Using Multi Criteria Decision Analysis to Identify and Prioritise Export-Related Sanitary and Phytosanitary Capacity-Building Options in Viet Nam

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Executive Summary

As part of efforts to establish more coherent and accountable decisions in the allocation of scarce resources towards competing Sanitary and Phytosanitary (SPS) capacity-building needs, the use of multi-criteria decision analysis (MCDA) is advocated as a structured framework for making the costs and benefits of alternative capacity-building investments explicit and for identifying options that offer the greatest return. Because the lack of data can impede such analysis, the Standards and Trade Development Facility (STDF) has supported the development of an MCDA-based framework which enables SPS capacity-building options to be prioritised on the basis of a range of decision criteria.

This report presents the initial results of a priority-setting exercise for SPS capacity-building in Viet Namwhich commenced with two stakeholder workshops in September 2012. A total of45 distinct SPS capacity-building options are identified, of which 10are judged to be substantive SPS issues. These 10capacity-building options are prioritised on the basis of a series of 13decision criteria to which weights are applied. These criteria and weights are again derived through the stakeholder workshops. The end result is a ranking of the 10capacity-building optionsthat are identified. The top five options are as follows:

- Residue control for honey exports (Option 6).
- Food safety controls for aquaculture production of Pangasius for export (Option 2)
- Food safety controls for capture fish and fishery products for export (Option 3).
- Food safety controls for aquaculture production of shrimp for export (Option 1)
- Food safety controls for fresh fruit and vegetable and aromatic herb exports (Option 4).

Whilst these results from the baseline model are considered the most valid, it is important to recognise that only two of these options are ranked as high priorities unequivocally, that is they remain in the top five across the three models that aim to test the sensitivity of the results to changes in decision criteria and/or their weights. These are:

- Residue control for honey exports (Option 6).
- Food safety controls for capture fish and fishery products for export (Option 3).

The results of the analysis should represent the starting point in the use of MCDA in the context of SPS capacity-building in Viet Nam. Indeed, the results should be revisited and revised on an ongoing basis in the light of improvements in the availability and/or quality of data, changes in policy priorities and as new issues arise or investments are made in the identified options. More immediately, given the sensitivity of many of the rankings, it is important to reflect on the baseline model to confirm that this indeed is a broadly accepted framework in which to establish SPS capacity-building priorities. At the same time, the scope for extending the analysis to SPS issues in domestic markets, including controls on imports, should be explored.

Using Multi Criteria Decision Analysis to Identify and Prioritise Export-Related Sanitary and Phytosanitary Capacity-Building Options in Viet Nam

1. Introduction

Sanitary and phytosanitary (SPS) measures are applied by governments to control food safety, plant health and animal health risks, and to prevent incursions of exotic pests and diseases. In turn, such measures act to protect human health, promote agricultural productivity and facilitate the international marketability of agricultural and food products.[1]Increasingly, private standards are being applied in parallel as a mechanism for firms to manage food safety risks and to differentiate their products. Whilst the illegitimate use of SPS measures undoubtedly remains a problem, despite the obligations and rights laid down in the World Trade Organization (WTO) Agreement on Sanitary and Phytosanitary Measures, arguably the biggest challenge for developing countries is achieving and maintaining the required compliance capacity, both within the public sector and in exporting firms.[2]

In making efforts to expand their agri-food exports and to reposition themselves towards higher-value markets, developing countries face an often daunting array of SPS capacity-building needs that outstrip available resources, whether from national budgets or donors. Inevitably, hard decisions have to be made to prioritise particular capacity-building needs over others. At the same time, the drive towards greater aid effectiveness requires that beneficiary governments are able to present coherent and sustainable plans for capacity-building. Whilst decisions have to be made between competing needs on an on-going basis, such decisions often lack coherence and transparency, and there are accusations of inefficiencies in the allocation of resources, whether by developing country governments or by donors.[3]

As part of efforts to establish more coherent and accountable decisions in the allocation of scarce resources towards competing SPS capacity-building needs, various economic analysis techniques have been touted. Approaches such as cost-benefit and cost-effectiveness analysis are seen as providing structured frameworks for making the costs and benefits of alternative capacity-building investments explicit and for identifying options that offer the greatest return.[4]The quantity and/or quality of data in many developing countries, however, can seriously impede such analyses. Further, establishing priorities amongst capacity-building needs is often made on the basis of multiple criteria measured in disparate ways, pointing to the potential use of multi-criteria decision analysis (MCDA).

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[1]Henson, S.J. and Humphrey, J., (2010). Understanding the Complexities of Private Standards in Global Agri-Food Chains as They Impact Developing Countries.*Journal of Development Studies*, 46 (9), 1628-1646.

[2]World Bank (2005).*Food Safety and Agricultural Health Standards: Challenges and Opportunities for Developing Country Exports*, Report 31207, Poverty Reduction and Economic Management Trade Unit. World Bank, Washington DC.

[3]Henson, S.J., and Masakure, O., (2009). *Guidelines on the Use of Economic Analysis to Inform SPS-related Decision-Making*.Standards and Trade Development Facility, Geneva.

[4]Hensonand Masakure(2009).*op cit.*

The Standards and Trade Development Facility (STDF) has supported the development of a framework for the establishment of priorities amongst competing SPS capacity-building needs that might be funded by government or the private sector in developing countries, and/or donors.[5]Through the use of MCDA, the framework enables capacity-building options to be prioritised on the basis of a wide range of decision criteria that are not necessarily measured (or even measurable) using the same metrics.

This reportprovides an overview and the results of the application of the MCDA framework in Viet Nam. Whilst a number of prior reports have highlighted gaps in SPS capacity in Viet Nam and emphasised the need for capacity-building in order to facilitate trade (see Appendix 1 for a list of such documents), most provide a rather broad overview of issues. The limited efforts to examine capacity-building needs in a more comprehensive manner (for example World Bank, 2006) are now rather outdated and do not attempt to define priorities amongst a virtual 'shopping list' of potential areas of investment.Thus, it is perhaps not surprising that Viet Namlacks a coherent and prioritised plan for the enhancement of SPS capacity that might guide government, donor and/or private sector investments. The analysis presented below aims to inform the development of such a plan.

The report starts by providing a short overview of Viet Nam's agri-food trade, highlighting the extent to which this trade is composed of products that might be considered 'SPS sensitive' and examining evidence that this trade is impeded by weaknesses in capacity in the areas of food safety, plant health and/or animal health. The report then proceeds by describing the MCDA framework and then outlining how this was applied in Viet Nam. First, the process by which SPS capacity-building needs are identified is described. The results of the analysis are then reported, followed by an assessment of the implications for SPS capacity-building in Viet Namin the medium term.

2. SPS issues facing agri-food exports from Viet Nam

Viet Nam is a major agri-food exporter, commanding a significant proportion of global markets for a number of commodities. The single most important agri-food export commodity is rice, valued at US$3.7 billion in 2011 (Table 1). Coffee exports totalled US$2.7 billion in 2011, having grown more than three-fold since 2008. Cashew (US$1.5 billion) cassava (US$960 million) and black pepper (US$732 million exports were also amongst the top agri-food exports in 2011.

One of the most dynamic export sectors is fish and fishery products, collectively valued in excess of US$5 billion in 2011. The sector consists of products from aquaculture (mainly shrimp and Pangasius) and capture fishery (mainly tuna, octopus and other molluscs). In 2011, exports of shrimp and Pangasius in 2011 were valued at US$2.4 billion and US$1.8 billion, respectively (Table 1).

[5]Henson, S.J., and Masakure(2009).*op cit.*
Henson, S.J., and Masakure, O., (2012). *Establishing Priorities for SPS Capacity Building: A Guide to Multi-Criteria Decision-Making*. Standards and Trade Development Facility, Geneva.

Table 1.Major exports of agricultural and food products from Viet Nam, 2008-2012 ('000 tonnes/US$ million)

Products	2006		2007		2008		2009		2010		2011	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Rice	5,254.8	1,408.4	4,580.0	1,490.2	4,741.9	2,894.4	5,958.3	2,663.9	6,886.2	3,247.9	7,112.2	3,656.8
Coffee	912.7	740.3	1,232.1	1,916.7	1,059.5	2,111.2	1,183.5	1,730.6	1,217.9	1,851.4	1,256.4	2,752.4
Cashews	109.0	503.1	154.7	645.1	165.3	911.0	177.2	846.7	194.6	1,134.7	178.5	1,473.1
Fruit and vegetables	-	235.5	-	305.6	-	406.5	-	438.9	-	460.3	-	622.6
Black Pepper	109.9	151.5	83.0	271.5	90.3	311.2	134.3	348.1	116.9	421.4	123.8	732.2
Tea	91.7	99.4	115.7	133.5	104.5	146.9	134.1	179.5	136.5	200.0	133.9	204.0
Cassava	-	-	-	-	-	-	3,301.9	573.8	1,700.4	564.3	2,680.2	960.2
Shrimp	155.9	1,359.1	161.0	1,506.6	191.8	1,628.0	208.4	1,670.3	237.4	2,102.8	242.6	2,413.9
Pangasius	142.1	331.5	382.2	968.3	644.0	1,460.3	606.0	1,338.6	658.3	1,424.8	704.5	1,854.8
Fish	74.5	223.6	137.3	339.7	168.5	479.5	169.2	392.9	191.5	519.0	128.7	525.1
Octopus	62.7	184.5	81.9	281.5	87.1	320.1	77.1	273.3	82.0	317.1	98.4	530.4
Tuna	30.2	82.2	52.6	150.4	54.4	196.3	54.6	175.2	84.3	298.9	82.6	385.3
Other crustacean	-	-	13.8	105.6	14.9	131.6	12.7	109.3	16.1	112.4	15.1	120.9
Other molluscs	-	-	16.3	39.2	18.3	42.0	25.7	57.4	31.7	92.7	28.6	80.4

Source: Ministry of Industry and Trade

Across most of its major agri-food product exports, Viet Nam has recorded significant rates of growth in recent years. Evidently, however, SPS capacity has not developed and evolved in line with the rapid evolution of these sectors. Thus, domestic regulations are generally not compliant with international norms, let alone the private standards implemented by many buyers in the industrialised country markets where many of Viet Nam's exports are destined. Likewise, the food safety controls implemented along value chains for many of Viet Nam's major agri-food exports are not fully compliant with international regulatory requirements and/or the standards applied by major buyers.

The weaknesses of SPS controls for many major agri-food exports has been highlighted by a number of previous studies (see Appendix 1), although as a whole these fail to provide a comprehensive and prioritised assessment of capacity-building needs.

The fact that weaknesses in SPS capacity impact Viet Nam's trade performance is evidenced by data on official rejections of agri-food product consignments in a number of its major export markets (Table 2). Thus, there were 3,443 US rejections of agri-food products from Viet Nam over the period 2002 to 2010, and 613 EU rejections over the same period. Japanese rejections totalled 563 over the period 2006 to 2010. In all three markets, fish and fishery products accounted for a large proportion of total rejections; around 70 per cent of EU and US rejections over the period 2002 to 2010 were fish and fishery products, whilst fish and fishery products accounted for 82 per cent of Japanese rejections from 2006 to 2010.

Table 2. Number of rejections of agri-food product imports from Viet Nam into European Union, United States and Japan, 2002 to 2010[6]

Market	2002	2003	2004	2005	2006	2007	2008	2009	2010
EU	67	35	55	124	68	44	54	96	70
USA	428	333	478	350	315	379	464	358	338
Japan	-	-	-	-	130	165	74	77	117

In the case of the US, bacterial contamination and hygienic condition/controls accounted for almost 50 per cent of rejections of agri-food product imports from Viet Nam over the period 2002 to 2010 (Table 3). Bacterial contamination was also a prominent reason for EU and Japanese rejections, suggesting widespread weaknesses in hygiene controls, notably for fish and fishery products but also other major agri-food product exports. Veterinary drug residues were also the cause of considerable rejections, notably in Japan and the EU where violation of limits on antibiotics accounted for 27 per cent and 53 per cent of rejections, respectively. In the case of the US, non-compliance with labelling requirements and restrictions on food additives were also a major cause of rejections, notably for imports of packaged processed predominantly directed at the US Vietnamese population.

In addition, exports of a number of commodities of plant origin, notably fresh fruit, vegetables and aromatic herbs, are curtailed due to lack of access to international markets due to plant health-related restrictions.

[6]UNIDO (2011).*Meeting Standards, Winning Markets: Trade Standards Compliance Report 2010*. United Nations Industrial Development Organisation, Vienna. (Data updated to 2010).

The rather piecemeal evidence that exists on the status of SPS capacity in Viet Nam suggests that there are potentially significant capacity-building needs, and that weaknesses in capacity are having significant adverse impacts on trade, even in sectors where Viet Nam has established a significant position in global markets. The analysis presented below will identify the specific capacity-building needs that exist currently, in the context of trade, and suggest how these might best be prioritised.

Table 3. Reasons for rejections of agri-food product imports from Viet Nam into European Union, United States and Japan, 2002 to 2010[7]

Reason	EU	US	Japan
Adulteration/missing documentation	18	490	0
Bacterial contamination	170	1,088	145
Food and/or feed additives	78	402	14
Heavy metal	61	0	0
Hygienic condition/controls	28	1,174	23
Labelling	2	997	0
Mycotoxins	23	32	7
Other contaminants	101	214	16
Others	27	25	6
Packaging	4	0	2
Pesticide residues	15	19	50
Veterinary drugs residues	198	174	300

3. Establishing priorities using a Multi-Criteria Decision-Making Framework

The framework employed here aims to present a comprehensive analysis of options for SPS capacity-building that can feed into the development of a prioritised action plan for the enhancement of SPS capacity. Thus, its ultimate objective is *to generate a prioritised schedule of options for SPS-related capacity-building in Viet Namon the basis of the multiple economic and/or social criteria*. The rationale behind the frameworkis that priorities need to be established on the basis of a range of economic and social considerations that may, at least on the face of it, be difficult to reconcile. In turn, this assumes that the rationale for investments in SPS capacity-building is not compliance with export market SPS requirements *per se*, but the economic and social benefits that conceivably flow from such compliance, whether in terms of enhanced exports, incomes of small-scale producers and/or vulnerable groups, promotion of agricultural productivity and/or domestic public health, etc. The framework provides an approach through which different decision criteria can be taken into account, even though they may be measured in distinct ways.

In pursuit of this objective, the framework aims to:

- Identify the current set of SPS-related capacity-building options in the context of existing and/or potential exports of agri-food products. Below this is termed the *choice set*.

[7]UNIDO (2011).*op cit.*

- Determine the *decision criteria* that should drive the establishment of priorities between SPS-related capacity-building options and the relative importance (*decision weights*) to be attached to each.
- Prioritise the identified SPS-related capacity-building options on the basis of the defined decision criteria and decision weights.
- Examine the sensitivity of the established priorities to changes in parameters of the framework.

The framework employs a highly structured process that aims to be applied in a wide variety of contexts and to provide various diagrammatic and numerical outputs. The framework and its practical implementation are described in detail in the associated user's guide.[8] Thus, here a relatively brief outline of the seven stages of the framework (Figure 1) is provided, with a particular focus on how they were implemented in Viet Nam.

Stage 1: Compilation of information dossier

The first stage of the analysis involved the compilation of a comprehensive dossier of existing information on the SPS challenges facing agri-food exports from Viet Nam and the associated capacity-building needs. In so doing, the aim was to ascertain what work had already been undertaken to identify capacity-building options and the definition of priorities for related investments. The documents/information in the dossier are itemised in Appendix 1.

Stage 2: Definition of choice set

In order to identify the SPS capacity-building options to be considered in the priority-setting framework, two one-day stakeholder workshopswere held, in Hanoi on 25th September 2012 and in Ho Chi Minh City on 27th September 2012. A total of 96 stakeholders (Appendix 2 and 3) attended the workshops, drawn from government, private sector and research organisations/universities. Workshop participants were presented with a series of cards and asked to identify the SPS capacity-building needs of Viet Nam. First, the product(s) affected. Second, the specific SPS issue faced by exports of this product(s). Third, the market(s) where these SPS needs were an issue. Fourth, the capacity-building option(s) that would solve the SPS issue being faced. The combination of these four elements defined a distinct capacity-building option. Respondents were free to define as many specific SPS capacity-building needs as they wished.

The cards of all respondents were collected, shuffled and then reported back to the workshop as a whole through listings on flip charts. The collection of items was then discussed in order to remove any ambiguities and to ensure that each represented a mutually-exclusive capacity-building option. A total of 45 SPS capacity-building options were defined through the above process. This 'long list' of potential SPS capacity-building needs was then 'sifted' in order to exclude superfluous options given the specific confines of the analysis being undertaken. This process resulted in the exclusion of 22 of the options (Table 4).

[8]Henson and Masakure (2011).*Op cit.*

Figure 1.Stages in multi-factorial prioritisation of SPS capacity building options

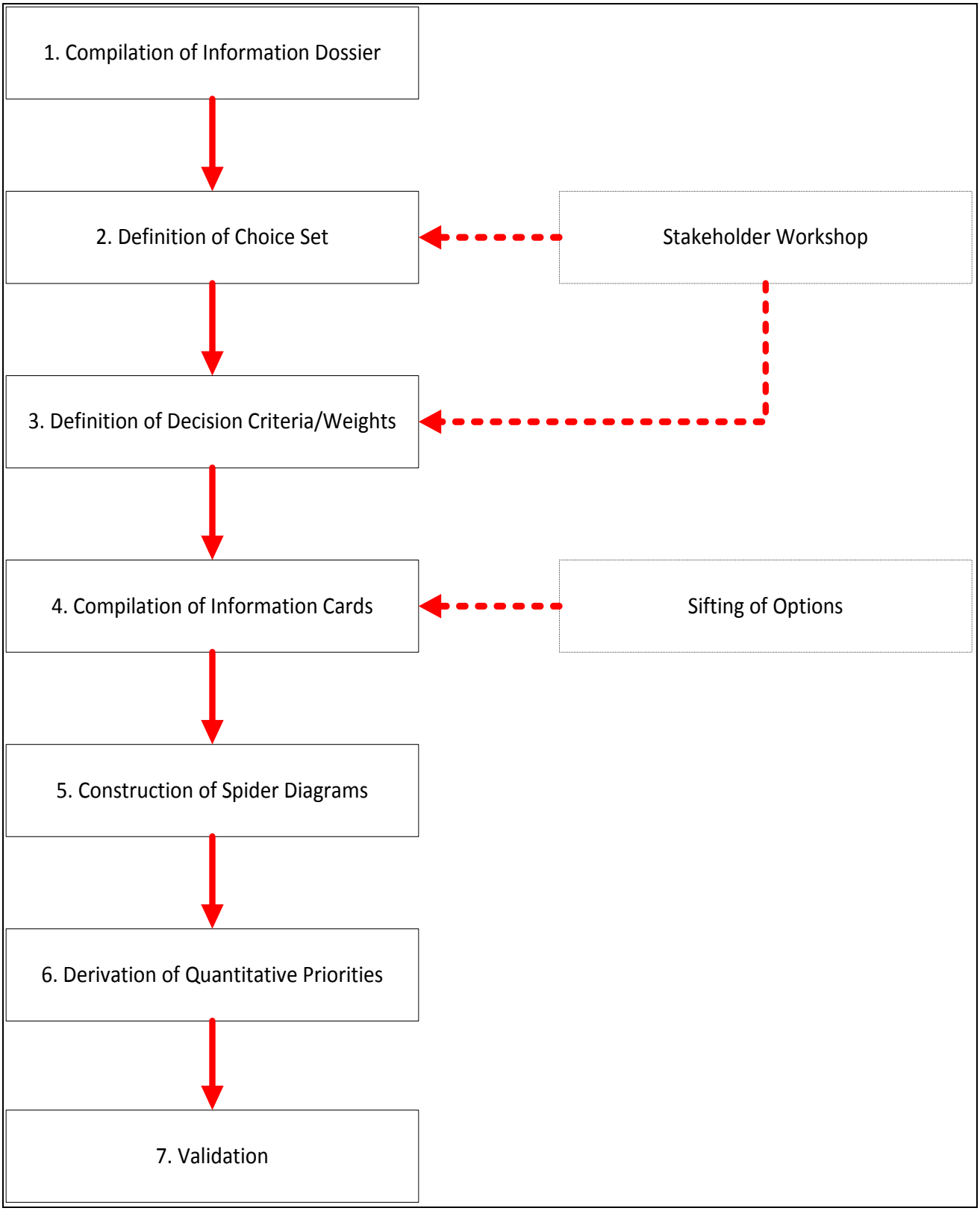


Table 4.SPS capacity-building excluded options – first sift

Relate to domestic market and not to exports	
1	Hygiene controls for moon cake
2	Hygiene controls for fresh fruit and vegetables
3	Hygiene controls for poultry
4	Hygiene controls for biscuits
5	Hygiene controls for bottled water
6	Hygiene controls for street food
7	Controls on antibiotics for meat and meat products
8	Hygiene controls for meat
9	Controls on pesticide residues in sugar cane imports
10	Controls on chemical and microbiological residues in food products from China
11	Controls on chemical residues in confectionery products from Taiwan
Not an SPS issue	
12	Unauthorised additives in instant noodles
13	Process controls for lychee products
14	Pesticide use to control aphids in cut flowers
15	Unauthorised colouring in salted eggs
16	Processing of nutrition powders derived from milk ingredients
17	Quality controls for rice
18	Controls on GMOs in fresh and dried vegetables
19	Quality control for cucumber
20	Quality control for baby melon
21	Unauthorised colouring in baby cucumber
Not an agri-food product	
22	Controls on heavy metals in toys

Each of the 23 remaining potential capacity-building needs was then examined in some detail and, where necessary, public and/or private sector stakeholders consulted and/or secondary data gathered in order to ascertain which were current and substantive issues facing agri-food exports from Viet Nam. As a result of this 'second sift' a further 13 of the options were excluded (Table 5).

Table 5. Excluded SPS capacity-building options – second sift

Option		Reason for exclusion
1	Controls on histamine in fish sauce exports to EU, Australia and US.	One EU rejection in 2009. No rejections in Japan (2006 to 2012) and US (2002 to 2012).
2	Heavy metals in capture fish	Control measures are relatively easy to implement; involve restricting size of landed fish to less than 70Kg. Viet Nam has accredited facilities for heavy metal testing.
3	Controls on pesticide residues in coffee exports to EU and Japan	No rejections in EU (2002 to 2012) and Japan (2006 to 2012). Discussions with exporters revealed no problems.
4	Controls on pesticide residues in tea exports to EU and Japan	No rejections in EU (2002 to 2012) and Japan (2006 to 2012). Discussions with exporters revealed no problems.
5	Hygiene controls for suckling pig	Exports to Malaysia, Hong Kong and China with no problems reported by exporters. Trade value very small.
6	Animal disease controls for pork exports to Russia	No pork exports to Russia in last ten years. Due to price competitiveness of pork exports from Viet Nam rather than animal health issues.
7	Controls on antibiotic residues in processed meat exports to EU, US, Japan and Korea	Minimal global exports. No rejections in EU and US (2002 to 2012) and Japan (2006 to 2012).
8	Controls of heavy metals in tea exports to EU	No rejections in EU (2002 to 2012). Discussions with exporters revealed no problems.
9	Controls on ochratoxin in coffee exports to EU	No evidence a significant problem at the current time for coffee exports on the basis of EU rejection data and consultation with coffee exporters.
10	Hygiene controls for tea exports to China	Discussions with exporters revealed no problems.
11	Controls on aflatoxins in cashew nut exports to EU	Four EU rejections of cashew flour due to aflatoxins in 2007-2008. No problems since. Accredited testing facilities in Viet Nam. Any problems because exporters fail to have consignments tested prior to export.
12	Controls on pesticide residues in cashew nut exports to EU and US.	No EU or US rejections (2002 to 2012). Exporters did not report any problems.
13	Controls on heavy metals in fish meal exports for human consumption to Japan, China and Korea	No Japanese rejections over period 2006 to 2012. No evidence of problems more generally.

The 10capacity-building options remaining after this two-stage 'sifting' process are outlined in Table 6. These options proceeded to the priority-setting stage of the analysis.

Table 6. SPS capacity-building options

Option		Brief Description
1	Food safety controls for shrimpproduction for export	Whilst the processing sector is largely compliant with export market food safety requirements, there are remaining and significant issues with controls on microbiological contaminants and antibiotic residues in aquaculture production. This impacts on exports to the EU, US, Japan and Australia, amongst other markets. It is estimated that around 20 per cent of shrimp farms have implemented good aquaculture practice (GAP). There is a need for GAP to be implemented across all farms serving these export markets.

2	Food safety controls for Pangasiusproduction for export	Whilst the processing sector is largely compliant with export market food safety requirements, there are remaining and significant issues with controls on microbiological contaminants and antibiotic residues in aquaculture production. This impacts on exports to the EU, US, Japan and Australia, amongst other markets. It is estimated that around 40 per cent of Pangasius farms have implemented GAP. There is a need for GAP to be implemented across all farms serving these export markets.
3	Food safety controls for capture fish and fishery product exports	Whilst the processing sector is largely compliant with export market food safety requirements, there are remaining and significant issues with hygiene controls on fishing vessels and at landing sites, including with the provision of ice produced from potable water. Investments are needed in improved handling on fishing vessels and in the upgrading of ice production facilities and in improved handling at landing sites. This is particular an issue for exports to the EU, but also US, Japan and Australia.
4	Food safety controls for fresh fruit and vegetable and aromatic herb exports	There are ongoing problems with microbiological contaminants, heavy metals and pesticide residues in fresh fruit, vegetables and aromatic herbs destined for markets in the EU, US, Japan and Australia. The solution is the adoption of good agricultural practice (GAP) in production.
5	Hygiene controls for spice exports	Exports of black pepper, and also some other spices, have recorded high levels of microbiological contamination, for example in the EU and US. There is a need for the widespread application of hazard analysis and critical control point (HACCP)or ISO 22000:2005 in the spice processing sector.
6	Residue controls for honey exports	Viet Nam sees the EU as a potentially high value market for its honey. At the current time, however, it is not approved for the export of honey to the EU. There is a need to have a residue monitoring plan in place and for this to be approved by the European Commission.
7	Plant pest controls for chilli and aromatic herb exports	Exports of fresh chillies and other aromatic herbs to the EU have been impeded by plant pests. There is a need for systems-based controls to be out in place in order to address this problem.
8	Plant pest controls for mangosteen exports	Viet Nam sees Korea as a potentially high-value market for mangosteen exports. Furthermore, accessing the Korean market is considered a 'stepping stone' to obtaining access to Japan and/or Australia.Systems-based controls are needed, that are approved by the Korean authorities, in order to gain access.
9	Plant pest controls for rambutan exports	Viet Nam sees Korea as a potentially high-value market for rambutan exports. Furthermore, accessing the Korean market is considered a 'stepping stone' to obtaining access to Japan and/or Australia. Systems-based controls are needed, that are approved by the Korean authorities, in order to gain access.
10	Controls on pesticide residues for rice exports	Exports of rice to Japan have been curtailed due to persistent problems with pesticide residues. There is a need for the application of GAP in rice production in order to overcome this problem.

Stage 3: Definition of decision criteria and weights

In the second stage of the stakeholder workshops, respondents were asked to define an appropriate set of criteria to drive the priority-setting process and to assign weights to these. First, participants were presented with a series of potential decision criteria organised into four categories and asked which (if

any) should be excluded and whether any potentially important criteria were missing. The final agreed decision criteria are detailed in Table 7.

To define the decision weights, the workshop participants were each asked to assign 100 points amongst the 12decision criteria. The scores of participants were then collated and an average weighting calculated. This average weighting was reported back to the workshop participants to identify any discrepancies. The final agreed weightings are reported in Table 7.

Stage 4: Construction of information cards

Having identified the choice set of SPS capacity-building options and the decision criteria and weights to be applied in the priority-setting exercise, this information was assembled into a series of information cards. The aim of these cards is not only to ensure consistency in the measurement of each decision criterion across the capacity-building options, but also to make the priority-setting exercise more transparent and open to scrutiny.

Table 7.Decision criteria and weights for setting priorities of SPS capacity-building options

Objectives	Decision Criteria	Minimum	Mean	Maximum
Costs and Difficulty of implementation	Up-front investment	0	7.5	18
	On-going costs	0	7.5	18
	Difficulty of implementation	0	8.4	27
Trade impacts	Impact on exports	0	12.2	18
	Trade diversification	0	6.5	18
	Impact on international reputation	0	7.5	38
	Impact on capacity to deal with future SPS problems	0	8.4	45
Direct agri-food impacts	Impact on agricultural productivity	0	8.4	18
	Impact on domestic public health	0	7.5	19
	Impact on environment	0	8.4	27
Social impacts	Livelihood	0	12.2	27
	Impact on vulnerable groups	0	5.6	18

First, the specific nature of each of the SPS capacity-building options was described in some detail on the basis of existing documentation, consultation with stakeholders, etc. Descriptions of each of the 10capacity-building options are provided in Section 4 below.

The metrics to be employed for each of the 12 decision criteria were then defined, taking account of currently available data and the range of plausible ways in which each of the criteria might be represented. Table 8 sets out the final metrics. Note that the choice of metrics involves a sometimes difficult compromise between the availability and quality of data, and the imperative to employ continuous quantitative measures. However, it is important to recognise that the aim of the framework is not to provide a final and definitive prioritisation of the capacity-building options. Rather, the priorities that are derived should be revisited on an on-going basis and revised as more and/or better data for the decision criteria become available.

Table 8.Decision criteria measurement

Criterion	Measurement
Cost/Difficulty of implementation	
Up-front investment	Absolute value (US$)
Annual on-going costs	Absolute value (US$)
Difficulty of implementation	Very easy (-3) Moderately easy (-2) Somewhat easy (-1) Neither easy nor difficult (0) Somewhat difficult (+) Moderately difficult (+2) Very difficult (+3)
Trade impact	
Change in absolute value of exports	Absolute value in five year (2017) (US$)
Trade diversification impact	Large negative (-3) Moderately negative (-2) Somewhat negative (-1) No impact (0) Somewhat positive (+1) Moderately positive (+2) Large positive (+3)
Impact on international reputation	
Impact on ability to deal with future SPS problems	
Domestic agri-food impacts	
Agricultural/fisheries productivity	Very negative (-3) Moderately negative (-2) Somewhat negative (-1) No impact (0) Somewhat positive (+1) Moderately positive (+12) Large positive (+3)
Domestic public health	
Environmental protection	
Social impacts	
Impact on livelihoods	Multiplicative scale composed of scale of impact (number of people affected) on scale from 0 to 10 and magnitude of impact (degree to which livelihood is impacts) on scale from -10 to +10.
Impact on vulnerable groups/areas	Very negative (-3) Moderately negative (-2) Somewhat negative (-1) No impact (0) Somewhat positive (+1) Moderately positive (+12) Large positive (+3)

Information cards for each of the 10SPS capacity-building options were then compiled. These are reported in Appendix 4. Each card presents data for the 12decision criteria, measured according to the scales outlined in Table 8. For each criterion, he information card provides details of how measures for each of the decision criteria were derived. There is also an indicator of the level of confidence in the measure reported. Where there is a lack of underlying data and/or these data are of dubious quality, a low or medium level of confidence is indicated. Conversely, where fairly rigorous and comprehensive prior research is available, a high level of confidence is reported. These confidence measures need to be considered in interpreting the results of the prioritisation exercise, and in considering how the analysis might be refined in the future.

Stage 5: Construction of spider diagrams

Through Stages 1 to 4, the inputs to the priority-setting process were collected and then assembled into the series of information cards. The aim of Stage 5 was to present the information on the information cards in a manner that permits easier comparison of the 10capacity-building options. Thus, spider diagrams were derived that plotted the 10SPS capacity-building options against each of the 12 decision criteria. Scrutiny of these diagrams identified the decision criteria against which each of the capacity-building options performed relatively well/badly compared to the other capacity-building options in the choice set.

Stage 6: Derivation of quantitative priorities

The formal priority-setting analysis involved the use of outranking through the D-Sight software package. The mechanics of the analysis are described in some detail in the user guide to the framework.[9] The inputs to the model are the data assembled in the information cards. For most of the decision criteria, preferences were modelled using a level function since these were measured using categorical scales. However, the up-front investment, on-going cost and trade impact criteria were measured continuously and modelled using linear functions.

Three models were estimated using D-Sight:

- *Baseline model* using decision weights derived in Stage 3.
- *Equal weights model* in which all of the decision criteria are weighted equally.
- *Costs and trade impact model* in which only the cost and trade impact decision criteria are included in the analysis with the respective weights form the baseline model applied.

The baseline model is considered to provide the most reliable set of priorities, in that it uses the full set of information derived through Stages 1 to 4. The two subsequent models wereestimated in order to examine the extent to which the derived priorities are sensitive to changes in the decision weights; if the ranking of the 10 SPS capacity-building options remains broadly the same under the three scenarios presented by these models, we can be reasonably confident that the results of the framework are

[9]Henson and Masakure (2011).*op cit.*

robust. The sensitivity of the derived rankings to changes in decision criteria measures for which there are low levels of confidence was also explored.

Stage 7: Validation

The final stage of the priority-setting analysis aimed to validate the findings of the analysis as reported in this report. This involved a two-stage process of stakeholder feedback. First, the draft report was circulated by email amongst stakeholders across the public and private sectors with a request for comments. Second, a stakeholder feedback workshop was held in Hanoi on 11th June 2013. There were 54 participants at the workshop (Appendix 5), including representatives of the public and private sectors, donors, etc. At the feedback workshop, the preliminary results were presented and comments invited from participants. The report was revised and finalised on the basis of this feedback.

4. Sanitary and Phytosanitary (SPS) capacity-building options

This section provides a more detailed description of each of the 10 SPS capacity-building options considered in the priority-setting analysis.

4.1. *Food safety controls for aquaculture production of shrimp (Option 1) and Pangasius(option 2) for export*

Viet Nam has established itself as a major global exporter of fish and fishery products, which currently account for five to six per cent of national exports and contribute four to five per cent to GDP. Over time, aquaculture production has accounted for a rising proportion of fish and fishery product exports, such that now the majority of production for exports is from aquaculture rather than the capture fishery. Within aquaculture production, shrimp (and especially black tiger and white legged shrimp) and Pangasius are the main products.

Aquaculture production of shrimp started with a multitude of small producers and, whilst there has been considerable consolidation of production, there remain a large number of farmers many of which have limited production areas. Shrimp is exported to over 90 markets, although the EU, US, Japan and Australia are the main markets, accounting for almost 70 per cent of the total in 2011. Exports were valued at US$2.2 billion in 2011.

Pangasius was traditionally farmed in the Mekong River Delta, predominantly for local and regional consumption. However, since the mid-1990s production has been transformed and increasingly directed at international export markets. Currently, the production area is around 6,000 hectares across 10 Mekong Delta provinces. Pangasius exports arecurrently valued at around US$2 billion. Whilst, there are exports to 145 countries, the EU, US, Japan and Australia account for around 60 per cent.

Despite the fact that Viet Nam has achieved significant growth in both shrimp and Pangasius exports from aquaculture production, it has faced significant and mounting problems due to weaknesses in food safety controls. The processing sector has largely addressed these problems, upgrading their facilities and implementing hazard analysis and critical control point (HACCP). However, food safety controls in aquaculture production, and especially the production of shrimp, remain a problem. This is evidenced by high and persistent rates of rejections in Viet Nam's major export markets due to levels of

microbiological contamination (in the EU, US, Japan and Australia) and resides of antibiotics (especially in the EU and Japan). There is a need for the universal application of good aquaculture practice (GAP) across facilities producing shrimp and Pangasius for export to these markets. Currently, only 20 per cent of shrimp producers and 40 per cent of Pangasius producers are certified to a GAP standard. The more widespread application of GAP will necessitate the training of producers, investment in the upgrading of production systems (especially for Pangasius) and the implementation of official monitoring and control mechanisms.

4.2. *Food safety controls for capture fish and fishery product exports (Option 3)*

The capture fishery still accounts for around 46 per cent of fish and fishery product exports from Viet Nam. The main capture fish for export are tuna and molluscs, of which over 60 per cent is destined for export to the EU, US, Japan and Australia.

Whilst the sustainability of the capture fishery is a mounting concern, such that aquaculture is seen as the main driver of export expansion into the future, the capture fishery will remain an important source of export earnings in at least the medium term. Thus, whilst the government's plan is to reduce the importance of capture fishery production, it is still expected to account for 30 to 35 per cent of production.

As with aquaculture products, food safety controls in fish processing facilities are largely compliant with international market requirements. The main challenge is in hygiene controls prior to processing, notably in fishing vessels and at landing sites. As a result of inappropriate handling practices, lack of temperature control and the use of ice produced from non-potable water, high and persistent levels of rejections of fish and fishery products due to microbiological contamination have been recorded in the EU, US, Japan and Australia. Thus, there is a recognised need for the upgrading of ice production facilities at landing sites, the training of fish crews and staff, implementation of documented hygiene controls, etc. At the same time, official systems of oversight and enforcement need to be enhanced.

4.3. *Food safety controls for fresh fruit and vegetable and aromatic herbs (Option 4)*

Exports of fresh fruit, vegetables and aromatic herbs have increased appreciably over recent years, with an average growth rate through the 2000s of almost 18 per cent annually. Whilst it is estimated that exports could be valued at US$1.2 billion by 2020, persistent problems complying with export market requirements with respect to microbiological contaminants and pesticide residues have resulted in significant levels of import rejections, notably in the EU, US and Japan. Furthermore, weaknesses in food safety controls are impeding efforts to exploit potentially lucrative markets in industrialised countries, and to diversify an increasing proportion of exports away from regional markets.

There is a recognised need for the more widespread application of good agriculture practice (GAP) in production, and especially farms in value chains to markets such as the EU, US and Japan. Whilst GAP is needed in order to control more effectively hygiene and pesticide use in the production of fresh fruit, vegetables and aromatic herbs, it will also enhance the supply of high quality produce that can fulfill the demands of customers in high-value markets. Thus, many pack-houses are unable to produce a sufficient supply of produce, such that they operate below capacity and only at certain times of the year.

The weak integration of pack-houses with production means that traders disrupt supply, with the result that prices are erratic.

The implementation of GAP will require the training of producers and their adoption of improved production practices. Record-keeping systems on-farm and post-farm will need to be enhanced in order to ensure traceability. In some cases, producers will need to make investments in physical infrastructure. Official systems of oversight will need to be enhanced in production areas.

4.4. *Hygiene controls for spice exports (Option 5)*

In the last decade Viet Nam has emerged as a major exporter of black pepper, such that it now commands around 50 per cent of global trade. The growth in exports reflects significant investment in increased production, with over 95 per cent destined for export. Current black pepper production is around 100,000 tonnes per annum.

In spite of the significant growth in exports, the price of pepperachieved by Viet Nam on global markets is low relative to other significant exporters. One reason for this is the widespread use of steam treatment of the spice prior to exportation as a means of reducing microbiological contamination and meeting hygiene requirements in export markets. The use of steam not only degrades the quality of the pepper and precludes efforts to build value, but also is the cause of mould in the final product that has been the cause of rejections in export markets. The solution is for the sector to invest in more advanced hygiene controls, notably application of HACCP or ISO 22000:2005 as a means to enhance the reputation of black pepper exports from Viet Nam in general, and to facilitate the repositioning towards higher value markets. Currently only 18 of the 166 pepper processing facilities in Viet Nam have implemented HACCP/ISO 22000.

4.5. *Residue controls for honey exports (Option 6)*

Viet Namcurrently exports about 30,000 tonnes of bee honey per year, valued at around US$80million in 2011. The production of honey for export is estimated to support the livelihood of 35,000 producers. Currently, around 95 per cent of exports are to the US, with the remainder directed to regional markets where prices are up to 35 per cent lower.

Whilst Viet Nam historically exported honey to the EU, since 1997 it has not been approved to do so. Access to the EU is seen as a priority for the development of the honey sector, not only as a means to expand the value of exports but also to reduce reliance on US markets. In order to access the EU, a residue monitoring plan has to be implemented in Viet Nam, and this plan approved by the European Commission. Such a plan has been implemented, although this needs to be expanded and adjusted in order to meet EU requirements and gain approval for the export of honey. This option would implement these changes and cover the cost of maintaining the monitoring plan over time.

4.6. *Plant pest controls for chillies and aromatic herbs (Option 7)*

Whilst fresh chilli and aromatic herb are not major exports, they are seen as potentially important high-value niche products, which have the secondary benefit of promoting food from Viet Nam globally.

Historically, the EU was the main non-regional market for these products. However, due to persistent interceptions of potentially harmful pests, exports have had to be curtailed.

The European Commission has notified Viet Namof the need to take corrective actions in order to reduce the incidence of these plant pests. As a result, more widespread controls have been implemented, including intensive sampling methods and export inspections. These measures have had limited effectiveness, such that Viet Namrecorded the highest number of EU plant pest interceptionsin 2011. Indeed, in February 2012 the European Commission threatened to ban the importation of fresh chillies and aromatic herbs from Viet Nam if more than five pest interceptions occur on a yearly basis.

Given their prevalence in production areas, there are currently no technical measures available for the effective control of these pests. In order to implement an effective system of phytosanitary export certification, a systems-based approach is needed based on riskmanagement.The implementation of such a system will require that pilot controls are undertaken in cooperation with the industry, the development of protocols for the registration, operation, monitoring and audit of production facilities, training of producers and exporters, etc.

4.7. *Plant pest controls for mangosteen (Option 8) and rambutan (Option 9)*

Currently, there around 11,000 hectares of land is dedicated to mangosteen in Viet Nam, with annual production of around 40,000 tonnes. Less than five per cent of production is exported, such that mangosteen accounts for only one per cent of fresh and processed fruit exports. Most exports are to China and some EU Member States. To date, Viet Nam has not achieved access to high-value markets such as the US, Korea, Japan, Australia and New Zealand, predominantly due to plant health requirements. Of these requirements, the most problematic relate to tropical fruit flies.

Viet Nam has successfully gained approval to export rambutanto the US. Whilst exports to the US are minimal, amounting to only 300 tonnes in 2012, these have served to highlight the ability of the National Plant Protection Organisation (NPPO) to negotiate successfully with trade partners over their phytosanitary requirements. Thus, it is now looking to exploit other potentially lucrative market opportunities, notably in Korea, Japan and Australia. As with mangosteen, meeting plant health requirements is the predominant challenge faced in accessing these markets, especially related to tropical fruit flies.

Given that Viet Nam now has the phytosanitary capacity required for the effective control of tropical fruit flies, it is now in a position to expand exports of mangosteenand rambutanto new markets. Korea has been chosen as the market with the greatest potential, both in terms of market demand and the likely success of gaining market access. Indeed, Viet Nam already has experience gaining access to the Korean market for exports of dragon fruit and mango. The Korean market is also seen as easing the way to gaining access to the Japanese and Australian markets.

There are currently two vapour heat treatment facilities in Viet Namthat are accredited by the Korean NPPO for the treatment of mango and dragon fruit prior to export. It is expected that other facilities will be registered in the near future. Although it is believed that these facilities can also be used to treat mangosteen and rambutan, research is needed to determine the effectiveness of this treatment for the

control of fruit fly on these fruits, the results of which will inform a technical document to be submitted to the Korean NPPO. Official controls will also need to be established and maintained to ensure compliance with Korean market requirements. Finally, there is a need for a training and public awareness programme within the industry.

4.8. *Controls on pesticide residues in rice (Option 10)*

Rice production plays a key food security role in Viet Nam as well as being critical for the livelihood of many small-scale producers. Whilst over 75 per cent of rice production in 2012 was consumed domestically, exports amounted to 7.3 million tonnes, valued at US$3.7 billion.

Japan has historically been a relatively small but high-value export market for rice from Viet Nam. In 2007, exports were valued at US$53 million. In 2007, however, pesticide residues were detected in a number of rice consignments as a result of which exports declined to near zero by 2008. In 2012, exports of rice to Japan restarted, with a value of US$20 million. The ability of Viet Nam to regain and grow its share of the Japanese market, however, is dependent on the implementation of GAP in rice production in order to bring about effective controls on pesticide usage. However, this is easier said than done; most rice production is on small farms, the production from which is procured and amalgamated by state-owned traders. Thus, potentially a large number of farmers would need training in GAP, whilst the value chain would need to permit traceability through the rice export value chain.

5. Results

The descriptions presented above, and the results of the stakeholder workshop, suggested that all 10of these options are credible options for SPS capacity-building. However, the associated costs and resulting benefits may well differ substantially, such that it is possible to define clear priorities amongst the options on the basis of the defined decision criteria and weights. Below the results of the prioritisation exercise are presented. These are derived using outranking analysis through the software package D-Sight.

To provide a first scan of the relative strengths and weaknesses of the 10capacity-building options, spider diagrams were constructed (Figures 2 to 13). Because of the relatively large number of options, a separate diagram is presented for each of the 12 decision criteria. Although this depiction only permits comparison of the capacity-building options according to the decision criteria on a one-by-one basis, it does enable the key dimensions along which each of the options performs relatively well/badly to be identified. As such, the spider diagrams are a useful way in which to present information on the SPS capacity-building options to more general (less technical)decision-makers.

Figures 2 and 3 present the up-front investment and on-going cost profiles of the 10 SPS capacity-building options. Food safety controls for aquaculture production of shrimp (Option 1) and Pangasius (Option 2) stand out as having the largest up-front investment by far, at US$240.7 million and US$104.6 million, respectively. Residue controls for honey exports has the lowest up-front investment at US$5,000. Food safety controls for aquaculture production of shrimp (Option 1) and Pangasius (Option 2) also have the highest on-going costs, at US$42.6million/annum and US$18.3 million/annum,

respectively. Plant pest controls for mangosteen exports (Option 8) and rambutan (Option 9) have the lowest on-going costs at US$10,000/annum.

Figure 2.Decision criteria measures scores for SPS capacity-building options – up-front investment (US$ million)

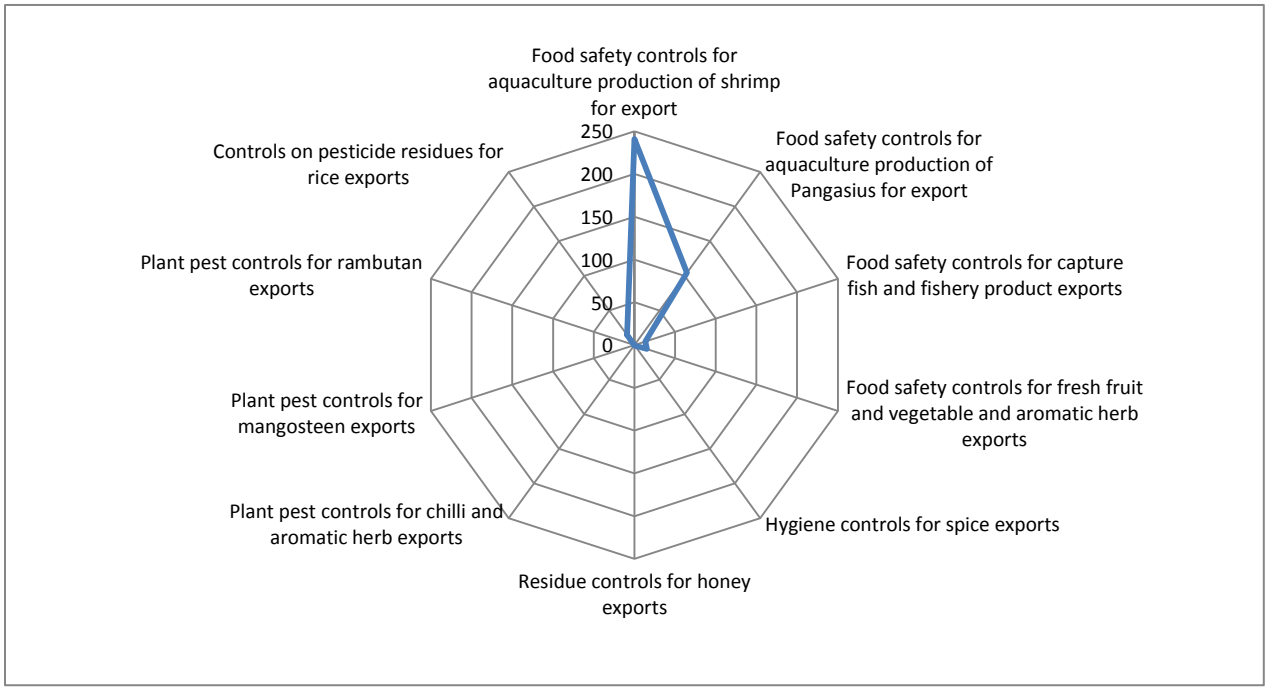
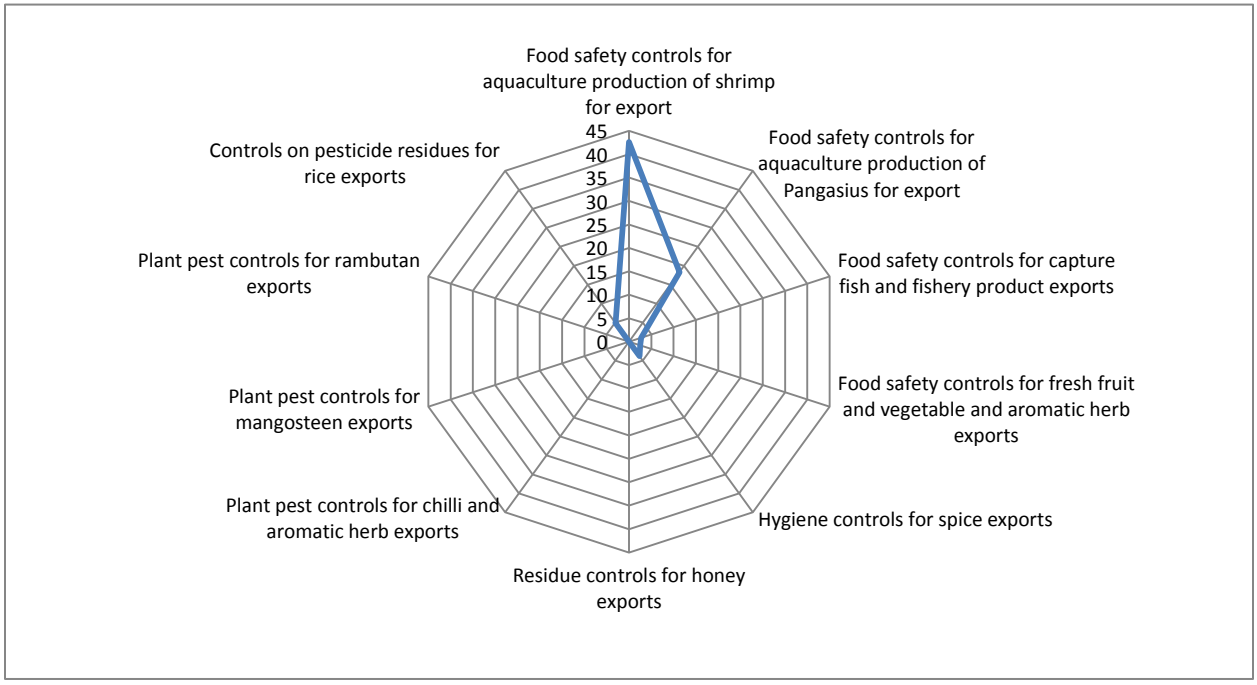


Figure 3.Decision criteria measures scores for SPS capacity-building options – on-going costs (US$million)



Of the 10 capacity-building options, food safety controls for aquaculture production of shrimp (Option 1) and Pangasius (Option 2) are judged to be most difficult to implement (Figure 4). Food safety controls for fresh fruit and vegetables and aromatic herb exports(Option 4) is the only option for which implementation is judged to be difficult, with all other options considered relatively easy to implement. Hygiene controls for spices and residues controls for honey are both judged to be 'very easy' to implement.

Figure 4.Decision criteria measures scores for SPS capacity-building options - difficulty of implementation

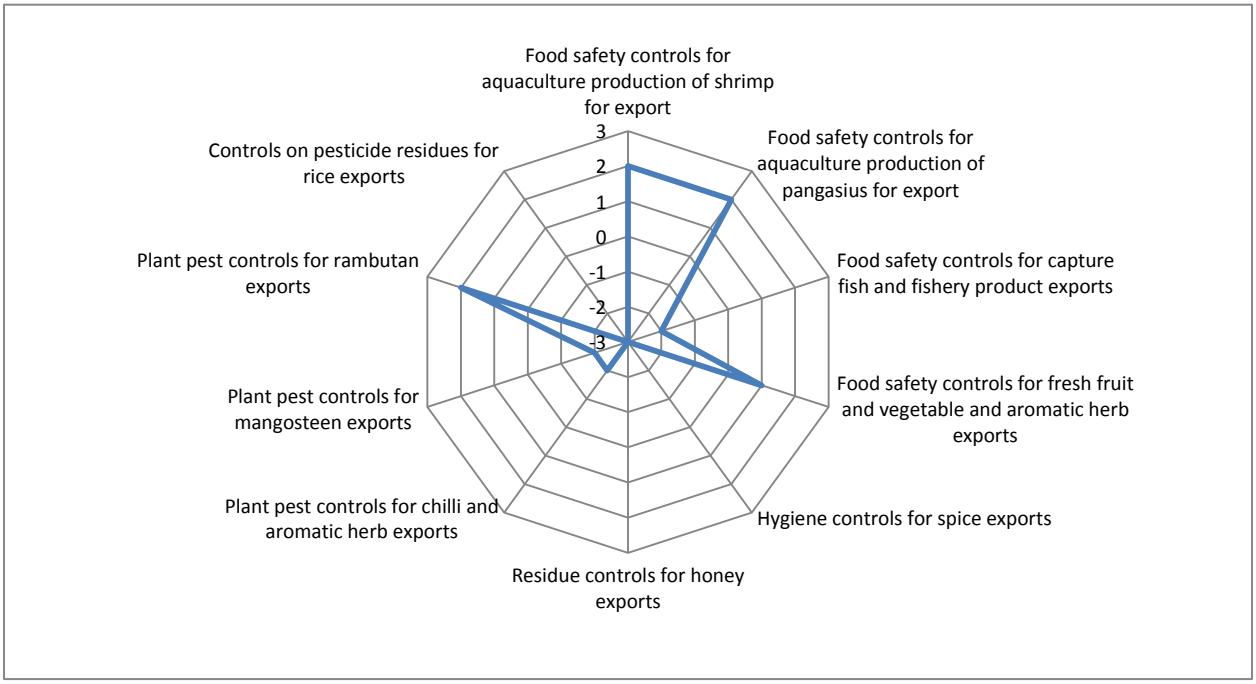


Figure 5 summarises the estimated impact of each of the 10 capacity-building options on the absolute value of exports; the degree to which they expand trade or avert reductions in the value of exports. Food safety controls for aquaculture production of Pangasius (Option 2) and Shrimp (Option 1) are estimated to have the largest impact on the aggregate value of exports by far, preventing losses of US$229.8 million and US$204.6 million, respectively. Plant pest controls for chilli and aromatic herb exports(Option 7) is judged to have minimal impact on the value of exports at US$3.1 million. The impact on the value of exports of plant pest controls for mangosteen exports (Option 8) and rambutan (Option 9) are also judged to be small, at US$4.9 million and US$5 million, respectively.

Residues controls for honey exports (Option 6) and food safety controls for aquaculture production of shrimp (Option 1) and Pangasius (Option 2) are judged to have the largest positive impact in terms of trade diversification (Figure 6). By facilitating access to EU markets, Option 6 is likely to reduce reliance on honey exports to the US, which currently account for 95 per cent of trade. Both Options 1 and 2 will prevent loss of access to key industrialised country markets, namely the EU, US, Japan and/or Australia which would necessitate greater reliance on regional trade. All other capacity-building options are likely to have minimal or zero impact on the diversity of trade across products and/or markets.

Figure 5.Decision criteria measures scores for SPS capacity-building options- change in absolute value of exports (US$ million)

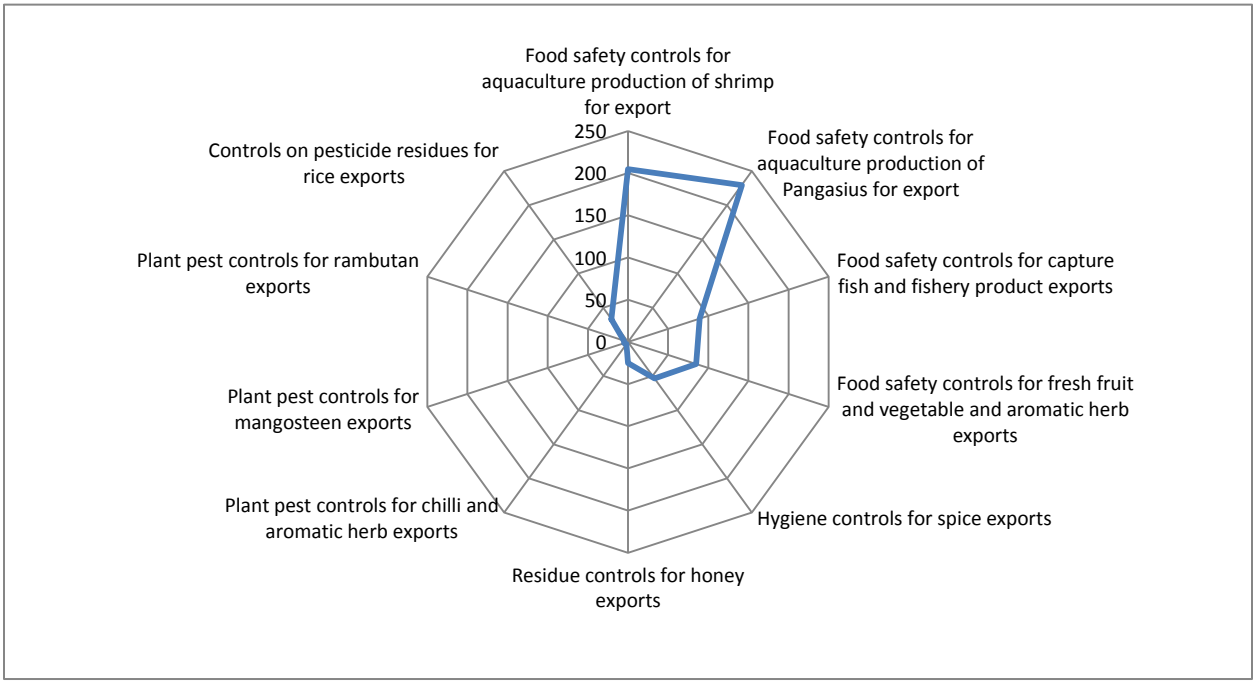


Figure 6.Decision criteria measures scores for SPS capacity-building options - trade diversification

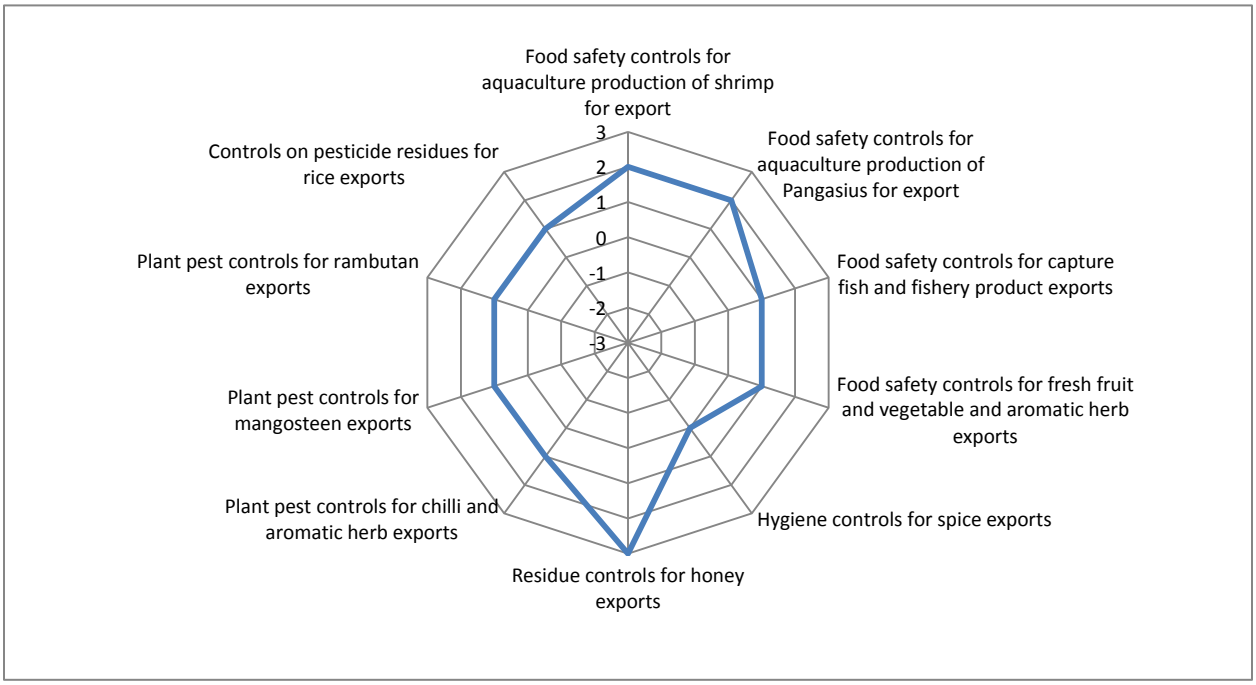
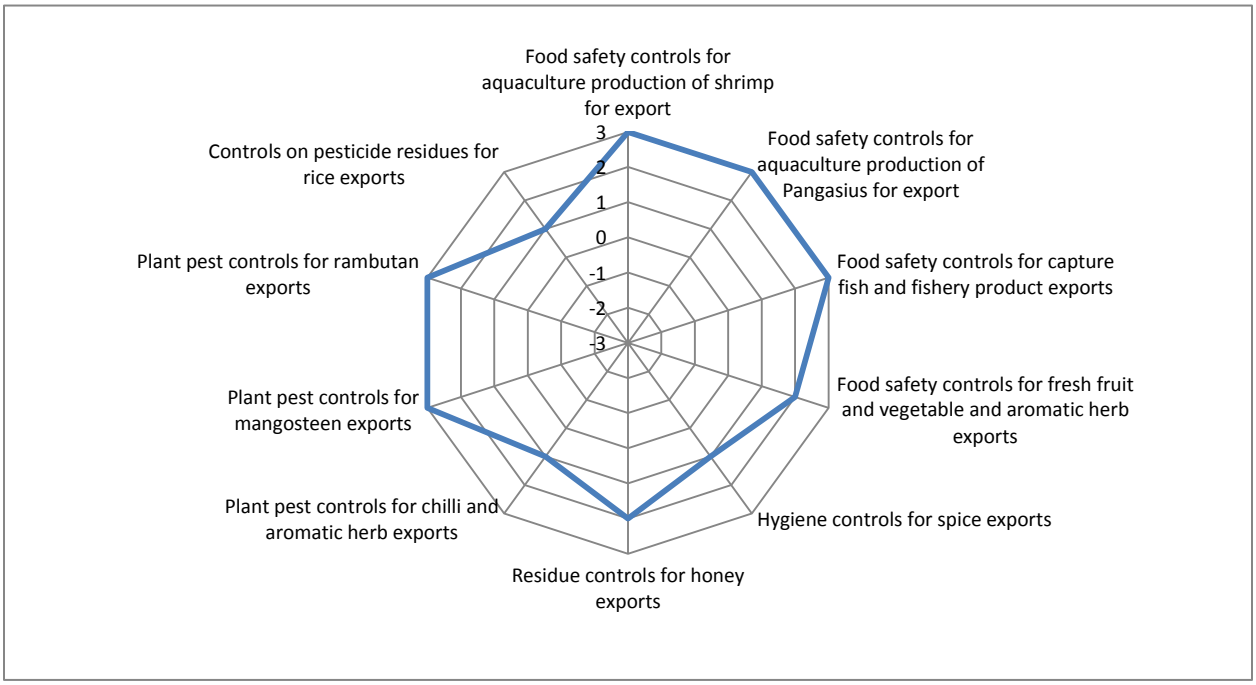


Figure 7 reports the scores attached to the 10 capacity-building options for the impact on Viet Nam's reputation internationally in terms of the efficacy of SPS controls. Both food safety controls for aquaculture production of shrimp (Option 1) and Pangasius (Option 2) are judged to have a 'large' positive impact on Viet Nam's reputation. Food safety controls for capture fish and fishery product

exports (Option 3), food safety controls for fresh fruit and vegetables and aromatic herb exports (Option 4) and controls on pesticide residues for rice exports (Option 10) and all likely to have a 'moderate' impact. All other options are likely to have minimal impact on Viet Nam's international reputation in terms of the efficacy of SPS controls.

Figure 7. Decision criteria measures scores for SPS capacity-building options –international reputation



Of the 10 capacity-building options, food safety controls for aquaculture production of shrimp (Option 1) and Pangasius (Option 2) are the only options judged to have a 'large' positive impact on Viet Nam's ability to deal with future SPS problems (Figure 8). Food safety controls for capture fish and fishery product exports (Option 3), food safety controls for fresh fruit and vegetables and aromatic herb exports (Option 4) and controls on pesticide residues for rice exports (Option 10) are judged to increase Viet Nam's ability to deal with future SPS problems by a 'moderate' amount. All other options are judged to have a minimal impact.

Figures 9 to 11 capture the domestic impacts of the 10 capacity-building options, on agricultural/fisheries productivity, domestic public health and environmental protection. With the exception of residue controls for spice exports (Option 5), all of the options are judged to have a positive and 'moderate' impact on agricultural/fisheries productivity. With the exception of hygiene controls for spice exports (Option 6) and controls on pesticide residues for rice exports (Option 10), none of the options are expected to impact on domestic public health. Even with these two options, the impact is expected to be moderate. Whilst controls on pesticide residues for rice exports (Option 10) is expected to have a 'moderate' positive environmental impact, food safety controls for capture fish and fishery product exports (Option 3) is predicted to have a 'moderate' adverse impact. With the exception of food safety controls for fresh fruit and vegetables and aromatic herb exports (Option 4) and residue controls for honey exports (Option 6) which are judged to a have minimal positive environmental impacts, all other options are judged to have little or no environmental impact.

Figure 8. Decision criteria measures scores for SPS capacity-building options –capacity to deal with future SPS problems

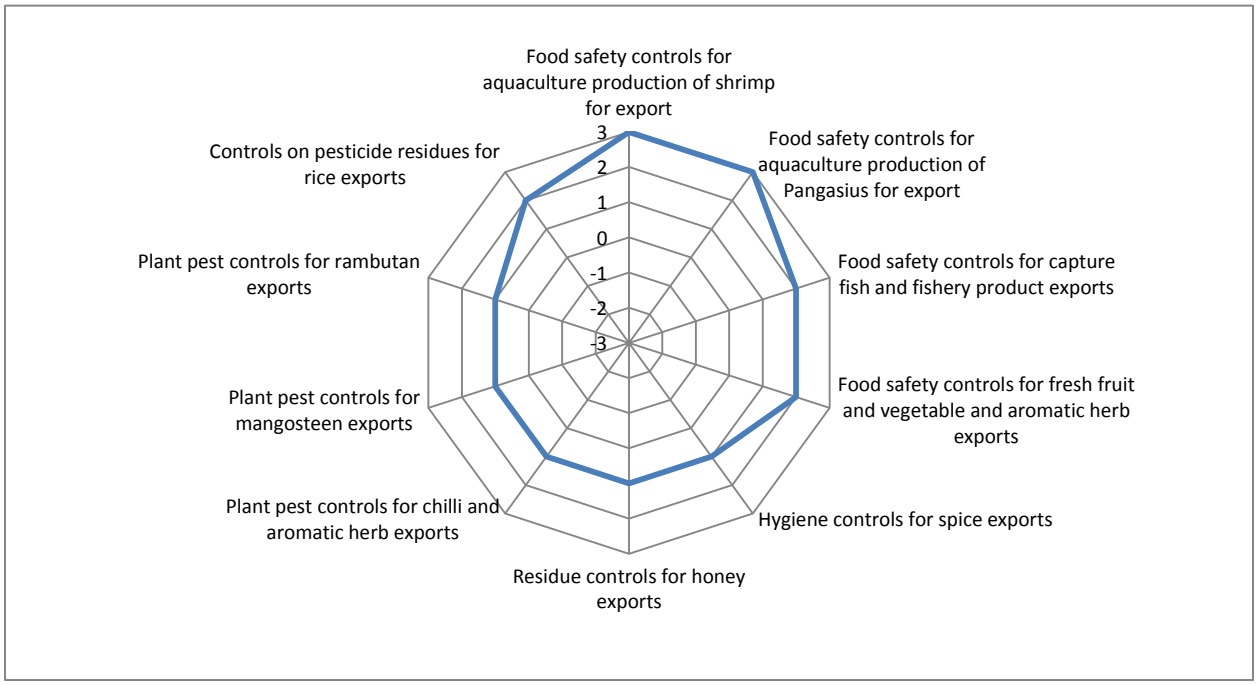


Figure 9.Decision criteria measures scores for SPS capacity-building options – agricultural/fisheries productivity

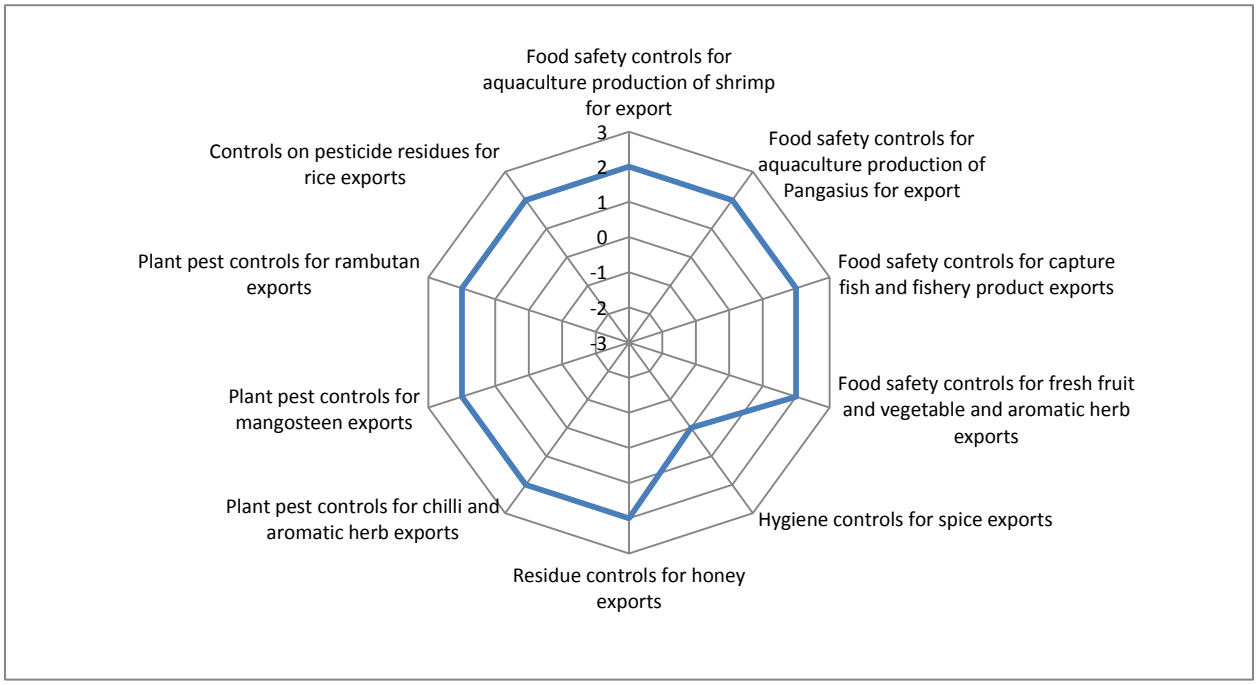
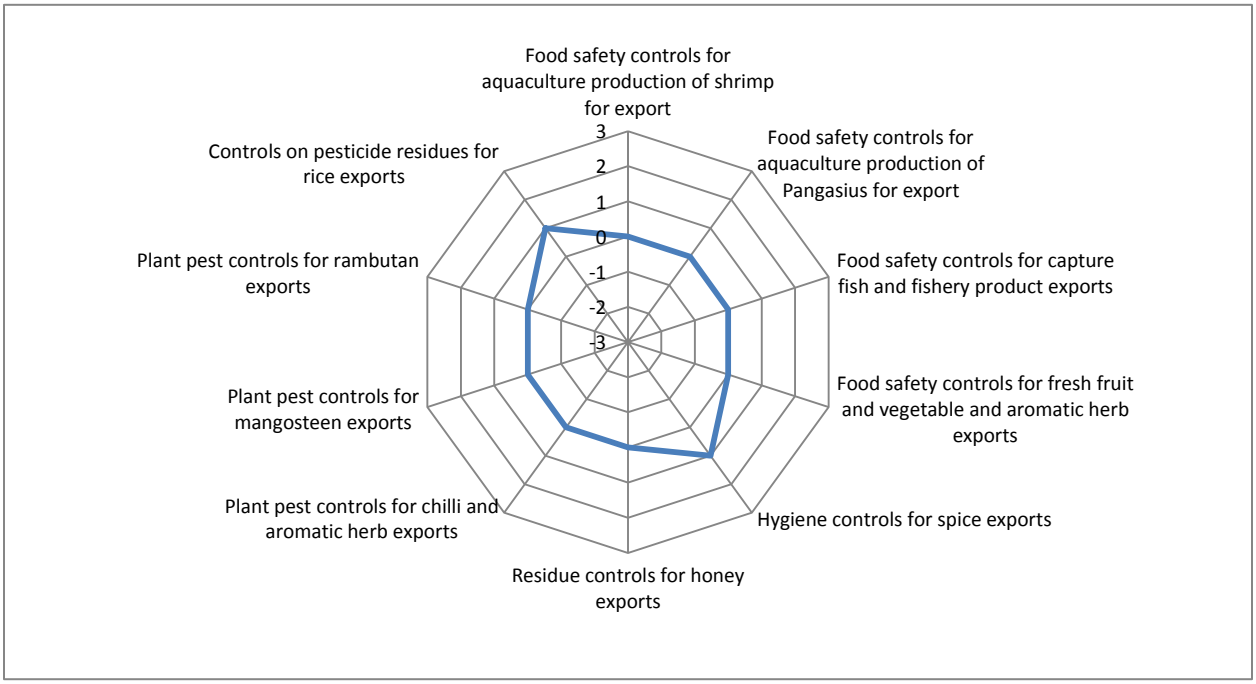


Figure 10.Decision criteria measures scores for SPS capacity-building options -domestic public health



The livelihood impact of the 10 capacity-building options is judged on a scale from -100 to +100, that is itself the product of two scales that assess the scale (0 to 10) and magnitude (-10 to +10) of any impact on the livelihood of poor people in Viet Nam (see Table 8). Food safety controls for aquaculture production of shrimp (Option 1) and Pangasius (Option 2) are judged to have the largest positive impact on livelihoods, with scores of 90 and 85, respectively. The magnitude of the expected impact is reflective of the fact that so many people derive their livelihood from the aquaculture sector in Viet Nam, such that the scale of any impact is likely to be very large. The livelihood impact of food safety controls for capture fish and fishery product exports (Option 3) is also considered to be appreciable, with a score of 50. Both plant pest controls for rambutan exports (Option 9) and plant pest controls for chilli and aromatic herb exports (Option 7) are expected to have minimal impacts on livelihoods with scores of three and six, respectively. These low scores are reflective of the fact that only small numbers of people derive their livelihoods from these sectors.

Finally, Figure 13 reports the expected impact of the 10 capacity-building options on vulnerable groups, notably women, children, people in marginal areas, etc. Whilst residue controls for honey exports (Option 6) is judged to have a 'large' and positive impact on vulnerable groups, notably women and people in marginal areas, conversely food safety controls for aquaculture production of shrimp (Option 1) and Pangasius (Option 2) are judged to have a 'moderate' negative impact. In both of the latter cases, the implementation of GAP is likely to bring about a process of consolidation in the aquaculture sector, likely to the detriment of small-scale and poor producers.

Figure 11.Decision criteria measures scores for SPS capacity-building options -environmental protection

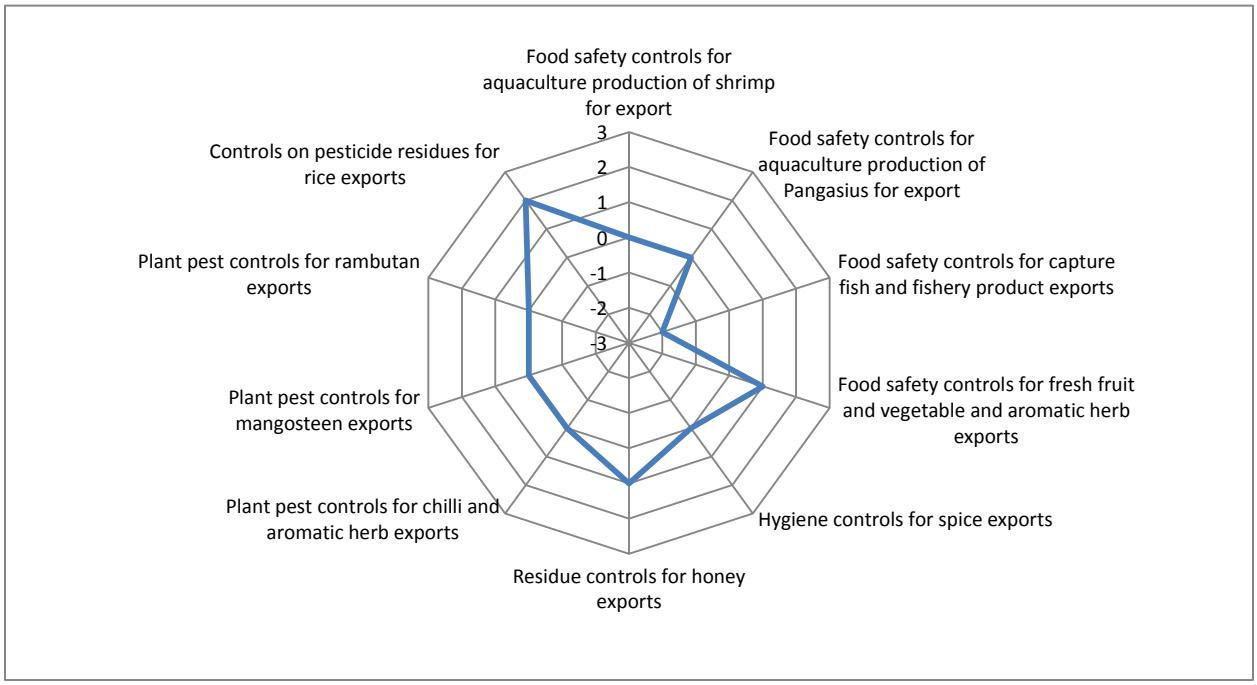


Figure 12.Decision criteria measures scores for SPS capacity-building options -livelihood impact

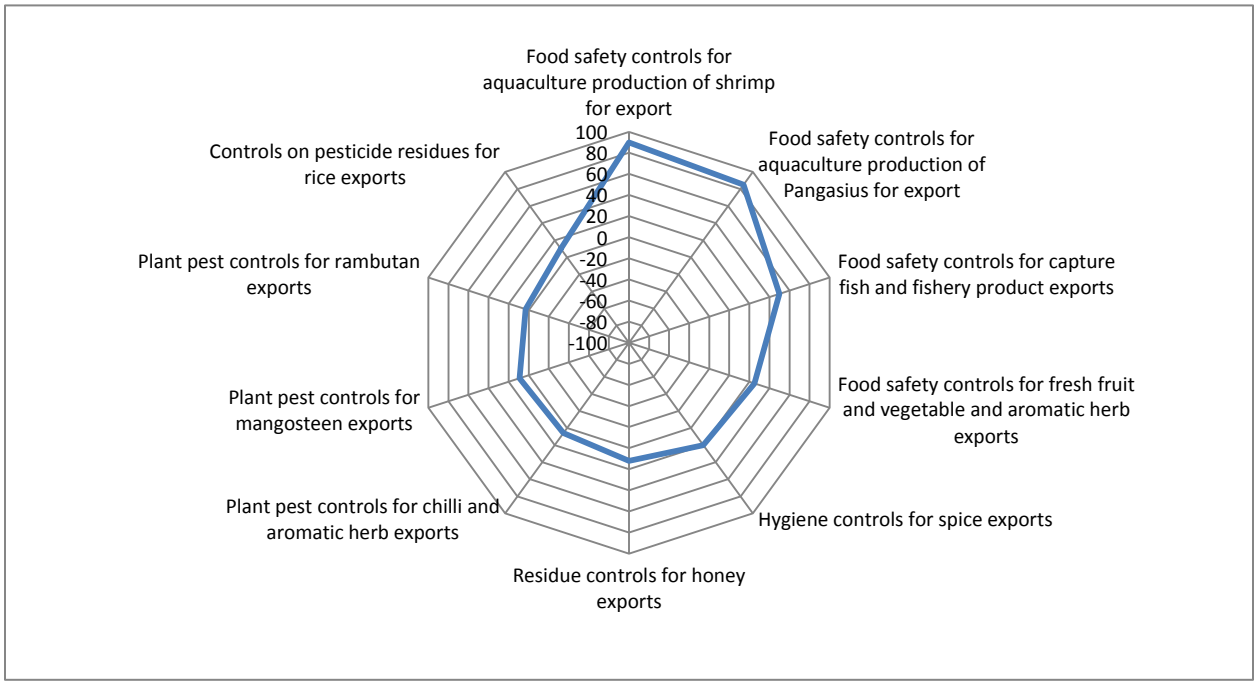
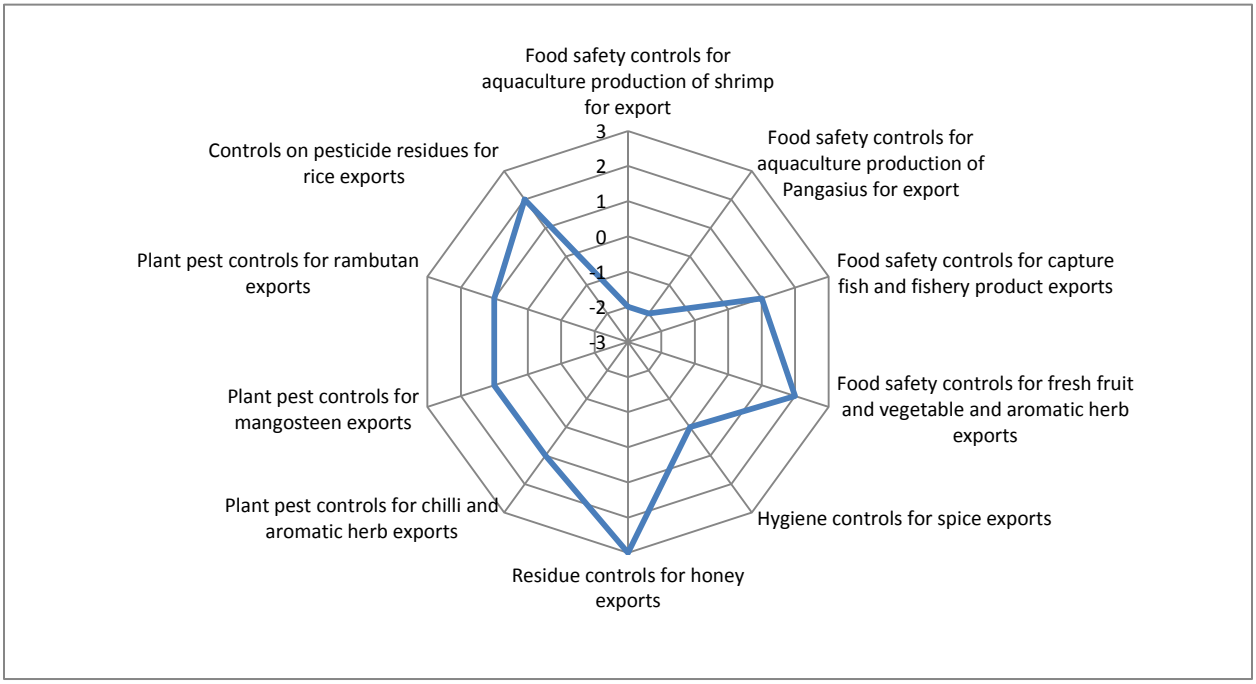


Figure 13. Decision criteria measures scores for SPS capacity-building options - impact on vulnerable groups



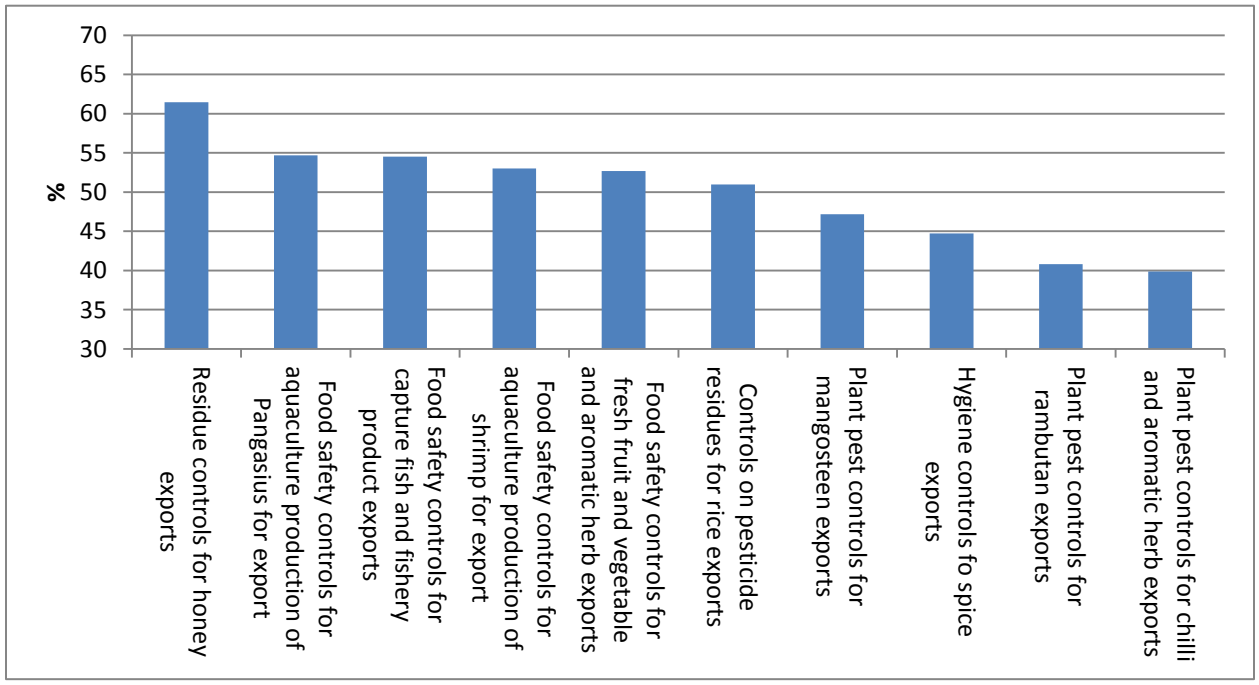
It is apparent that none of the 10SPS capacity-building options dominates across all or even most of the 12decision criteria, such that it is not immediately apparent how these options should be prioritised. That is where the outranking analysis comes in; it compares each of the capacity-building options on a pair-wise basis with respect to each of the 12 decision criteria in turn. Each of these comparisons determines whether one option dominates (or is dominated by) another and by how much. The aggregate of all of these comparisons, taking account of the defined decision weights, gives an overall measure of preference, what is termed the 'net flow'. The maximum score an option can have is 100 per cent; when a particular options dominates (is better than) all other capacity-building options across all 12 decision criteria. The minimum score is zero per cent; when an option is dominated by (is worse than) all other capacity-building options under consideration across all 12 decision criteria. Thus, the higher the percentage score, indicating better performance overall across the 12 decision criteria, the higher a capacity-building option is ranked.

Figure 14 reports the net flows for the 10 SPS capacity-building options for the baseline model; that is the prioritisation derived using the decision weights defined in the stakeholder workshops. The options are ordered according to decreasing score, and so declining priority. It is important to note that the scores indicate relative priority. Importantly, a low score does not suggest that a particular capacity-building option is not worth investing in; all of the options bring about benefits of one kind or another. Rather, a high/low ranking suggests that a particular option should be invested in before/after other options that are ranked lower/higher.

The capacity-building option judged to be top priority on the basis of the 12 decision criteria is residue controls for honey exports (Option 6). Other highly-ranked options are food safety controls for aquaculture production of Pangasius for export (Option 2) and food safety controls for capture fish and

fishery product exports (Option 3). Food safety controls for aquaculture production of shrimp for export (Option 1) and Food safety controls for fresh fruit and vegetable and aromatic herb exports (Option 4) are also ranked in the top five. Plant pest controls for chilli and aromatic herb exports (Option 7) and Plant pest controls for rambutan exports (Option 9) are ranked bottom of the 10 capacity-building options covered by the analysis.

Figure 14.Net flows for baseline model



The ranking of each of the capacity-building options reflects the score it achieves for each of the 12 decision criteria – how well it performs relative to each of the other options in the analysis – weighted according to the decision weights. Figure 15 shows the contribution that each of the 12 decision criteria makes to the overall score achieved by the 10 options. For example, the trade and livelihood impact criteria alone account for 42 per cent of the overall score achieved by total food safety controls for aquaculture production of Pangasius for export (Option 2). Indeed, for four of the five top-ranked capacity-building options, the trade and livelihood impacts account for the largest proportion of the overall score achieved. The top-ranked option - residue controls for honey exports (Option 6) - is, however, somewhat different. This is a low-cost option that performs relatively well across the 12 decision criteria.

The prioritisation of the 10 SPS capacity-building options reflects a trade-off or compromise between the 12decision criteria; note that even the top-ranked option only achieves a score of 62 per cent (Figure 14). It is instructive, therefore, also to examine how each of the capacity-building options performs relative to one another across the 12 decision criteria (Figures 16 to 25). For example, residue controls for honey exports (Option 6) scores 100 per cent for up-front investments; it has the lowest up-front costs. It also scores highly for impact on trade diversification (94%), impact on vulnerable groups (94%) and difficulty of implementation (81%); Option 6 is evidently better than most (but not all) of the other capacity-building options according to these decision criteria. It scores relatively low, however, on trade

impact (31%) and ability to deal with future SPS problems (33%); the majority of the other options score better according to these criteria. Whilst plant pest controls for chilli and aromatic herb exports (Option 7) is ranked bottom, it has a relatively high score for up-front investment (89%) and on-going costs (78%); this is a low-cost option. However, it scores zero for trade impact - it is worse than all other options on this criterion – and has scores less than 45 per cent for six of the 12 decision criteria.

Figure 15.Baseline model – criteria contribution to option scores

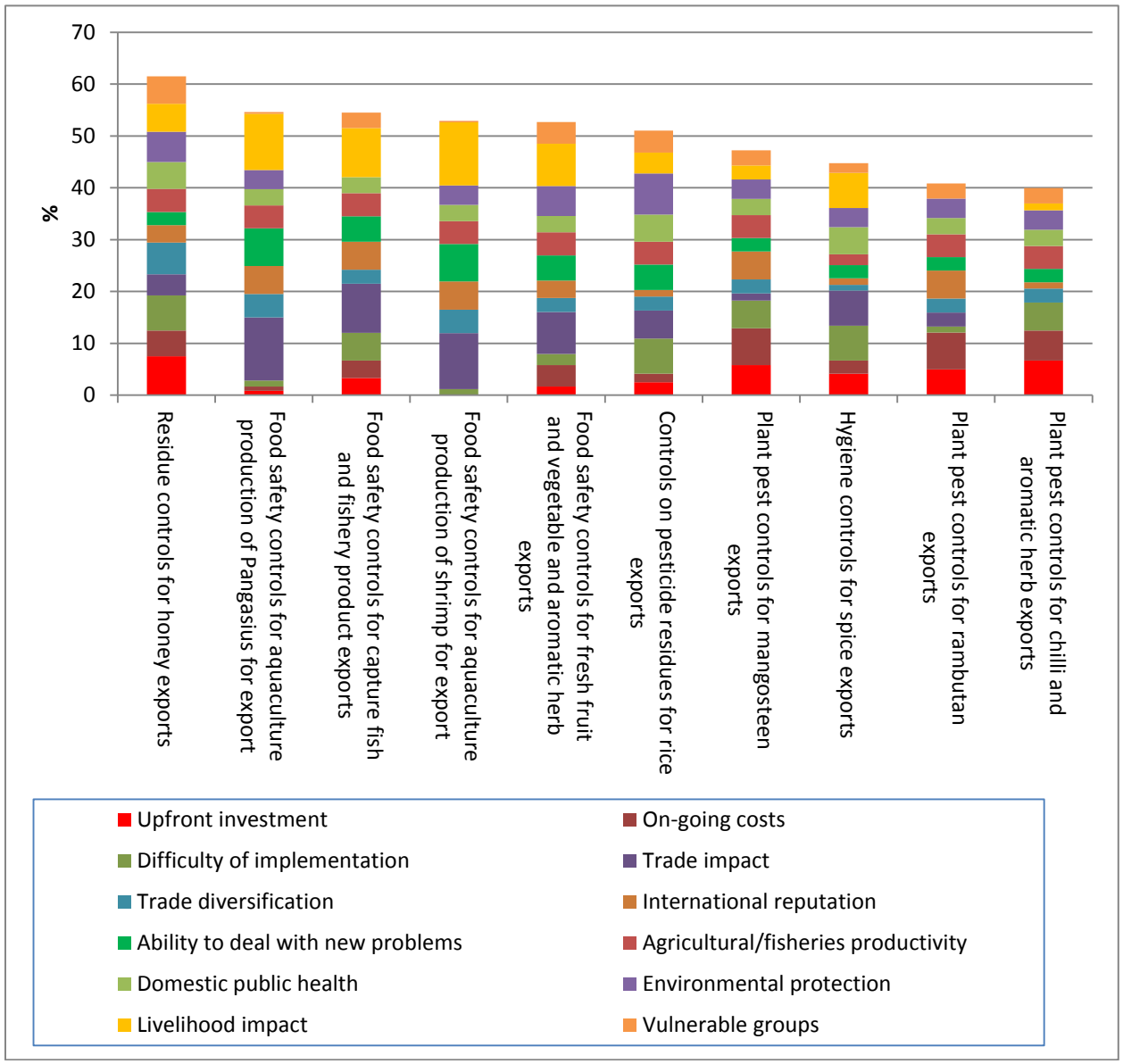


Figure 16. Decision criteria scores from baseline model – Food safety controls for aquaculture production of shrimp for export(Option 1)

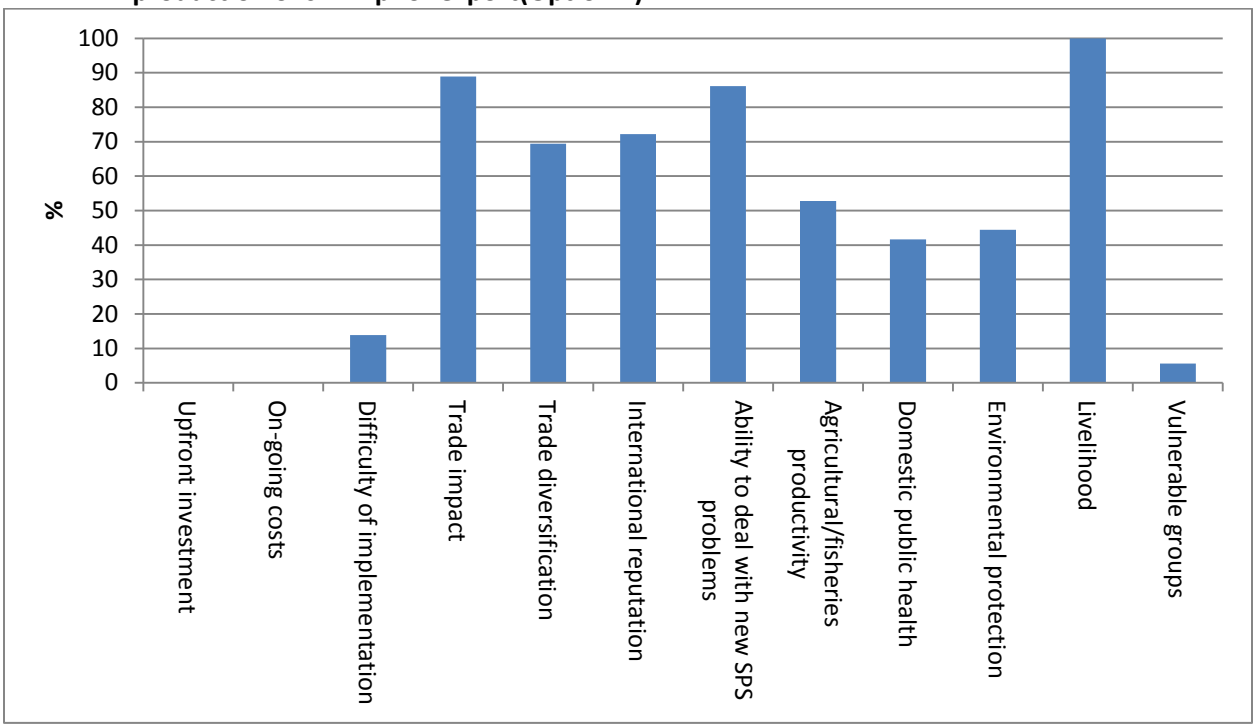


Figure 17. Decision criteria scores from baseline model – Food safety controls for aquaculture production of Pangasius for export (Option 2)

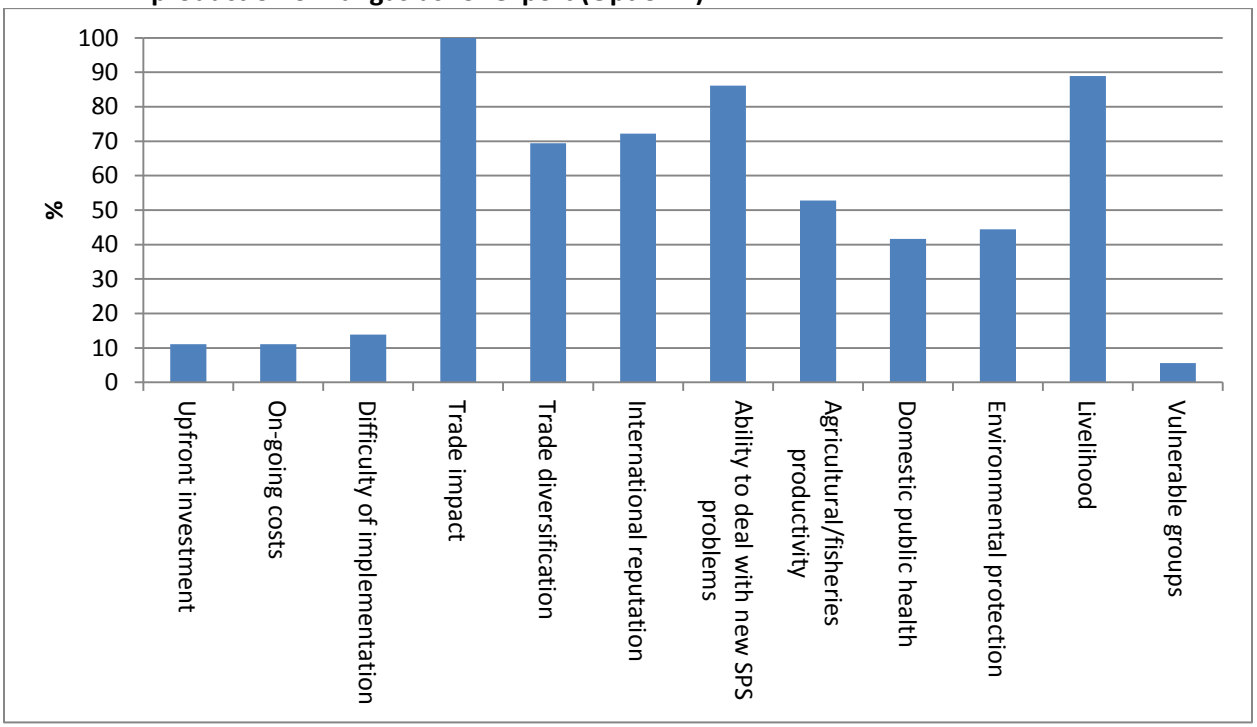


Figure 18. Decision criteria scores from baseline model – Food safety controls for capture fish and fishery product exports (Option 3)

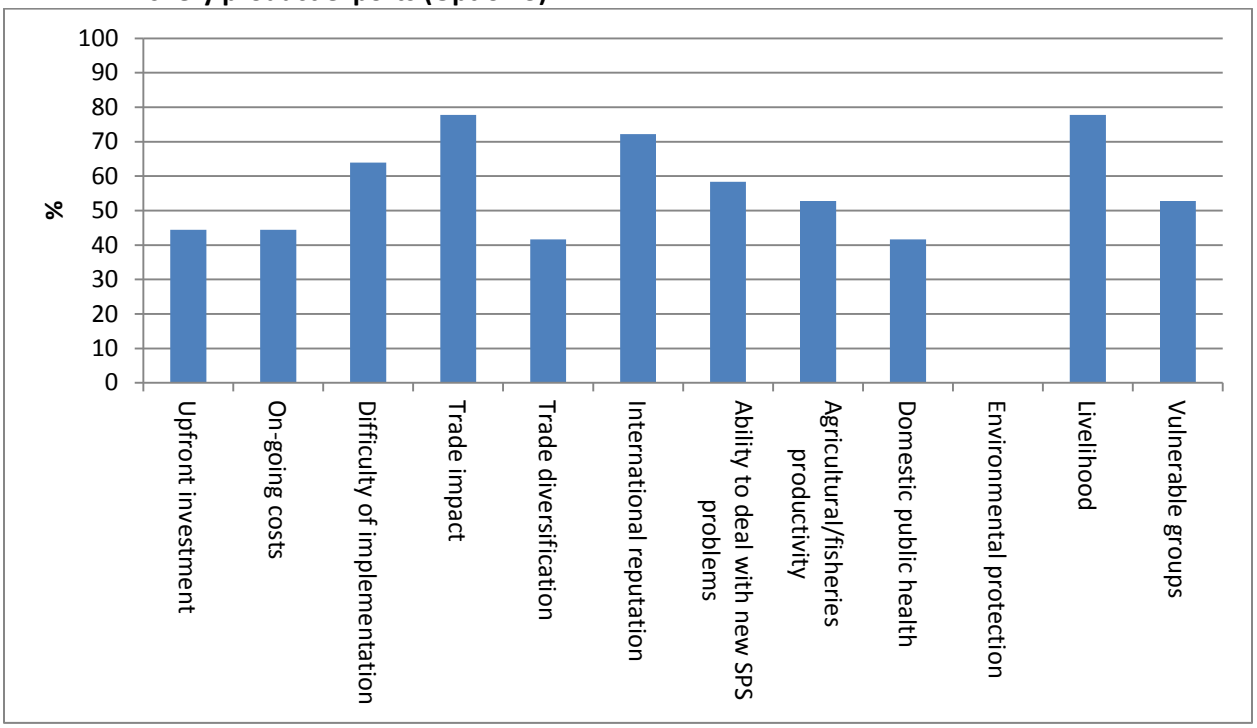


Figure 19. Decision criteria scores from baseline model – Food safety controls for fresh fruit and vegetable and aromatic herb exports (Option 4)

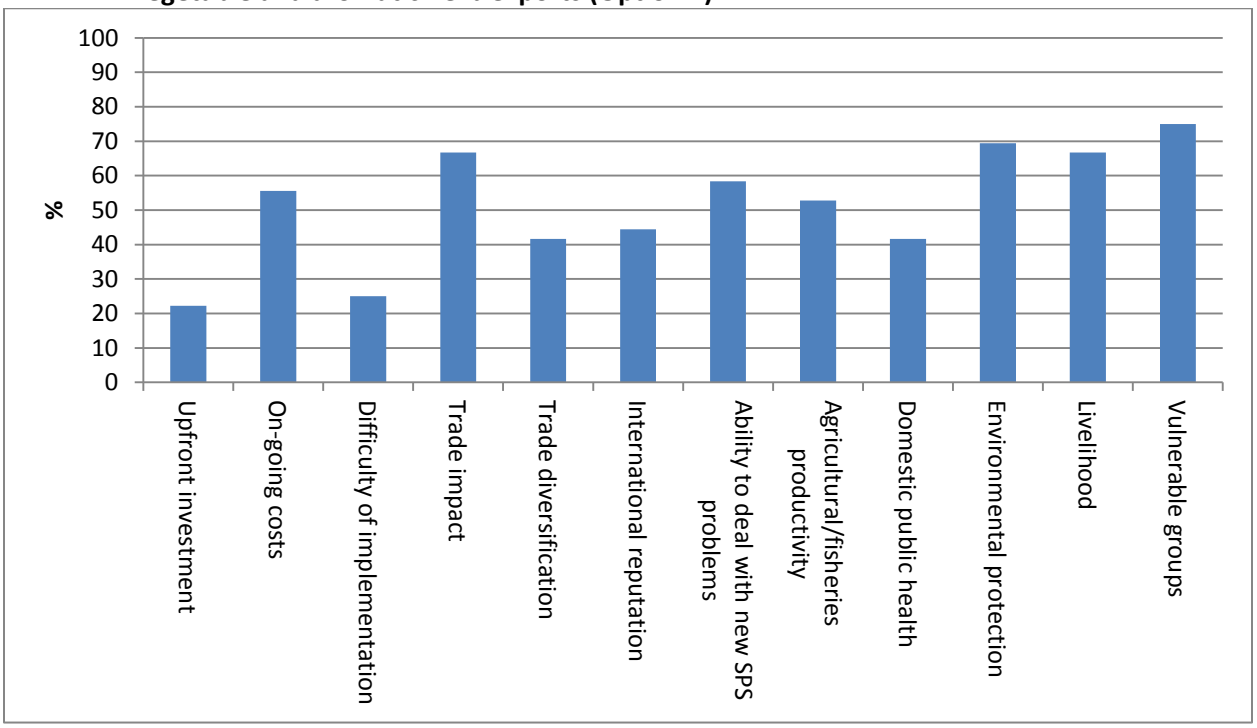


Figure 20.Decision criteria scores from baseline model – Hygiene controls for spice exports (Option 5)

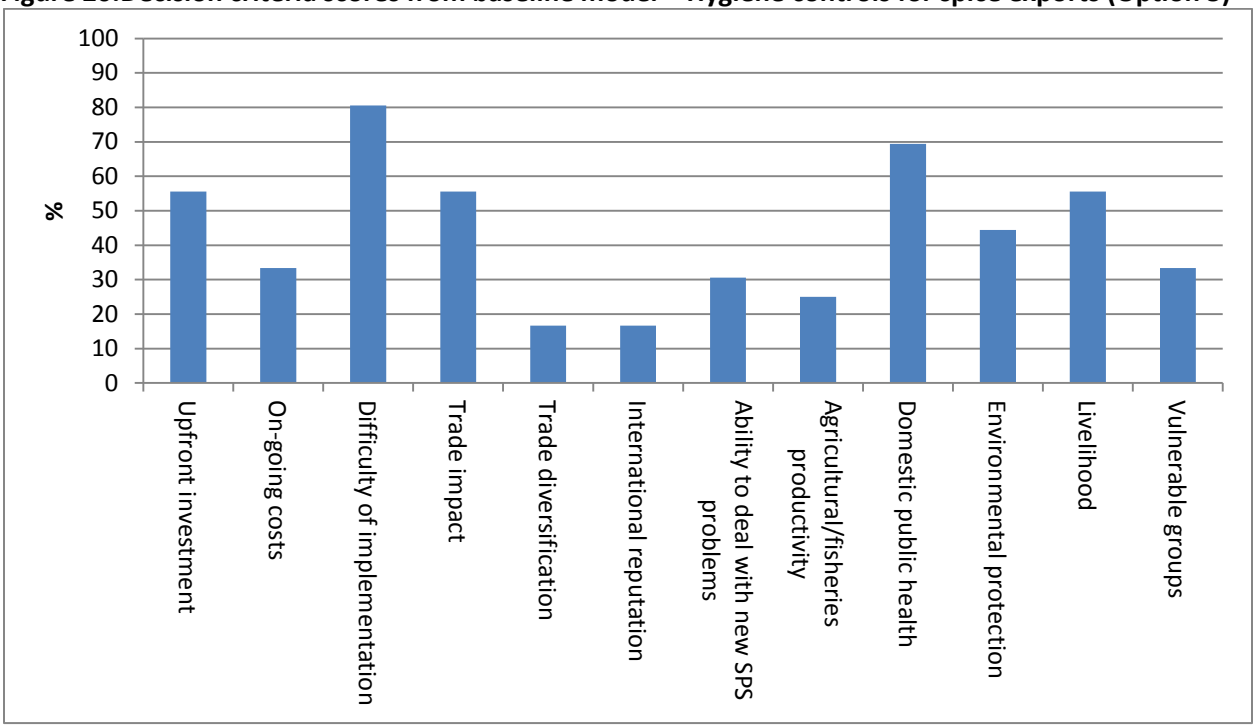


Figure 21. Decision criteria scores from baseline model – Residue controls for honey exports (Option 6)

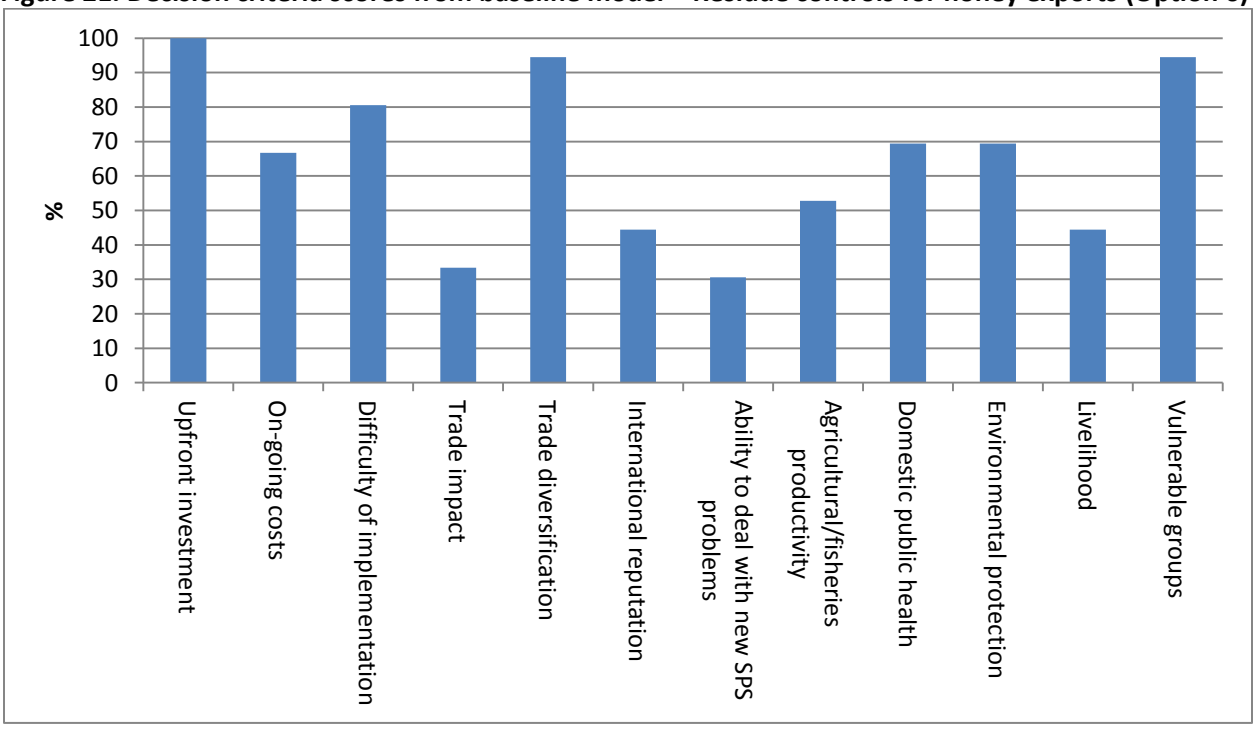


Figure 22. Decision criteria scores from baseline model – Plant pest controls for chilli and aromatic herb exports (Option 7)

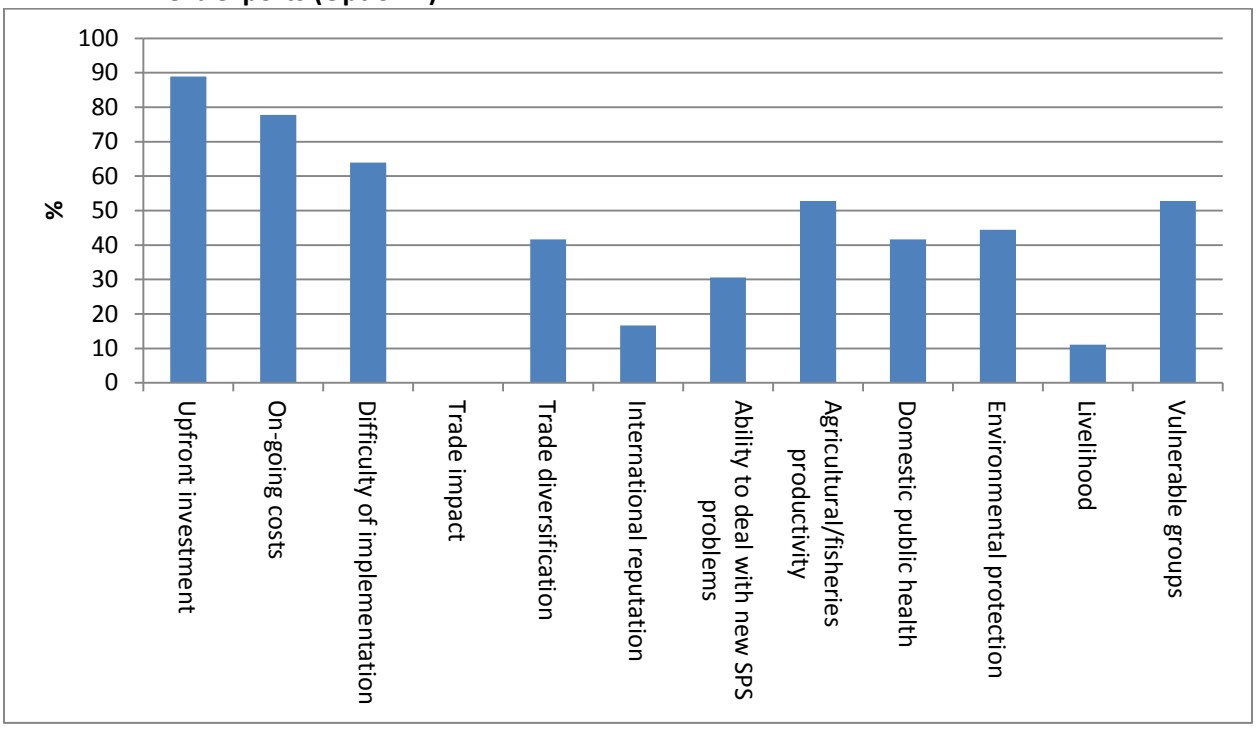


Figure 23. Decision criteria scores from baseline model –Plant pest controls for mangosteen exports (Option 8)

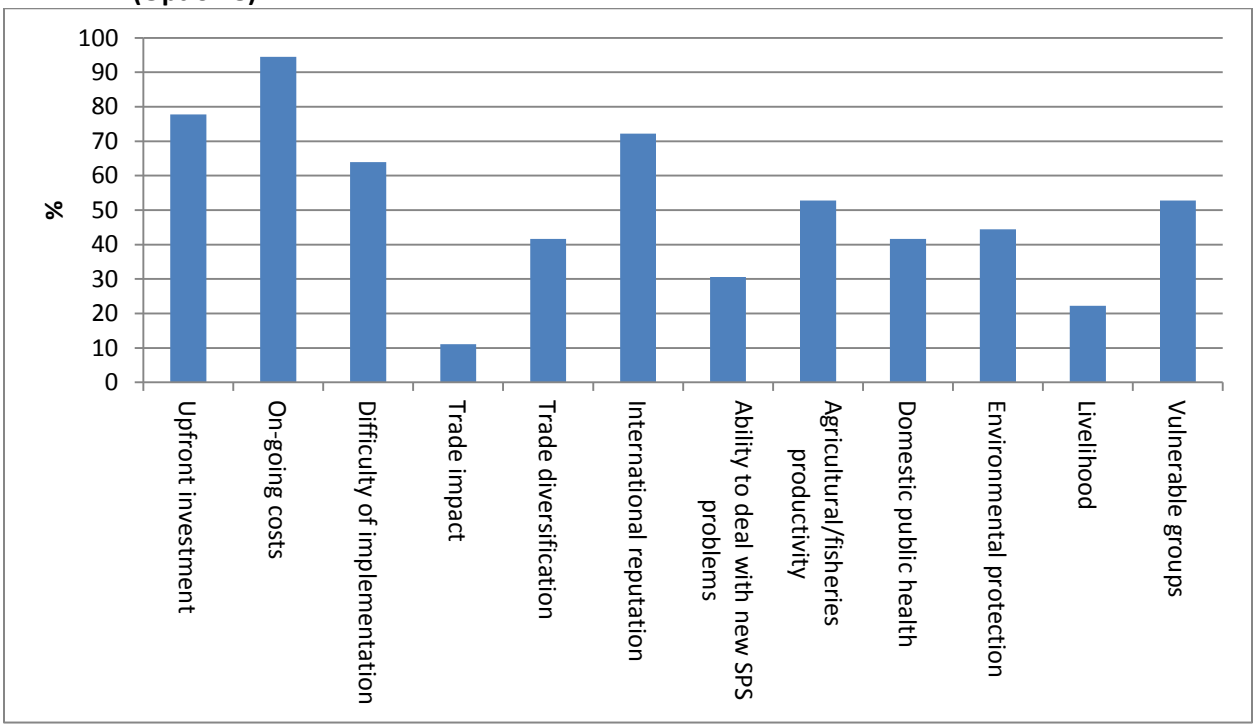


Figure 24. Decision criteria scores from baseline model –Plant pest controls for rambutan exports (Option 9)

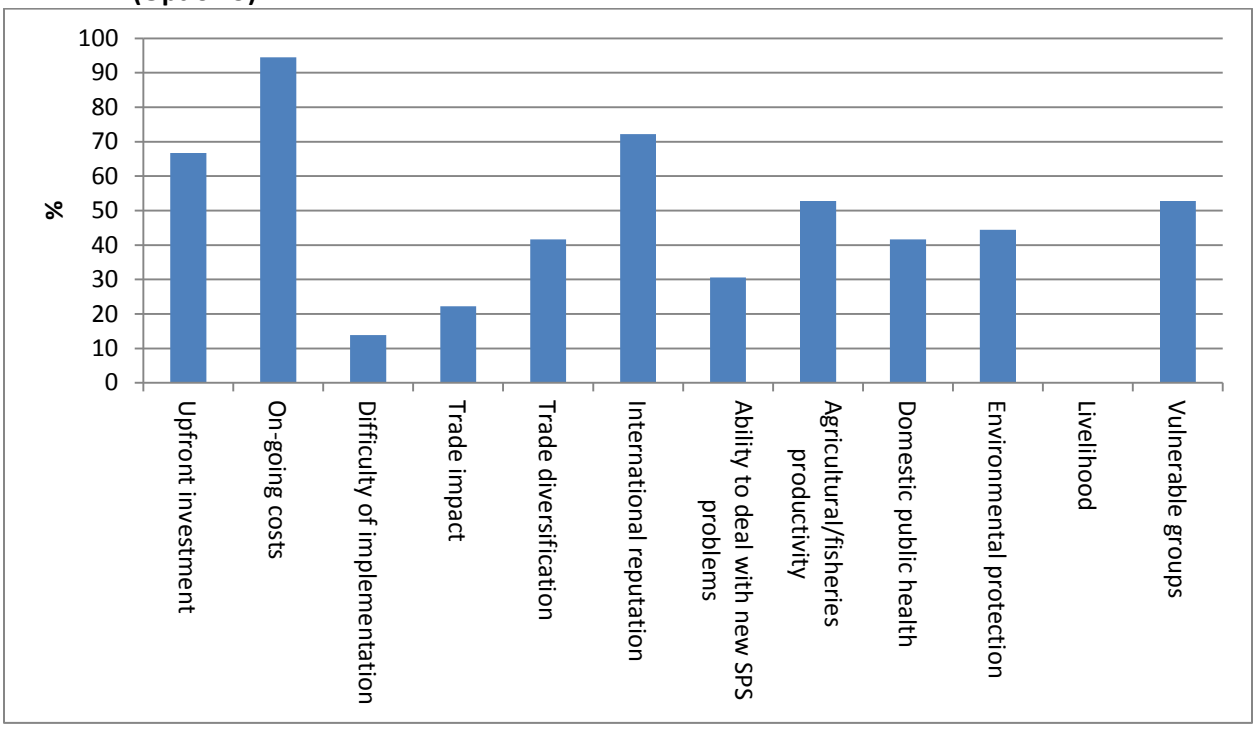
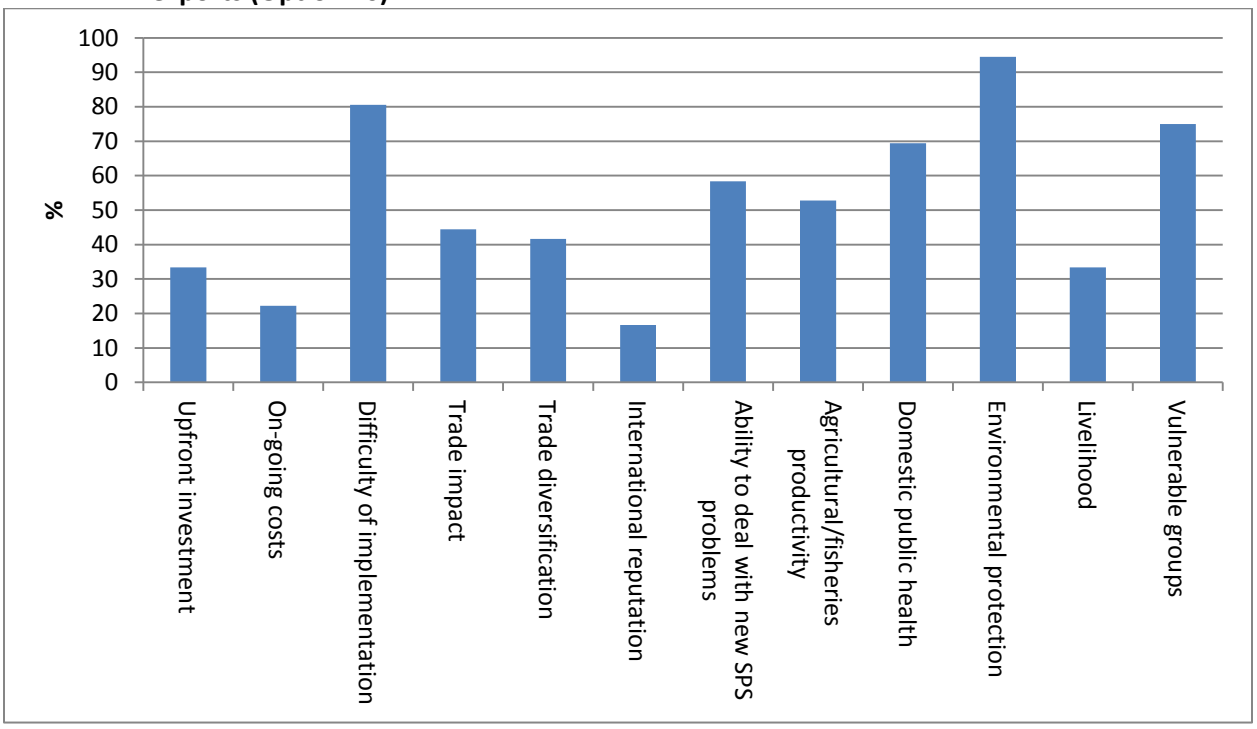


Figure 25. Decision criteria scores from baseline model – Controls on pesticide residues for rice exports (Option 10)



The core results of the analysis are based on the decision criteria and weights derived from the stakeholder workshops. These arguably represent the most valid prioritisation. It is important to recognise, however, that different stakeholder groups might have distinct perspectives on the criteria that should drive the prioritisation of the capacity-building options and/or the weights that should be assigned to particular criteria. Such differences can lead to conflict in decision-making processes, such that it is important to ascertain where distinct perspectives on the decision criteria have an appreciable impact on the prioritisation and where they do not. In cases where the prioritisation is insensitive to changes in the decision criteria, it should be relatively easy to come to collective agreement on which options should be prioritised. Where changes to the decision criteria, conversely, have appreciable impacts on the prioritisation it may be necessary to enter into a more extensive process of consultation or to explore the reasons why different stakeholder groups put more or less weight on particular criteria.

Figures 26 and 27 present alternative scenarios, the aim of which is to ascertain the sensitivity of the results of the baseline model to changes in the decision criteria. The first of these alternative models assumes that all 12 of the decision criteria are weighted equally. Implicitly this negates the weightings derived in the stakeholder workshop. For example, it might be viewed that the workshop was not representative of stakeholders more generally, or was biased towards particular interests. As in the baseline model, residue controls for honey exports (Option 6) is ranked first. Food safety controls for capture fish and fishery product exports is also ranked highly (Option 3); third in the equal weights model compared to second in the baseline model (Figure 14). However, food safety controls for aquaculture production of shrimp (Option 1) and Pangasius (Option 2), which are ranked second and fourth in the baseline model, drop to seventh and sixth in the equal weights model, respectively. Food safety controls for fresh fruit and vegetable and aromatic herb exports (Option 4) is also ranked in the top five, as in the baseline model.

The second alternative model (Figure 27), which could conceivably be the perspective of the Ministryof Industry and Trade**,**, assumes that the prioritisation of SPS capacity-building should be driven by cost-effectiveness at driving increased exports alone, whilst taking account of the difficulty likely to be faced in implementation. Thus, this model only includes the following decision criteria: upfront investment, on-going costs, difficulty of implementation andchange in absolute value of exports. The respective weightings from the baseline models are preserved. Again, residue controls for honey exports (Option 6) and food safety controls for capture fish and fishery product exports (Option 3) are ranked highly. However, food safety controls for aquaculture production of shrimp (Option 1) and Pangasius (Option 2) drop to tenth and ninth position, respectively. Plant pest controls for chilli and aromatic herb exports (Option 7), and plant pest controls for mangosteenexports (Option 8), which are ranked tenth and seventh in the baseline, are both amongst the top five capacity-building options.

Figure 26. Net flows for equal weights model

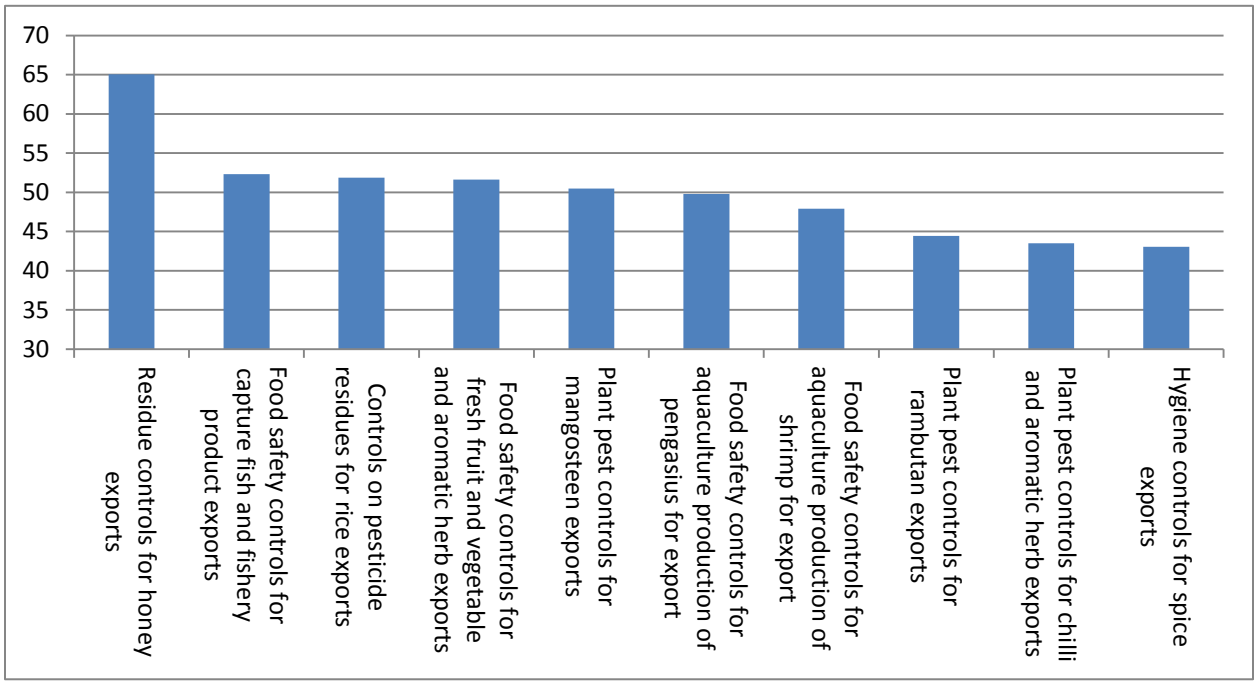
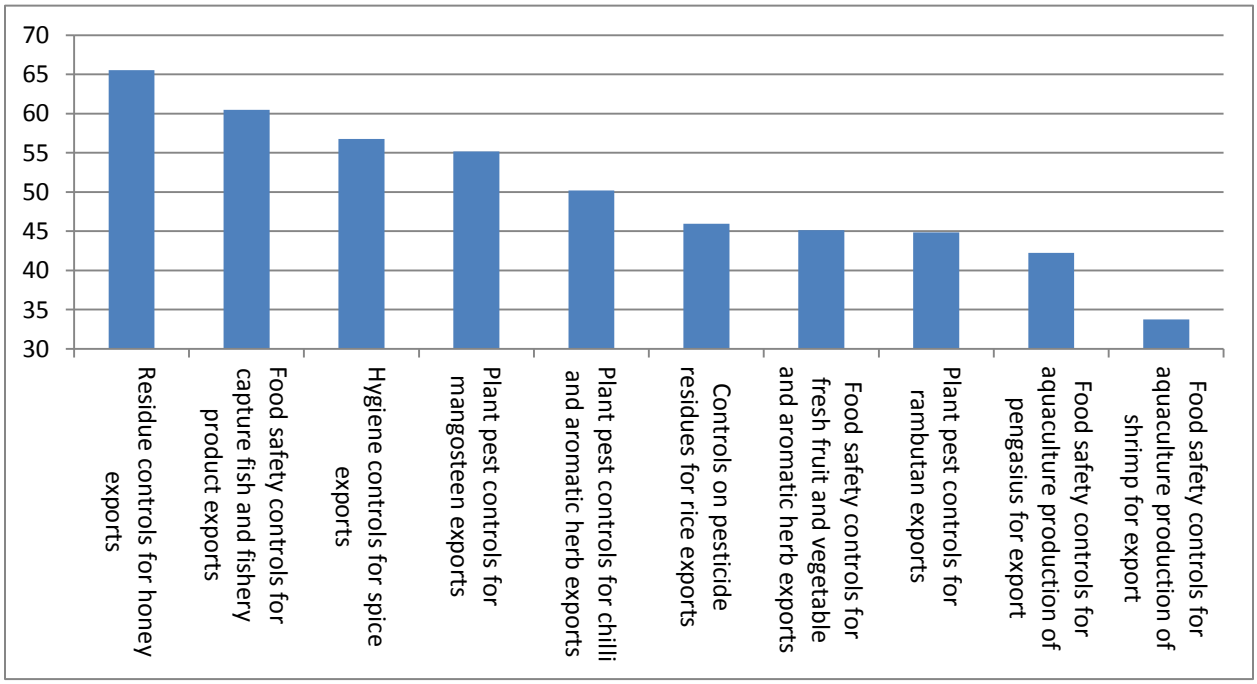


Figure 27. Net flows for cost/difficulty of implementation and aggregate trade impact model



6. Conclusions

This report presents the initial results of a priority-setting exercise for SPS capacity-building in Viet Nam. The priorities were defined using a prioritisation framework based on MCDA, which provides a structured and transparent approach to ranking capacity-building options on the basis of predefined and

agreed decision criteria. The options to be considered were identified through a process of stakeholder consultation that was informed by a review of prior assessments of SPS capacity. In this case, 45 distinct SPS capacity-building options were identified, of which 35 were subsequently excluded as not representing substantive SPS issues. The 10 remaining capacity-building options were then prioritised on the basis of a series of 12 decision criteria to which weights were applied, both of which were derived through a similar process of stakeholder consultation. These criteria cover the upfront and on-going costs and difficulty of implementing the capacity-building options and the pay-off from these investments in terms of impacts on trade (including the aggregate value of exports and trade diversity), impacts of Viet Nam's reputation in terms of the efficacy of SPS controls, the ability to deal with future SPS problems, domestic spill-overs on agricultural/fisheries productivity, public health and the environment, and the degree to which any capacity-building option will bring about broader socio-economic benefits in terms of livelihoods and impacts on vulnerable groups.

The result of the application of the MCDA framework is a coherent ranking of the 10 capacity-building options that are identified. The top five options are as follows:

- Residue control for honey exports (Option 6).
- Food safety controls for aquaculture production of Pangasius for export (Option 2)
- Food safety controls for capture fish and fishery products for export (Option 3).
- Food safety controls for aquaculture production of shrimp for export (Option 1)
- Food safety controls for fresh fruit and vegetable and aromatic herb exports (Option 4).

Whilst the above results from the baseline model are considered the most valid, it is important to recognise that only two of these options are ranked as high priorities unequivocally, that is they remain in the top five across the three models that aim to test the sensitivity of the results to changes in decision criteria and/or their weights. These are:

- Residue control for honey exports (Option 6).
- Food safety controls for capture fish and fishery products for export (Option 3).

Likewise, only one of the options, plant pest controls for rambutan exports (Option 9), is consistently ranked very low. All other capacity-building options are sensitive to changes in the decision criteria and/or weights. For example, whilst food safety controls for aquaculture production of Pangasius for export (Option 2) is ranked second in the baseline model (which is considered to be most valid), this option drops to sixth in the equal weights model and ninth in the cost/difficult of implementation and trade impact model.

The sensitivity of the results beyond the ranking of residue control for honey exports (Option 6) and food safety controls for capture fish and fishery products for export (Option 3) suggest the need for on-going dialogue and reflection amongst stakeholders across and within the public and private sectors. Thus, whilst no substantive issues were raised during the process of stakeholder consultation on the results presented above, it could be that some stakeholders feel that a particular option has been treated too harshly in the analysis, or that an inordinate weight has been attached to a particular decision criterion. They may also disagree with estimates in the information sheets.

Whilst the rankings are based on a structured and open process of stakeholder consultation and the collection and collation of data directed at the compilation of the information sheets, it is always possible to improve on this process, for example by encompassing the perspectives of a larger number and wider range of stakeholders. It is important to recognise that a key function of the MCDA analysis is to facilitate debate over the prioritisation of the capacity-building options; the output of the framework should not be seen as 'final' but instead the basis on which differences in opinion can be explored and consensus over which options should be given priority is moved towards. Thus, if a particular group of stakeholderscontests the results, they should be invited to present new data that can be used to revise the information sheets. Such changes can then be employed and the model re-estimated accordingly.

Importantly, the results presented in this report should be seen only as the starting point for the use of MCDA to prioritiseSPS capacity-building in Viet Nam. Thus, this initial prioritisation will need to be revisited and revised on an on-going basis in the light of improvements in the availability and/or quality of data, changes in policy priorities that imply shifts in the decision weights and/or the introduction of new decision criteria. If new capacity-building needs arise, these need to be added to the analysis. Conversely, as investments are made in the options included above, these need to be excluded and the priorities re-estimated.[10]

Following this trial application, Viet Nam is planning to employ the MCDA framework on a routine basis for the planning of SPS capacity-building. Towards this end, there is a need to put in place systems for the effective capture of the data needed to populate and update the information sheets, and to enable these data to be validated. These will require that fruitful linkages are established with private sector and other stakeholders, and across those involved in various SPS and trade functions within government. There is an interest, in due course, in extending the focus of the framework to SPS issues impacting domestic markets. This is a welcome initiative, and will require that the framework is revised somewhat to reflect this wider remit in the medium term.

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[10] Indeed, the government proceeded with investments in Option 6 whilst the analysis was proceeding, and Viet Nam was recently approved for the export of honey to the EU under Decision 2011/163/EU. As a result, there is a need to now update the analysis excluding this Option.

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Appendix 2.Participants at Stakeholder Workshop in Hanoi, Tuesday 25th September 2013

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Tran Thi Thu Phuong	Animal Health Department	No 15/78 đường Giải Phóng, Hanoi
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Appendix 4.Capacity-Building Option Information cards

Table A4-1.Food safety controls for aquaculture production of shrimp for export

Decision Criterion	Value	Details	Confidence
Cost and difficulty of implementation			
Up-front investment	US$240.7 million	Average cost per farm of GAP implementation and certification estimated at US$14,534. Number of farms in 2012 was around 30,000 of which 20% already GAP certified. Approximately, 70 per cent of shrimp production in 2011 was destined for EU, US, Japan and Australia.	Medium
On-going cost	US$42.6 million	Costs of official post-harvest monitoring plan around US$3 million/year. Farm-level costs of around US$2,270 per farm. Number of farms in 2012 was around 30,000 of which 20% already GAP certified. Approximately, 70 per cent of shrimp production in 2011 was destined for EU, US, Japan and Australia.	Medium
Difficulty of implementation	+2	Difficult– very large number of small producers, including many smaller producers.	High
Trade impact			
Change in absolute value of exports	US$204.6 million	Significant reduction (say 80%) in import rejections in major export markets (currently around US$7 million/year). If do not upgrade food safety controls, likely to see loss of non-GAP-certified shrimp exports to EU, US, Japan and Australia (estimated at US$1.33 billion in 2011). To some extent will be offset by increased exports to regional markets, notably China. Say, 15% decline in medium term overall.	**Low**
Trade diversification	+2	Ultimately, the lack of such controls could lead to loss of key markets, requiring greater reliance on regional markets.	Medium
International reputation	+3	Viet Nam has high rates of rejections in its main export markets due to antibiotic residues and microbiological contamination. Significant reductions in the number of rejections will enhance Viet Nam's international reputation appreciably.	High
Capacity to deal with future SPS problems	+3	Implementation of GAP and associated official controls will mean much greater control of food safety along the value chain. As a result, will be much greater ability to prevent and control future problems.	High

Domestic agri-food impact			
Agricultural/fisheries productivity	+1	Yields may decline due to lower antibiotic use. But better disease control could offset this. May get higher price due to lower rejection levels, increased exports, etc.	Medium
Domestic public health	0	Some sales to domestic market, although in medium term likely that GAP will be implemented in value chains directed at export markets. Overall impact likely to be minimal.	Medium
Environmental protection	0	Negative if leads to increased production area. But GAP should mean is a lesser environmental impact of production. Overall, probably neutral.	Medium
Socio-economic impact			
Impact on livelihoods	90	Large numbers of people employed directly or indirectly in the shrimp aquaculture sector (estimated at around 1million), many of which are poor. Could expect significant decline in livelihood if appreciable loss of exports. Scale = 9/Impact=+10	Medium
Impact on vulnerable groups	-2	Shrimp production involves a large number of poor small-scale producers. Involvement of women is limited in aquaculture production. Women extensively involved in processing sector. Implementation of GAP likely to lead to consolidation of production away from small-scale producers.	Medium

Table A4-2.Food safety controls for aquaculture production of Pangasius for export

Decision Criterion	Value	Details	Confidence
Cost and difficulty of implementation			
Up-front investment	US$104.6 million	Average cost per farm of GAP implementation and certification estimated at US$14,534. Number of farms in 2012 was around 20,000 of which 40% already GAP certified. Approximately, 70 per cent of Pangasius production in 2011 was destined for EU, US, Japan and Australia.	Medium
On-going cost	US$18.3 million	Costs of official post-harvest monitoring plan around US$2 million/year. Farm-level costs of around US$2,270 per farm. Number of farms in 2012 was around 20,000 of which 20% already GAP certified. Approximately, 60 per cent of Pangasius production in 2011 was destined for EU, US, Japan and Australia.	Medium
Difficulty of implementation	+2	Difficult–large number of producers. Difficult to implement GAP in Pangasius production.	High
Trade impact			
Change in absolute value of exports	US$229.8 million	Significant reduction (say 80%) in import rejections in major export markets (currently US$2 million/year). If do not upgrade food safety controls, likely to see loss of non-GAP-certified Pangasiusexports to EU, US, Japan and Australia (estimated at US$1.52 billion in 2011)). To some extent will be offset by increased exports to regional markets, notably China. Say, 15% decline in medium term overall.	**Low**
Trade diversification	+2	Ultimately, the lack of such controls could lead to loss of key markets, requiring greater reliance on regional markets.	Medium
International reputation	+3	Viet Nam has high rates of rejections in its main export markets due to antibiotic residues and microbiological contamination. Significant reductions in the number of rejections will enhance Viet Nam's international reputation appreciably.	High
Capacity to deal with future SPS problems	+3	Implementation of GAP and associated official controls will mean much greater control of food safety along the value chain. As a result, will be much greater ability to prevent and control future problems.	High

Domestic agri-food impact			
Agricultural/fisheries productivity	+1	Yields may decline due to lower antibiotic use. But better disease control could offset this. May get higher price due to lower rejection levels, increased exports, etc.	Medium
Domestic public health	0	Some sales to domestic market, although in medium term likely that GAP will be implemented in value chains directed at export markets. Overall impact likely to be minimal.	Medium
Environmental protection	0	Negative if leads to increased production area. But GAP should mean is a lesser environmental impact of production. Overall, probably neutral.	Medium
Socio-economic impact			
Impact on livelihoods	80	Large numbers of people employed directly or indirectly in the aquaculture sector (estimated at around 670,000), many of which are poor. Could expect significant decline if appreciable loss of exports. Scale = 8.5/Impact=+10	Medium
Impact on vulnerable groups	-2	Pangasius production involves significant numbers of producers, some of which are small. Involvement of women is limited in aquaculture production. Women extensively involved in processing sector. Implementation of GAP likely to lead to consolidation of production towards larger producers.	Medium

Table A4-3.Food safety controls for capture fish and fishery product exports

Decision Criterion	Value	Details	Confidence
Cost and difficulty of implementation			
Up-front investment	US$13.5 million	Upgrading of facilities and hygiene procedures at landing sites: US$300,000 per site x 9 sites: US$2.7 million. Upgrading of facilities and hygiene procedures on fishing vessel: US$5,000 per vessel x 3,415 vessels: US$17.1 million. Around 63% of production exported to EU, US and Japan in 2011.	Medium
On-going cost	US$2.7 million	Official controls on landing sites and fishing vessels: US$500,000/year. Costs of maintaining facilities and controls at landing sites: US$10,000 per site x 9 sites: $90,000. Costs of maintaining facilities and controls on fishing vessels: US$1,000 per vessel x 3,415 vessels: $6.92 million. Around 63% of production exported to EU, US and Japan in 2011.	Medium
Difficulty of implementation	-2	Landing sites easy – only nine in total. Large numbers of fishing vessels but changes that are required are straightforward.	High
Trade impact			
Change in absolute value of exports	$89.2 million	Significant reduction (say 80%) in import rejections in major export markets (currently US$5 million/year): US$4 million. If do not upgrade food safety controls, likely to see loss of fish and mollusc exports to EU, US, Japan and Australia (US$568 million in 2011). To some extent will be offset by increased exports to regional markets, notably China. Say, 15% decline in medium term.	**Low**
Trade diversification	+1	Ultimately, the lack of such controls could lead to loss of key markets, requiring greater reliance on regional markets.	High
International reputation	+3	Viet Nam has high rates of rejections in its main export markets due to antibiotic residues and microbiological contamination. Significant reductions in the number of rejections will enhance Viet Nam's international reputation appreciably.	High
Capacity to deal with future SPS problems	+2	Implementation of enhanced hygiene controls and associated official controls will mean much greater control of food safety along the value chain. As a result, will be greater ability to prevent and control future problems.	High

Domestic agri-food impact			
Agricultural/fisheries productivity	+1	May get higher price due to lower rejection levels, increased exports, etc.	Medium
Domestic public health	0	Some sales to domestic market, although in medium term likely that hygiene controls will be implemented in value chains directed at export markets. Overall impact likely to be minimal.	Medium
Environmental protection	-2	Over-exploitation of capture fishery a major concern. Negative if leads to increased production.	Medium
Socio-economic impact			
Impact on livelihoods	80	Large numbers of people employed directly or indirectly in the capture fishery sector (estimated at 1.4 million), including many poor people as fishers, etc. Could expect significant decline if appreciable loss of exports. Scale=10/Impact=+5	Medium
Impact on vulnerable groups	+1	Capture fishery sector employs mainly men. Women extensively employed in processing sector. Most of employment of people from urban areas.	Medium

Table A4-4.Food safety controls for fresh fruit and vegetables and aromatic herbs

Decision Criterion	Value	Details	Confidence
Cost and difficulty of implementation			
Up-front investment	US$15.2 million	Based on previous investment in implementation of GAP by producers of dragonfruit, estimated cost is US$900 per farm. Estimated number of producers in export value chains is 89,000. Around 19 per cent of production exported to EU, US, Japan and Australia in 2010.	Medium
On-going cost	US$2.5 million	Costs of recertification, on-going controls, etc.: US$150/farm. Estimated number of producers in export value chains is 89,000. Around 19 per cent of production exported to EU, US, Japan and Australia in 2010.	Medium
Difficulty of implementation	+1	Relatively large numbers of small-scale producers. Value chains lack integration. Implementation of GAP well understood.	Medium
Trade impact			
Change in absolute value of exports	US$85 million	Implementation of GAP and related controls likely to enhance exports to EU, US, Japan and Australia (around US$85 million in 2010). Say by 100%.	Medium
Trade diversification	+1	Ultimately, the lack of such controls could lead to loss of key markets, requiring greater reliance on regional markets.	Medium
International reputation	+2	Implementation of GAP will	High
Capacity to deal with future SPS problems	+2	Implementation of GAP will bring about greater control of value chains for fresh fruit, vegetables and aromatic herbs. In turn, will mean greater ability to control or prevent future problems.	High
Domestic agri-food impact			
Agricultural/fisheries productivity	+1	Costs of production likely to decline with better use of pesticides, greater control of production, etc. May be increased prices due to lower rejections, access to higher-value customers, increased yields, etc.	Medium
Domestic public health	0	Likely that implementation of GAP will be largely confined to export value chains	High
Environmental protection	+1	May be some expansion of production, but better use of pesticide likely to reduce environmental impacts of existing production. Overall impact likely to be positive	Medium

Socio-economic impact			
Impact on livelihoods	25	Significant numbers of people employed in export value chain for fresh fruit, vegetables and aromatic herbs (estimated at 89,000). Increased exports likely to lead to higher incomes for existing or new producers. Scale=5/Impact=+5	High
Impact on vulnerable groups	+2	Significant involvement of smaller/poorer farmers and employment of poorer people in export value chains for fresh fruit, vegetables and aromatic herbs.	High

Table A4-5. Hygiene controls for spices exports

Decision Criterion	Value	Details	Confidence
Cost and difficulty of implementation			
Up-front investment	US$1.1 million	Cost of setting up HACCP or ISO 22000:2005 is US$4,000per plant, initial training is US$2,400 per plant and equipment purchase is US$4,500 per plant. Total number of establishments is 116 plants, of which 18 already have HACCP in place.	Medium
On-going cost	US$3.8 million	Annual costs of maintaining HACCP in processing facilities include period training (US$750), supplies (US$30,000), and additional salaries (US$8,000).	Medium
Difficulty of implementation	-2	Limited number of processing facilities. Implementation of HACCP in spice production well understand and does not require complicated changes.	High
Trade impact			
Change in absolute value of exports	US$53.6 million	Exports in 2010 to EU around US$148.0 million, to US around US$57.4 million, and to Japan US$ 8.8 million. With better controls on microbiological contaminants exports could increase through increased volumes and higher unit prices to these markets. Say increase of 25% in medium term.	Medium
Trade diversification	0	Little or no impact – already export to EU.	High
International reputation	+1	Implementation of HACCP in spice production will increase Viet Nam's reputation in EU and international spice markets.	High
Capacity to deal with future SPS problems	+1	With the implementation of HACCP in the production of spices, will be increased ability to control and prevent future problems with spice exports	High
Domestic agri-food impact			
Agricultural/fisheries productivity	0	May be some increase in unit price of spice exports, but impact on spice producers likely to be marginal	High
Domestic public health	+1	May lead to reduced microbiological contamination in spices sold onto domestic markets	High
Environmental protection	0	Little or no impact	High

Socio-economic impact			
Impact on Livelihoods	20	May be some increases in employment in spice processing sector and spice production, but probably limited. Significant impact on significant numbers of producers (Scale=5/Impact=+4).	High
Impact on vulnerable groups	0	Significant impact since the production area is high mountainous area with poor people	High

Table A4-6. Residue controls for honey exports

Decision Criterion	Value	Details	Confidence
Cost and difficulty of implementation			
Up-front investment	$5,000	Cost of planning and implementing modifications to existing monitoring plan required by EU	High
On-going cost	$53,000	Current monitoring plan costs US$48,000/year. Cost of modifications required by EU limited (around US$5,000/year)	High
Difficulty of implementation	-3	Residue monitoring plan been in place for a number of years. Current plan just needs some modifications to meet EU requirements.	Medium
Trade impact			
Change in absolute value of exports	$25 million	Exports to EU will be re-established and grow. These exports will be in addition to existing exports. Before closure of EU market exported in excess of $20 million annually.	Medium
Trade diversification	+3	Currently US accounts for over 90 per cent of exports. Would enable access to a number of EU Member States	High
International reputation	+2	Will signal better controls of residues in honey	High
Capacity to deal with future SPS problems	+1	Will better enable extent and nature of problems with residue controls in honey to be identified, although existing plan already provides much of this information	High
Domestic agri-food impact			
Agricultural/fisheries productivity	0	Minimal – not evident that a higher unit price was achieved in EU markets previously.	High
Domestic public health	0	None. Limited honey consumed domestically. Little or no impact on safety of honey.	High
Environmental protection	+1	May expand honey production with potential benefits for the environment. Not extensive because of small scale of honey production.	High
Socio-economic impact			
Impact of livelihoods	12	Most of additional exports will come from increased production – limited diversion expected from US markets. Exports of $25 million represent an expansion of production of around 50%. Thus, could expect employment in honey production to increase by up to 17,500. Scale=3/Impact=+4	Medium
Impact on vulnerable groups	+3	Production in mountainous areas and by small producers which tend to be poor and are often women and in more marginal areas.	high

Table A4-7.Plant pest controls for chillies and aromatic herbs

Decision Criterion	Value	Details	Confidence
Cost and difficulty of implementation			
Up-front investment	US$50,000	Costs of implementing audit and monitoring system, undertaking pilot research, workshops and other forms of awareness-raising amongst exporters and producers, and development of regulation/standard estimated at US$50,000	High
On-going cost	US$30,000	Estimated cost of regular audits and monitoring and maintenance of system estimated at US$30,000/year	High
Difficulty of implementation	-2	Have already formulated proposal and have good understanding of what needed to implement effective controls. Relatively easy to implement	High
Trade impact			
Change in absolute value of exports	US$3.1 million	Stopped exporting the most problematic aromatic herbs and chillies. Total exports in 2011 were an estimated US$7.2 million. Of this, 43 per cent lost in 2012 due to restrictions.	High
Trade diversification	+1	Measures would re-establish access to EU markets.	High
International reputation	+1	Some impact on international reputation in terms of ability to implement effective controls for plant pests	High
Capacity to deal with future SPS problems	+1	Measures would increase ability more generally to control plant pests in value chain for chillies and aromatic herbs.	High
Domestic agri-food impact			
Agricultural/fisheries productivity	+1	Unit price in EU is much higher than alternative export markets and domestic markets. However, potential volumes are small given overall scale of production.	High
Domestic public health	0	None	High
Environmental protection	0	Little or no impact	High
Socio-economic impact			
Impact on livelihoods	6	Some impact of loss of EU exports on incomes of producers engaged in the respective value chain, but numbers relatively small. Scale=2/Impact=+3	High
Impact on vulnerable groups	+1	Production almost entirely by smallholders many of whom are poor, but very small numbers.	High

Table A4-8.Plant pest controls for mangosteen

Decision Criterion	Value	Details	Confidence
Cost and difficulty of implementation			
Up-front investment	US$170,000	Costs of up-front research, inspections by importing country, training and information dissemination to producers and exporters, etc. estimated at US$170,000	High
On-going cost	US$10,000	Maintenance of on-going costs of official controls and annual surveys estimated at US$10,000	High
Difficulty of implementation	2	Relatively easy. Limited area of production in main production area. Have experience from dragon fruit and mango	High
Trade impact			
Change in absolute value of exports	US$4.9 million	Expect exports of 300 tonnes per year within 5 years valued at US$16.2/Kg.	Medium
Trade diversification	+2	Would permit access to new and higher-value markets, for example North Korea	High
International reputation	+2	Fact that able to access markets such as North Korea would enhance reputation and. In turn, make accessing other high-value markets (for example Japan and Australia) easier.	High
Capacity to deal with future SPS problems	+1	To some extent, these control measures would enhance capacity to deal with plant pests more generally.	High
Domestic agri-food impact			
Agricultural/fisheries productivity	+1	Unit price in export markets such as Korea greater. However, scale of production involved is small.	High
Domestic public health	0	None	High
Environmental protection	0	Scale of production for export small and so minimal impacts	High
Socio-economic impact			
Impact on livelihoods	9	Around 4,000 households involved in production for export currently. Plan is to expand production given greater exports such that likely to involve around 10,000 households. Scale = 3/Impact=+3	High
Poverty impact	+1		High
Impact on vulnerable groups	+1	Production involves smallholders in more marginal areas, including women.	High

Table A4-9.Plant pest controls for rambutan

Decision Criterion	Value	Details	Confidence
Cost and difficulty of implementation			
Up-front investment	US$200,000	Costs of up-front research, inspections by importing country, training and information dissemination to producers and exporters, etc. estimated at US$200,000	High
On-going cost	US$10,000	Maintenance of on-going costs of official controls and annual surveys estimated at US$10,000	High
Difficulty of implementation	-2	Relatively easy. Limited area of production in main production area. Have experience from dragon fruit and mango	High
Trade impact			
Capacity to deal with future SPS problems	US$5.0 million	Expect exports of 300 tonnes per year within five years valued at US$16.5/Kg	
Trade diversification	+1	Would permit access to new and higher-value markets, notably South Korea	High
International reputation	+3	Fact that able to access markets such as South Korea would enhance reputation and. In turn, make accessing other high-value markets (for example Japan and Australia) easier.	High
Capacity to deal with future problems	+1	To some extent, these control measures would enhance capacity to deal with plant pests more generally.	High
Domestic agri-food impact			
Agricultural/fisheries productivity	+1	Unit price in export markets such as South Korea greater. However, scale of production involved is very small.	High
Domestic public health	0	None	High
Environmental protection	0	Scale of production for export very small and so minimal impacts	High
Socio-economic impact			
Impact on livelihoods	3	Only around 100 households involved in production for export currently. Would be an expansion of production if exports are facilitated, but from a very small production base. Could be good opportunity to enhance income. Scale =1/Impact=+3	High
Impact on vulnerable groups	0	Very limited scale of production, but does involves smallholders in more marginal areas, including women.	High

Table A4-10.Controls on pesticide residues in rice

Decision Criterion	Value	Details	Confidence
Cost and difficulty of implementation			
Up-front investment	US$14.8 million	Estimated cost of GAP implementation per hectare of rice production is US$450/hectare. Exports to Japan before restrictions were 196,800 tonnes, equivalent to 32,800 hectares of average yield of 6 tonnes per hectare.	Medium
On-going cost	US$4.9 million	Costs of recertification, on-going controls, etc.: US$150/hectare. Exports to Japan before restrictions were 196,800 tonnes, equivalent to 32,800 hectares of average yield of 6 tonnes per hectare.	Medium
Difficulty of implementation	-3	State enterprise which exports rice collects from large number of producers and consolidates	High
Trade impact			
Change in absolute value of exports	US$33.4 million	Almost all exports to Japan have stopped. Value of exports in 2006 before problem arose was US$33.4 million. Assume this could be achieved if these controls were put in place	High
Trade diversification	+1	Japan historically a significant market. However, in 2010 had exports exceeding US$100 million to nine markets.	High
International reputation	+1	May have some marginal impact, although have well-established exports within the region, including to Singapore	High
Capacity to deal with future SPS problems	+2	Enhanced controls on pesticides, if widely applied, could prevent future problems with pesticide residues	High
Domestic agri-food impact			
Agricultural/fisheries productivity	+1	Reduced use of pesticides could reduce production costs. However, impact of GAP on productivity uncertain	High
Domestic public health	+1	If controls on pesticides extends to rice production more generally, consumer exposure would be reduced	High
Environmental protection	+2	Reduced and better use of pesticides should reduce environmental impacts	High

Socio-economic impact			
Impact on livelihoods	10	Large number of producers (estimated 90,000 people) engaged in rice production for export to Japan. These exports represent a small proportion of total production and there are alternative domestic and export markets so impact on income likely to be quite small. Scale =5/Impact=+2	High
Impact on vulnerable groups	+2	Much of rice production by small/poor farmers, including in marginal areas	Medium

Appendix 5.Participants at Stakeholder Workshop in Hanoi, Tuesday 11th June 2013

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