ENVIRONMENTAL INDICATORS FOR ICELAND

SCANNET WORKSHOP AT REYJAVIK
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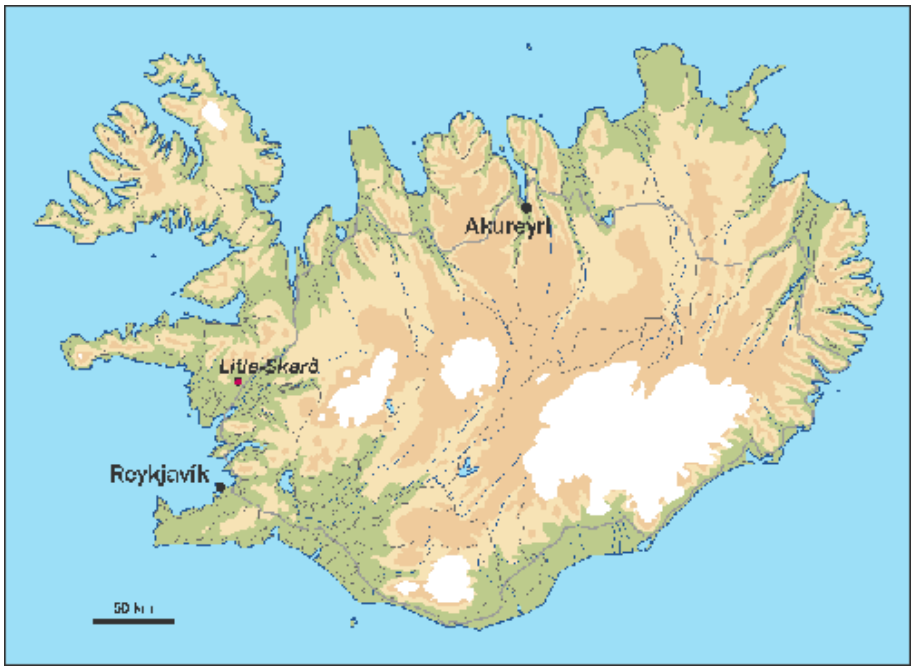

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1. Introduction

SCANNET (Scandinavian-North European Network of Terrestrial Field Bases) is a network of field sites and user groups in northern Scandinavia and Europe. It focuses on the environmental and land use conditions found in the North Atlantic Arctic region. SCANNET (www.scannet.nu) aims to improve comparative observations and access to information on environmental change in the north.

One part of the programme involves identifying perceived key indicators of social and environmental change for each site. The approach is to work with local stakeholders, to rank the importance of resources, topics, issues and indicators in decision workshops at SCANNENT research areas. The information gained is intended to help prioritize the recording of environmental change across the SCANNET network

This report summarizes results from a workshop in Reykjavik which focused on possible environmental change in Iceland over the next 20 years.

2. Development of the decision workshop approach

The approach involved stakeholders progressively ranking the importance of lists of resources, topics, issues and indicators, with a focus on parameters that could be used for assessing change over the next 20years.

In producing lists of parameters, it was born in mind that topics, issues and indicators can relate to either pressures forcing change, or responses to those pressures. The DPSIR framework (www.iia-cnr.unical.it/EUROCAT/Pag.CNR/DPSIR1.htm) adopted by the EU to provide a guide for State of the Environment Reports recognises:

Driving forces of environmental change (e.g. industrial production)
Pressures on the environment (e.g. discharges of water)
State of the environment (e.g. water quality in lakes and rivers)
Impacts on population, economy, ecosystems (e.g. if water is unsuitable for drinking)
Responses of society (e.g. development of watershed and drinking supply protection)

Indicators of change can relate to any (or several) of these categories.

The working lists of parameters had been identified during a preliminary workshop in Banchory in January 2001 by a small group of professional environmental economists, sociologists, ecologists and statisticians. These parameters were than arranged into an analytical hierarchy, or decision tree (Satay 1992) (Appendix 1).

Two scientific workshops at Abisko, Sweden in February 2001 and Tórshavn, Faroes in November 2001 tested and refined the decision tree and the method protocol. Two stakeholder workshops were then undertaken in the Cairngorms, Scotland in May 2002, and on the Faroes in July 2002. The workshop in Iceland described here was the third in this series.

3. Decision Workshop at Reykjavik

3.1 Aim

The aim was for a stakeholder group to identify the most important indicators of change that could be used to monitor changes in the environment of the Iceland over a period of 20 years from the present. The *environment* was taken to cover natural capital, economic and social/political resources

Importance was to be judged in relation to the likelihood and severity of impacts on the ecological, economic and social resources of the Iceland.
Impacts on the natural, social or economic environment could be for better or worse. (positive or negative).

The *indicators of change* were the generic parameters that could be potentially used to monitor impacts to provide a SOE of Iceland

Importance rankings were made on an individual's own perception and knowledge of Iceland, taking into account the likelihood of change for a particular parameter, and the severity of that change if it occurred.

3.2.The area

The area considered was the whole of Iceland. Iceland is a volcanic island located in the North Atlantic, between 63° 24' - 66° 32'N and 13° 32' - 24° 28' W. The land area is 103.000 km^2. The maximum S – N distance is 675 km and E – W is 755 km. There are several small islands at the coastline, the biggest is Heimaey (13.5 km^2) off the southern coast. The country was settled between 874 and 930 A.D., by Norsemen from Scandinavia and Celts from the British Isles. The present population is 286.000, over 90% live in towns and villages. The population of the capital Reykjavik and neighbouring towns is around 182.000.

The terrestrial flora and fauna of Iceland is rather poor due to the isolation of the island and short time from the Ice Age. Most of the present biota is postglacial. The present nakedness and lack of trees is largely due to man and his livestock. There is considerable evidence that about 35% of the total land area was covered with Birch woodland and Willow shrub at the time of settlement in the 9th century. After the settlement the woods were cut for fuel and housing and heavy grazing by livestock (sheep, cattle, horses) damaged the vegetation and caused disturbance to the volcanic soils and erosion. The present vegetation of lowland and highland areas is therefore under strong influence from utilization by cultivation and livestock grazing. Most of the extensive lowland wetlands were affected by draining in the last century and very few of them remain intact. In the lowlands grasslands, modified wetlands and heathlands are the dominant vegetation types at present. In the highlands, barren areas, heathlands and wetlands are most extensive.

Traditional farming has declined in the last 100 years and fewer and fewer people live in the rural areas. The economy is very much based on the fishing-industry, although it employs relatively few people. The social and services sector has increased considerably in the last 50 years. Tourism, hydro-electric development and associated heavy industry has also expanded greatly. Gross national income and the standard of living is high in Iceland, and the social security system is similar to that of neighbouring Scandinavian countries.

3.3 Workshop participants

The workshop participants had a wide range of perspectives, but all had local knowledge of Iceland. It was not necessary to be an expert in a particular field as the workshop considered the whole Icelandic environment, and how the participants perceived possible environmental threats over the next two of decades. The panel comprised:

Olafur Einarsson	Icelandic Institute of Natural History
Gudmundur A. Gudmundsson	Icelandic Institute of Natural History
Gudrun Gisladottir	Dept. Geography and Geology, University of Iceland
Snorri Baldursson	Icelandic Institute of Natural History/(CAFF)
Holmfridur Sigurðardottir	Icelandic Planning Agency
Bjarni Didrik Sigurdsson	Iceland Forest Research, Mogilsa
Hlynur Oskarsson	Agricultural Research Institute
Sigmar A. Steingrimsson	Marine Research Institute
Stefan Gislason	Environice/Nat. Ass. Local Authorities (Agenda 21)
Sverrir O. Elefsen	Hydrological Service of the National Energy Authority
Olafur Petursson	Environmental and Food Agency of Iceland
Olafur R. Dyrmundsson	The Farmers Association of Iceland
Tryggvi Felixsson	National Association for the Protection of the Icelandic Environment.
Borgthor Magnusson	Icelandic Institute of Natural History

A list of the interests of individuals are given in Appendix I.

Neil Bayfield from the Centre for Ecology and Hydrology was the facilitator and Borgthor Magnusson from the Icelandic Institute of Natural History was the local coordinator and responsible for inviting the stakeholders.

3.4 Workshop procedure

Before the meeting, participants were given a letter inviting them to the workshop and introducing the SCANNET project.

The workshop began with an overview of the SCANNET project followed by an explanation of the decision workshop procedure and scoring booklet. An example (on climate change) was worked through to clarify the scoring procedure and the use of the electronical keypad voting system.

Participants were then asked to rank the importance of parameters at each of four hierarchical steps of the decision tree (the full tree is given as Appendix II and definitions of included parameters in Appendix III):

1. **Resources** (such as economic or ecological resources)
2. **Topics** related to these resources (such as economic activity or land use)
3. **Issues** related to the topics (such as economic production by sector or extensive land use)
4. **Indicators** of change related to the issues (such as primary sector output, or areas used for conservation)

Participants used a simple percentage scale where 100% was most important and 0% of no importance. Within each group of parameters being ranked, the most important was given the 100% score and the others ranked against it. More scores of a 100 were possible for parameters of equal importance. The perceived importance of a parameter in this context was in relation to the likelihood and severity of change to the Iceland environment over a 20 year time scale.

After scoring the tree individually, participants compared scores by means of electronic voting keypads and a computer display. Discussion of the scores was followed by revision of the scoring if necessary, which usually ended in closer agreement between participants.

The procedure for calculating the final values for each parameter used a statistical weighting method (Figure 1). The final scores at each level were weighted by factors based on scores at previous levels. Weighting in each case = score/100. Thus a weighted indicator score = indicator score x issue weighting x topic weighting x resource weighting. Similarly a weighted issue score = issue score x topic weighting x resource weighting.

These weighted scores could then be compared with any other score from the same level in the decision tree (i.e within resources, topics. issues, indicators).

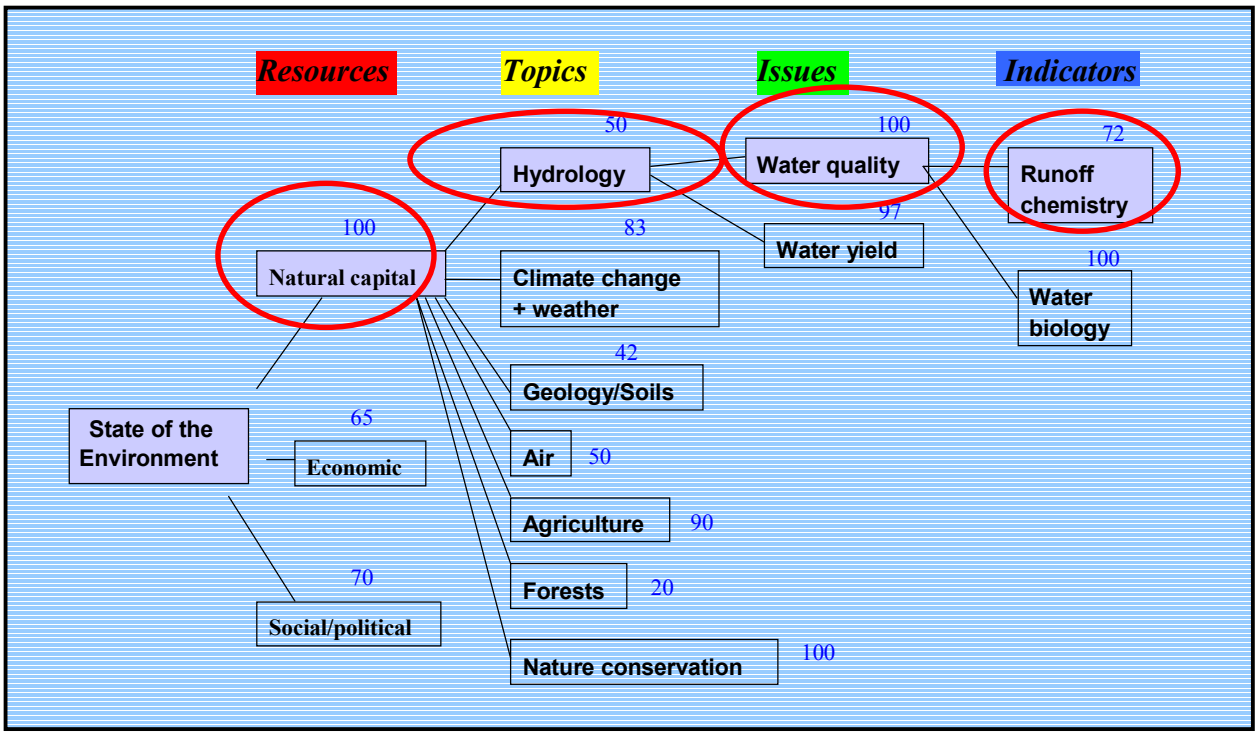


Figure 1. Part of the decision tree, showing scoring from resources (Step1) to indicators (step4)
Weighted criteria scores example for runoff chemistry = indicator score x issue weighting x topic weighting x resource weighting:
runoff chemistry =72 x 1.0 x 0.5 x 1.0 =36

The workshop permitted the ranking of a large number of environmental parameters and also showed how much agreement or disagreement there was on scores. In this way an audit trail was created for prioritising key indicators of change for Iceland.

3.5 Results

3.5.1 Rankings for Resources

The panel gave the highest mean score to *natural capital* (89%), followed by *economic* (80%) and *social and political* resources (78%) (Table 1). The variation between participants is indicated by the standard deviation values. There was quite wide variation in scores between individuals, with the largest standard deviation (± 16) for economic resources scores.

Table 1. Rankings (maximum 100) for the three categories of environmental resources given by the 14 workshop participants (individuals scores in initialled columns)

	BM	OB	GAG	GG	SB	BDS	HS	HO	SAS	SG	SOE	OP	ORD	TF	Mean	SD
Natural Capital resources	70	100	100	100	70	100	80	100	100	100	100	100	100	100	**89**	12
Economic resources	100	90	50	100	100	80	75	100	100	70	100	80	80	100	**80**	16
Social and political resources	70	75	75	90	70	90	100	70	75	80	100	80	80	100	**78**	11

3.5.2 Rankings for Topics

Topics with weighted scores of 50% or above are summarised in Table 2. There were 7 such natural capital topics, 6 economic topics and 4 social and political topics. *Climate* and *land use* were the two highest scoring natural capital topics, *economic activity* and *tourism* the highest economic topics and *planning/regulation* and *demography* the highest social/political topics.

	Mean	SD
Climate	**87.1**	26.3
Land use	**76.9**	22.2
Biological capital	**74.0**	24.1
Hydrology	**67.6**	23.5
Air	**64.1**	20.0
Geology/geomorphology/soils	**56.6**	28.0
Landscape factors	**51.4**	21.5
Economic activity	**84.9**	19.4
Tourism and recreation	**65.1**	10.4
Gross income	**61.0**	19.9
Transport	**60.9**	11.9
Public sector investment	**58.8**	20.6
Private sector investment	**58.8**	21.3
Planning / regulation	**71.5**	19.6
Demography	**65.8**	21.5
Stakeholders	**65.0**	16.2
Cultural heritage	**59.1**	15.1

Table 2. Topics with weighted scores of 50% or higher. Natural capital topics are highlighted in green, economic in pink and social/ political in blue. Individuals scores for all the topics are given in Appendix IV.

3.5.3 Rankings for Issues

Issues with mean ranking values of 50% or above are listed in Table 3. There were 9 such natural capital, 6 economic and 5 social and political issues.

Individuals scores for all the issues are given in Appendix V.

Climate	**87.1**	26.3
Snow & ice	**73.1**	27.2
Extensive use of land	**72.0**	23.6
Status/condition	**71.1**	24.3
Oceanographic data	**65.7**	22.6
Forests	**62.3**	26.4
Gaseous components	**59.1**	23.2
Biodiversity inventories	**58.4**	25.9
Erosion	**56.6**	28.0
Intensive use	**55.0**	25.0
Water yield	**53.8**	26.4
Production/ turnover by sector	**84.9**	19.4
Employment levels	**62.4**	21.5
Income per capita	**58.0**	19.0
Capital expenditure	**56.2**	22.1
Visitors to key attractions	**56.1**	13.6
Tourism Infrastructure	**53.1**	17.3
Agri-environment subsidies	**52.6**	19.7
Traffic flows	**51.2**	14.3
Regulation of environmental quality	**65.9**	22.7
Planning applications	**64.4**	25.0
Views of stakeholders	**62.8**	19.6
Population density	**62.7**	20.6
Impacts on local culture	**58.7**	15.3
Age structure	**57.1**	24.6

Table 3. Issues with scores of 50% or higher. Natural capital issues are highlighted in green, economic in pink and social/ political in blue

3.5.4 Rankings for Indicators

Indicators with mean scores of 50% or above are listed in Table 4. There were 16 such natural capital, 8 economic and 7 social/ political indicators.

The highest three scores in each resource category were *temperature*, *precipitation* and *glacier* data for natural capital resources, *primary sector*, *secondary sector* and *employment* for economic resources and *exceedence data, approved planning applications* and *surveys of stakeholders views* for social/ political resources. Individuals scores for all the indicators are given in Appendix VI.

	Mean	SD
Air temperature	**87.1**	26.3
Precipitation	**76.8**	26.1
Glaciers	**70.2**	27.3
Habitat condition	**67.2**	22.5
Rangeland areas	**67.0**	24.9
Sea temperature	**63.8**	22.2
Currents	**60.5**	23.8
Multi use forest	**60.3**	26.3
Key species status	**59.9**	26.4
Snow	**59.1**	27.2
Greenhouse gases	**58.6**	23.8
Conservation areas	**57.2**	17.9
Erosion rates	**55.6**	28.7
Windiness	**55.0**	24.7
Abandoned areas	**52.3**	23.3
Habitats	**50.3**	27.2
Primary sector	**77.8**	18.7
Secondary sector	**67.5**	22.5
Employment	**60.4**	21.4
Tertiary sector	**60.1**	27.0
Visitor numbers	**55.6**	14.6
Cost of living	**55.2**	21.1
Tourism occupancy rates	**52.5**	17.9
New business starts	**51.3**	25.5
Environmental regulation exceedance data	**63.8**	22.7
Approved planning applications	**62.1**	27.6
Survey of stakeholders views	**62.1**	20.2
Spatial distribution of population	**59.1**	23.6
Participation in cultural activities	**58.7**	15.3
Population structure	**57.1**	24.6
Environmental regulation compliance data	**54.8**	29.8

Table 4. Indicators with scores of 50% or higher. Natural capital indicators are highlighted in green, economic in pink and social/ political in blue

These lists include indicators that are common to most sites in the SCANNET network such as *temperature, precipitation, habitat inventories* and *planning approvals*, and some that are more specific to Iceland such as *erosion*, and *greenhouse gases*.

3.6 Changes in scores before and after discussion

Some interesting debates followed where there was a wide range of scores between individuals. As a result there were a number of changes to scores. Figure 2 shows a principal coordinates ordination graph of the scores for each individual before and after discussion. Each point represents all the scores of one individual, and the proximity of other participants indicates the relative closeness of their scores. When compared to their initial scores (blue triangles), revised scores mostly showed only small movements, and there was no consistent direction of movement.. Thus the further discussion in most cases only resulted in relatively

minor adjustments of scores. The largest movements were by participants 1 and 8 and the smallest by participants 12 and 14, who hardly changed their scores.

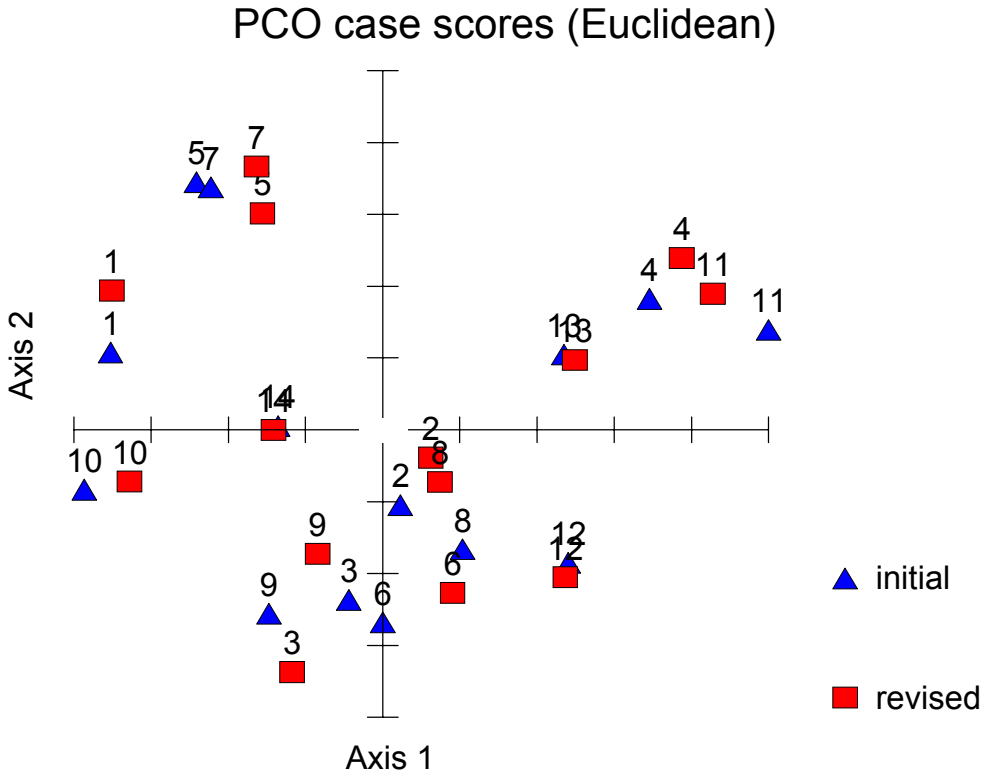


Figure 2. Principal coordinates ordination (PCO) for the initial scores of individuals (blue triangles) and final scores after discussion (red squares).

3.7 Comparison with previous workshops

3.8.1 Top indicators

The indicators with a mean weighted score a score of 50% or higher can be compared with those for previous stakeholder workshops held in Scotland and the Faroes (Table 5) At the Scottish site, the geographical area under consideration was the proposed boundary for the Cairngorms National Park. The area therefore included environmentally sensitive and valued habitats, with a low number of settlements. Farming, tourism and recreation were the most important uses of the area. In the Faroes, as in Iceland, fishing was a mainstay of the economy but there were perceived to be many other important issues including population migration to Torshavn, tourism and agri-environment schemes.

At some sites there were indicators not given high priority at the other two sites, largely reflecting local concerns. Examples included greenhouse gases and erosion in Iceland, and hunting and fishing areas and landscape fabric in the Cairngorms. There were no unique indicators for the Faroes.

Natural capital related indicators common to all three sites, were *precipitation, temperature, habitat condition* and *habitat inventories*. There were also some common indicators between Faroes and Icelend such as ocean temperature and currents, reflecting their shared maritime interests.

There were only a few economic and social/political indicators common to all three sites. These were *primary sector data, approved planning applications* and *statistics for compliance with environmental protection standards.* Some indicators in common between Iceland and Cairngorms seemed to be related to tourism, such as *visitor numbers* and *tertiary sector statistics*.

Table 5. Top environmental change indicators (with a score of 50% or above) selected by stakeholders in Iceland, Cairngorms and the Faroes (A) . Natural capital indicators are highlighted in green, economic in pink and social/ political in blue

	Iceland			**Scotland**			**Faroes**	
	Mean	SD		Mean	SD		Mean	SD
Temperature	**87**	26		**70**	21		**71**	30
Precipitation	**77**	26		**74**	20		**54**	27
Glaciers	**70**	27						
Habitat condition	**67**	22		**72**	31		**53**	23
Rangeland areas	**67**	25		**69**	30			
Ocean temperature	**64**	22					**71**	30
Currents	**61**	24					**68**	35
Multi use forest	**60**	26		**63**	22			
Key species status	**60**	26		**71**	32			
Snow	**59**	27		**56**	28			
Greenhouse gases	**59**	24						
Conservation areas	**57**	18		**60**	35			
Erosion rates	**56**	29						
Windiness	**55**	25		**63**	23		**56**	25
Abandoned areas	**52**	23						
Habitats	**50**	27		**67**	26		**52**	28
Hunting and fishing areas				**70**	28			
Plant communities				**69**	29		**59**	31
Animal populations				**63**	30		**63**	32
Aquatic biology				**58**	27		**50**	28
Landscape fabric				**55**	31			
Hydrographic data				**55**	19			
Runoff/groundwater chemistry				**53**	25			
Stock levels				**52**	22			
Surface water chemistry							**56**	31
Artifacts in landscapes							**53**	27
Primary sector	**78**	19		**65**	25		**61**	28
Secondary sector	**67**	22					**55**	32
Employment	**60**	21		**50**	19			
Tertiary sector	**60**	27		**56**	25			
Visitor numbers	**56**	15		**59**	17			
Cost of living	**55**	21						

Occupancy rates	**52**	18		**52**	19		
New business starts	**51**	26					
Agri-environment impacts				**65**	25		
Recreational activity uptake				**63**	21		
Mammal & bird stocks				**64**	16		
Traffic flows				**54**	15		
Grant/assistance uptake by sector				**51**	23		
Regional budget by area				**51**	30		
Use of paths				**51**	20		
Fish stocks				**51**	15	**66**	30
Planning applications				**50**	29		
Impacts of agri-environment schemes						**52**	36
Fish catches						**62**	31
Exceedance data	**64**	23				**53**	19
Approved applications	**62**	28		**69**	22	**74**	29
Survey of views	**62**	20		**65**	32		
Spatial distribution	**59**	24		**52**	14		
Participation	**59**	15					
Population structure	**57**	25		**57**	15		
Compliance data	**55**	30		**78**	17	**67**	24
Membership lists				**50**	23		
Types of application						**66**	24

3.9 Reference

Saatay, T.L.(1992). Multicriteria decision making: The Analytical Hierarchy Process. RVS Publications, Pitsberg.

Appendix I

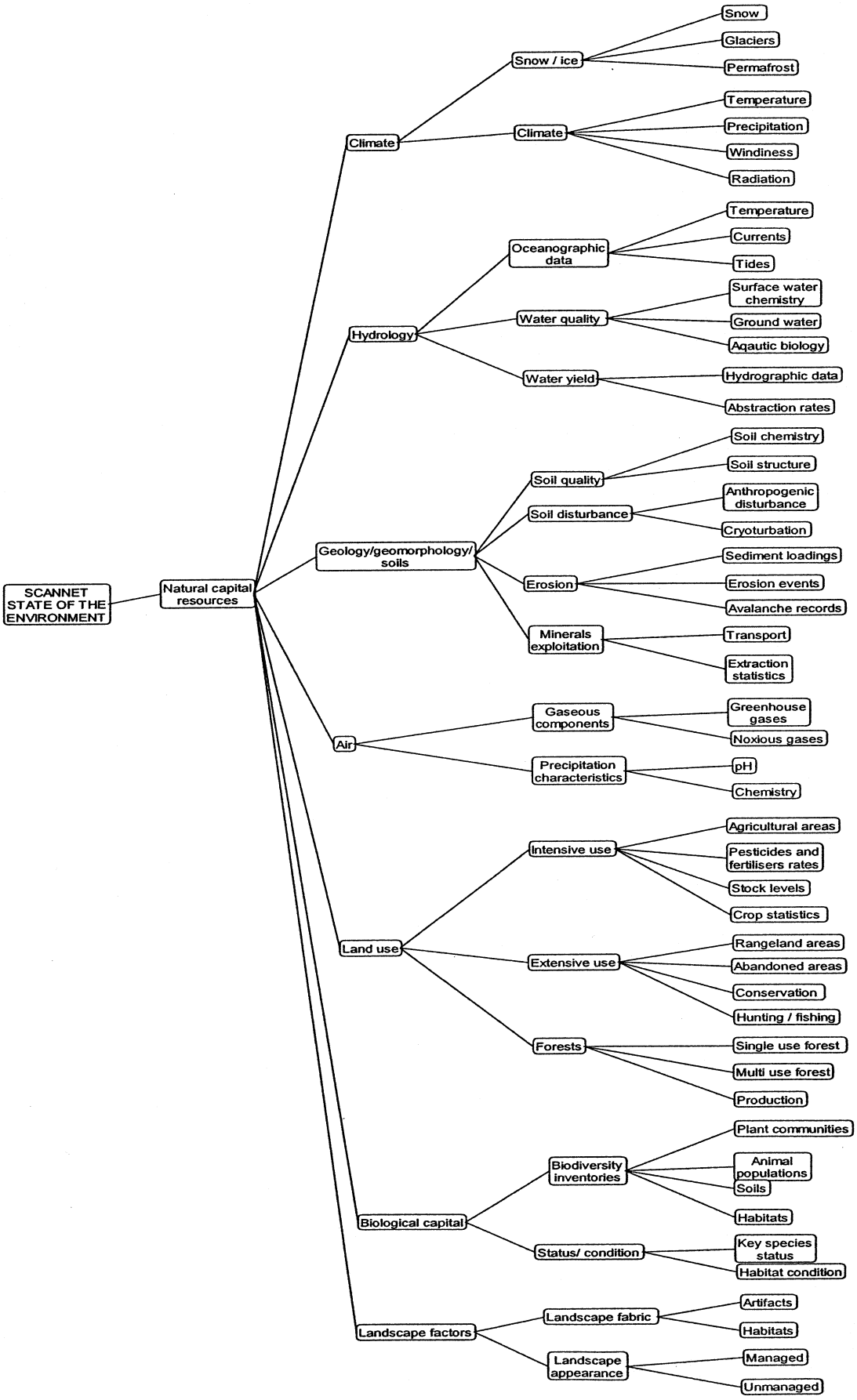
Interests of the workshop participants (+ moderate interest; ++ strong interest) Olafur Einarsson (OE), Gudmundur A. Gudmundsson (DAG), Gudrun Gisladottir (GG), Snorri Baldursson (SB), Holmfridur Sigurðardottir (HS), Bjarni Didrik Sigurdsson (BDS), Hlynur Oskarsson (HO), Sigmar A. Steingrimsson (SAS), Stefan Gislason (SG),Sverrir O. Elefsen (SOE), Olafur Petursson (OP), Olafur R. Dyrmundsson (ORD,)Tryggvi Felixsson (TF), Borgthor Magnusson (BM).

	OE	GAG	GG	SB	HS	BDS	HO	SAS	SG	SOE	OP	ORD	TF	BM
Advice, consulting	+	+		+	++				++	++	++	+		
Education	+	+	++	+	+				+		++	+	+	
Farming	++				+	+	+		+			++	+	+
Fishing	+					+				+			+	
Forestry	++			+	+	++	+				+	+	+	
Land ownership	+				+		+					+		
Nature conservation	++	++	+	++	++	+	++	+	+	+	+	+	++	+
Planning	+	+			++	+	+	+		+	+	+	+	
Recreation	+		+	+	++								+	
Research	++	++	++	++	++	++	++	++		++	+	+		++
Shooting	+	+				+								
Tourism	+		+		+	+			+			+	+	
Water resources	+				++		+			++	+		+	

Appendix II

Decision tree for the Workshop: Part 1 Natural capital resources

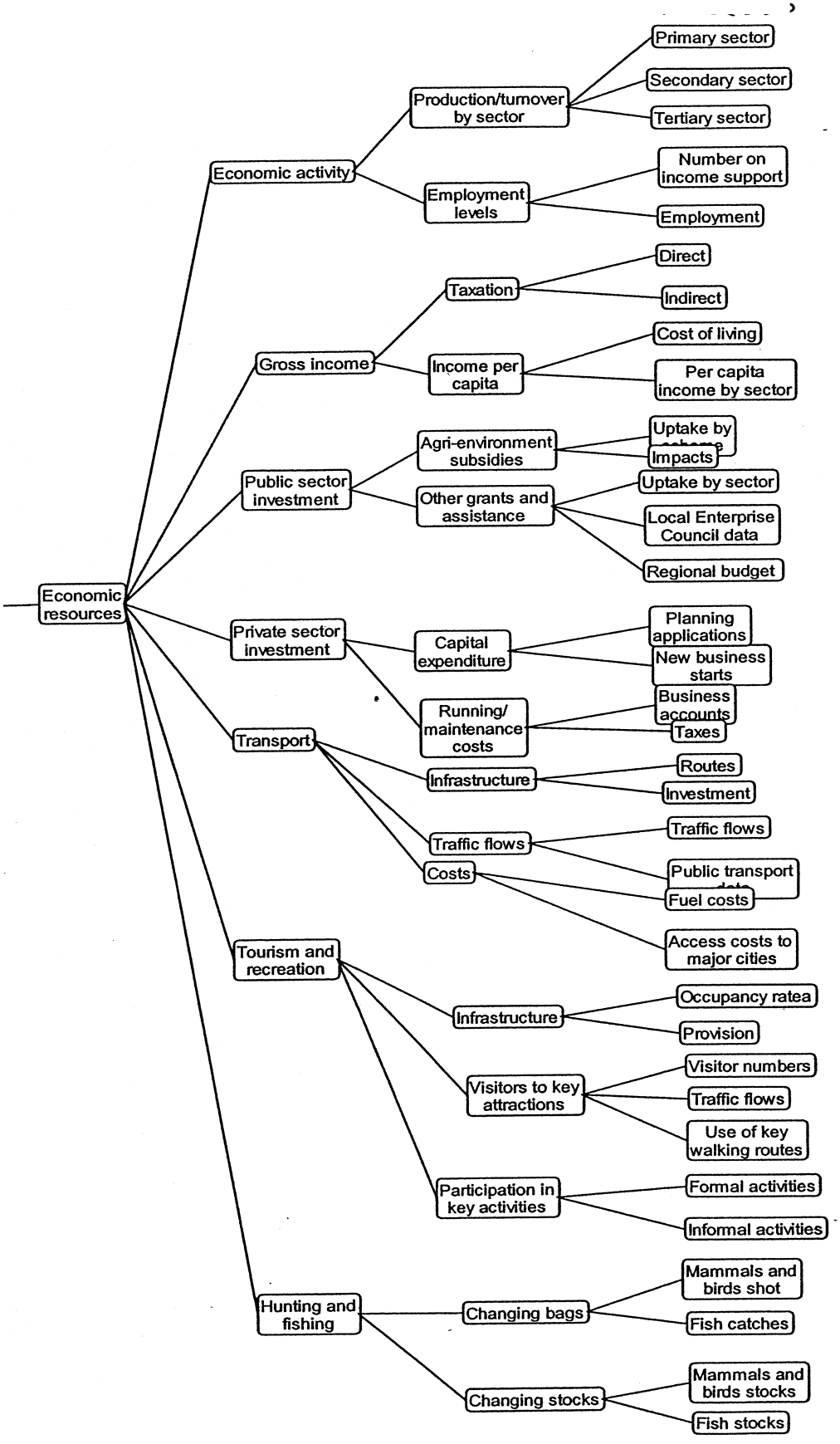
RESOURCES TOPICS ISSUES INDICATORS



Appendix II

Decision tree for the Workshop: Part 2 Economic resources

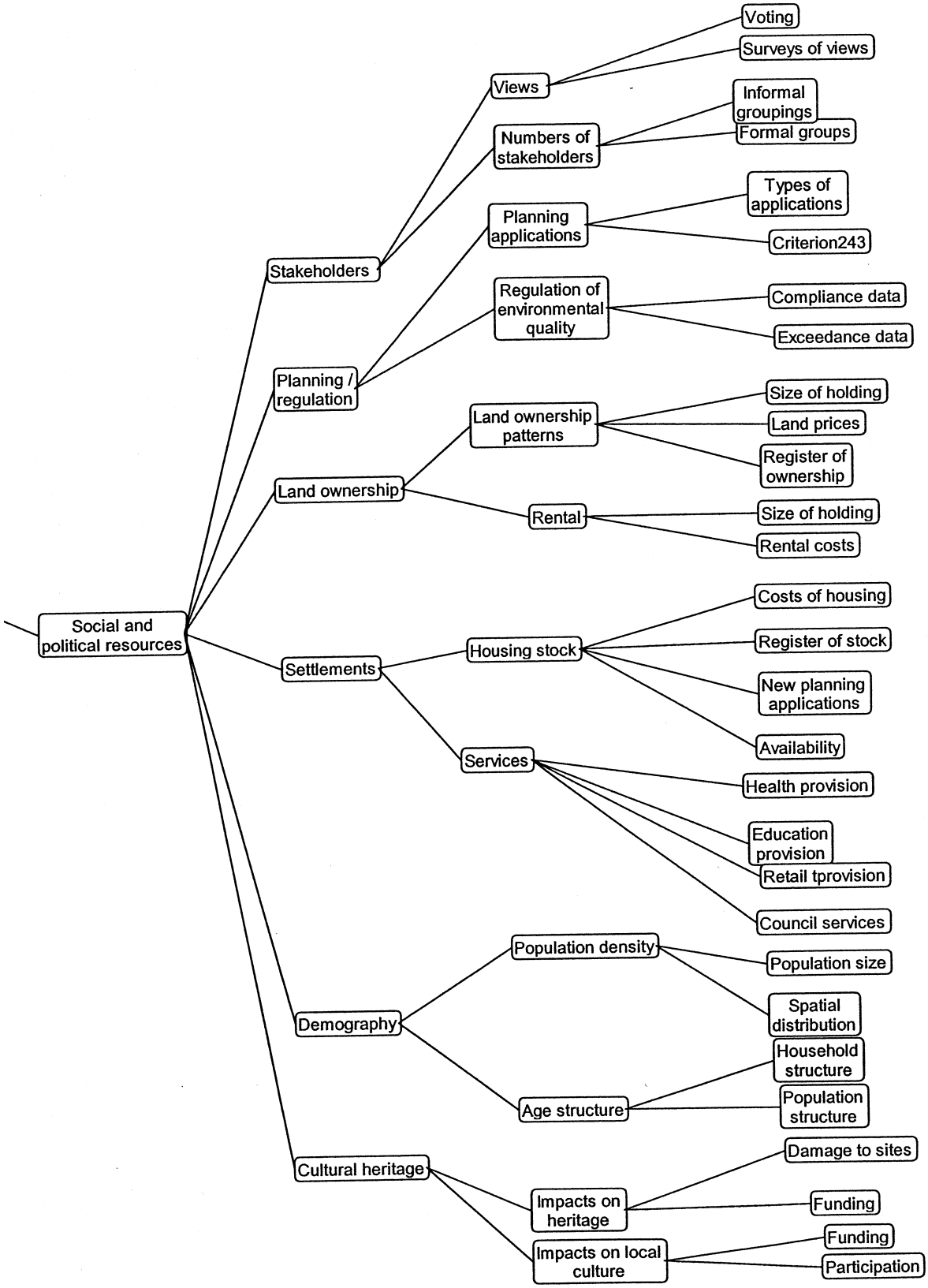
RESOURCES TOPICS ISSUSES INDICATORS



Appendix II

Decision tree for the Workshop: Part 3 Social and political resources

RESOURCES TOPICS ISSUES INDICATORS



APPENDIX III

Parameter definitions

Resource Definitions

Natural Capital resources: Biological and physical aspects of the environment
Economic resources: The condition of a region, community or individual with regard to material prosperity
Social and political resources: The structure, welfare (health and housing) and beliefs and culture of communities, and the regulatory framework within they exist

Topic definitions

Natural capital

Climate: Meteorological characteristics
Hydrology: Covers water quality, yield abstraction and water chemical and biological quality (fresh and sea water)
Geology/geomorphology: Includes soils, underlying geology and sub-soil (or drift) geomorphological features , minerals and oil
Air: Air and precipitation quality (including polluting gases and acid rain)
Land use: Covers all types of land use, but mainly agriculture, forestry and non-intensive (extensive) use
Biological capital: Includes plant, animal and soil communities and species
Landscape factors: Covers both the physical structure (fabric) of the landscape and its appearance (views)

Economic

Economic activity: Production and turnover by economic sectors
(**primary**: related to harvesting of resources such as forests or fishing
secondary: processing and manufacturing,
tertiary: services)
Gross income: Taxation and per capita income by sector
Public sector investment: Local, regional or EU government subsidies and investment
Private sector investment: All non-government investment
Transport: Infrastructure, traffic flows of walkers, road vehicles, and public transport and costs
Tourism and recreation: Infrastructure and use of areas for tourist visits and participation in recreational activities
Hunting and fishing: Hunting birds and mammals, and fishing

Social/political

Stakeholders: Views and numbers of persons, organizations or groups with an interest in the area
Planning/ regulation: Planning and statutory regulation of developments and of environmental protection
Land ownership: The pattern of land ownership
Settlements: Housing, commercial infrastructure and social and local council services in the area
Demography: The structure of the population, age, sex, family units etc.
Cultural heritage: The intellectual and cultural status (ideas, beliefs, values and knowledge) of a community

Issue definitions

Natural capital

Snow/ ice: includes snow cover, depth and persistance, permafrost and glacier dynamics
Climate: Meteorological characteristics and the changes over time in key features such as temperature, wind speed and precipitation
Soil quality: Defined through chemistry and structure
Soil disturbance: Includes anthropogenic and natural disturbance
Erosion: Removal of soil or subsoil materials by wind, water, trampling or other means
Minerals exploitation: Includes oil and gas, sand and gravel, stone and ore extraction
Gaseous components: Means the air composition (including greenhouse and noxious gases)
Precipitation characteristics: Information about pH and major cations and anions in rain
Intensive (enclosed) use: Arable land and pasture (grazing and fodding)
Extensive use: Include rangeland areas, abandoned areas, areas for hunting and fishing and areas designated for landscape or nature conservation
Forests: Forests used for multiple use including commercial , recreational conservation, hunting and landscape uses
Biodiversity inventories: The variety and extent of biological organisms communities, populations and habitats
Status/ condition: quality or fitness of communities species or habitats (such as the extent to which a community has been damaged by grazing**)**

Landscape fabric: Distribution and proportions of structural elements of the landscape (woods, slopes, skylines, water, linear features, habitats, artifacts etc.)
Landscape appearance: views of the landscape from key observation points

Economic

Production/turnover by sector:
Primary, secondary and tertiary sectors
(**primary**: related to harvesting of resources such as forests,
secondary: processing and manufacturing,
tertiary: services)
Employment levels: Employment and unemployment statistics by sector including financial cost of creating a new job
Taxation: Direct and indirect taxation including national insurance and income tax, council tax, VAT…
Income per capita: Income per capita by economic sectors (gross and net income)
Agri-environment subsidies: Investment in agri-environment schemes to encourage prescribed types of management. Includes farm woodland schemes, ESA schemes etc.
Other grants and assistance: All other grants and assistance from local, regional, NGO (non- governmental organisation) or EU sources
Capital expenditure: it reflects the level of development activity taking place
Running/ maintenance costs: recurrent/continuing investment in business activities
Infrastructure: Includes number and type of routes as well as new investment in the route network
Traffic flows: Traffic types and flow rates (road, rail, air, water)
Costs: Fuel, fares and vehicles
Infrastructure (tourist): Provision and use statistics for tourist accomodation and facilites such as car parks, information centres, nature trails, toilets
Visitors to key attractions: Numbers going to paid or free tourist attractions
Participants in key activities: Numbers participating in recreational activities such as canoeing, skiing, walking, horse riding, paragliding
Changing bags: Changes in the numbers of birds, mammals and fish killed
Changing stocks: Stocks of game birds, mammals and fish

Social/political

Stakeholders views: Opinions and voting patterns of stakeholders
Numbers of stakeholders: The numbers of stakeholders in various interest groups
Planning applications: Types of applications (commercial, domestic, tourism, etc.) and those applications given planning permission
Regulation of environmental quality: Effectiveness of statutory controls on environmental quality
Land ownership patterns: The pattern and size of land holdings (which might influence management practices and land prices)
Rental sector: Pattern and size of properties and rental income
Housing stock: Types and proportions of different categories of housing including costs and availability of housing
Services: Provided services such as health care, schools, retail outlets, council services such as water, sewage, refuse collection, etc.
Population density: Distribution and density of populations (can be linked to provision of services, living costs etc. in remote areas)
Age structure: Population age and range (can be linked to provision of schools, services for elderly people)
Impacts on heritage: Effects of development and other pressures on ancient monuments, buildings, routes etc
Impacts on local culture: Effects of development and other pressures on local culture

Indicator definitions

Natural capital

Snow: Snow cover and persistence
Glaciers: Cover, melt rates
Permafrost: Depth, extent
Air temperature
Precipitation: Amount and frequency of rainfall
Windiness
Radiation: Solar radiation
Ocean temperature: Water temperature
Currents: Flows and direction
Tides: Tidal range
Surface water chemistry: Major cations, anions and pollutants in streams and rivers
Ground water: Ground water quality (chemistry, pollutants etc)
Aquatic biology: Vertebrate and invertebrate fauna of streams and rivers (indicators of biological quality

Hydrographic data: Flow rates
Abstraction rates: The rates and proportions of water abstracted for domestic, agricultural or industrial use
Soil chemistry: Major anions, cations and pollutants
Soil structure: Physical composition, compaction, aeration
Anthropogenic disturbance: Ploughing, vehicular and other forms of human impact
Cryoturbation: Frost and solifluction features both active and historic
Sediment loadings : Quantities of transported sediments
Erosion events: Numbers and severity of erosion events
Avalanche records: Numbers and severity of avalanches and mudslides
Transport movements: Numbers of vehicle movements
Mineral extraction statistics: Quantities of minerals extracted
Greenhouse gases: O_3, CO_2, CH_4 (methane)
Noxious gases: Ammonia, NO_x (oxides of nitrogen), SO_2 (sulphur dioxide)
pH: A number used to express degrees of acidity or alkalinity in solutions
Chemistry: Major anions and cations in rain
Agricultural areas: Areas of arable, grazing, meadows etc
Pesticides and fertilizer rates: Frequencies and types of fertilizer application
Stock levels: Numbers and types of grazing animals
Crop statistics: Types of crops
Rangeland areas: Condition and size of areas used for extensive grazing by domestic or wild stock
Abandoned areas: Condition and size of areas with no formal management regime
Conservation areas: Condition and size of areas managed for landscape or nature conservation
Hunting /fishing: Condition and size of areas managed for bird or mammal hunting or for rod fishing
Single use forest areas: Areas and types of forest used mainly or exclusively for timber production
Multi use forest areas: Areas of forests with recreation, hunting or other uses in addition to timber production
Timber production: Timber production by species
Plant communities: Cover and species composition of plant communities
Animal populations: Distribution and species of animals
Soils: Types and distribution of soils
Habitats: Numbers and distribution of habitats
Key species status: Status (favourable or otherwise) of key species (numbers or extent of key species of local, regional or EU importance such as rare raptors)
Habitat condition: The status (favourable or otherwise) of key habitats
Artifacts: Human constructions or facilities including walls, buildings, fields, pylons ditches, etc.
Habitat features: areas or proportions of woodland, grassland, wetlands, rivers etc.
Managed landscapes: Proportions of views featuring obvious signs of human management such as fields, plantation forests, domestic animals, buildings, roads etc
Unmanaged landscapes: Proportions of views with with a “natural” appearance and largely lack artifacts

Economic
Primary sector: Related to harvesting of resources such as forests
Secondary sector: Processing and manufacturing
Tertiary sector: Services
Number on income support: Numbers of persons receiving income support
Employment: Numbers employed by sector
Direct taxation: Such as national insurance, income tax, local taxes
Indirect taxation: VAT and any other indirect taxes
Cost of living: The amount of income or money needed to acquire a given quantity of goods and services or to achieve a given living standard
Per capita income by sector: Income per person (gross and net income)
Uptake by scheme: Numbers of participants in individual agri-environment schemes
Agri-environment scheme Impacts: Effects of the schemes on the environment (social, economic and environmental)
Planning applications: investment proposed by planning applications
New business starts: investment committed by new business starts
Development investment: expenditure on product or other business expansion
Running cost subsidies: investment to cover business losses
Routes network: System of transport routes
Transport Investment: Levels of investment on new or existing routes, vehicles, other infrastructure such as stations, bus stops, garages, etc.
Traffic flows: Traffic by vehicle type, route and region
Public transport data: Numbers of people transported by transport type (bus, train etc.), region and route
Fuel costs: Price of fuel etc.
Access costs to major cities: Cost of transport to centres of population
Tourism occupancy rate: Numbers and proportion of tourist beds occupied by location and time of year
Tourist bed provision: Numbers of tourist beds available
Visitor numbers: Numbers of visitors to key attractions (including car parks, visitor centres etc.)

Traffic flows: Tourist flows by type of vehicle
Use of key walking routes: Numbers of visitors using key walking routes
Formal activities: Numbers participating in organised activities for which there is usually a charge such as skiing, horse riding
Informal activities: Numbers participating in free activities such as walking
Mammals & birds shot : Numbers of animals killed (grouse, deer, etc.) by area
Fish catches: Numbers of fish caught by area or river
Mammals & birds stocks: Stocks of mammals or birds used for hunting by area
Fish stocks: Stocks of fish caught by area or river

Social/political
Voting statistics: Results of local, regional or national elections
Surveys of views: Results of surveys of views of stakeholder groups
Informal groupings: Numbers of stakeholders with a common interest in an issue
Formal groups: Numbers of stakeholders belonging to organised clubs, societies or action groups
Types of planning application: Types and numbers of applications that were submitted
Approved planning applications: Types and numbers of applications that were approved
Environmental regulation compliance data: Numbers and types of samples within statutory limits
Environmental regulation exceedance data: Numbers and types of samples within exceeding statutory limits
Size of property holding: Size and location of property
Land prices: Price of land in various categories (agricultural, forestry, building, commercial etc.)
Register of ownership: List of ownership of property
Size of holding: Numbers and sizes of land holdings
Rental costs: Costs of renting various types of property (agricultural, domestic, commercial etc)
Costs of housing: House prices by area
Register of stock: Lists of all housing by area
New planning applications: Numbers and types of applications for new housing (affordable, executive, second homes, etc.)
Health provision: Expenditure or other indicators of health provision such as hospital beds available by area
Education provision: Expenditure or other indicators of education provision such as distance to school or class sizes
Retail provision: Numbers of shops and other commercial outlets by area or location
Council services: Expenditure on other indicators of levels of service (refuse collection, water, sewage, lighting etc.) provided by local councils
Population size: population size by region
Spatial distribution: density of population by area and locality
Household structure: Composition of households by sex age and number
Population structure: Population structure by age class and area
Damage to heritage sites: numbers and severity of damaged sites
Heritage funding: expenditure on heritage by area and type
Culture funding: expenditure by area and type
Culture participation: numbers participating in cultural activities

Appendix IV

Weighted scores for topics

Natural capital topics are highlighted in green, economic in pink and social/ political in blue. Scores of 50 and above highlighted in red. Columns with initials: weighted final scores of individuals.

	BM	OB	GAG	GG	SB	BDS	HS	HO	SAS	SG	SOE	OP	ORD	TF	**Mean**	**St. Dev.**
Climate	**56**	**100**	**100**	**100**	35	**100**	28	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**87**	26
Hydrology	28	**75**	**75**	**70**	49	**70**	40	**80**	**80**	30	**100**	**100**	**90**	**60**	**68**	23
Geology/geomorphology/soils	21	40	**50**	**80**	21	**90**	40	**60**	10	**50**	**70**	**80**	**80**	**100**	**57**	28
Air	35	**60**	**50**	**70**	35	**50**	**72**	**90**	**70**	40	**80**	**100**	**75**	**70**	**64**	20
Land use	**70**	**80**	**75**	**100**	**70**	**100**	**72**	**90**	**80**	10	**100**	**75**	**75**	**80**	**77**	22
Biological capital	42	**100**	**100**	**80**	49	**90**	40	**60**	**100**	**90**	**50**	**100**	**85**	**50**	**74**	24
Landscape factors	28	30	10	**80**	**56**	**60**	**56**	**70**	20	**70**	**50**	**50**	**70**	**70**	**51**	22
Economic activity	**100**	**90**	38	**100**	**##**	**80**	**68**	**100**	**100**	**70**	**100**	**64**	**80**	**100**	**85**	19
Gross income	**70**	**81**	38	**75**	**80**	40	**60**	**50**	**50**	**63**	**80**	16	**72**	**80**	**61**	20
Public sector investment	**70**	**63**	25	**100**	**70**	48	38	**70**	**80**	42	**80**	40	48	**50**	**59**	21
Private sector investment	**80**	**63**	25	**100**	**70**	32	**68**	**70**	40	42	**80**	40	**64**	**50**	**59**	21
Transport	**60**	**63**	**50**	**70**	**60**	32	**75**	**60**	**80**	**63**	**70**	**64**	**56**	**50**	**61**	12
Tourism and recreation	**70**	**72**	38	**70**	**70**	**72**	**60**	**70**	**80**	**53**	**60**	**64**	**64**	**70**	**65**	10
Hunting and fishing	30	**54**	38	30	**50**	24	**53**	30	10	28	**60**	**80**	**56**	**60**	43	19
Stakeholders	**70**	30	**75**	**90**	**56**	**72**	**70**	**70**	**53**	**64**	**80**	40	**60**	**80**	**65**	16
Planning / regulation	**56**	38	**75**	**81**	42	**90**	**100**	**70**	**75**	**64**	**100**	**80**	**80**	**50**	**71**	20
Land ownership	49	41	**56**	**72**	**56**	18	**50**	49	45	**64**	**80**	16	**64**	30	49	19
Settlement	35	**53**	38	36	42	18	**60**	21	30	40	**60**	**64**	**56**	10	40	17
Demography	49	**75**	38	**72**	**70**	**72**	**100**	21	**53**	**64**	**80**	**64**	**64**	**100**	**66**	21
Cultural heritage	42	38	**56**	**68**	42	**81**	**60**	**56**	45	**80**	**80**	48	**72**	**60**	**59**	15

Appendix V

Weighted scores for issues

Natural capital issues are highlighted in green, economic in pink and social/ political in blue. Scores of 50 and above are highlighted in red. Columns with initials: weighted final scores of individuals

	BM	OB	GAG	GG	SB	BDS	HS	HO	SAS	SG	SOE	OP	ORD	TF	**Mean**	**St. Dev**
Snow & ice	34	100	100	80	32	50	28	100	80	70	70	100	80	100	73	27
Climate	56	100	100	100	35	100	28	100	100	100	100	100	100	100	87	26
Oceanographic data	28	75	75	70	49	70	40	80	80	30	100	100	63	60	66	23
Water quality	14	38	38	53	25	35	20	40	40	18	80	80	72	30	42	22
Water yield	20	60	56	63	39	35	20	64	72	24	100	80	90	30	54	26
Soil quality	6	10	38	64	11	27	20	18	5	40	56	40	24	30	28	18
Soil disturbance	15	20	38	80	17	27	28	48	9	25	49	64	60	30	36	21
Erosion	21	40	50	80	21	90	40	60	10	50	70	80	80	100	57	28
Minerals exploitation	4	32	25	48	11	9	12	6	3	25	42	16	40	30	22	15
Gaseous components	18	60	38	70	35	50	72	90	70	40	40	100	75	70	59	23
Precipitation characteristics	35	36	50	56	35	40	58	72	35	12	80	50	45	35	46	17
Intensive use	49	80	38	90	56	80	58	27	64	4	80	75	38	32	55	25
Extensive use	70	64	56	100	63	100	72	90	72	10	100	75	56	80	72	24
Forests	42	64	75	100	70	100	36	63	80	2	50	75	75	40	62	26
Biodiversity inventories	29	70	100	72	34	90	20	36	80	72	50	80	60	25	58	26
Status/condition	42	100	75	80	49	90	40	60	100	90	35	100	85	50	71	24
Landscape fabric	28	30	10	64	45	60	56	42	20	7	30	50	70	70	42	21
Landscape appearance	17	18	5	80	56	18	56	70	16	70	50	25	63	56	43	25
Production/ turnover by sector	100	90	38	100	##	80	68	100	100	70	100	64	80	100	85	19
Employment levels	70	72	19	100	80	40	68	50	40	49	60	64	72	90	62	21
Taxation	49	81	19	56	48	20	60	25	15	25	56	8	72	56	42	23
Income per capita	70	65	38	75	80	40	48	50	50	63	80	16	58	80	58	19
Agri-environment subsidies	70	63	25	80	70	48	38	56	80	13	56	40	48	50	53	20
Other grants and assistance	49	44	13	100	56	24	26	70	56	42	80	20	36	30	46	25
Capital expenditure	80	63	13	100	70	32	68	70	40	42	56	40	64	50	56	22
Running/ maintenance costs	56	38	25	70	42	16	47	21	20	21	80	20	51	15	37	21
Infrastructure	42	44	50	56	60	22	75	48	80	25	35	51	56	25	48	17
Traffic flows	60	63	25	70	30	32	60	60	40	63	49	64	50	50	51	14
Costs	36	32	38	56	48	16	75	30	64	44	70	51	45	10	44	19
Infrastructure	70	72	19	49	49	29	60	42	80	37	60	64	64	49	53	17
Visitors to key attractions	56	50	38	70	63	72	30	70	56	53	36	64	58	70	56	14
Participants in key activities	42	50	19	49	70	58	48	28	56	21	48	64	58	56	48	15
Changing bags	21	54	28	24	50	24	53	30	7	20	60	40	45	48	36	16
Changing stocks	30	54	38	30	30	24	37	24	10	28	54	80	56	60	40	19
Views	70	21	75	90	56	72	70	70	53	64	80	28	51	80	63	20
Numbers of stakeholders	49	30	38	68	39	43	70	49	37	26	80	40	60	40	48	16
Planning applications	56	38	75	81	42	90	100	70	60	19	100	80	56	35	64	25
Regulation of environ. quality	34	30	75	73	34	72	100	56	75	64	100	80	80	50	66	23
Landownership patterns	49	41	56	72	56	18	50	49	45	64	80	16	64	30	49	19
Rental sector	25	25	28	65	34	2	35	15	14	45	48	8	45	3	28	19
Housing stock	25	37	19	25	29	5	42	17	15	8	42	51	56	5	27	17
Services	35	53	38	36	42	18	60	21	30	40	60	64	50	10	40	16
Population density	49	75	38	65	70	72	80	21	37	64	80	64	64	100	63	21
Age structure	34	60	28	72	70	43	100	15	53	38	64	64	58	100	57	25
Impacts on heritage	29	26	28	47	29	32	42	56	32	64	64	38	65	24	41	15
Impacts on local culture	42	38	56	68	42	81	60	50	45	80	80	48	72	60	59	15

Appendix VI

Weighted scores for indicators

Natural capital indicators are highlighted in green, economic in pink and social/ political in blue. Scores of 50 and above are highlighted in red. Columns with initials: weighted final scores of individuals

	BM	OB	GAG	GG	SB	BDS	HS	HO	SAS	SG	SOE	OP	ORD	TF	**Mean**	**St. Dev.**
Snow	24	**100**	**100**	**72**	25	**50**	17	**70**	40	42	**56**	**80**	**72**	**80**	**59**	27
Glaciers	34	**100**	**75**	**80**	32	35	28	**100**	**80**	**70**	**70**	**100**	**80**	**100**	**70**	27
Permafrost	0	**80**	25	40	3	15	3	**100**	**56**	7	42	0	**64**	40	34	32
Temperature	**56**	**100**	**100**	**100**	35	**100**	28	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**87**	26
Precipitation	45	**100**	**100**	**90**	35	**100**	25	**90**	**60**	**80**	**100**	**70**	**80**	**100**	**77**	26
Windiness	11	**80**	**75**	**70**	25	**60**	20	**70**	**80**	**60**	**70**	**70**	**60**	20	**55**	25
Radiation	22	**70**	**50**	**70**	11	**60**	3	**50**	**60**	10	**80**	**70**	**70**	20	46	27
Tempearature	28	**75**	**56**	**70**	49	**70**	40	**72**	**80**	30	**100**	**100**	**63**	**60**	**64**	22
Currents	20	**53**	**75**	49	49	**70**	40	**80**	**72**	30	**100**	**100**	**50**	**60**	**61**	24
Tides	0	**53**	8	28	15	21	28	48	40	9	**60**	20	25	12	26	18
Surface water chemistry	14	26	28	26	20	35	20	40	20	9	**80**	**64**	**72**	9	33	23
Ground water	10	19	28	**53**	12	35	10	32	40	9	48	**80**	**65**	9	32	23
Aquatic biology	7	38	38	26	25	21	10	24	32	18	32	**64**	43	30	29	14
Hydrographic data	4	48	**56**	**63**	39	35	20	**64**	36	24	**100**	**80**	45	30	46	25
Abstraction rates	20	**60**	42	47	24	25	8	6	**72**	17	**70**	40	**90**	24	39	26
Soil chemistry	4	10	19	38	7	27	10	18	3	40	**56**	40	24	9	22	16
Soil structure	6	5	38	**64**	11	27	20	9	1	28	28	40	7	30	22	18
Anthropogenic disturbance	12	20	19	**80**	17	27	28	48	9	25	49	**64**	48	30	34	21
Cryoturbation	15	6	38	**60**	13	27	14	34	9	10	49	32	**60**	24	28	18
Sediment loadings	11	28	38	**64**	17	**90**	16	6	9	**50**	**70**	**80**	**56**	**100**	45	32
Erosion rates	21	40	**50**	**80**	17	**90**	40	**60**	10	40	**70**	**80**	**80**	**100**	**56**	29
Avalanche records	13	28	25	32	21	**54**	40	48	3	40	**70**	**64**	**72**	**50**	40	21
Transport	4	32	13	24	11	9	4	1	2	10	42	8	40	9	15	14
Extraction statistics	3	19	25	48	11	5	12	6	3	25	42	16	4	30	18	15
Greenhouse gases	18	**60**	38	**70**	28	**50**	**72**	**90**	**70**	40	40	**100**	**75**	**70**	**59**	24
Noxious gases	14	48	19	49	35	45	43	**63**	35	24	32	**50**	**68**	49	41	16
pH	25	36	**50**	39	35	40	17	**72**	35	7	**80**	**50**	32	18	38	20
Chemistry	35	32	38	**56**	35	40	**58**	**72**	35	12	**80**	25	45	35	43	18
Agricultural areas	34	**80**	28	**72**	**56**	**80**	**58**	8	32	1	**80**	**75**	34	26	47	28
Pesticides and fertilizers	29	**72**	19	45	28	**72**	6	22	**64**	4	**80**	38	23	32	38	25
Stock levels	49	**72**	38	**90**	**56**	**80**	40	27	**58**	2	40	**60**	38	32	49	23
Crop statistics	15	**72**	19	27	34	**56**	35	5	32	0	8	38	26	16	27	20
Rangeland areas	**70**	**64**	42	**100**	**63**	**100**	**72**	**90**	**72**	2	**70**	**56**	**56**	**80**	**67**	25
Abandoned areas	**56**	**51**	42	**70**	**63**	**70**	**58**	45	**58**	3	**100**	**56**	45	16	**52**	23
Conservation areas	49	**51**	**56**	**75**	**50**	**60**	**58**	**72**	43	10	**70**	**75**	**51**	**80**	**57**	18
Hunting and fishing areas	7	**51**	28	**75**	44	**100**	**58**	**72**	36	1	**70**	**56**	17	16	45	29
Single use forest	8	**64**	**56**	**50**	**56**	**70**	4	**63**	24	1	**50**	15	**68**	4	38	27
Multi use forest	42	**51**	**75**	**100**	**70**	**100**	36	**63**	**80**	2	**50**	**75**	**60**	40	**60**	26
Production	0	**51**	8	**50**	14	**100**	4	**63**	8	0	**50**	15	**75**	4	32	33
Plant communities	24	35	**75**	**72**	34	**72**	12	25	**64**	**72**	30	**80**	24	25	46	25
Animal populations	24	**70**	**50**	**58**	27	**63**	12	25	**80**	36	35	40	**60**	25	43	20
Soils	15	21	**75**	**50**	14	**63**	8	18	**56**	**72**	25	**80**	18	20	38	26
Habitats	29	49	**100**	**58**	21	**90**	20	36	**80**	36	**50**	**80**	36	20	**50**	27
Key species status	29	**100**	**56**	**64**	34	**90**	28	42	**80**	45	35	**100**	**85**	**50**	**60**	26
Habitat condition	42	**70**	**75**	**80**	49	**90**	40	**60**	**100**	**90**	35	**100**	**60**	**50**	**67**	22

Artifacts	20	30	5	48	31	30	22	42	4	1	30	25	70	70	31	21
Habitat features	28	12	10	64	45	60	56	34	20	7	18	50	63	49	37	21
Managed landscapes	12	18	4	80	56	18	56	49	16	14	50	19	63	28	34	24
Unmanaged landscapes	17	9	5	80	56	18	56	70	8	70	25	25	63	56	40	27
Primary sector	70	90	38	100	70	80	68	100	100	70	60	64	80	100	78	19
Secondary sector	80	63	28	100	90	80	68	50	50	70	100	64	72	30	67	22
Tertiary sector	100	63	19	75	##	80	54	30	20	70	80	64	56	30	60	27
Number on income support	70	50	9	40	64	40	41	50	40	25	48	64	72	27	46	18
Employment	49	72	19	100	80	40	68	50	40	49	60	64	65	90	60	21
Direct taxation	34	81	19	56	34	20	60	25	15	25	45	8	58	56	38	21
Indirect taxation	49	49	9	28	48	20	36	20	3	25	56	6	72	56	34	21
Cost of living	70	45	38	75	80	20	48	50	50	63	80	16	58	80	55	21
Per capita income by sector	56	65	38	56	48	40	24	40	45	63	80	12	46	80	49	19
Uptake by scheme	49	44	13	40	70	48	38	56	48	6	56	40	48	25	41	17
Impacts	70	63	25	80	70	24	23	56	80	13	56	40	48	50	50	22
Uptake by sector	49	44	9	100	56	24	26	70	39	29	80	15	36	30	43	26
Local development grants	25	18	6	100	56	12	26	14	11	42	80	15	32	30	33	28
Regional budget	34	22	13	100	56	12	26	56	56	21	80	20	29	30	40	26
Planning applications	80	32	13	90	70	32	68	70	40	21	45	30	58	10	47	26
New business starts	56	63	6	100	70	26	68	70	8	42	56	40	64	50	51	26
Development investment	56	38	25	70	42	16	47	21	20	21	64	20	51	15	36	19
Running costs subsidies	34	11	19	63	42	8	24	17	4	13	80	15	41	8	27	23
Routes network	25	22	50	56	42	22	45	48	80	25	35	51	56	5	40	19
Investment	42	44	38	56	60	16	75	29	16	13	28	41	50	25	38	18
Traffic flows	60	63	25	70	30	32	36	60	40	63	49	64	50	50	49	15
Public transport data	24	63	19	70	21	22	60	48	24	38	39	64	50	10	39	20
Fuel costs	36	19	38	56	48	16	75	30	64	44	70	26	40	10	41	20
Access costs to major cities	7	32	19	56	24	10	75	15	64	13	49	51	45	2	33	23
Occupancy rates	70	72	19	49	49	29	60	34	80	37	60	64	64	49	52	18
Provision	49	50	9	49	39	14	6	42	56	6	60	64	58	15	37	22
Visitor numbers	56	50	38	70	63	72	30	70	56	53	29	64	58	70	56	15
Traffic flows	11	25	19	35	38	50	15	56	50	37	18	32	52	35	34	15
Use of key walking routes	39	35	28	70	38	36	24	42	22	26	36	48	46	70	40	15
Formal activites	42	50	19	49	70	58	48	28	28	21	48	64	52	56	45	16
Informal activites	25	25	19	49	49	58	5	28	56	16	29	64	58	56	38	19
Mammals and birds shot	21	54	28	24	50	24	26	30	7	12	60	40	45	48	33	16
Fish catches	15	54	28	24	50	24	53	30	7	20	60	40	45	48	35	17
Mammal & bird stocks	30	54	38	30	30	24	18	24	6	28	43	80	50	60	37	19
Fish stocks	21	54	38	30	30	24	37	24	10	28	54	80	56	60	39	19
Voting statistics	56	6	8	72	56	43	35	42	53	38	80	28	51	40	43	21
Survey of views	70	21	75	90	56	72	70	70	53	64	80	28	41	80	62	20
Informal groupings	49	12	38	68	31	43	7	34	18	26	64	40	48	40	37	18
Formal groups	34	30	19	68	39	43	70	49	37	10	80	40	60	20	43	21
Types of application	56	30	56	81	29	63	50	56	30	19	80	80	50	7	49	23
Approved applications	34	38	75	81	42	90	100	70	60	10	100	80	56	35	62	28
Compliance data	27	30	38	73	34	72	100	45	60	19	100	80	80	10	55	30
Exceedance data	34	30	75	73	34	50	100	56	75	64	100	80	72	50	64	23
Size of holding	25	41	56	72	34	4	50	49	14	64	48	16	58	6	38	22
Land prices	49	33	28	72	56	4	50	39	45	32	64	12	64	6	40	22
Register of ownership	29	17	28	72	17	18	50	25	5	64	80	8	38	30	34	24
Size of holding	25	25	28	65	20	2	35	15	14	22	48	8	31	1	24	17
Rental costs	15	12	14	65	34	1	35	15	14	45	48	6	45	3	25	20
Costs of housing	25	37	9	18	29	1	42	13	8	6	42	51	56	5	24	18
Register of stock	7	37	19	25	18	3	21	8	2	2	34	26	34	1	17	13
New planning applications	17	37	14	18	24	5	21	17	15	2	42	51	45	1	22	16

Availability	12	37	9	18	29	3	21	8	12	8	34	38	**50**	1	20	15
Health provision	25	**53**	19	36	34	13	**60**	21	30	12	48	32	**50**	10	32	16
Education provision	28	**53**	19	36	42	18	**60**	21	30	40	**60**	**64**	45	10	38	17
Renatl provision	25	26	28	27	29	18	**60**	17	3	24	36	48	40	5	28	15
Council service	35	42	38	27	17	13	**60**	13	15	16	36	**64**	40	10	30	18
Population size	25	**75**	28	**58**	**56**	**72**	48	21	26	**64**	**56**	**51**	**64**	20	47	20
Spatial distribution	49	**75**	38	**65**	**70**	**72**	**80**	21	37	19	**80**	**64**	**58**	**100**	**59**	24
Household structure	24	**60**	14	**58**	**56**	22	**100**	10	42	8	45	**64**	**52**	**100**	47	30
Population structure	34	**60**	28	**72**	**70**	43	**100**	15	**53**	38	**64**	**64**	**58**	**100**	**57**	25
Damage to sites	24	26	28	47	18	32	42	**56**	32	**64**	**64**	29	**58**	5	37	18
Funding	29	21	14	38	29	16	4	**56**	6	48	**64**	38	**65**	24	32	20
Funding	29	38	28	**68**	29	**81**	**60**	35	23	**80**	**80**	48	**65**	30	50	22
Participation	42	38	**56**	**68**	42	**81**	**60**	**50**	45	**80**	**80**	48	**72**	**60**	**59**	15