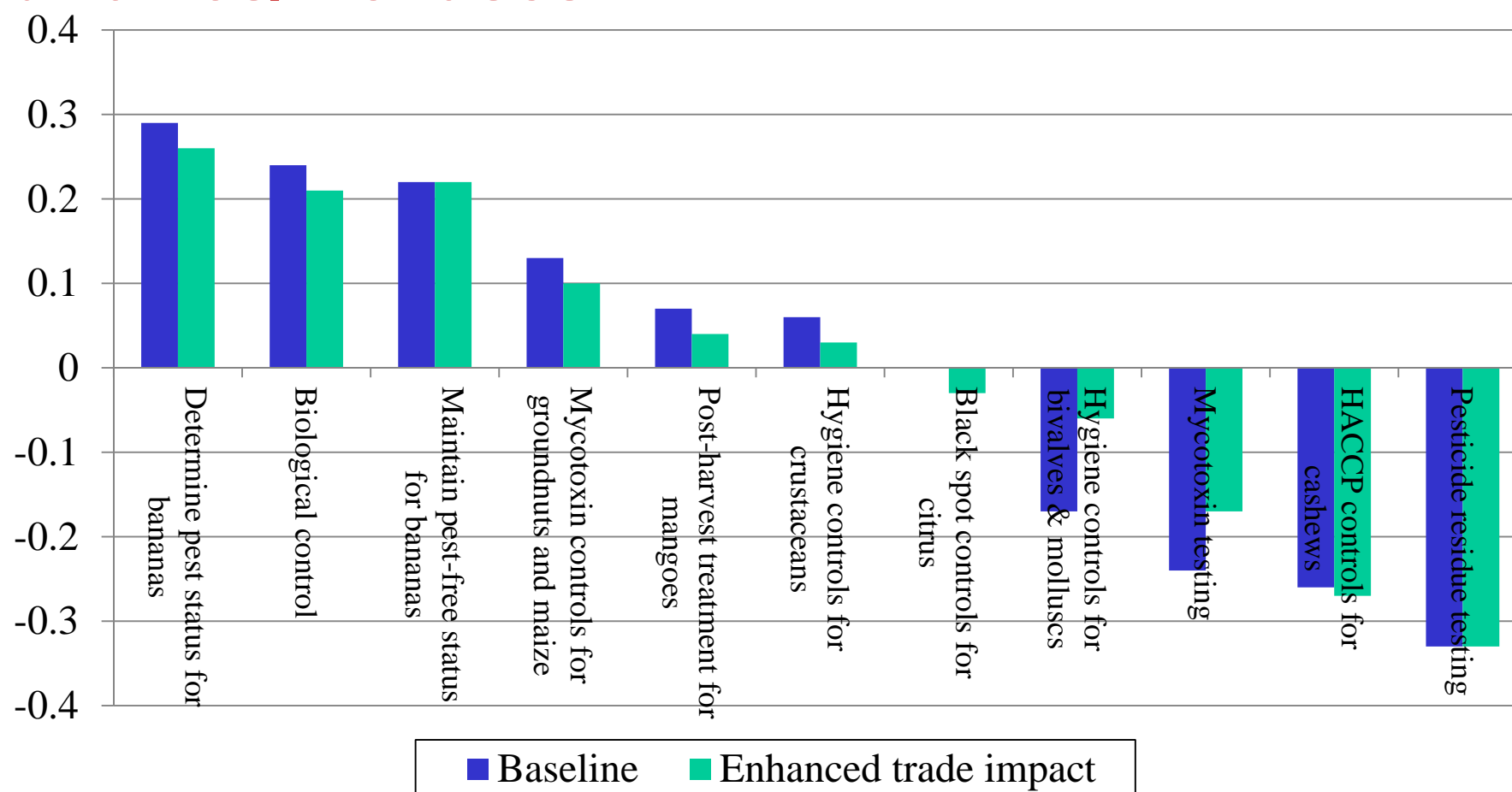
Mozambique equal weights model



Mozambique costs and trade impact model



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



Outputs of the framework

- Key outputs:
 - Choice set
 - Information cards
 - Spider diagrams
 - Formal prioritisation
 - Prioritisation model
- Not the end point....
-ideas is to use the framework on a routine basis:
 - Disagreements over priorities
 - New data
 - New capacity-building needs
 - Capacity-building needs solved

Implications/issues

- Aims to aid decision-making....
-not to make decisions
- Nature of decision-making processes:
 - Structure
 - Transparency
 - Cost
- Constraints:
 - Resources
 - Expertise
 - Buy-in at senior administrative and political levels