31 July 2020

Online Workshop on Co-creating UK Socio-economic Scenarios

4-7 May 2020

Summary of workshop output on drivers of future socio-economic development and their mapping to the Shared Socio-economic Pathways

Paula A. Harrison[1], Zuzana Harmáčková and Simona Pedde
UK Centre for Ecology & Hydrology

An online workshop was held on 4-7 May 2020 to co-create socio-economic scenarios for the UK with a range of stakeholders from academia, policy, practice and business. 37 stakeholders participated in the workshop that focused on developing downscaled and enriched versions of the IPCC-related Shared Socio-economic Pathways (SSPs) for the UK and its countries (England, Wales, Scotland and Northern Ireland).

The workshop is part of the project "*Development and provision of UK socio-economic scenarios for climate vulnerability, impact, adaptation and services research and policy*" funded by the UK Climate Resilience Strategic Priority Fund. The project will generate four products for use by UK research and stakeholder communities: (i) narratives for all five SSPs for the UK and its countries; (ii) tables of semi-quantitative trends for a wide range of socio-economic indicators; (iii) quantifications for specific indicators at the appropriate temporal and spatial resolution depending on user needs; and (iv) a set of interactive visualisations that show the interrelationships between the key drivers represented in the scenarios and ensure internal consistency in their future projections. The projections will be linked to the IPCC community's global scenario framework of Shared Socio-economic Pathways (SSPs) and Representative Concentration Pathways (RCPs) to ensure cross-sector consistency in scenario application within the UK and cross-scale consistency with other international scenario initiatives, such as future IPCC Assessments.

This report presents our outputs from Session 1 of the workshop on "Drivers and Uncertainties" and Session 2 on "Mapping the drivers to the SSPs". In Session 1, participants were asked to suggest drivers that are particularly important and uncertain for determining the socio-economic development of the UK over this century. Drivers were clustered into driver categories by participants as we progressed through the session. After cleaning and processing the primary data, 14 final driver categories emerged as being key for future socio-economic development in the UK. Session 2 focused on eliciting potential driver trends under different SSPs. The driver trends were scored based on specific polarities (extreme dimensions) defined for each driver separately.

In the following pages, we present the WordClouds for each of the 14 driver categories, summarise their key dimensions and present the scoring of their trends. The scores presented in this report merge data from the 37 workshop participants with expert-opinion based scoring by the 10 members of the project team. These results were used in subsequent workshop sessions to provide context for developing the narratives of the UK Shared Socio-economic Pathways (UK-SSPs).

[1] For further information, contact PaulaHarrison@ceh.ac.uk

Driver 1: UK/Devolved Administration Policy & Governance

Driver 1 "UK/Devolved Administration Policy & Governance" included the dimensions of the level of centralisation within the UK, different political and economic models, public spending and different types of policies.

Figure 1: Word cloud for the driver "UK/Devolved Administration Policy & Governance".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between the two extremes of centralized UK governance, and devolved governance.

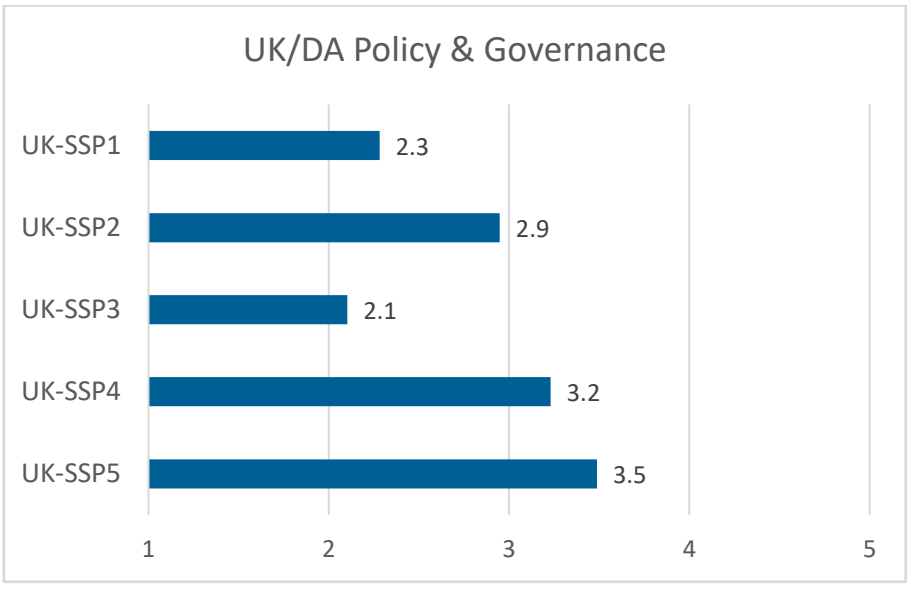


Figure 2: Scoring for the driver "UK/Devolved Administration Policy & Governance". The scale ranges between 1 (Devolved) and 5 (Centralized). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 2: International relations

The key dimensions of Driver 2 "International relations" were the UK's relationship with the rest of the world, including trade, supply chains, the role of populism in international relations and different types of policies influencing international relationships between countries.

Figure 3: Word cloud for the driver "International relations".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between the two extremes of a protectionist/nationalistic view of how international relationships might evolve, and a more globalised future with less barriers to trade and broader international cooperation.

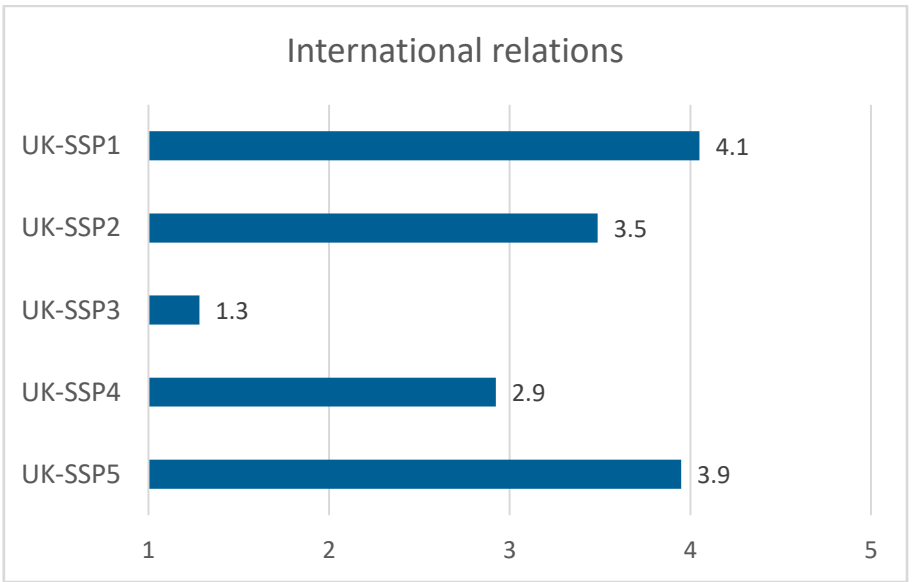


Figure 4: Scoring for the driver "International relations".
The scale ranges between 1 (Protectionist) and 5 (Globalized). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 3: Response to global shocks

The key dimensions of Driver 3 "Response to global shocks" were different aspects of recovery after pandemics and other types of global shocks (including those related to climate and other social and natural hazards). The priority was given to different types of responses, and economic aspects of the responses.

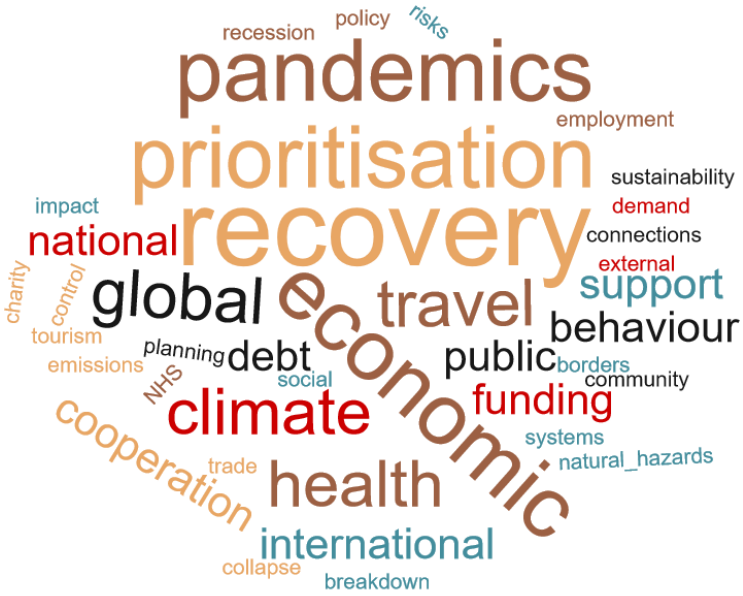


Figure 5: Word cloud for the driver "Response to global shocks".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between the two extremes of "persistence" (responding to global shocks reactively, trying to sustain previous patterns) and "transformative change" (responding in novel ways compared to the past, both politically and socially).

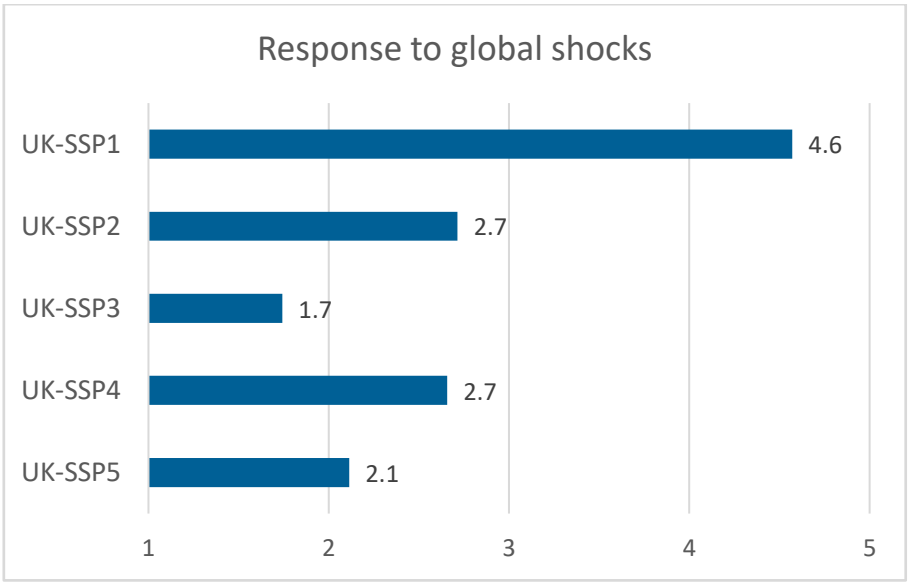


Figure 6: Scoring for the driver "Response to global shocks".
The scale ranges between 1 (Persistence) and 5 (Transformative change). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 4: Public attitudes

The key dimensions of Driver 4 "Public attitudes" were different types of public perceptions of, and attitudes to, social and environmental dynamics (including climate extremes and extreme weather events), changes in individual and societal behaviour and consumption patterns.

Figure 7: Word cloud for the driver "Public attitudes".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between the two extremes of an engaged and inspired society, empowered to change its attitudes, with high levels of trust in the government, and a disillusioned, disengaged and disempowered society, not likely to change its behaviour and lifestyles.

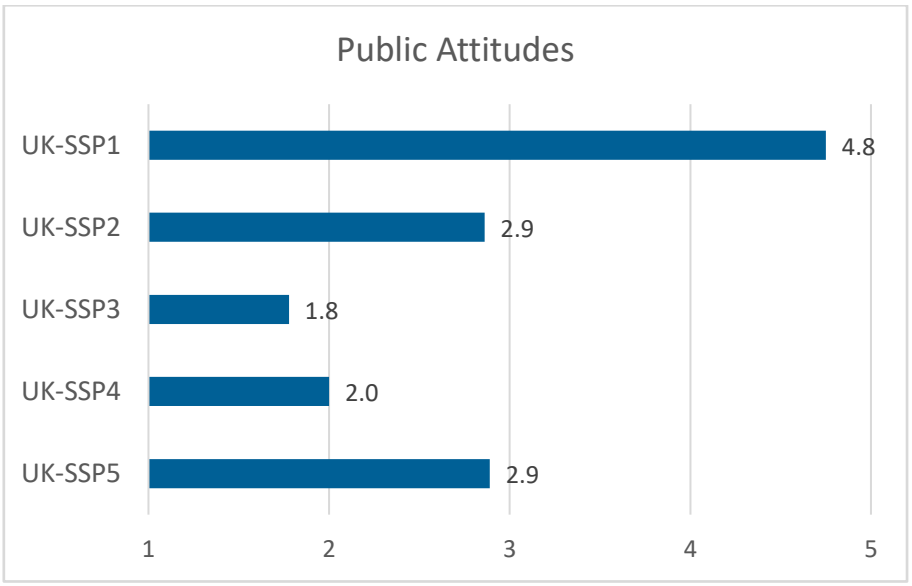


Figure 8: Scoring for the driver "Public attitudes".
The scale ranges between 1 (Disillusioned, disengaged and disempowered) and 5 (Engaged, empowered and inspired). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 5: Social structure

The key dimensions of Driver 5 "Social structure" were social inequality, social justice, as well as societal division between regions, generations, rural and urban areas.

Figure 9: Word cloud for the driver "Social structure".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between the two extremes of a society where just a few privileged people benefit from the economy, access to health care, education, etc., and an egalitarian society where many people enjoy the benefits of the society in which they live equally.

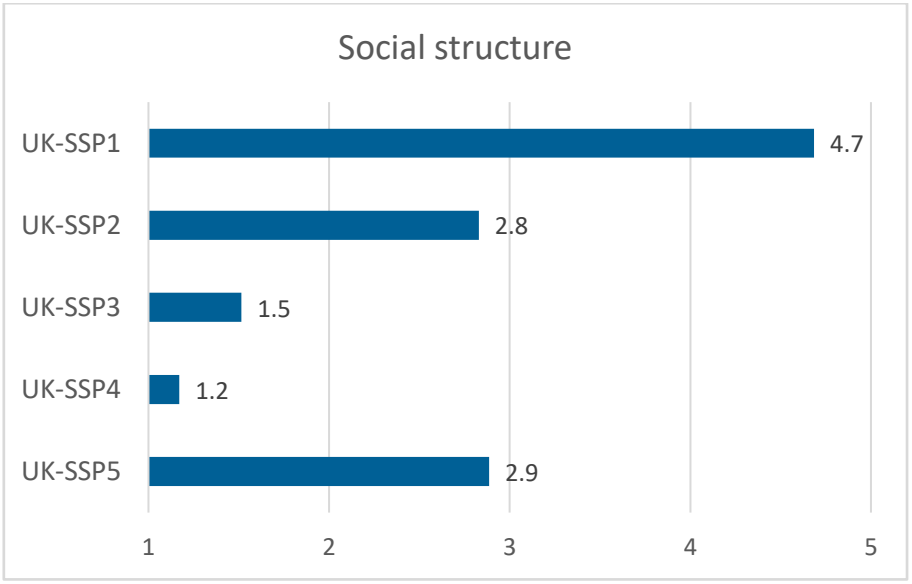


Figure 10: Scoring for the driver "Social structure".
The scale ranges between 1 (Privileged, few) and 5 (Egalitarian, many). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 6: Natural resources

The key dimensions of Driver 6 “Natural resources” were resource availability and scarcity (e.g. water scarcity), biodiversity loss, the role of food production and diets, climate, land use as well as different aspects of trade, policies and solutions (including nature-based solutions).

Figure 11: Word cloud for the driver “Natural resources”.

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between the two extremes of a resource-friendly, sustainable way in which resources are used, and overexploitation of resources related to using them in an unsustainable way.

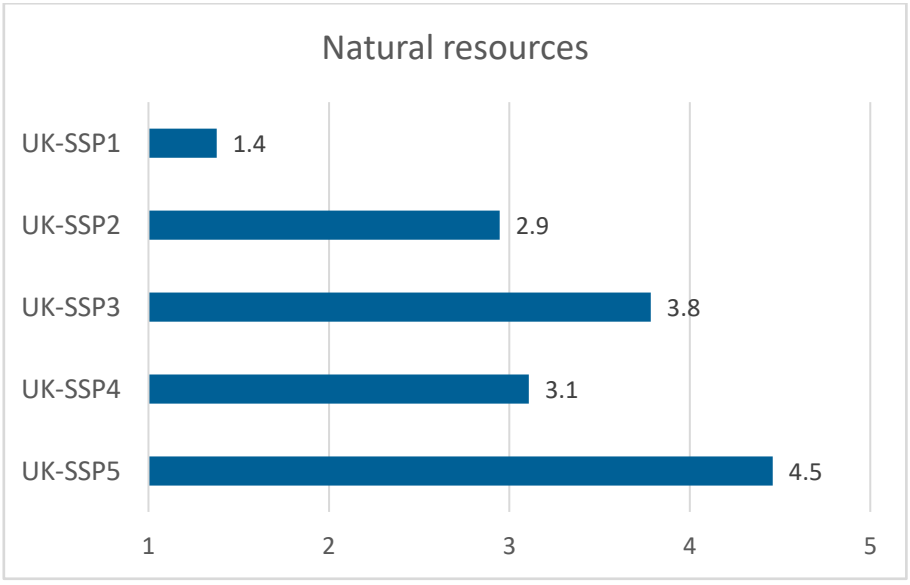


Figure 12: Scoring for the driver “Natural resources”.
The scale ranges between 1 (Resource-friendly, sustainable use) and 5 (Resource over-exploitative, unsustainable use). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 7: Technology

The key dimensions of Driver 7 "Technology" were automation and digitalisation, different types of innovation in technology and energy, access to technology, as well as the links to economy, policies and employment.

Figure 13: Word cloud for the driver "Technology".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between the two extremes of slow vs. rapid technological development.

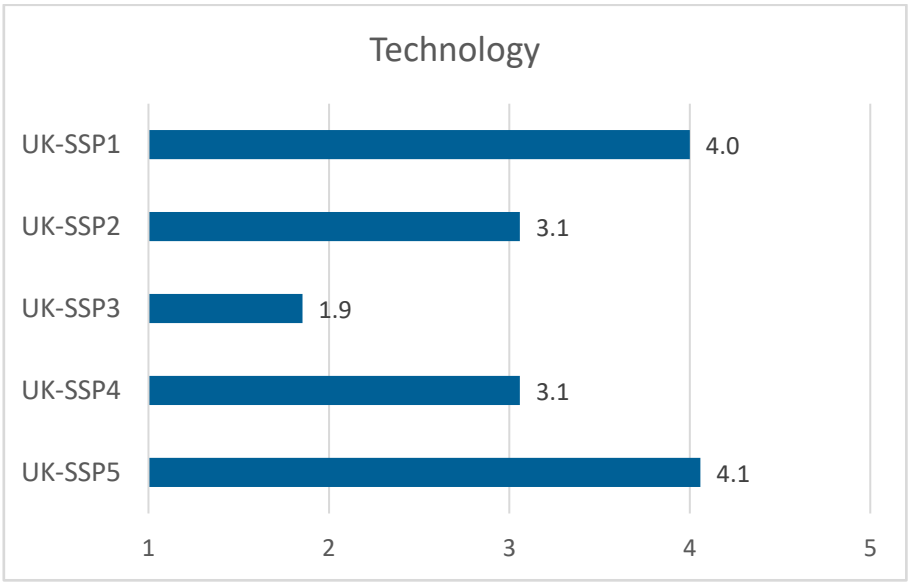


Figure 144: Scoring for the driver "Technology".
The scale ranges between 1 (Slow) and 5 (Rapid). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 8: Education

The key dimensions of Driver 8 "Education" were different types of education and research, ranging from university education to lifelong learning, awareness raising and developing scientific and climate literacy among the general public. Equally important were the issues of funding of education, and research and development.

Figure 15: Word cloud for the driver "Education".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between the two extremes of low investment and high investment. Importantly, different types of investments were included in these extremes, e.g. private and public, monetary and non-monetary (time, capacity), depending on the context of a specific future scenario.

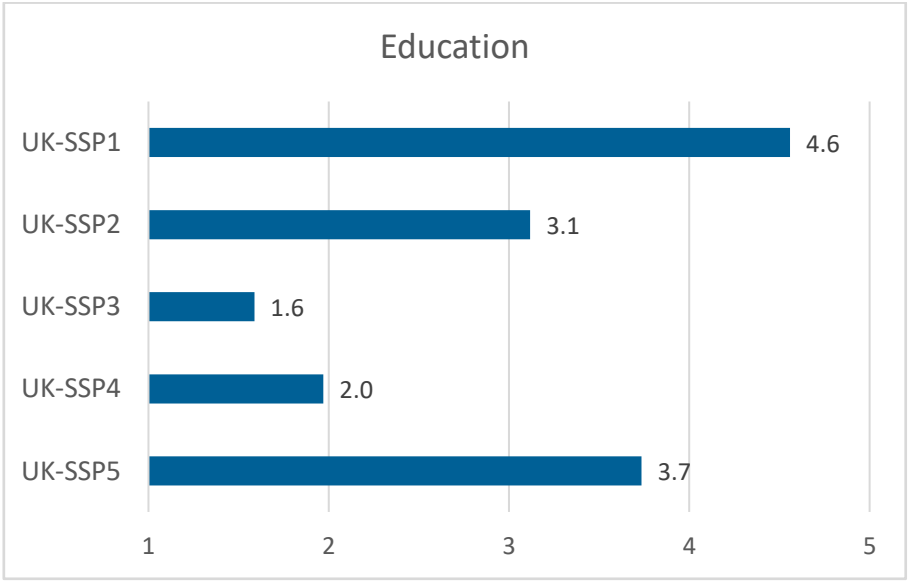


Figure 16: Scoring for the driver "Education".
The scale ranges between 1 (Low investment) and 5 (High investment). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 9: Demography

The key dimensions of Driver 9 "Demography" were population growth and ageing, migration, employment and divisions between different parts of the society, including age, and rural vs. urban areas.

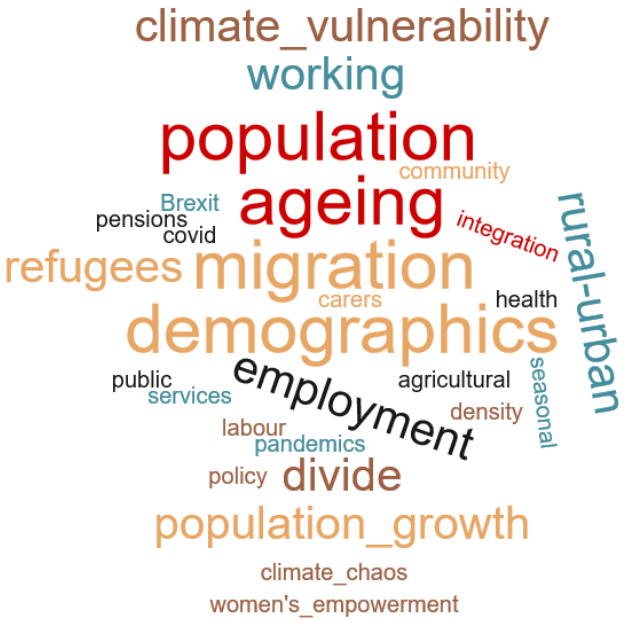


Figure 17: Word cloud for the driver "Demography".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between two extremes that were related to the age-profile of the population. Specifically, the extremes were a low proportion of people over 65 years in the society, vs. a high proportion of people in this age category.

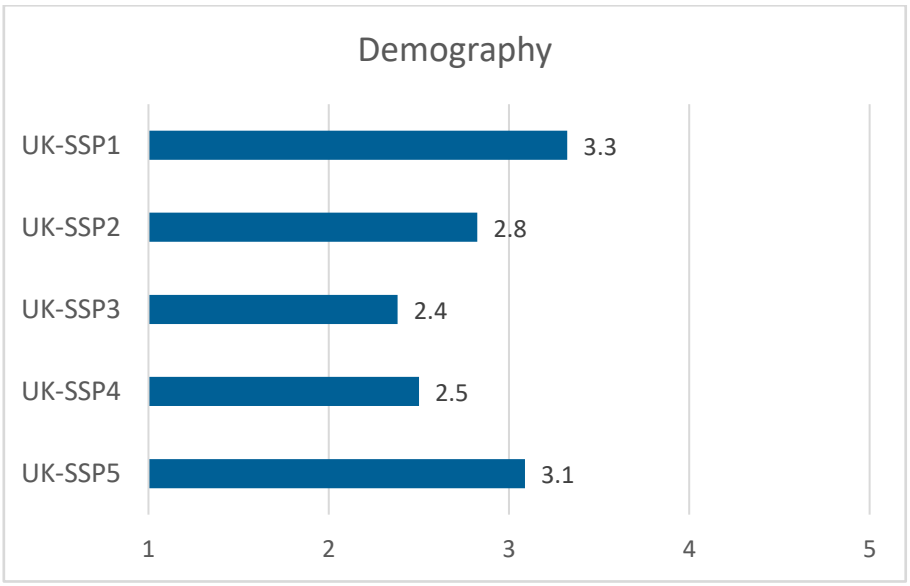


Figure 18: Scoring for the driver "Demography".
The scale ranges between 1 (Lower proportion of people >65) and 5 (Higher proportion of people >65). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 10: Energy

The key dimensions of Driver 10 "Energy" were different types of energy sources (including fossil fuels vs. green sources and renewables), the level of decarbonisation, as well as the link to policies, lobbying and behaviours.

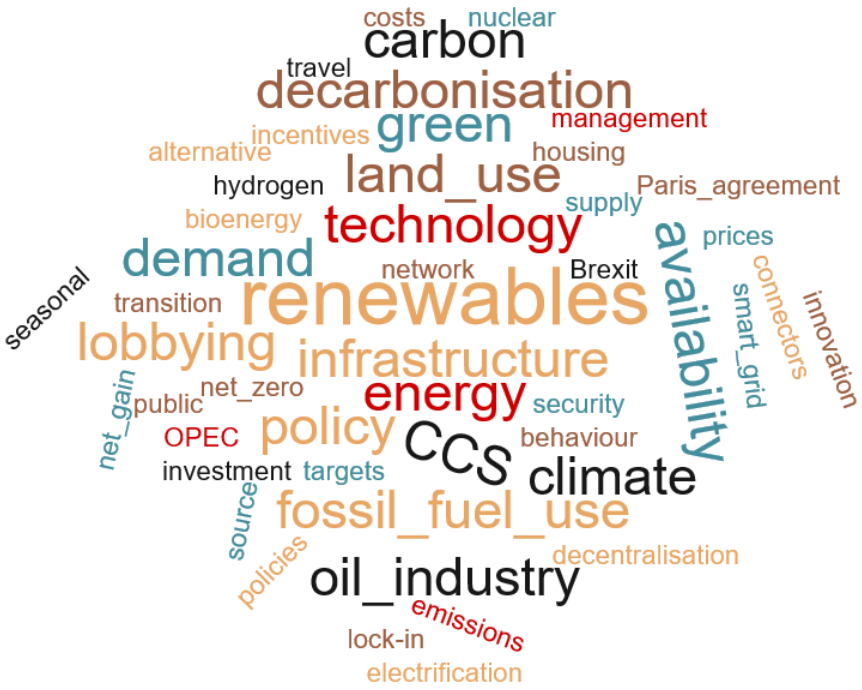


Figure 19: Word cloud for the driver "Energy".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between the two extremes of low-carbon energy (such as solar or wind energy) vs. high-carbon energy (such as fossil fuels).

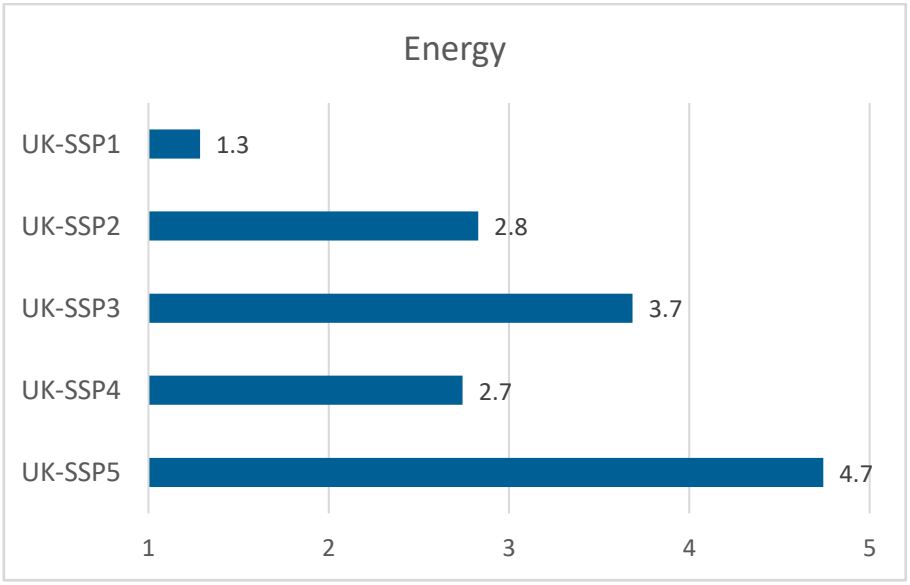


Figure 20: Scoring for the driver "Energy".
The scale ranges between 1 (Low-carbon) and 5 (High-carbon). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 11: Food

The key dimensions of Driver 11 "Food" were related to different parts of food supply chains (including supply and demand, local to global), links to trade and land use, the role of diets and meat consumption as well as broader consumer behaviour and demand.

Figure 21: Word cloud for the driver "Food".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between two extremes that were related to diet composition, particularly meat consumption. Specifically, the extremes included low-meat diet and high-meat diet.

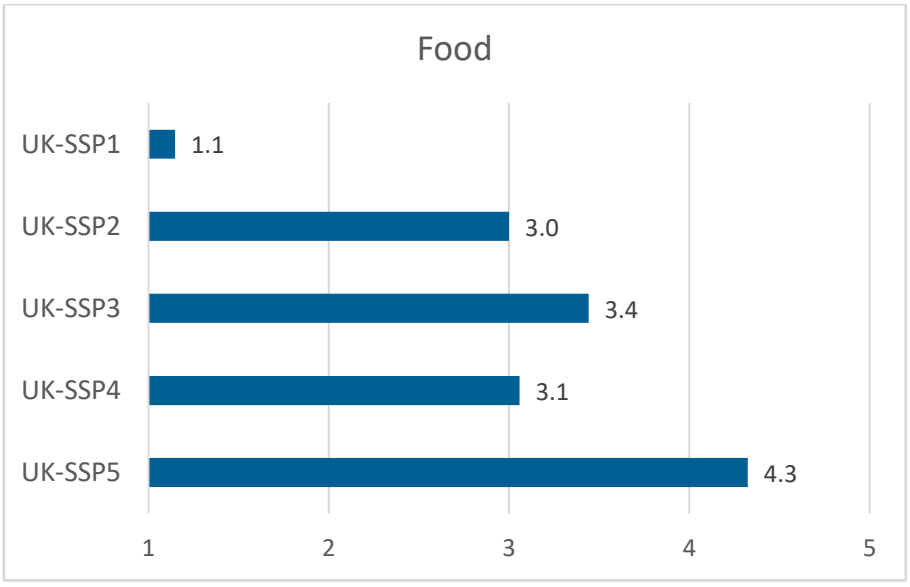


Figure 22: Scoring for the driver "Food".
The scale ranges between 1 (Low-meat diet) and 5 (High-meat diet). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 12: Economic development

The key dimensions of Driver 12 "Economic development" were related to economic policies, the overarching future economic model, economic growth (vs. degrowth), trade, employment and inequality.

Figure 23: Word cloud for the driver "Economic development".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between two extremes that were related to moving towards a traditional market-based economic system vs. moving towards a novel economic system. The latter extreme was left intentionally vague in order to allow for different interpretations in the context of the UK-SSPs (e.g. inclusive wealth, degrowth, non-monetary economic systems).

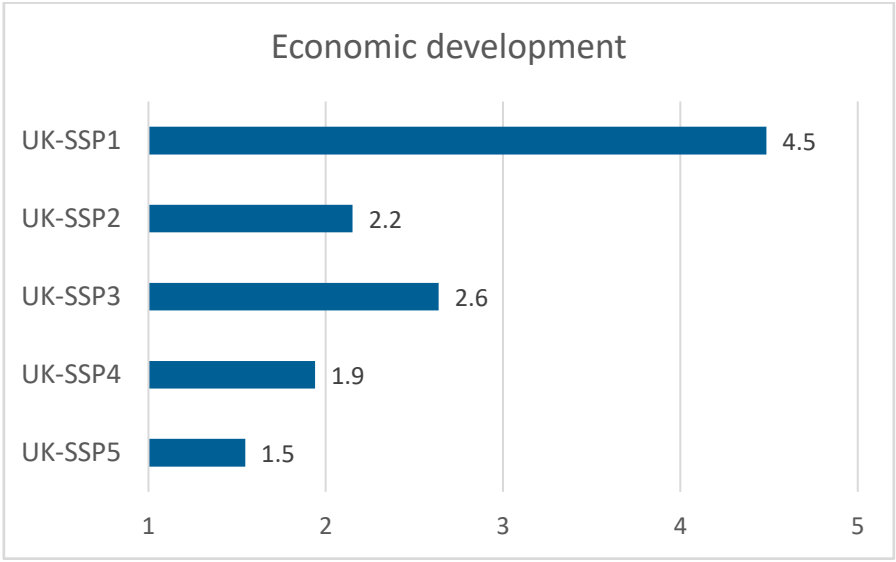


Figure 24: Scoring for the driver "Economic development".
The scale ranges between 1 (Traditional market-based systems) and 5 (Novel economic systems). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 13: Health

The key dimensions of Driver 13 "Health" were related to the future of the National Health Service, future pandemics and other crises (e.g. climate-related), as well as equal access to health care.

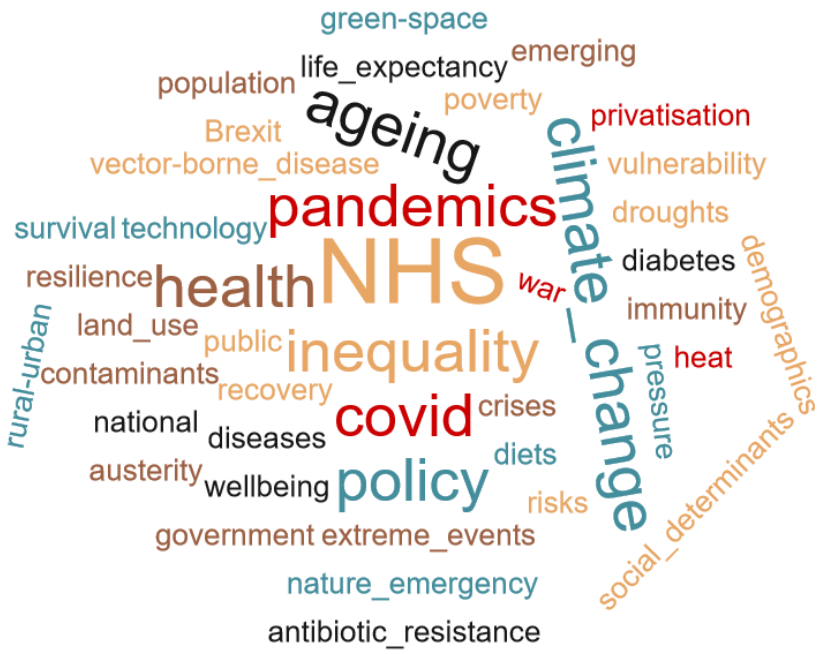


Figure 25: Word cloud for the driver "Health".

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between the two extremes of low vs. high investment in health. Similar to the driver on Education, the specific interpretation of the type of an investment was left to the context of a specific future scenario (including public or private, monetary or non-monetary investments).

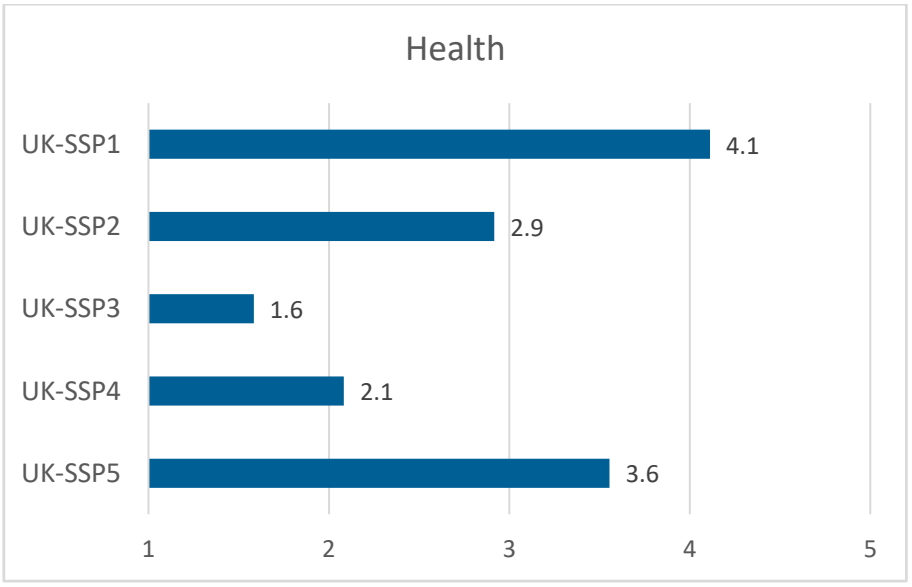


Figure 26: Scoring for the driver "Health".
The scale ranges between 1 (Low investment) and 5 (High investment). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

Driver 14: Transport & mobility

The key dimensions of Driver 14 "Transport & mobility" were related to different modes of transport, travel, tourism and mobility, as well as their sustainability. An important aspect were the investments in transport infrastructure as well as the link to lifestyles and behaviour.

Figure 27: Word cloud for the driver "Transport & mobility" (note: since this driver was included only later in the process, the specific terms under this driver were derived from the content of the previous drivers and the project team).

To provide context for the development of the UK-SSPs, participants scored how the driver might develop in each scenario between the two extremes of low mobility and high mobility of the population, depending on factors such as the investment in transport infrastructure and the level to which it is accessible for different parts of the society.

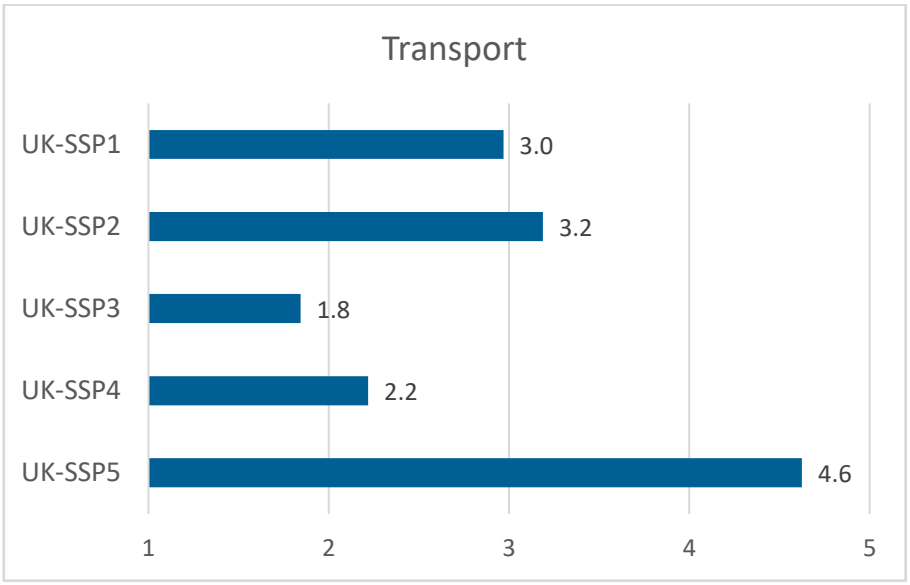
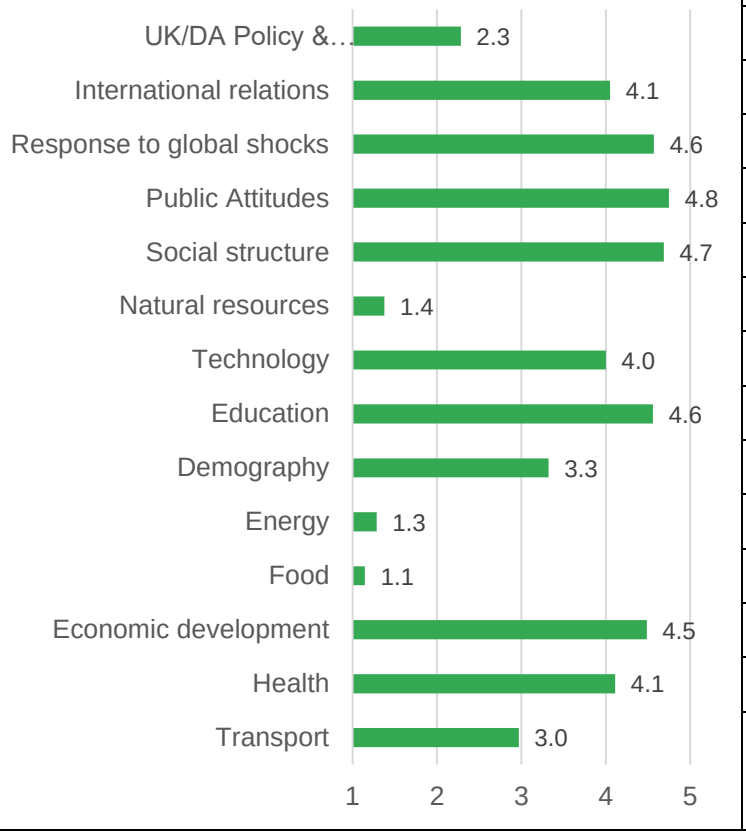


Figure 28: Scoring for the driver "Transport & mobility".
The scale ranges between 1 (Low mobility) and 5 (High mobility). The values represent a weighted mean score of 37 workshop participants and 10 members of the project team.

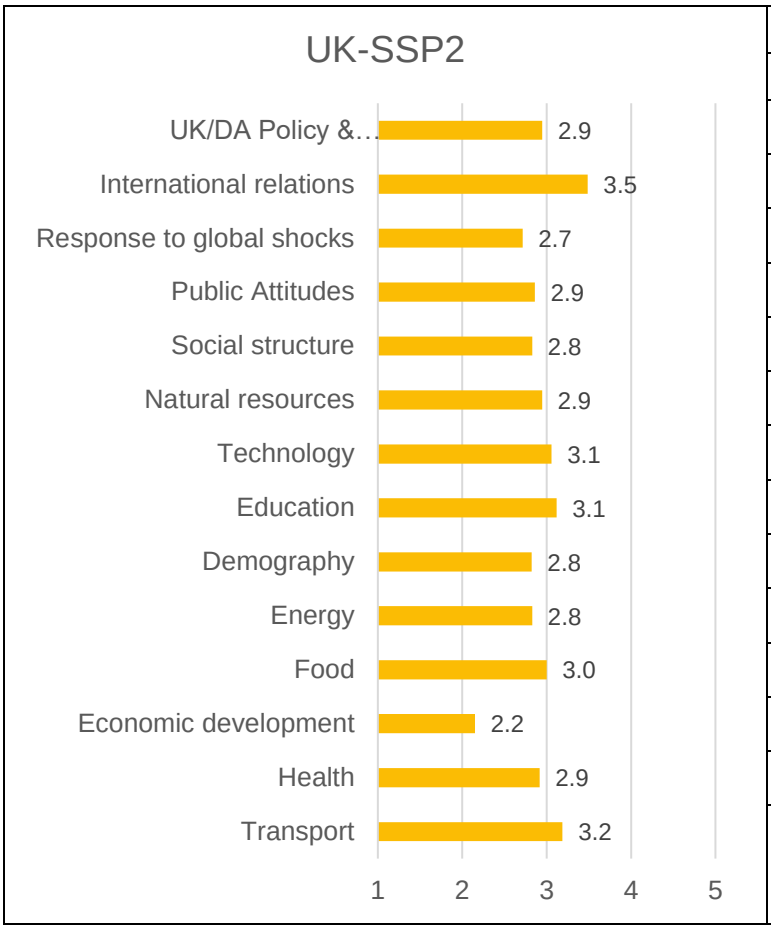
Summary showing the scores per UK-SSP



Score	
1	**5**
Devolved	Centralized
Protectionist	Globalized
Persistence	Transformative change
Disillusioned, disempowered	Engaged, empowered
Privileged (few)	Egalitarian (many)
Resource friendly, sustainable use	Over-exploitative, unsustainable use
Slow	Rapid
Low investment	High investment
Lower proportion of people >65	Higher proportion of people >65
Low-carbon	High-carbon
Low-meat diet	High-meat diet
Traditional market-based systems	Novel economic systems
Low investment	High investment
Low mobility	High mobility

Figure 29: Summary of driver scores for UK-SSP1

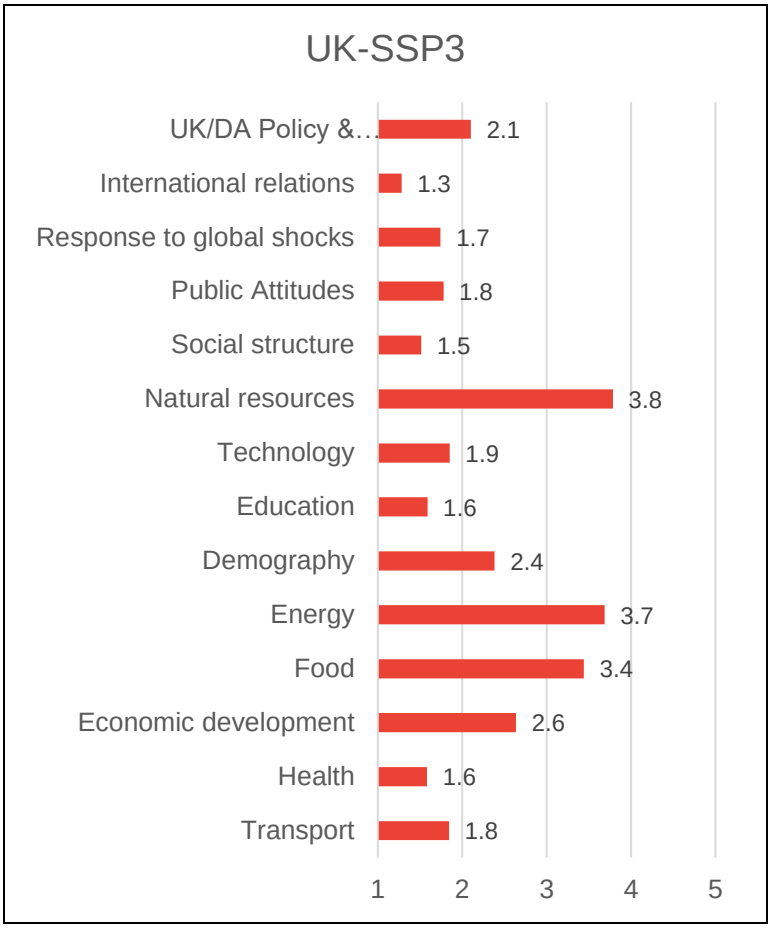
In UK-SSP1, policy-making and governance are devolved, with a high level of local participation, while being open to a globalised world. Transformative response to global shocks and a highly engaged society are the main drivers towards sustainability. Social structure is egalitarian, with high investments in public services such as health and education and benefits widely shared among different members of the society. This leads to increases in the proportion of the population over 65. Natural resource use is sustainable and efficient due to new green technologies, prioritising low-carbon energy resources and sustainable diets and lifestyles. Economic development is characterised by a transformation towards novel economic systems (welfare and circular economy).



	Score	
	1	5
	Devolved	Centralized
	Protectionist	Globalized
	Persistence	Transformative change
	Disillusioned, disempowered	Engaged, empowered
	Privileged (few)	Egalitarian (many)
	Resource friendly, sustainable use	Over-exploitative, unsustainable use
	Slow	Rapid
	Low investment	High investment
	Lower proportion of people >65	Higher proportion of people >65
	Low-carbon	High-carbon
	Low-meat diet	High-meat diet
	Traditional market-based systems	Novel economic systems
	Low investment	High investment
	Low mobility	High mobility

Figure 30: Summary of driver scores for UK-SSP2

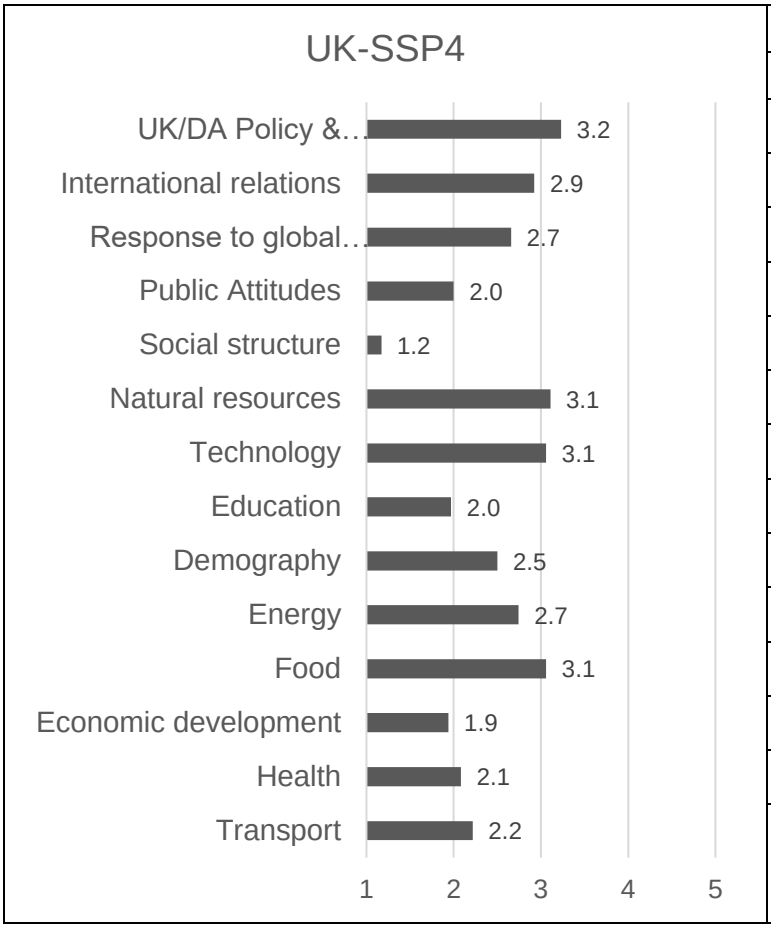
In UK-SSP2, the UK continues to devolve its governance system, but public attitudes remain mixed with only some parts of society feeling engaged and empowered. While responses to global shocks trigger technological development and policy responses, both are primarily focused on the persistence of the existing system. Investments in education and health are insufficient at first, leading to a collapse of the current systems, and their subsequent transition to a new funding system partly covered by the public and the private sector. This results in a gradually ageing population. While the economy grows, the economic system remains rather traditional, with increasing inequalities. Mobility is high, particularly in terms of moving from rural to urban areas.



Score	
1	**5**
Devolved	Centralized
Protectionist	Globalized
Persistence	Transformative change
Disillusioned, disempowered	Engaged, empowered
Privileged (few)	Egalitarian (many)
Resource friendly, sustainable use	Over-exploitative, unsustainable use
Slow	Rapid
Low investment	High investment
Lower proportion of people >65	Higher proportion of people >65
Low-carbon	High-carbon
Low-meat diet	High-meat diet
Traditional market-based systems	Novel economic systems
Low investment	High investment
Low mobility	High mobility

Figure 31: Summary of driver scores for UK-SSP3

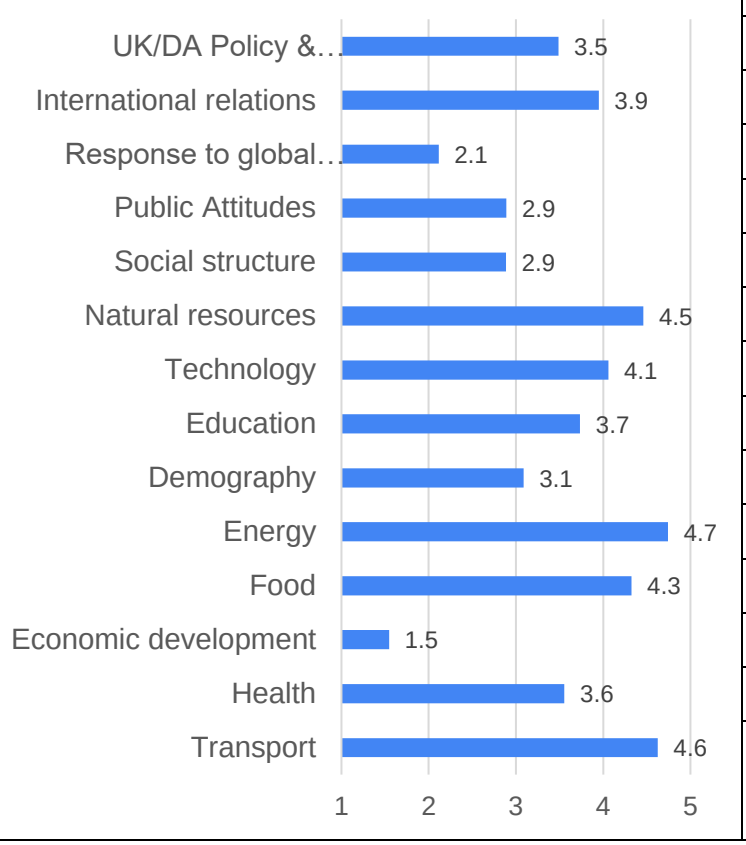
In UK-SSP3, the four UK countries become independent and governance at all levels deteriorates. The world becomes highly regionalised and international cooperation reduces dramatically. There are not enough resources nor societal agency to effectively deal with global shocks. As technology development fails, trade becomes constrained and people increasingly depend on local resources. This results in natural resources becoming over-exploited, often high-carbon and scarce. Public investments in health and education cease. Food shortages and the spread of diseases lead to reduced life expectancy and hence a lower proportion of the population over 65. Inequality and social unrest reaches high levels, resulting in armed conflicts.



Score	
1	**5**
Devolved	Centralized
Protectionist	Globalized
Persistence	Transformative change
Disillusioned, disempowered	Engaged, empowered
Privileged (few)	Egalitarian (many)
Resource friendly, sustainable use	Over-exploitative, unsustainable use
Slow	Rapid
Low investment	High investment
Lower proportion of people >65	Higher proportion of people >65
Low-carbon	High-carbon
Low-meat diet	High-meat diet
Traditional market-based systems	Novel economic systems
Low investment	High investment
Low mobility	High mobility

Figure 32: Summary of driver scores for UK-SSP4

In UK-SSP4, inequality reaches unprecedented levels and a substantial part of the society becomes disempowered. Governance becomes more centralised. Economic development sustains a traditional market-based system, while leveraging technological development for green energy and new modes of work. Other scores for UK-SSP4 tend to vary considerably between the privileged few and the masses. For example, diet and food consumption differ greatly across society, and education and health care are only accessible to the privileged part of the society leading to poor health and a lower proportion of people over 65 in the majority of the population.



	Score	
	1	5
	Devolved	Centralized
	Protectionist	Globalized
	Persistence	Transformative change
	Disillusioned, disempowered	Engaged, empowered
	Privileged (few)	Egalitarian (many)
	Resource friendly, sustainable use	Over-exploitative, unsustainable use
	Slow	Rapid
	Low investment	High investment
	Lower proportion of people >65	Higher proportion of people >65
	Low-carbon	High-carbon
	Low-meat diet	High-meat diet
	Traditional market-based systems	Novel economic systems
	Low investment	High investment
	Low mobility	High mobility

Figure 33: Summary of driver scores for UK-SSP5

In UK-SSP5, the world becomes increasingly globalised and the economic system remains traditional and market-based. In the UK, governance systems become slightly more centralised. People are highly mobile and strongly depend on intensive natural resource use and rapid technological development. Energy needs remain covered from high-carbon sources. Newly discovered energy sources as well as international trade increase public income, leading to higher investments in health care and education and partly mitigating social inequalities. The population ages, but younger population segments grow towards the end of the century.

Consolidated summary scores across the UK-SSPs

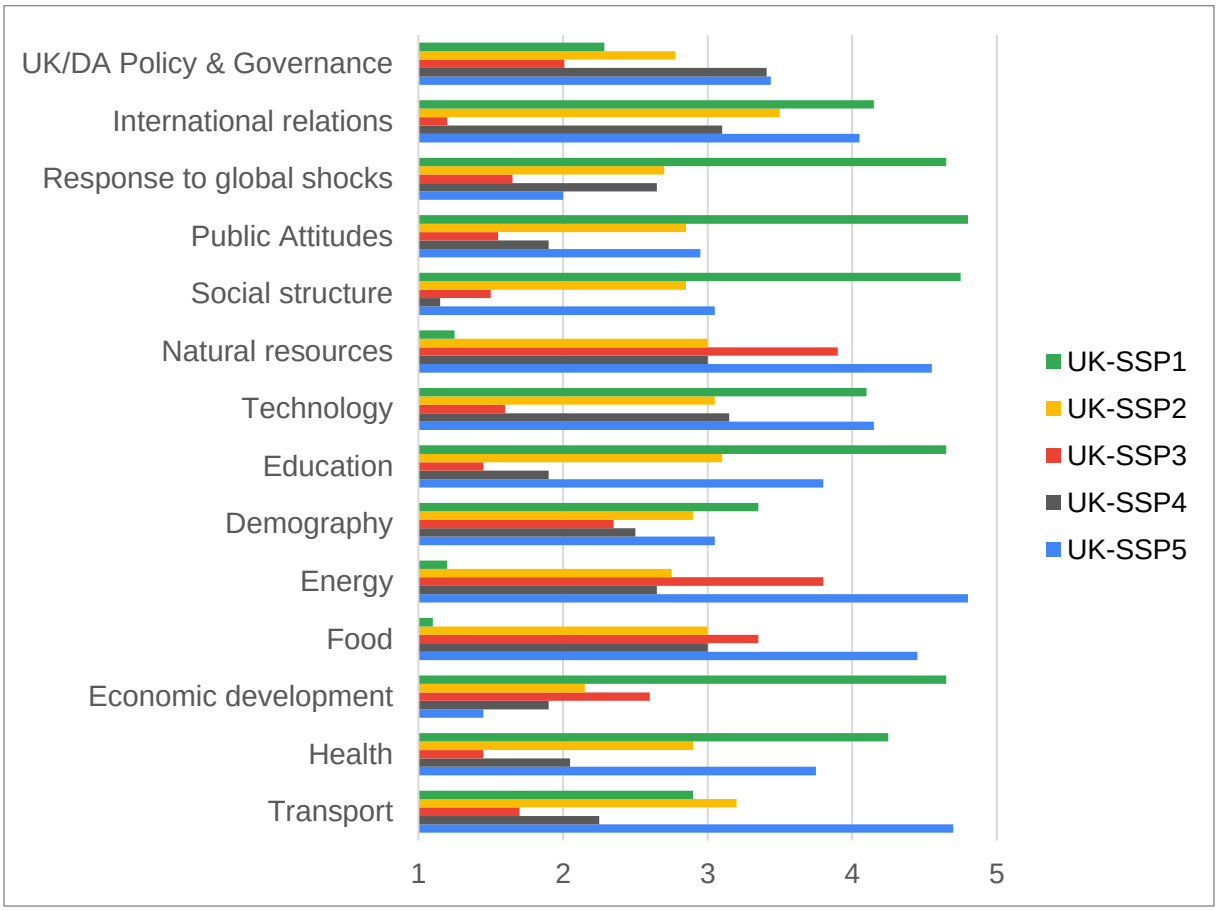


Figure 34: Consolidated summary scores across the UK-SSPs.
Legend:

	Score				
Driver	**1**	**2**	**3**	**4**	**5**
UK/DA Policy & Governance	Devolved				Centralized
International relations	Protectionist				Globalized
Response to global shocks	Persistence				Transformative change
Public Attitudes	Disillusioned, disengaged and disempowered				Engaged, empowered and inspired
Social structure	Privileged (few)				Egalitarian (many)
Natural resources	Resource friendly, sustainable use				Resource over-exploitative, unsustainable use
Technology	Slow				Rapid
Education	Low investment				High investment
Demography	Lower proportion of people >65				Higher proportion of people >65
Energy	Low-carbon				High-carbon
Food	Low-meat diet				High-meat diet
Economic development	Traditional market-based systems				Novel economic systems
Health	Low investment				High investment
Transport	Low mobility				High mobility

Acknowledgements

We are extremely grateful to workshop participants for all their valuable input to the scenarios and hope you find the first taste of our workshop findings useful.

Project team:

Project funding: