

Social acceptability of aquaculture: the use of survey-based methods for eliciting public and stakeholder preferences

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Introduction

- **Aquaculture** – the cultivation of fish and aquatic organisms - is one of the fastest growing food producing sectors and contributes just under **40%** to world fish supply.
- **Socio-economic benefits** are real: for producing countries (e.g. food security, livelihood support, export earnings) and consumers (lower prices).
- But expansion has brought problems: specifically, **environmental impacts** have been shown to create significant negative effects – clearly demonstrated in the case of **shrimp farming**.
- The challenge to aquaculture planners is to achieve **sustainable development** – and this requires a governance framework that can account for the environmental impacts in **social** and **economic** terms.

Externalities created by aquaculture

- Aquaculture development may impact on:
 - Use of **marine space** (e.g. due to conflict in congested coastal areas)
 - Land and **property values** (e.g. due to salinization and subsidence)
 - Recreational and **amenity benefits** (e.g. due to pollution or visual intrusion)
 - Supplies from **capture fisheries** (e.g. due to habitat destruction, interactions with feed fisheries)
- **External costs** of **habitat degradation** are most clearly demonstrated in the case of shrimp and mangrove. (e.g. Barbier and Strand, 1998; Sathirathai and Barbier, 2001)
- **External costs** of **pollution** have been more difficult to assess, and for salmon quite controversial (e.g. Folke et al 1994).

The social acceptability of aquaculture

- **Environmental damage** caused by aquaculture cannot always be valued in monetary terms.
- But there is evidence that the **public are not indifferent** to the environmental performance of aquaculture:
 - **Consumer demand** for farmed fish is influenced by the environmental attributes of the product (Young et al., 1999), with corresponding implications for market power and **prices**.
 - **Public attitude** studies in the Mediterranean (Katrinidis et al., 2003) and Scotland (Whitmarsh and Wattage, 2006) link the **social acceptability** of aquaculture to its environmental impact.
- So: we should at least provide information on the **relative importance** that people attach to the **environmental performance** compared with other objectives.

Organic farmed salmon



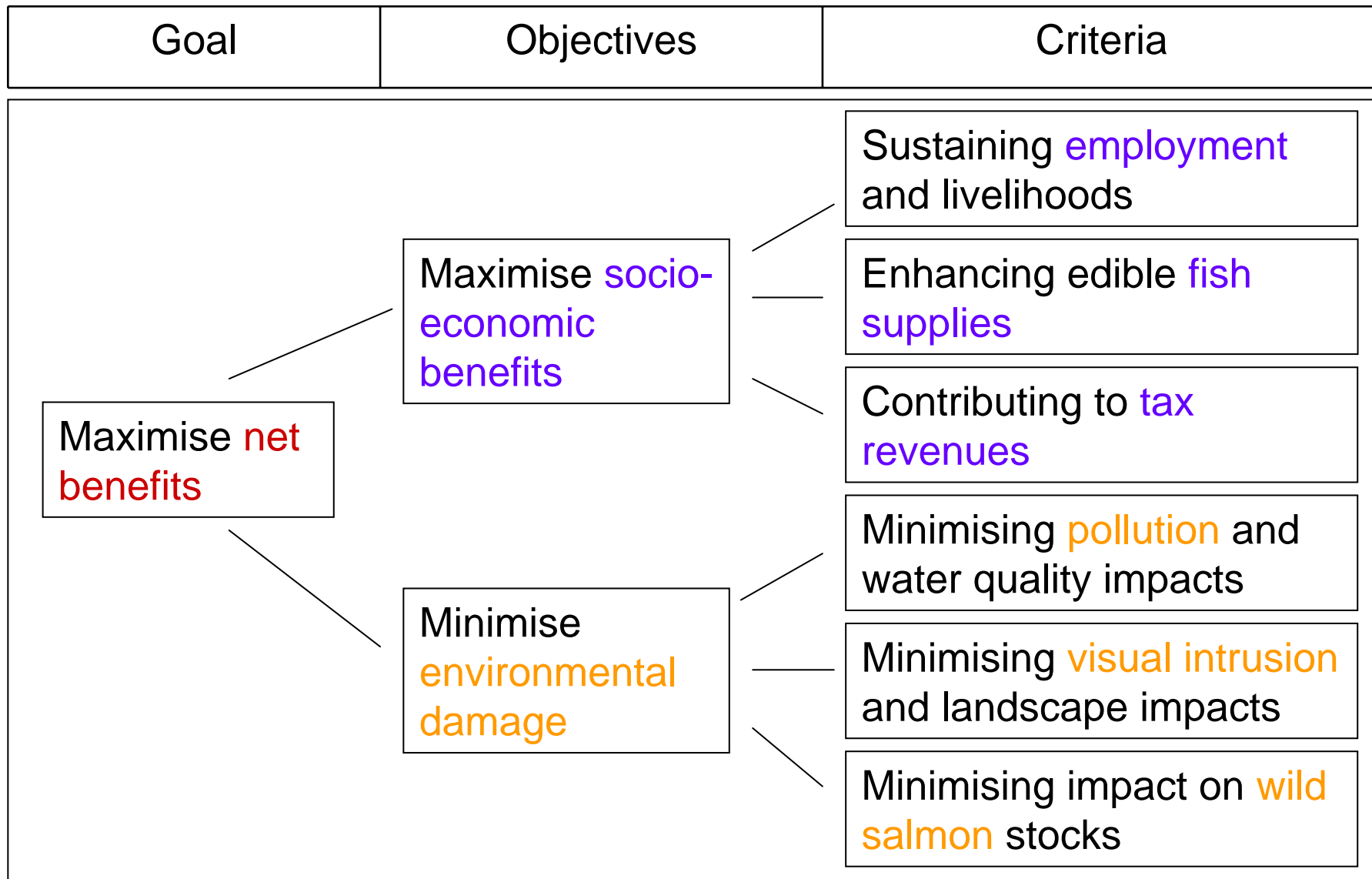
What people want from aquaculture: the ECASA project

- University of Portsmouth is a partner in the EU funded Framework Six project (**ECASA**) investigating the environmental impacts of aquaculture. (see <http://www.ecasa.org.uk>)
- Our role is to find out about the **social acceptability** of aquaculture development, based on a **preference elicitation** methodology.
- **Study area:** Main **salmon farming** regions in Scotland
- **Methodology:**
 - **Questionnaire** surveys of (i) the general public, differentiated by region (ii) key stakeholder groups
 - Preferences have been elicited using a **multicriteria** assessment method, the **Analytic Hierarchy Process** (AHP), originally developed by **Saaty (1977)**

The Analytic Hierarchy Process (AHP)

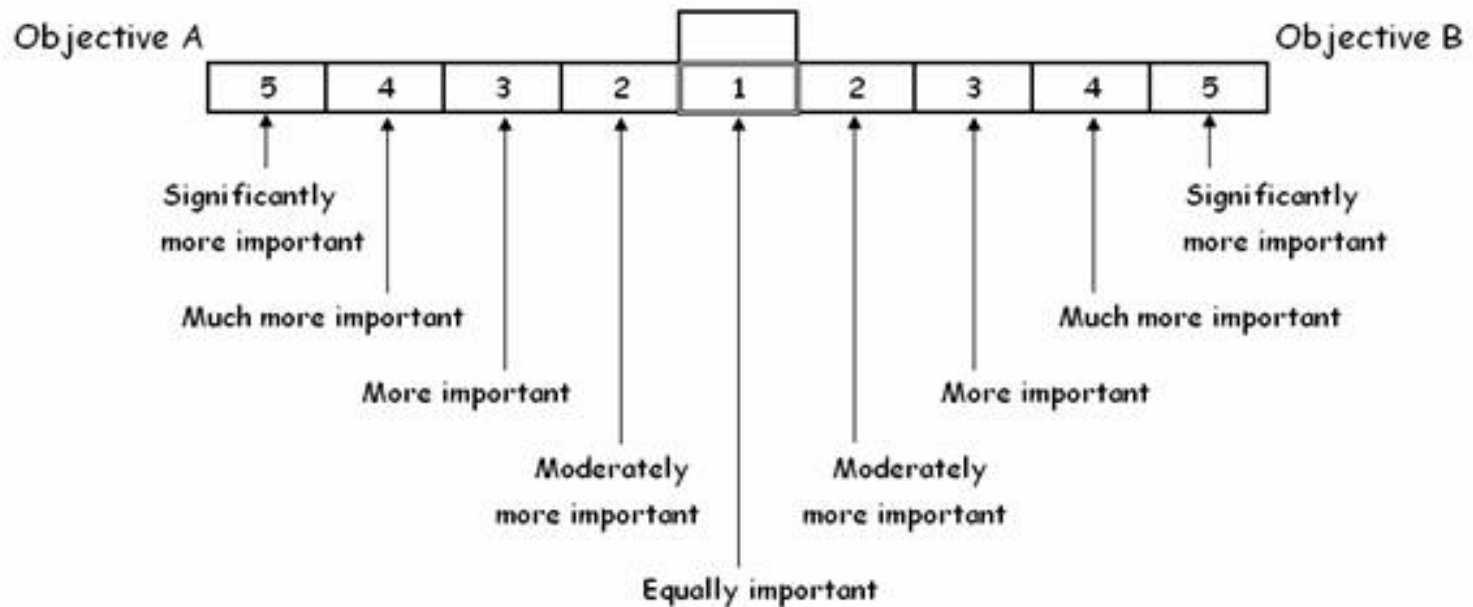
- AHP is a **multicriteria** method that enables qualitative judgements about the relative importance of different objectives to be converted to **numerical scores**.
- The technique has been applied to a range of decision problems, including **natural resource use and conservation** (Mardle & Pascoe, 1999 & 2003; Mardle et al. 2004; Wattage and Mardle, 2005)
- In the present study, AHP is relevant because the performance of the **aquaculture industry** covers **multiple dimensions** (e.g. economic, social, environmental, etc.)
- Respondents are asked to make **paired comparisons** between different objectives or criteria, where the intensity of preference is measured on a scale (9-point or 5-point).
- Responses can be converted to **scores** to show the **priority** attached to different objectives and criteria.

Hierarchy of objectives for Scottish salmon aquaculture

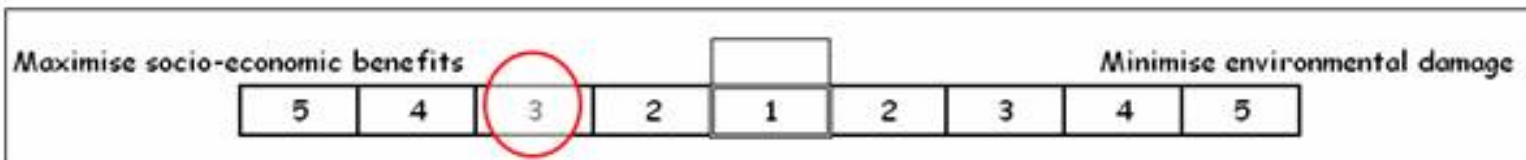


Pairwise choices of objectives and criteria

How to use the importance scale:



In the example below, if you think that to **maximise socio-economic benefits** is "more important" than to **minimise environmental damage**, circle the relevant point on the scale as shown:



Complete set of pairwise choices used in the survey

Objectives:	Socio-economic	<i>compared with:</i>	Environmental
Socio-economic:	Employment etc.	<i>compared with:</i>	Fish supply
	Employment etc.	<i>compared with:</i>	Tax revenue
	Fish supply	<i>compared with:</i>	Tax revenue
Environmental:	Pollution etc.	<i>compared with:</i>	Visual intrusion
	Pollution etc.	<i>compared with:</i>	Impact on wild stocks
	Visual intrusion	<i>compared with:</i>	Impact on wild stocks

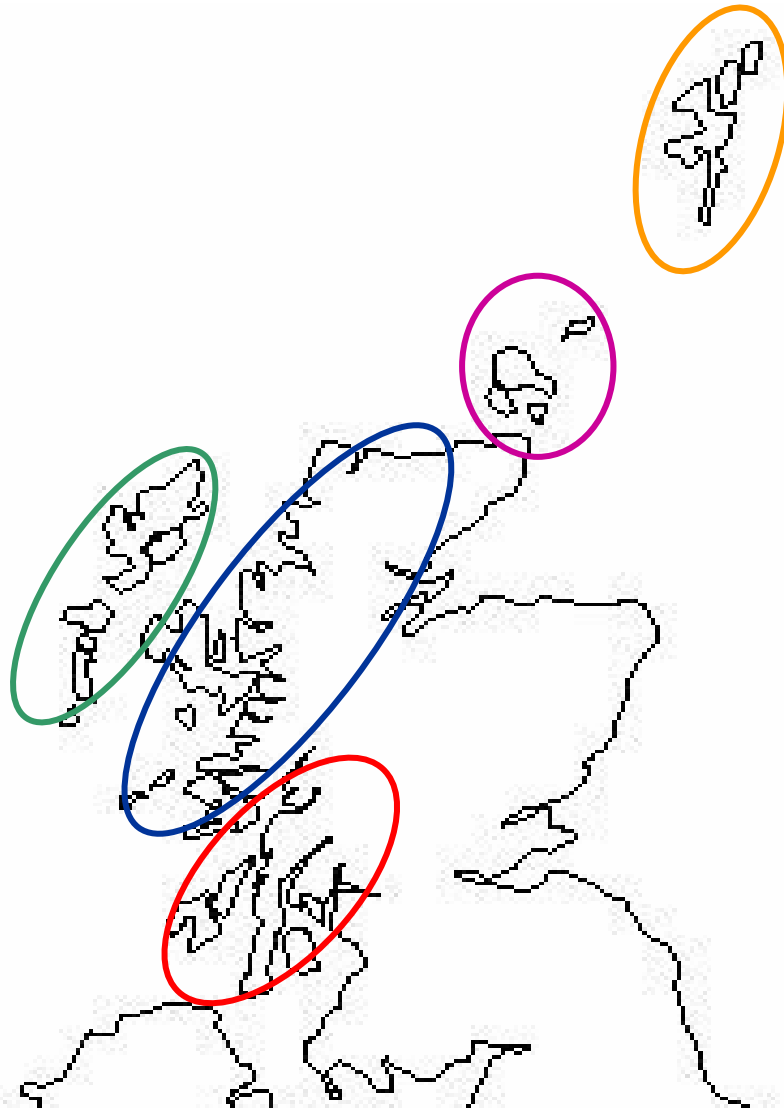
Structure of the questionnaires

Section	Stakeholders	Public
Introduction: Summary of the effects of salmon farming	✓	✓
AHP section: pairwise choices of objectives and criteria	✓	✓
Preferences towards salmon farming development in Scotland	X	✓
Socio-economic information about respondents	X	✓
General comments	✓	✓

ECASA stakeholder survey: interest groups

Organisations or groups	Number
Regulators	5
Industry	3
Environmental organisations	6
Wild fish interests	6
Economic development agencies	6
Independent experts	10
Consumer organisations	3
Total	39

ECASA public attitude survey: study sites



- Argyll and Bute
- Highland
- Orkney
- Shetland
- Western Isles
- Sampling frame:
Scottish Electoral Registers
- Survey method:
Questionnaires mailed to random samples of residents in coastal areas – **745** usable responses

Accessing other socio-economic data

Scottish Neighbourhood Statistics - Microsoft Internet Explorer provided by Wanadoo

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

Address <http://www.sns.gov.uk/Browser/browseResults.asp#Economic%20Activity%20and%20Benefits> Go Links

Orange Toolbar get free pop-up blocker search highlight

Google Go Bookmarks 0 blocked Check AutoLink AutoFill Send to Settings

Scottish Neighbourhood Statistics

- > Home
- > **Area Browser**
- > Area Reporter
- > Area Data Guide
- > Area User Guide
- > Login

Area Browser

Select Postcode
 Local Authority
 Scottish Parliamentary Constituency
 Scotland


Enter a Postcode...

Area Browser

Browser Report for: PA37 1QA

Profile report for data zone S01000825 containing postcode PA37 1QA

- Economic Activity and Benefits**
- Education, Skills and Training
- Health
- Housing
- Population
- Access to Services
- Index of Deprivation



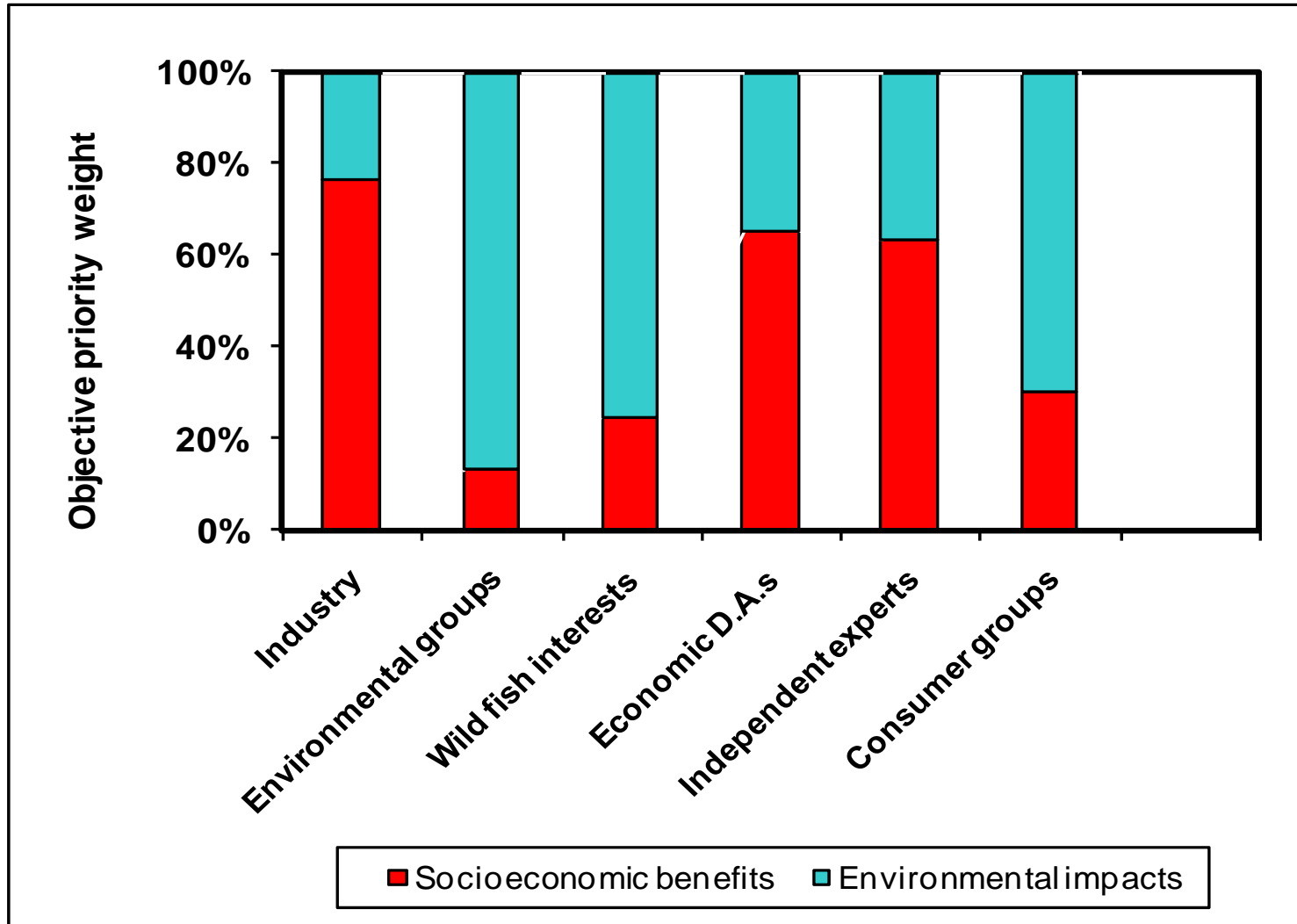
Retrieved 24/11/06

Summary profile of Scottish survey regions

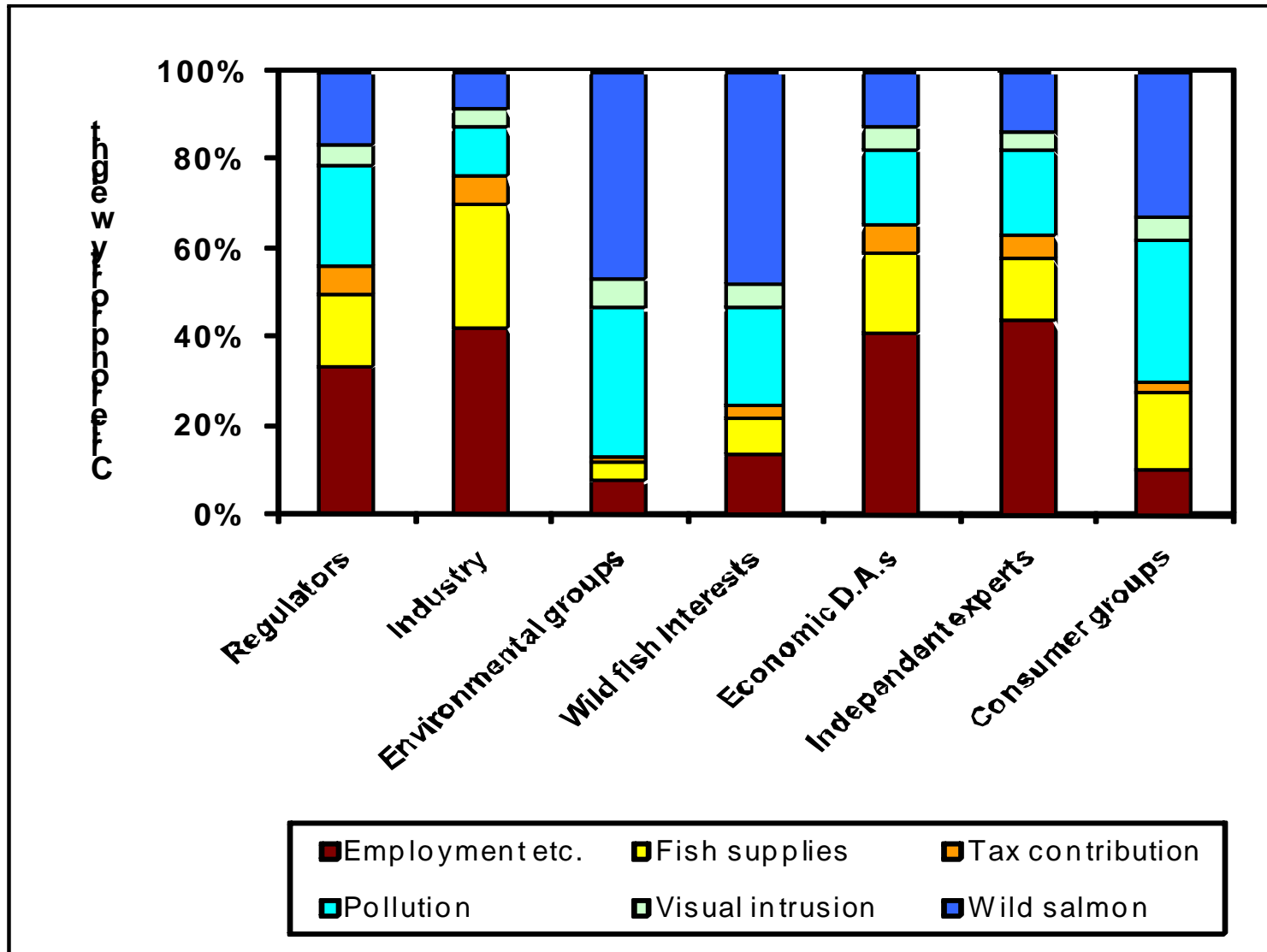
	Argyll & Bute	Highland	Orkney	Shetland	W.Isles
Population	90,900	213,600	19,600	22,000	26,400
Pop. density	13.1	8.3	19.8	15.3	8.8
Unemployment	4.3	4.1	3.0	3.6	5.0
Ben. claimants	13.9	14.5	11.2	10.4	16.1
Jobs density	0.88	0.90	0.99	1.17	0.84

Source: Scottish Neighbour Statistics; NOMIS

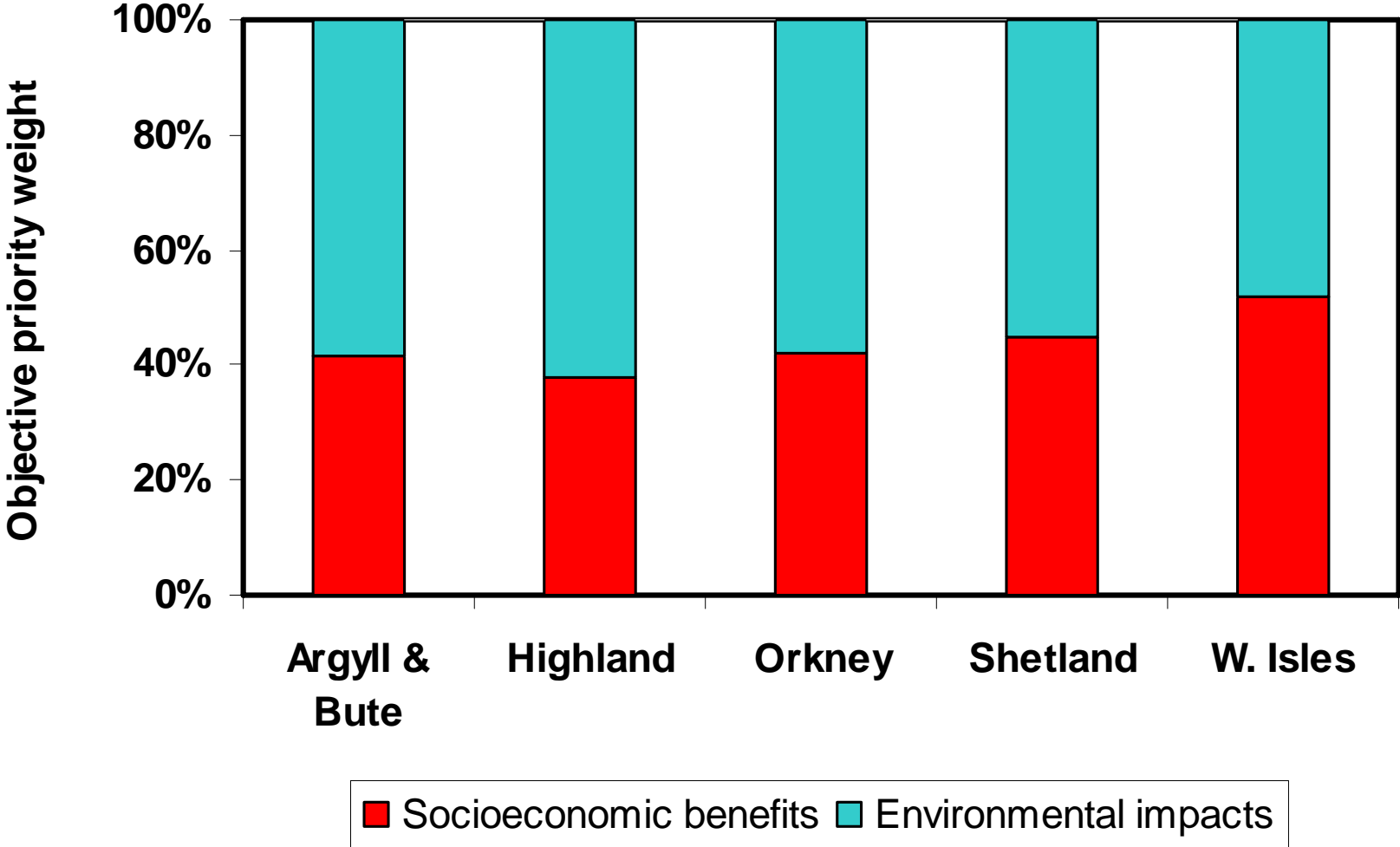
Stakeholder survey results: objective priority weights



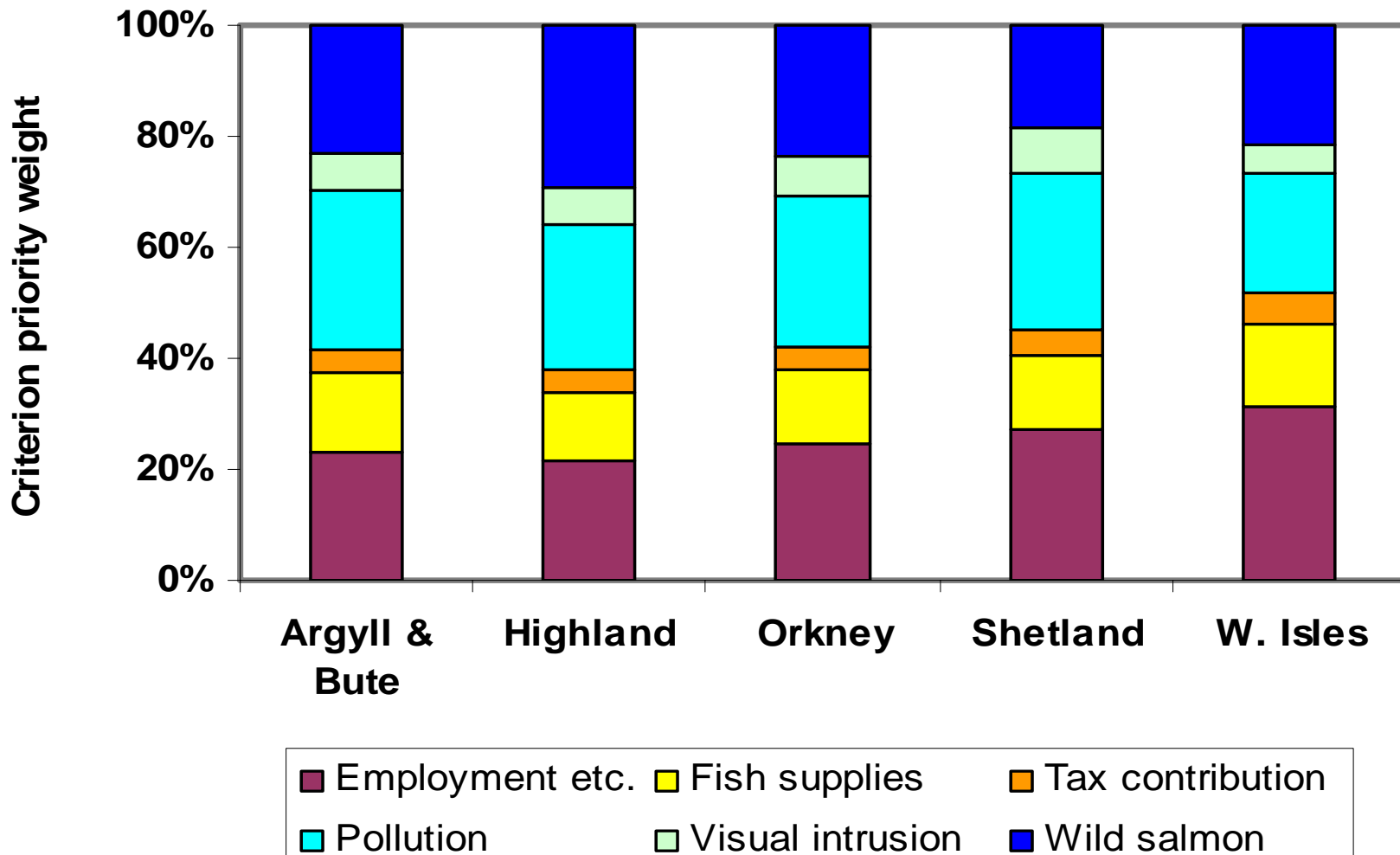
Stakeholder survey results: criterion priority weights



Public survey results: objective priority weights



Public survey results: criterion priority weights



Public survey results: preferences towards aquaculture development

<i>Best option for Scotland:</i>	Argyll & Bute	Highland	Orkney	Shetland	W. Isles
	%	%	%	%	%
Expansion	28	21	20	21	38
Same size	48	42	45	48	30
Contraction	13	18	13	13	15
N/K	9	15	19	15	13
Nil reply	1	4	4	3	4
TOTAL	100	100	100	100	100
	<i>N = 158</i>	<i>N = 150</i>	<i>N = 151</i>	<i>N = 155</i>	<i>N = 131</i>

Public survey results: priority scores and attitude to aquaculture development

Region	Expansion		Same size		Contraction	
	SOCIO %	ENVL %	SOCIO %	ENVL %	SOCIO %	ENVL %
Argyll & Bute	61.8	38.2	37.2	62.8	20.0	80.0
Highland	62.1	37.9	42.4	57.6	18.6	81.4
Orkney	55.7	44.3	43.1	56.9	20.8	79.2
Shetland	67.6	32.4	44.2	55.8	31.9	68.1
W. Isles	70.1	29.9	52.4	47.6	15.6	84.4

Explaining public attitudes: statistical analysis

- **Attitudes** towards the future development of salmon farming – i.e. preferences regarding expansion or contraction – can partially be explained by other variables.
 - **Attribute variables** (family size, salmon purchases, environmental membership, gender, employment)
 - **Context variables** (region, area characteristics)
- Respondents living in neighbourhoods of relatively high **social deprivation** were more likely to favour expansion of salmon farming.
- This result may also account for the observed regional differences in attitudes, since the **Western Isles** had an average rank on the Scottish Index of Multiple Deprivation (**SIMD**) that was **below that of the other regions** surveyed.

Relevance of the study

- **Results.** The study has generated empirical evidence on:
 - **Stakeholder** and **public** attitudes towards aquaculture development in Scotland.
 - Priorities attached to **socio-economic benefits** compared with **environmental impacts**.
 - **Factors** affecting public attitudes, and specifically the influence of area characteristics.
- **Methodology.** The multicriteria method used in the survey (**AHP**) is:
 - A relatively straightforward way to elicit preferences
 - Adaptable to other areas and situations (e.g. local fish farm development) where the **social acceptability of aquaculture** is in contention.

Acknowledgements

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