MOVING
MOuntain Valorisation through INterconnectedness and Green growth

Vulnerability and Resilience of the Speyside Whisky, food and drink tourism value chain assemblage

Report to stakeholders

Authors: Thompson, C, Blackstock, K.; Creaney, R.; Miller, D.

The James Hutton Institute, Aberdeen, Scotland

December 2022

Acronyms

CNPPP	Cairngorms National Park Partnership Plan
MRL	Mountain Reference Landscape
VC	Value Chain
VC-A	Value Chain Assemblage

Summary

As a further step in the process of assessing the sustainability of mountain value chains, the 23 MOVING case studies have carried out a vulnerability and resilience assessment of their value chain assemblage against current environmental, socio-economic and political threats. This report provides the findings for the Scottish case. Our case considered the vulnerability or resilience of the Speyside Whisky, food and drink tourism value chain assemblage within the upper Speyside mountain reference landscape (MRL). Using as short list of five threats: low flows and increased water temperatures; demographic changes; inflation; policy changes and volume of malting capacity, participants at one face-to-face and one online workshop discussed the threats and provided scores. The findings show that the Speyside whisky, food and drink tourism VC-A within the MRL was perceived to have the most exposure to demographic changes (particularly the effects on availability of skilled labour and affordable housing) and inflation (particularly the effects on visitor numbers and investment in businesses). When it came to whether the exposure translated to a negative impact on the Speyside whisky, food and drink tourism VC-A, the most negative impacts were from threat 2 (demographic changes as above) and threat 1 (low flows and increased temperatures, impacting on water supplies to the VC-A). Whether something is vulnerable or resilient depends also on whether the local actors can adapt to these threats. Here, the highest scores were for training, apprenticeships, promotion of industry to young people in response to the threat from the lack of skilled labour; and marketing strategies to respond to the potential impact of inflation and spirit duty rises. Overall, the highest vulnerability score (recognising exposure and impact, taking account of adaptive capacity) was for demographic changes and the lowest was for policy changes. Overall, the scores suggested the VC-A was not very vulnerable. However, the participants were concerned about the combination of cost-of-living crisis following the impacts of the pandemic on many businesses, and therefore felt the VC-A was still vulnerable to threats they were unable to control or prevent. The next step in this research is to share potential strategies to increase resilience for the VC-A and MRL and further material on this will be available in Spring 2023.

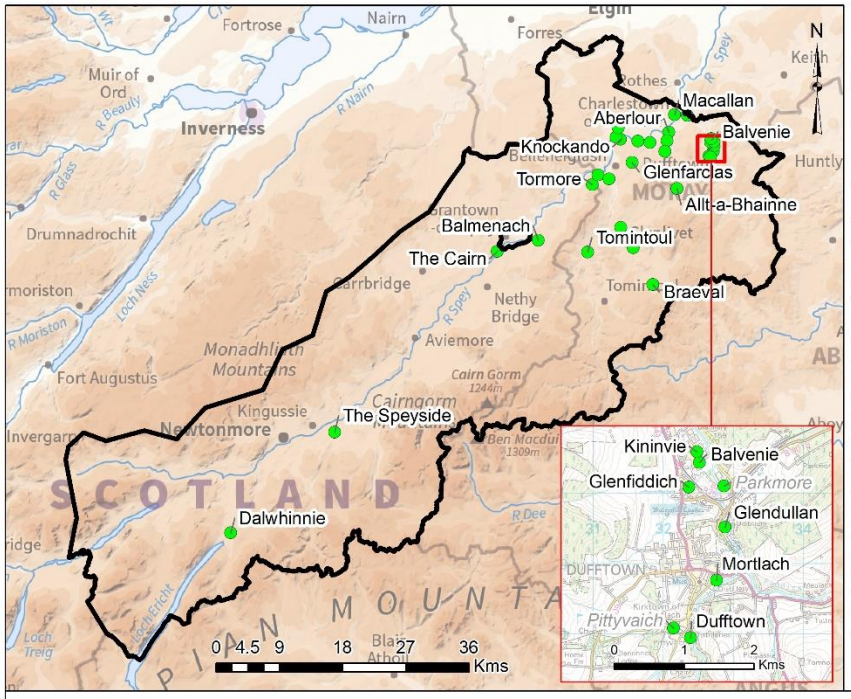
Contents

1 Description of Speyside Whisky, Food and Drink Tourism Value Chain Assemblage

Our focal value chain (FVC) is single malt whisky, and our additional value chain (AVC) is food and drink tourism – their interactions combined comprise our 'value chain assemblage' (VC-A). The area (or Mountain Reference Landscape - MRL) of our case study includes much of Badenoch and Strathspey and part of Moray; an area commonly referred to as 'Speyside', which includes parts of the River Spey and Cairngorms National Park. These are both significant features of both value chains in our VC-A. For the purposes of this workshop and report we refer to our VC-A as **'Speyside Whisky and F/D Tourism'.**

Our case study area is home to 29 active distilleries, and many of these distilleries produce single malt whisky as their final product, with others alternatively or additionally producing whisky to be included in blended products (see Figure 1). Several of these distilleries (n=11 at last count) have visitor centres (labelled vc in Figure 1) which creates a link with the tourism sector, bringing visitors to the area to learn more about one of Scotland's key national products.

Distilleries and the "Mountain Reference Landscape"



Label	Distillery	Founded	Status
1	Aberlour	1879	Active (vc)
2	Tomintoul	1965	Active
3	Tamnavulin	1966	Active
4	Knockando	1898	Active
5	Tamdhu	1897	Active
6	Macallan	1824	Active (vc)
7	Glenfarclas	1836	Active (vc)
8	Dalwhinnie	1897	Active (vc)
9	Balvenie	1892	Active (vc)
10	Glenlivet	1824	Active (vc)
11	Cardhu	1824	Active (vc)
12	Tormore	1958	Active
13	Cragganmore	1869	Active (vc)
14	Glenallachie	1967	Active (vc)
15	Allt-a-Bhainne	1975	Active
16	Ballindalloch	2014	Active
17	The Speyside	1990	Active
18	Mortlach	1823	Active
19	Glendullan	1897	Active
20	Glenfiddich	1886	Active (vc)
21	*Parkmore*	*1894*	*Mothballed*
22	*Pittyvaich*	*1974*	*Demolished*
23	Dufftown	1896	Active
24	Dailuaine	1852	Active
25	Dalmunach	2015	Active
26	Braeval	1973	Active
27	Craigellachie	1891	Active
28	Balmenach	1824	Active
29	Benrinnes	1826	Active
30	Kininvie	1990	Active
31	The Cairn	2022	Active (vc)

Notes:
Extent of mountain reference landscape as defined in the MOVING project including locations of distilleries in the catchment area.
Locations derived from OpenStreetMap by Jon Hopkins. Red inset shows area around Dufftown. (vc) in table indicates visitor centre. Capacity (LPA) data derived from a number of sources including the Malt Whisky yearbook 2021. ISBN 978-0-9576553-7-9.
(NB Not all distilleries labelled in main map).

Figure 1: Distillery locations and the Mountain Reference Landscape

Visitor Centres are the most direct link between whisky and food and drink tourism in Speyside, but links between territorial capital in the area also extend to: the iconic and productive land and landscapes (particularly mountains) from which spring water is drawn; traditions and heritage upon which whisky production (and folklore) is based; and built infrastructure that supports local and visitor populations in terms of transport, accommodation, and finally consumption of local food and drink products (e.g. salmon, whisky, venison). Essentially, the territorial capital upon which all stages of the whisky FVC are founded are also destination elements that underpin tourism marketing and consumption in the AVC. From the perspective of food and drink tourism, connections with malt whisky production in the area characterise and add value to the area – including attractions such as the Malt Whisky Trail and Speyside Whisky Festival, as well as distillery tours and whisky-themed accommodation, shops, and hospitality venues.

The Speyside Whisky and Tourism assemblage results in a plethora of economic, socio-cultural, and environmental outcomes – including both positive and negative (see Figure 2 or online here). The purpose of this workshop and report is to consider the potential threats to the sustainability of the VC-A and MRL and consider if the VC-A is vulnerable or resilient to these threats.

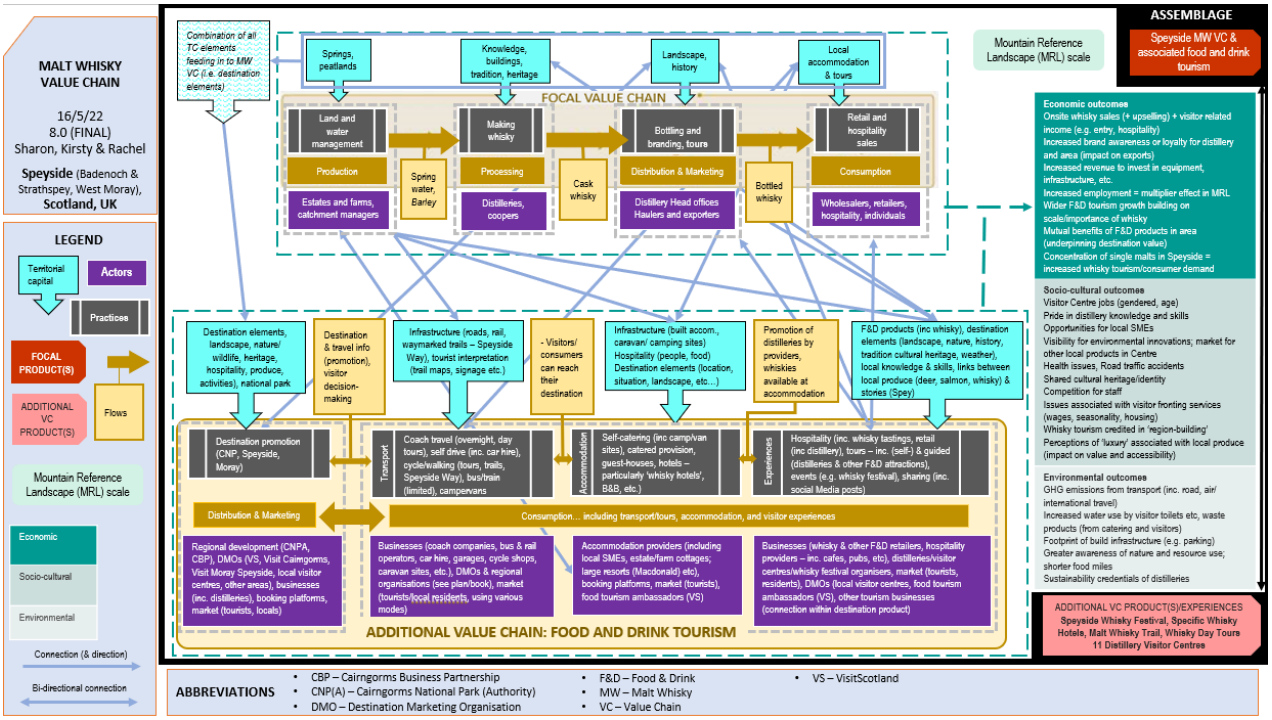


Figure 2: Diagram of Value Chain Assemblage

The approach to analysis is demonstrated in Figure 3 below: the Hutton researchers evaluated the threats to the MRL (section 2.1) and selected a shortlist to work with (section 2.2). A short narrative describing the threats and how they relate to specific elements of the VC-A (figure 2) was then developed (section 3.1). Two workshops were held – an in-person event within the MRL attended by 3 participants (3rd November 2022) and an online event attended by 5 participants

(22nd November 2022). In both cases, illness and other last-minute issues reduced the number of attendees. These workshops improved the narrative (section 3.2) which was then underpinned by the participants' quantitative assessments of exposure (section 3.3.1), impacts (section **Error! Reference source not found.**) and adaptive capacity (section 4). P1-8 in the tables refers to the anonymised participant scores. A preliminary assessment of whether the VC-A is vulnerable (and if so to which threats) is provided in section 5. Further information about the workshop is provided in section 6.

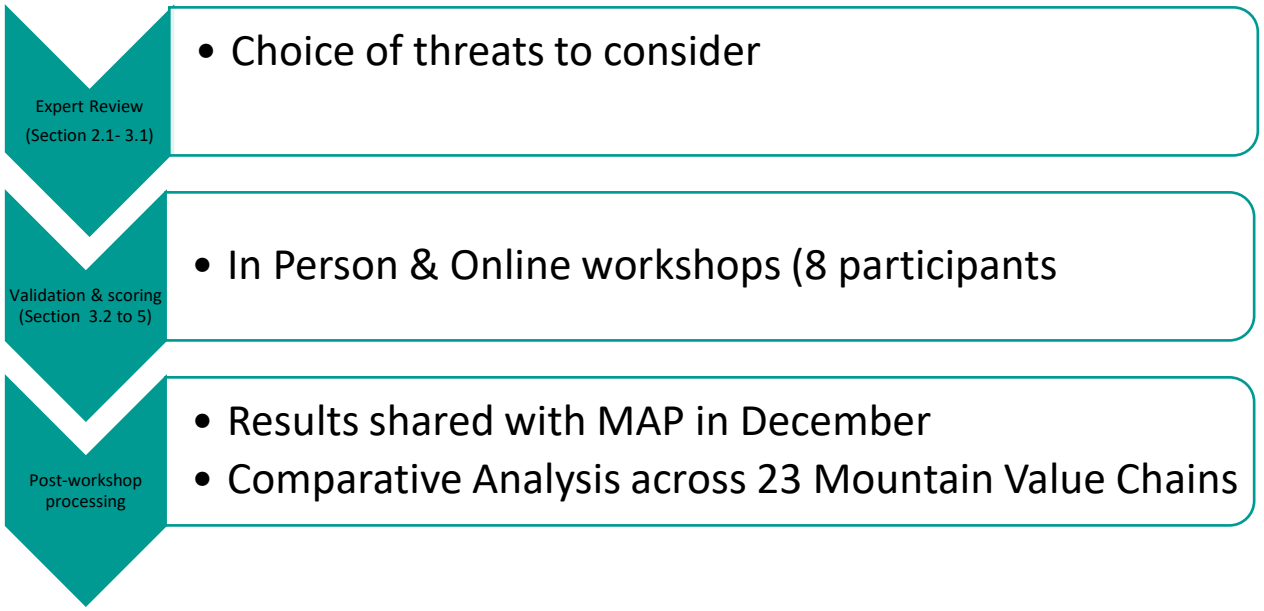


Figure 3: Methodological Steps

2 Threats to the Mountain Reference Landscape

This section is based on the expert opinion of the James Hutton Institute researchers working on the H2020 MOVING project. A list of threats was provided by the partner leading this research task (CZU, Czech University of Life Sciences) in order to provide some commonality across the 23 MOVING reference regions. These threats are drawn from literature on mountains, ensuring that the full suite of STEEP (social, technical, economic, ecological and political) issues was considered. The task therefore complements and extends prior research in H2020 MOVING that addressed climate change drivers on the main natural resource system underpinning the focal value chain (see here for the report for the Speyside Malt Whisky VC).

2.1 Evaluation of the threats

The threats are summarised in the tables below. The threats were categorised as environmental (Table 1); socio-economic (Table 2) and political (Table 3). The threats were assessed by six researchers within the James Hutton Institute. We evaluated each threat according to their current threat to the VC-A of our MRL, using the scale 1 – low, 2 – medium and 3 – high.

Table 1: Assessment of Environmental Threats

Environmental	**Mean Score (0 - 3)**
Drought: Changes in levels of precipitation impacting on surface and groundwater quantity available.	2.66
Air Temperature change; Increases or decreases in air temperature in the MRL that do not match historical patterns.	1.33
Water Temperature change; Increases or decreases in water temperature in the MRL that do not match historical patterns.	1.67
Extreme weather events: increase in storms and other events not covered above/below.	1.00
Flooding: Submergence of land that would normally be dry by river water.	1.83
Wildfires; Frequency of muirburn that get out of control.	1.00
Soil condition; Changes in the extent of erosion and degradation of soils in the MRL.	1.00
Use of natural resources – renewable and non-renewable; The overuse of resources for the whisky/tourism VC within the MRL.	2.40
Biodiversity change; Decrease in plant life, insects, or wild animals in the MRL.	1.17
Non-native invasive species; Species not native to the area with potential to damage local ecosystems	1.00
Air quality: change to how pollution free air in the MRL is.	1.50
Water quality: A measure of the condition of the water in the MRL/how pollution free the water in the MRL is	2.17
Soil quality; A measure of the condition of the soil in the MRL/how pollution free the soil in the MRL is.	1.33

Table 2: Assessment of Socio-Economic Threats

Social and Economic	**Mean Score (0 - 3)**
Agricultural Land use changes; Particularly a change from rough grazing to forestry.	1.33
Other Land Use: Alternative land uses for tourism or other non-primary sector use (e.g., roads, wind farms, hotels, housing)	2.60
Demographic changes; Movement of people in and out of the area.	2.33
Life-style changes (post-productivism); Changes in business motivations (e.g., towards extensification or payment for carbon and other ecosystem services) and Societal changes in values towards rewarding multi-functional land and water stewardship rather than quantities of products produced	1.67
Change in traditional practices; May include traditional practices such as peat use in whisky production or highland traditions and their role in tourism.	1.33
Market changes: On-going changes in consumption patterns due to Brexit, trade talks with US, financial crises etc.	2.00
Change in knowledge production and use: Skills and knowledge involved in the VC-A	1.17
Technological Innovation; Changes to technology in the MRL. Could be viewed as green energy progress (i.e., biomass usage at Macallan), changes to the manufacturing process etc, digitalisation etc	2.33
Society polarization: Extent and impacts of differences in income within the MRL.	1.33
Inflation: Increase in prices.	2.33
Energy prices: Influence of energy prices on the VC-A within the MRL.	2.33
Pandemic situations: Influence of on-going COVID pandemic to VC-A in MRL. Perhaps through workforce, technology changes post-pandemic etc.	1.83

Table 3: Assessment of Political and Institutional Threats

Political and Institutional drivers	**Mean Score (0 - 3)**
Legislation changes: Influence of policy changes on VC-A in MRL. Could encompass environmental legislation, trade legislation etc. (re-named policy changes)	1.67
Incentives and subsidies changes: Influences of changes to incentives and subsidies on the VC-A in the MRL.	1.17

Changes in the political system: Current tensions in UK/Scottish Government relationships, potential Indy Ref 2 etc.	1.00

2.2 Prioritised list of the threats

Once all scores were collected, the scores were averaged out. The aim of this step was to reduce the threats to a tractable set to discuss in the workshops. The methodology required us to ensure we had at least one threat from each category (environmental, socio-economic and political). The overall shortlist should contain between 3-6 threats. The final threats were those that scored the highest in each category.

The final list was:

- **Drought (environmental)**
- **Demographic Changes (socio-economic)**
- **Inflation (socio-economic)**
- **Policy Changes (political)**

We opted for fewer threats to focus discussion during the workshops and allow space for the participants to add more threats.

3 How the VC-A are exposed and impacted by threats

This section sets out the initial narrative of what the potential adverse of effects of the four threats highlighted in section 2.2. The workshop participants updated the narratives based on their knowledge and experience. To make the scoring easier, we chose elements of the VC-A (see Figure 2) to focus on when make their quantitative assessment (see section 3).

3.1 Narrative of adverse effects – initial version

3.1.1 Drought:

Drought relates to changes in the levels of precipitation impacting on the quantity of surface and groundwater available. Climatic drought influences the availability of surface water (and potentially spring water) necessary for year-round abstraction for processing and cooling in whisky distilling. The main current risk is to cooling water volumes but future availability of processing water (used to make the mash) in also a concern. Threats to the focal malt whisky VC from drought include the potential for reduced outputs (and therefore profits). For the wider assemblage there are threats to food and drink production (and the associated tourism ventures) that benefit from these local food and drink products.

The following elements of the VC-A are involved:

- Capitals: springs, destination elements
- Flows: spring and river water, barley (outside MRL)
- Actors and/or practices: businesses (especially food and drink); farms; distilleries; tourist accommodation; destination promotion.

We selected the **threat to spring and river water** for private water supplies, food and drink processing, cattle waterings; and **destination image** as the elements for scoring.

3.1.2 Demographics:

The issue of demographics relates to the movement of people in and out of an area which may impact on employment opportunities and housing availability. Overall, there has been population growth in the MRL. Specifically there has been depopulation in the southwest of the MRL and population growth in the more accessible north-eastern parts. Within the MRL there is an ageing population, with many younger people moving out of the area (potentially) due to lack of long-term job opportunities or suitable housing. The impacts of Brexit may also have had a negative impact on the demographics of the MRL (i.e., fewer opportunities for EU members to remain working and living in the area). Wages in the MRL tend to be higher than the national average but there is still a gulf between wages and the high cost of accommodation.

We selected the threat to availability of **skilled labour** for distilleries and food/drink tourism and availability of **affordable housing** for distillery and food/drink tourism workers as the final two elements for scoring.

3.1.3 Inflation:

The impact of increases in prices and associated inflation is a growing concern on the VC assemblage. Increase in prices may impact production and processing given rising prices for inputs to the system. Rising energy prices are a major constituent of these inflationary pressures. Rising prices for goods and services will likely mean that rising prices are passed onto consumers, or else result in job losses and/or reduced profits within the VC-A businesses. It may also result in fewer tourists visiting the MRL (i.e., less disposable income means that holidays are curtailed) and may also impact consumption as cost-of-living squeezes potential tourists or whisky consumers. Issues around wages, jobs and competition for staff (current socio-cultural outcomes) will be negatively affected through the cost-of-living crisis. In extreme situations businesses may need to reduce their production or even cease altogether; and when businesses are having to manage rising input costs, they may lack the ability to invest in technologies to adapt to change.

We selected the threat to **visitors** to Speyside food and drink trails and **investment** in processing and visitor infrastructure as the final two elements for scoring.

3.1.4 Policy:

This proved the most difficult narrative to select and write, as it does not flow from the VC-A diagram and we found it very hard to select one specific change (hence we went with two options).

It was difficult to find one single policy change that was relevant to the VC-A, so we considered two complementary and contemporary policy issues.

Firstly, in October 2022, UK government fiscal budget reversed a proposed freeze on duty for spirits and instead alcohol duty will rise in line with inflation (linking to the inflation threat highlighted above). As alcohol duty is a relatively large proportion of the overall cost of the product and is paid when the product is warehoused (not sold) creating a cashflow strain on smaller businesses. Therefore, duty increases the impact on the processing, distribution and consumption stages of the focal VC, with potential knock-on implications for associated food and drink tourism businesses (many of which in the MRL rely on sales of local alcohol products such as beer, whisky and gin).

We selected the threat to **overall demand** for malt whisky and other products as the final element for scoring.

Secondly, Scotland's 'net zero by 2045 climate mitigation targets' apply to all sectors of the Scottish economy and both the whisky sector and wider Food and Drink tourism sectors recognise the need to take steps to reduce their own greenhouse gas emissions and offset those that can't be reduced. The main land use focus in the national climate change plan is to sequester carbon

through afforestation and peatland restoration, which might change the open moorland landscape promoted in much of the tourism iconography of upland Scotland.

We selected the threat to the **landscape mosaic** of grazed pastures, woodlands and moorland as the final element for scoring.

3.2 Narrative of adverse effects – updated version

In the interests of time, a very brief summary of the narrative was presented to the workshop participants. The discussion was wide ranging, and we did not attempt to revise the narrative word-for-word during the workshop. Red font illustrates the insights from the workshop discussions and whether we revised the threat or the elements for scoring.

The responses to our threats are highlighted below. Participants also questioned the focus on food and drink tourism, as there is a wider and more complex relationship between Speyside whisky and tourism than just the food and drink angle. The global draw of Speyside whisky can help raise the profile of the area that benefits other food and drink producers and introduces whisky tourists to other aspects of the Cairngorms or Scottish Highland experience. Likewise, those coming for adventure or nature tourism in the National Park, might discover whisky and become new consumers due to the association with holiday memories.

3.2.1 Drought - Water Temperature and Low Flows

Drought relates to changes in the levels of precipitation impacting on surface and groundwater quantity available. Climatic drought influences the availability of surface water (and potentially spring water) necessary for year-round abstraction for process and cooling in whisky distilling. The main current risk is to cooling water volumes, but future availability of processing water (used to make the mash) could become a concern. Threats to the focal malt whisky VC from drought include potential for reduced outputs (and therefore profits). For the wide assemblage there are threats to food and drink production (and the associated tourism ventures) that benefit from these local food and drink products.

We selected the **threat to spring and river water** for private water supplies, food and drink processing, cattle waterings; and **destination image** as the final two elements for scoring.

Stakeholders highlighted that for the whisky value chain it is cooling waters that are most vulnerable, and this is due to a combination of increasing water temperatures and periods of decreased surface water flows. Spring water for production is less of an immediate concern. Therefore, the threat was renamed. Increasing water temperatures also impact on wild salmon and trout numbers, and any other food or drink processing that requires cooling waters. Low flows can threaten private water supplies for domestic and commercial buildings. There was also a discussion of the impact on drought on the supply chain, with concerns over soil moisture deficits impacting on the quality and yield of malting barley grown outside the MRL. This is a very

important threat but was not included in scoring directly as the focus is on the vulnerability of the VC-A within the MRL.

However, most participants did not believe that low flows or increased water temperatures would impact much on the destination image associated with food and drink tourism. Potentially, low flows impeding water-based recreation (canoeing etc) might be problematic; but increased water temperatures can attract people to nearby honey spots like Loch Morlich, rather than deter tourism.

3.2.2 Demographics

The issue of demographics relates to the movement of people in and out of an area which may impact on employment opportunities and housing availability. Overall, there has been population growth in the MRL with depopulation in the southwest of the MRL, and population growth in the more accessible north-eastern parts. Within the MRL there is an ageing population, with many younger people moving out of the area due to (potentially) lack of long-term job opportunities or suitable housing. The impacts of Brexit may also have had a negative impact on the demographics of the MRL (i.e., fewer opportunities for EU members to remain working and living in the area). Wages in the MRL tend to be higher than the national average but there is still a gulf between wages and the high cost of accommodation.

We selected the threat to availability of **skilled labour** for distilleries and food/drink tourism and availability of **affordable housing** for distillery and food/drink tourism workers as the final two elements for scoring.

Stakeholders agreed that demographic changes were a problem in the area, with availability of employees causing issues in both the whisky and tourism sectors (i.e., hospitality venues only being able to open for a few days a week). It was felt that lack of affordable housing contributes to the problem, with properties being used for short term holiday lets. However, the lack of local amenities – for example schools and medical care – can also deter young families moving into the area. However, in contradiction to the initial narrative, participants highlighted that there are numerous long term job opportunities – so it is potentially (or partially) a lack of awareness of career pathways that is the problem.

3.2.3 Inflation

The impact of increases in prices and associated inflation is a growing concern on the VC assemblage. Increase in prices may impact production and processing given rising prices for inputs to the system. Rising energy prices are a major constituent of these inflationary pressures. Rising prices for goods and services will likely mean rising prices passed onto consumers, or else result in job losses and/or reduced profits within the VC-A businesses. It may also result in fewer tourists visiting the MRL (i.e., less disposable income means that holidays are curtailed) and may also impact consumption as cost-of-living squeezes those who would otherwise become tourists or whisky consumers. Issues around wages, jobs and competition for staff (current socio-cultural

outcomes) will be negatively affected through the cost-of-living crisis. In extreme situations businesses may need to reduce their production or even cease altogether; and when businesses are having to manage rising input costs, they may lack the ability to invest in technologies to adapt to change.

We selected the threat to **visitors** to Speyside food and drink trails and **investment** in processing and visitor infrastructure as the final two elements for scoring.

When discussing this threat, stakeholders felt it may affect different value chains in different ways. There may not be a large impact on investment in whisky processing because of current inflation because of the long-term business model where investments today are made on the basis of consumer preferences in 10-15 years' time, and most distilleries are owned by large companies. However, smaller food and drink tourism businesses may suffer more acutely as they do not have these long-term horizons. This threat may interact with the demographic threat, with anecdotal examples of hospitality businesses wanting to increase wages to attract staff but being unable to do so with the pressure inflation is already putting on their businesses. It is hoped that the international status of Speyside Whisky and current Sterling exchange rates will help offset lower domestic tourism as more tourists visit from abroad.

3.2.4 Policy

It was difficult to find one single policy change that was relevant to the VC-A, so we considered two complementary contemporary policy issues.

Firstly, UK government fiscal budget reversed as proposed freeze on duty for spirits and instead alcohol duty will rise in line with inflation (linking to inflation threat above). As alcohol duty is a relatively large proportion of overall cost of the product and is paid when the product is warehoused (not sold) creating a cashflow strain on smaller businesses. Therefore, duty increases the impact on the processing, distribution, and consumption stages of the focal VC with potential knock-on implications for associated food and drink tourism businesses (many of which in the MRL rely on sales of local alcohol products such as beer, whisky and gin).

We selected the threat to **overall demand** for malt whisky and other products as the final element for scoring.

Secondly, Scotland's 'net zero by 2045' climate mitigation targets apply to all sectors of the Scottish economy and both the whisky sector and wider food and drink tourism sectors recognise the need to take steps to reduce their own greenhouse gas emissions and offset those that can't be reduced. The main focus of the national climate change plan is to sequester carbon through afforestation and peatland restoration, which might change the open moorland landscape promoted in much of the tourism iconography of upland Scotland.

We selected the threat to **landscape mosaic** of grazed pastures, woodlands and moorland as the final element for scoring.

Our discussions in the workshops confirmed that duties can impact on consumer demand for whisky, gin and beer created in the case study area. However, the products tend to be 'aspirational' and associated with quality, so many consumers may trade up to these brands when visiting on holiday. Participants also highlighted that many businesses are trying to decarbonise energy used in processing, distribution and consumption, which is challenging in remote regions and technological improvements can be costly (see comments on inflation and investments). Any association with over exploitation of non-renewable resources could be severe in terms of missed net zero targets and damage to the brands, that rely on values of environmental stewardship, quality, provenance and heritage. There was interest in connecting the industries supporting net zero through land use and management, and so this was seen as an opportunity as well as a threat.

3.2.5 Malting Barley Capacity

This threat was highlighted during the first (in person) workshop. In the context of proposed expansion in malt whisky production in Speyside (including upper Speyside) and across Scotland, the capacity of local (Scottish) malting facilities was raised. Currently, many suppliers to distilleries are having their barley malted in England due to lack of current capacity, which increases the carbon costs of the whisky value chain. Furthermore, maltings in Scotland are becoming focussed on distilling malts, which makes it more difficult for brewing malt used for beer to be locally sourced. This has implications for the wider food and drink value chains that also wish to promote local beers. However, other participants felt that there was ongoing investment in capacity so that the threat would be mitigated shortly; and sometimes choice of maltings was as much a result of relationships and historical ties as proximity or capacity. There are no maltings within the Mountain reference landscape. This threat was added and used for scoring (see Section **3**).

We selected the threat to **whisky production** problems when supply is limited and **net zero targets** harder to reach when barley travels larger distances as the elements for scoring.

3.3 Exposure and Impacts

In this section we illustrate how participants scored how exposed they felt the value chain assemblage was to the five threats outlined above (section 3.3.1.) and the impact of the threats on the value chain assemblage (section **Error! Reference source not found.**).

3.3.1 Exposure

To be vulnerable to a threat depends on whether the threat creates changes in the mountain reference landscape. Here, the most exposure was to threats 2 (demographics) and 3 (inflation).

To what extent are the following VC-A elements exposed to changes induced by a given threat?

(1 = the least exposed; 7 = the most exposed, N/A = no answer)

Threat 1: Water temperature and low flows									
Elements of VC-A* // Participants	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**Mean**
Water supply	N/A	3	5	4	6	N/A	5	N/A	4.6
Destination image	N/A	N/A	4	2	6	N/A	3	N/A	3.75

Threat 2: Demographics									
Elements of VC-A* // Participants	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**Mean**
Availability of skilled labour	5	6	5	5	6	7	6	N/A	5.71
Availability of affordable housing	5	6	5	6	6	7	6	N/A	5.86

Threat 3: Inflation									
Elements of VC-A* // Participants	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**Mean**
Visitors to Speyside	4	5	6	5	7	6	6	N/A	5.57
Investment in food and drink processing	3	4	6	4	7	7	5	N/A	5.14

Threat 4: Policy Changes									
Elements of VC-A* // Participants	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**Mean**
Overall demand for malt whisky	5	3	5	4	6	6	3	N/A	4.57
Landscape mosaic	2	3	5	2	5	N/A	2	N/A	3.17

Threat 5: Malt Barley Capacity									
Elements of VC-A* // Participants	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**Mean**
Whisky production	6	4	2	2	6	6	5	N/A	4.43
Net zero	4	N/A	2	2	5	N/A	6	N/A	3.8

3.3.2 Impacts

Vulnerability is also related to the impact of the change on the value chain assemblage elements. Here, the most impacts were felt by elements in response to threats 2 (Demographics) and 1 (Water Supply).

How big are the impacts of the change on the VC-A element? (1 = the least impact, 7 = the most impact, N/A = no answer)									
Threat 1: Water temperature and low flows									
Elements of VC-A* // Participants	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**Mean**
Water supply	7	3	5	4	6	6	6	N/A	5.29
Destination image	7	N/A	N/A	2	6	N/A	4	N/A	4.75

Threat 2: Demographics									
Elements of VC-A* // Participants	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**Mean**
Availability of skilled labour	7	N/A	5	4	6	7	5	N/A	5.67
Availability of affordable housing	6	N/A	5	4	6	7	4	N/A	5.33

Threat 3: Inflation									
Elements of VC-A* // Participants	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**Mean**
Visitors to Speyside	4	N/A	5	4	6	6	3	N/A	4.67
Investment in food and drink processing	3	N/A	5	3	N/A	7	3	N/A	4.20

Threat 4: Policy Changes									
Elements of VC-A* // Participants	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**Mean**
Overall demand for malt whisky	4	3	4	5	6	N/A	3	N/A	4.17
Landscape mosaic	3	N/A	4	2	N/A	6	1	N/A	3.20

Threat 5: Malt Barley Capacity									
Elements of VC-A* // Participants	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	Mean
Whisky production	6	4	2	2	N/A	6	5	N/A	4.17
Net zero	4	6	2	3	N/A	N/A	3	N/A	3.60

3.3.3 Summary:

In both the in-person and online workshops stakeholders from different industries felt that the whisky and tourism value chain was vulnerable to the threats discussed (see Figure 4).

Increased river water temperature and low flows both have the potential to cause issues with whisky production, and risk unplanned shutdowns of distilleries. There could be potential impacts on water based recreational tourism but less impact on the food and drink tourism sector.

As reflected in the narratives and scores, all aspects of the value chain assemblage were exposed and impacted by the demographic changes, namely emigration of young people from the area and difficulties in attracting staff to the area due to housing and other costs.

It was felt that increasing costs of living could damage domestic tourism. However, some felt that it was potentially less at risk than the average area in Scotland; whisky was noted as an aspirational good, and there were anecdotal reports of consumers increasingly buying more premium products which helps to offset any overall loss in sales due to the current cost of living crisis. Additionally, the Highlands as a tourist destination continue to benefit from international status as a desirable holiday location, and as exchange rates favour international tourists there was hope that this would bring more money into the area. Short term economic changes may not hit the whisky value chain as hard as they do not face the same need to instantly sell stock, so short term decreases in buy due to a cost-of-living squeeze isn't immediately a pressing problem. Furthermore, as much of the whisky is exported, what matters is consumer behaviour in other markets.

The same reasoning was applied to the exposure and impacts of duty rises, with the additional observation that exported whisky is not affected by domestic duty changes. In terms of net zero targets, this is seen as necessary for the whisky and tourism brands; and investment in landscape restoration was seen as an opportunity, with little threat to landscape character.

Finally, whilst malting capacity was considered a potential threat, the exposure was not very high and the impact was also not very high. There was interest in the vulnerability of the barley supply chain, but this was not pursued as it is focussed on land use in the lowlands of Scotland.

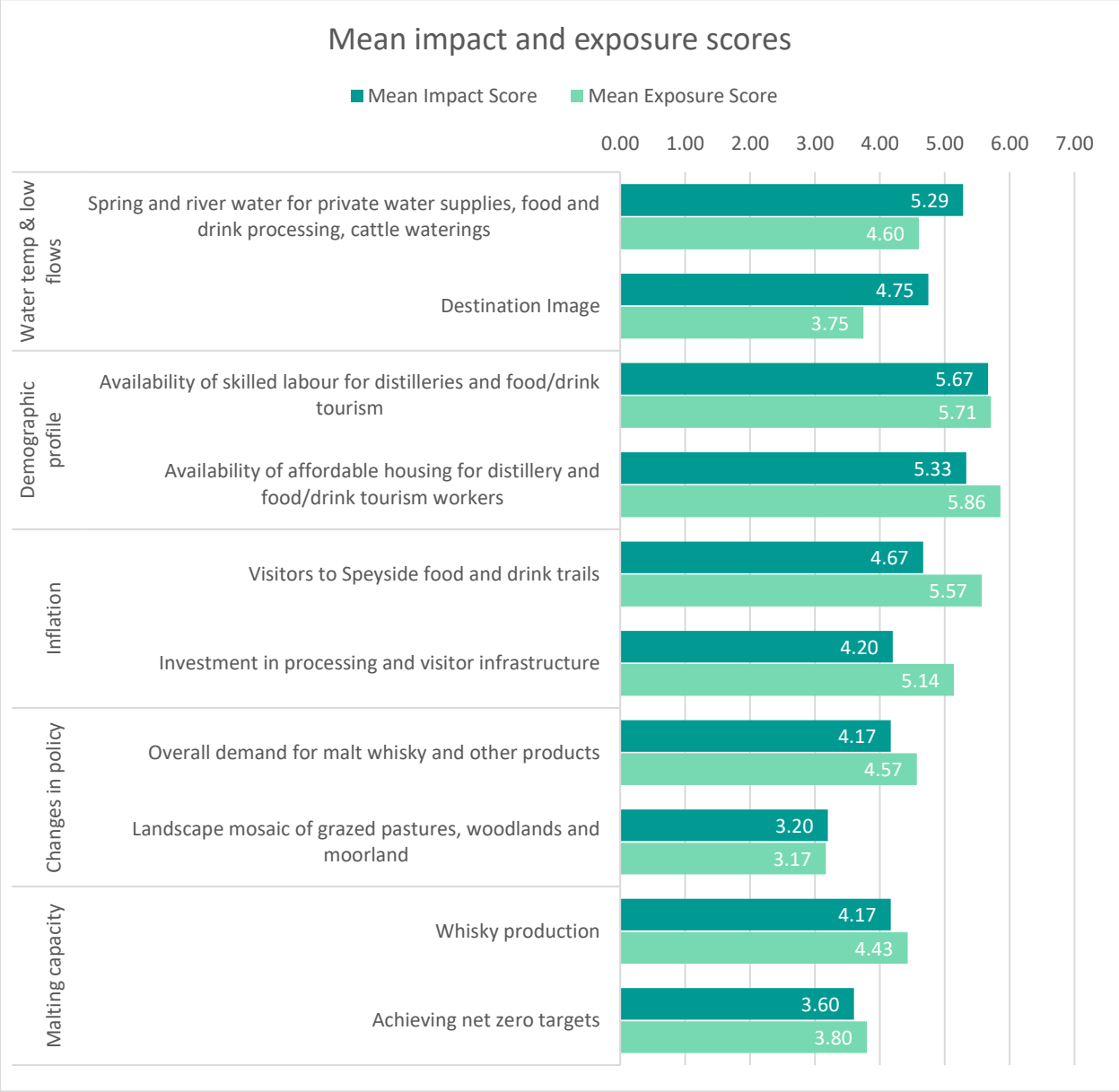


Figure 4: Overall Exposure and Impact Scores

4 Adaptive capacity to respond to threats

The overall vulnerability or resilience of the value chain assemblage is not only dependent on the exposure and impact of threats. It also depends on whether the actors involved in the value chain assemblage can mobilise resources to respond to, and mitigate the impact of, these threats.

4.1 Scoring the resources and the actors' ability to mobilize them

Here we present the ways in which local actors could potentially start to be, or were already, adapting to the threats. These choices were based in the information gathered as part of prior research in the MOVING project, particularly through the Scottish case information submitted as part of D3.2 Land use systems vulnerability matrixes and vulnerability maps for the 23 reference regions and D4.3 Report on participatory value chain analysis.

Table 4: Ability of local actors to mobilise adaptive capacity

Threat	VC-A Elements*	Resources for adapting to the threats	What is the overall ability of local actors to mobilize the selected resources enabling adaptation to change? (1 = very low, 7 = very high)								
			P1	P2	P3	P4	P5	P6	P7	P8	Mean
Water temperature and low flows	Water supply	Water saving and heat reduction technologies	5	5	6	1	6	2	6	N/A	4.71
		Flexible production plans	5	2	3	1	5	3	6	N/A	3.57
	Destination image	Riparian woodlands and leaky dams	N/A	N/A	7	2	N/A	4	N/A	N/A	4.33
		Catchment restoration success stories	6	2	7	3	N/A	4	4	N/A	4.33
	Availability of skilled labour	Training, apprenticeships, promotion of industry to young people	7	6	7	7	6	5	5	N/A	6.14

Demographic changes		Wider services, facilities in area	7	N/A	5	2	3	3	N/A	N/A	4.00
		Payment of Living Wage	7	5	5	1	6	3	6	N/A	4.71
	Availability of affordable housing	CNPPP affordable housing targets	N/A	N/A	6	1	N/A	5	N/A	N/A	4.00
		Highland council planning regulations	N/A	N/A	4	1	N/A	6	N/A	N/A	3.67
		Tied housing for distillery workers	6	2	4	1	4	N/A	3	N/A	3.33
Inflation	Visitors to Speyside	Tactical added value to visitor experiences	7	5	6	1	6	5	4	N/A	4.86
	Food and Drink Processing	Fixing input costs	4	4	4	1	2	N/A	6	N/A	3.50
		Distillers supporting communities to reduce energy costs	7	3	6	1	4	N/A	5	N/A	4.33
		Energy efficiency, generation, & behaviours	7	5	7	1	5	4	6	N/A	5.00
Changes in Policy	Overall demand for malt whisky	Marketing strategies	6	5	7	1	6	7	7	N/A	5.57
	Landscape Mosaic	Agro-forestry and peatland restoration	6	3	5	1	N/A	5	3	5	4.00
		Extensification of beef industry	N/A	N/A	4	1	N/A	N/A	N/A	3	2.67
Malt Barley Capacity	Whisky production	Invest in Scottish next generation facilities	5	4	3	2	4	4	2	N/A	3.43
	Net Zero	Low(er) carbon transport to other maltings	5	3	5	1	2	7	3	N/A	3.71

TE = territorial capital, EN = environmental capital, SC = socio-cultural capital, EC = economic capital, GS = governance structures

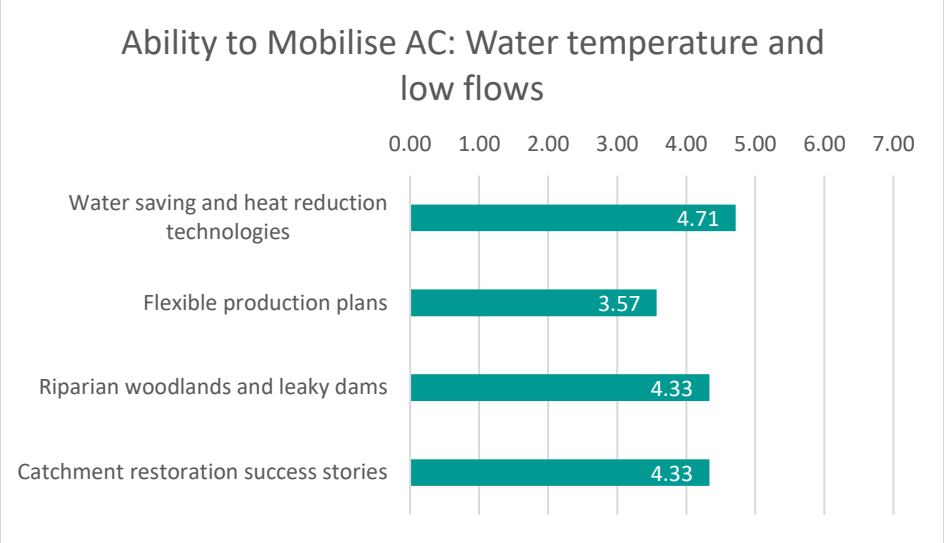


Figure 5: Responses to Threat 1

As shown in Figure 5, technological innovations were the most popular ways of mitigating the threat of low flows and high-water temperatures based on the actors' ability to use these resources. It reflects the whisky industry's investment in technologies to future proof their distilleries against climate change. However, many of the larger distilleries were less able to flex their processing plans in light of unexpected low flows or heatwaves, due to the pressure to meet targets for future demand. Restoration measures and success stories were seen as relatively possible to mobilise.

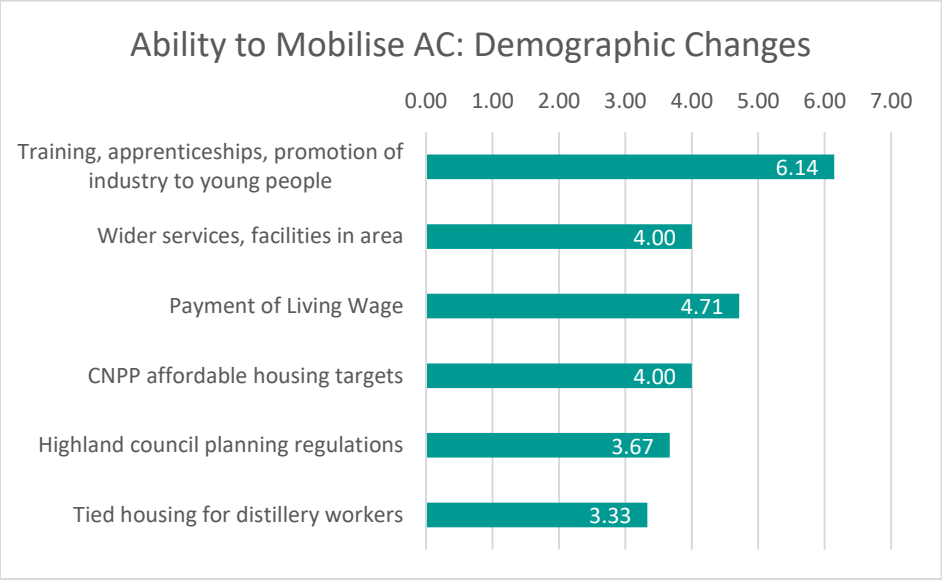


Figure 6: Responses to Threat 2

As shown in Figure 6, our participants felt very empowered to mobilise training and the promotion of opportunities to young people, but much less able to mobilise planning regulations or tied housing. With the former, the regulations are the jurisdiction of Highland Council (not present) but the later reflected both the lack of control (this is up to the businesses themselves) but also uncertainty if it was a good solution to the threat. Tied housing can be useful and is common in other rural industries in the MRL (e.g., for gamekeepers and agricultural workers) but also can be problematic if it deprives people of the chance to join the housing ladder or makes them unable to move positions without risking homelessness.

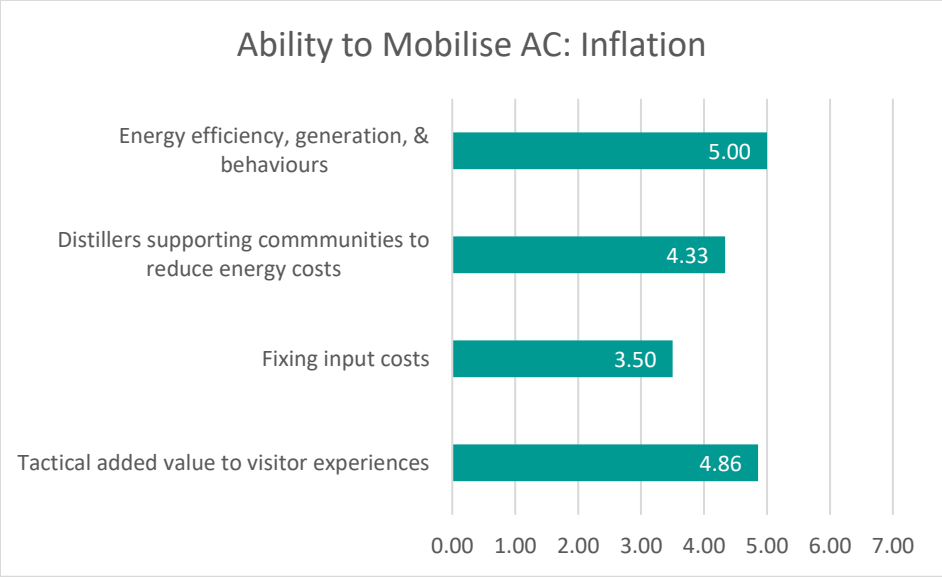


Figure 7: Responses to Threat 3

As shown in Figure 7, again technological solutions were most popular (see also Figure 1) to reduce exposure to rising energy bills. Fixing costs was seen as important and necessary to allow for planning, but not always easy to achieve, particularly for smaller enterprises. The idea of community energy provision, involving interactions between individual distilleries, energy supply infrastructure and the development of bio-energy (based on farm and distillery by-products) was introduced during the first workshop as another way to guard against rising energy costs that are large part of inflationary pressures in the food and drink sector. Finally our original suggestion of 'provision of affordable accommodation and low-cost transport to visitors' to respond to the threat of inflation to 'visitors to Speyside food and drink trails' was rephrased at the first workshop to 'tactical added value'. This refers to making the tourism offer more attractive in the shoulder and low seasons (e.g. offering a free dram with a meal in the visitor centre, or additional night free in a hotel) to keep the destination competitive without losing potential for revenue in peak seasons (ski season and summer).

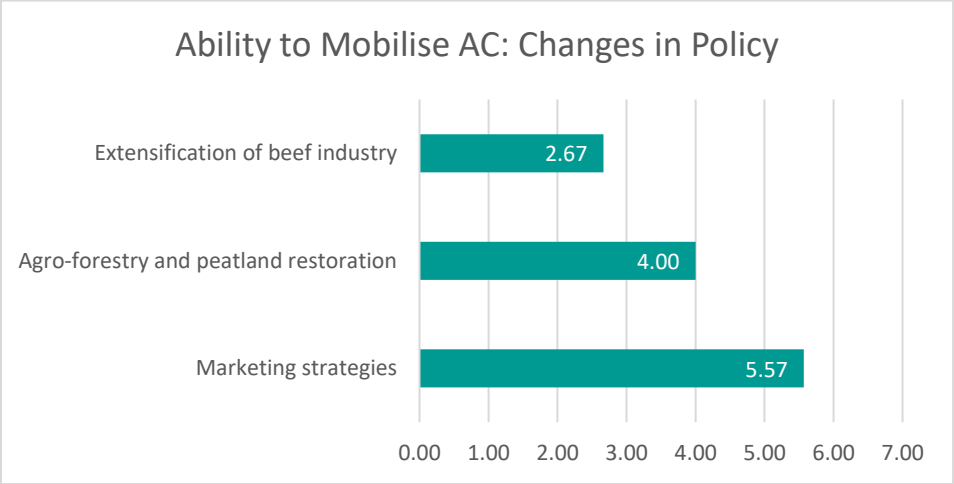


Figure 8: Responses to Threat 4

As shown in Figure 8, participants felt able to mobilise marketing strategies to maintain consumer demand (domestically and abroad) despite changes in duty. This can be contrasted with the very low score for extensification of the beef industry in the area. There were no land management representatives at the meeting, but other stakeholders felt that the farmers were already operating extensive rather than intensive beef production with very tight margins and had little further room to reduce numbers and remain viable. Agro-forestry and peatland restoration on the uplands in the area were much more popular options to respond to the need to achieve net zero whilst maintaining the landscape character of the area. Furthermore, approaches to reduce energy costs were also ways to reduce greenhouse gases and achieve net zero (see Figure 7).

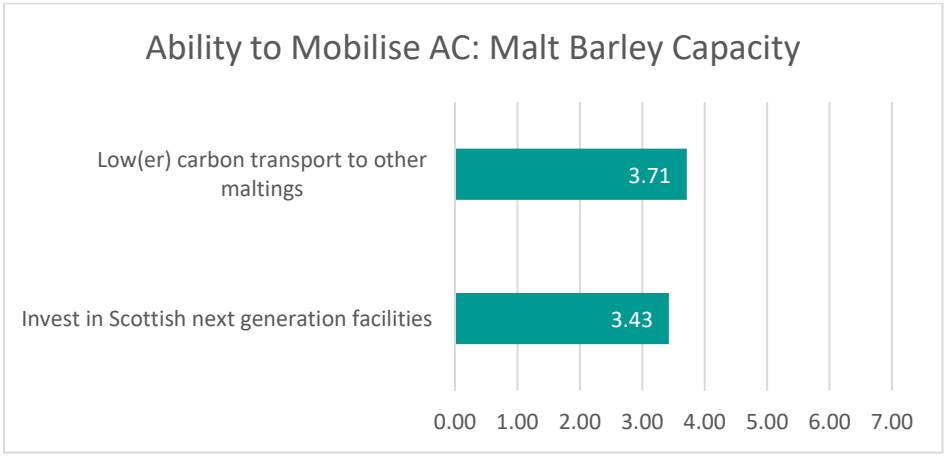


Figure 9: Responses to Threat 5

Finally, there were relatively low scores to suggested ways to mitigate threats to lack of malting barley capacity. Investment in 'next generation' facilities were recognized as underway, but most

participants did not feel that they could influence these investments taking place outside the MRL. The need for lower carbon transport in the area was strongly acknowledged, with reference to a prior feasibility study looking at getting spirit transported by rail rather than road. Improvements to transport infrastructure were desired, but again not many participants felt able to mobilise these themselves.

Overall, these results will reflect the knowledge and interests of the participants (see section 6) as we asked the participants to score based on the sector they represented. Given we did not have any land managers present, some of the scores, particularly regarding land use and restoration may change if they had participated. Lower scores do not always imply that the approach to adapt to threats was unpopular, and our summaries point out where the scores reflect either the problems with the resources or that the participants or their sectors were not able to mobilise them.

4.2 Interpretation of adaptive capacity results

Funding limitations were raised as one reason for low scoring of the adaptive capacity mechanisms. Stakeholders who took part in the workshop were keen for most options to be implemented and felt that they would benefit the region but did not see how it could be done with current threats of inflation and recession. Nearly all of the adaptive capacity mechanisms would require significant investment, particularly changes to greener energy and production and increases to affordable housing and wages. Some participants hope to be able to attract private investment to help with these, particularly in regarding peatland restoration. Not all the barriers were financial, however. There were also issues regarding human capacity. An issue faced when trying to recruit young people to work in the sector was the inability of schools to allow students time to explore the value chains; there often isn't the time in the syllabus or the teaching resources available to introduce young people to the industry opportunities.

Scores are higher where work is already being done to fulfil the adaptive capacity mechanism. For example, the whisky industry does work with farmers in the local areas to help with greener energy generation – there has been the development of anaerobic digesters on farms in the area. Though there are issues with involving schools in 'opening up' the sector to young people there is an effort and interest in doing so; outreach events are planned. Marketing strategies are underway, with the global tourism brand of the Highlands and the global brand of Speyside whiskies being able to mutually support one another.

Adaptive capacity reduces vulnerability and increases resilience of the whisky, food and drink tourism value chains by providing buffers to threats that would otherwise have negative impacts. These work by addressing the different threats (water temperature and low flows, demographic changes, inflation, and policy changes) specifically. For example, water saving technologies or leaky dams retain water in an area for a longer period, supporting supply to a distillery. Mechanisms like planning regulations, housing targets and the living wage aim to improve living conditions in the locality for workers and should attract more to the area; providing them with suitable accommodation, schools, medical facilities, and sustainable wages.

Stakeholders showed interest in the adaptive capacities, and some are already underway with others prioritised in the Cairngorms National Park Partnership Plan. However, a limiting territorial capital is finance. Housing schemes would need a huge amount of investment, and many local businesses are struggling to survive in the recession following two years of pandemic-related lockdowns, so often have no spare money to invest in higher wages or staff housing. The whisky industry is still investing in upgrading its energy infrastructure, so measures aimed at private green energy production and land use changes to maintain water supplies are more feasible.

The identified adaptive capacities could increase the coping ability of the whisky, food and drink tourism value chains without radically altering the functioning of the VC-A system. Therefore, these approaches should improve resilience and reduce vulnerability, provided the necessary investments can be found.

5 Preliminary Vulnerability or Resilience Scores

Whilst the scores were being calculated during the workshops, participants were asked if they felt the Value chain assemblage was vulnerable to the threats, or it felt resilient. Perhaps reflecting the wider sense of economic pessimism at the time, we were quite surprised to hear that even the global whisky value chain was perceived to be vulnerable to the combination of climate change driving water scarcity and higher water temperatures, the negative impacts of amenity migration into the national park on housing; and wider economic pressures of inflation. The food and drink tourism sector were much more adversely affected by the pandemic lock-downs (with all visitor centres and hospitality outlets closed for many months) so this is a sector that was already feeling vulnerable to many threats. Participants felt that the value chain assemblage had many positive synergies and could leverage their international profiles to support each other during the difficult times ahead. There was optimism about the potential to respond to threats and evidence that the workshops were helping build a regional community practice, linking individuals from different value chains to help support each other. However, even these positive outcomes were not sufficient to make the participants feel that the value assemblage was resilient at this moment in time.

Following the equation *(Exposure × Impact) – Adaptive Capacity)*, the vulnerability of the value chain assemblage to each threat was calculated. A higher number corresponds to higher vulnerability of the whisky, food and drink tourism value chain assemblage. To create these scores, averages were calculated from all responses from both in-person and online workshops, before being substituted into each calculation. The results are shown in Table 5 (in order from highest to lowest vulnerability):

Table 5: Vulnerability/ Resilience Scores

Threat	Equation	Score
Demographic changes	(5.79×5.50)-4.31	27.51

Inflation	(5.36×4.43)-4.42	19.33
Water temperature and low flows	(4.18 × 5.02)-4.24	16.71
Malt Barley Capacity	(4.11 × 3.88)-3.57	12.41
Changes in Policy	(3.87×3.68)-4.08	10.17

In every case, except water temperature and low flows, mean exposure is higher than mean impact. This suggests that the value chain assemblage is quite well adapted to the threats already as there are threats to the elements but the effects are not severe. Furthermore, mean ability to mobilise resources to adapt to the threat are generally medium to high. This also suggests that participants felt relatively empowered, a finding confirmed by the quality of the discussion that illustrated the range of expertise and experience available within the community of practice. These results suggest that the whisky/tourism value chain is most vulnerable to demographic changes in the region. Whilst not easy to address, these issues are already at the heart of the National Park and local authority planning strategies.

Furthermore, the most vulnerable score possible is (7x7)-1, resulting in a score of **48**; and the most resilient score possible is (1x1)-7, resulting in a score of **-6**. These scores contrast high exposure and impacts with low adaptive capacity (extremely vulnerable) with low exposure and impacts and high adaptive capacity (extremely resilient). A neutral score (neither vulnerable nor resilient) would be 21. Therefore even the highest score of 27.51for demographic changes was not at the extreme end of the vulnerability spectrum; and all the other scores are more towards the resilient end of the spectrum. This is an interesting contrast to the workshop discussions where participants felt the VC-A was more vulnerable than resilient.

6 Information about the workshop

This section provides more information about the workshop participants, structure and observations about how the process worked to inform further research in this area.

6.1 Organisation of the workshop

Total number of participants:

Farmers: 0 (unable to come at last minute)

Processors: 3 (Maltsters and Whisky industry)

Consumers: 0 (unable to come at last minute)

Researchers: 1 (climate and food systems)

Policy makers/deliverers: 5 (regional/national bodies associated with area / value chains)

Age of participants:

From those that completed the feedback forms (5 people) (see section 6.2), three participants were over 40 and two were aged 25 – 40 years old. We will consider running subsequent events in the evenings/weekends on occasions to get a wider age range of participants.

6.2 Feedback

An online feedback form was filled in by five participants. The overall results were as follows:

Table 6: Feedback Scores

Aspect of workshop	Mean Score (Scale of 1-4, where 1 = Poor, 2 = Satisfactory, 3 = Good, 4 = Very good)
Pre-workshop information	3.2
Information during the meeting	3.4
Venue	3.4
Facilitation	3.4
Opportunity for participation	3.8
Groupwork	3.4
Content	3.25
Usefulness of the workshop	3

Table 6 shows that overall, the feedback was positive. However, the lowest scores were regarding the utility of the workshop; content and pre-workshop information; whilst the highest was the opportunity for participation. These scores concur with the researchers' observation that it was primarily a knowledge elicitation process, whereby we gained more value from the participants than we were able to provide to them. However, we have identified areas where we might be able to repay their expertise as detailed below.

Further comments were provided on:

The expectations of participation in this MOVING research activity

One respondent was unsure what to expect. Others were seeking opportunities to showcase the industry; understand where and how to add value to local value chains and how to improve marketing of the local value chains. Note that their expectations were not specifically around the vulnerability or resilience assessment – they were more practically orientated towards solutions.

Whether they learnt anything new

Although the score for utility was the lowest, all respondents seemed to learn something new. Tourism or business participants learnt more about distilling and malting; whilst the whisky sector learnt more about the visitor experience and wider tourism setting. One respondent highlighted how the workshop had helped them think about how to be "custodians of the community we operate in".

Further comments and suggestions

One respondent would like more attention to the wider supply chain issues outside the MRL, particularly related to the barley sector. This is outside the focus of mountain sustainability, but we will consider whether and how to progress this through other research activities in the James Hutton Institute.

The overall advice, including discussion at the end of the workshop, was to "focus in on a few risks or opportunities that are new and where some collaboration with other stakeholders in the catchment could make us more resilient while adding value". Aligning these opportunities with proposed workstreams within the organisations represented on our Multi-Actor Platform would make these opportunities more relevant and likely to be taken up.

7 Next Steps

The next step for the overall MOVING project work package four is to consider upgrading strategies for vulnerable value chain assemblages across the 23 case studies, with a final report available in April 2023. For our Scottish case, we will pay particular attention to the adaptive capacity opportunities that seem to fit the recommendation of 'adding value through collaboration' and support with practical action where possible. One example of this is the proposed careers day involving local secondary school children in the Speyside area in Spring 2023, where we will represent the results of MOVING to raise awareness of the variety of practices within the value chain assemblage; and allow young people to feed back about their perceptions of the industries.

8 Acknowledgements

The research team would like to acknowledge the knowledge and expertise gained from our workshop participants and the methodological guidance provided by the Czech MOVING partners (Lukas Zagata and team).

The H2020 MOVING project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 862739. The content of this website does not reflect the official opinion of the European Union. Responsibility for the information and views expressed therein lies entirely with the author(s).

Further information about the European project can be found here: https://www.moving-h2020.eu/

Information on the research by the James Hutton Institute can be found here: www.hutton.ac.uk/research/projects/moving

For more information or feedback on this report, please contact Kirsty.Blackstock@hutton.ac.uk

9 Annex: Workshop slides

Welcome & Housekeeping

MOVING
MOuntain VAlorization through INterconnectedness and GREEN growth

Aim of the workshop:

- Identify threats to Whisky/F&D tourism
- Identify resilience of Whisky/F&D tourism to these threats
- Understand different perspectives
- Identify potential strategies to address any vulnerabilities

- Introductions
- Comfort breaks
- Consent forms
- Recording
- Tweets & social media

Agenda

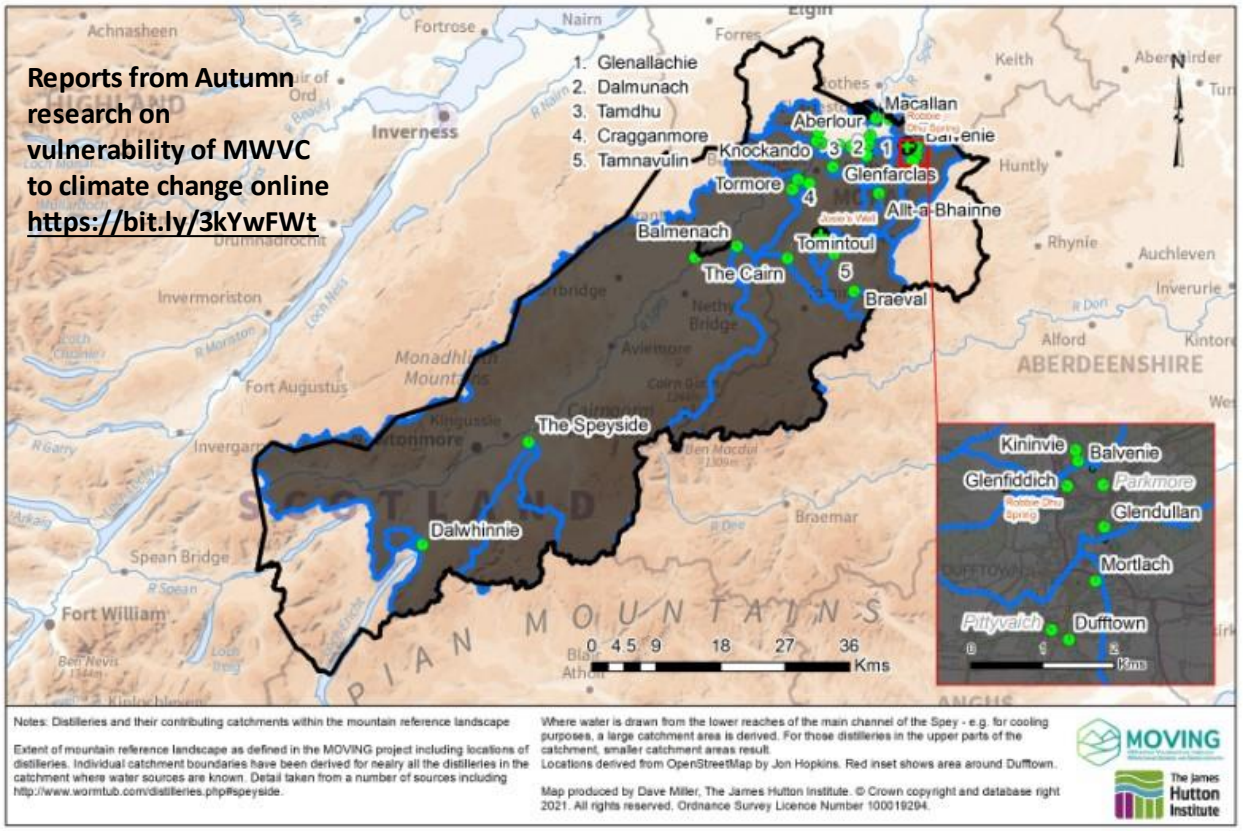
Time	Content
10:00 – 10:15	Welcome, introductions and icebreaker Reminder of progress to date
10:15 - 11:15	Threats and impacts onSpeyside Whisky and associated food/drink tourism businesses: • Presentation (plenary) • Discussion (breakout)
11:15 – 11:25	Break
11:25 – 11:35	Scoring threats and impacts (plenary)
11:35 – 12:15	Potential adaptive capacity to mitigate threats • Discussion (breakout) • Scoring (plenary)
12:15 – 12:45	Preliminary assessment of vulnerability/resilience of Speyside Whisky and associated food/drink tourism businesses
12:45 – 13:00	Next steps, feedback form and close the meeting

What is the H2020 MOVING project about?

MOVING (MOuntain Valorisation through INterconnectedness and Green growth) – is a four-year project (2020-2024) involving 23 Value Chain cases funded by the EU **Horizon 2020** programme.

The **Project's main objective** is to build capacities and co-develop relevant policy frameworks across Europe for the establishment of value chains that contribute to the resilience and sustainability of mountain areas to climate change.

Distillieries and their contributing catchments within the mountain reference landscape



Notes: Distilleries and their contributing catchments within the mountain reference landscape

Extent of mountain reference landscape as defined in the MOVING project including locations of distilleries. Individual catchment boundaries have been derived for nealry all the distilleries in the catchment where water sources are known. Detail taken from a number of sources including http://www.wormtub.com/distilleries.php#speyside.

Where water is drawn from the lower reaches of the main channel of the Spey - e.g. for cooling purposes, a large catchment area is derived. For those distilleries in the upper parts of the catchment, smaller catchment areas result.
Locations derived from OpenStreetMap by Jon Hopkins. Red inset shows area around Dufftown.

MOVING
The James Hutton Institute

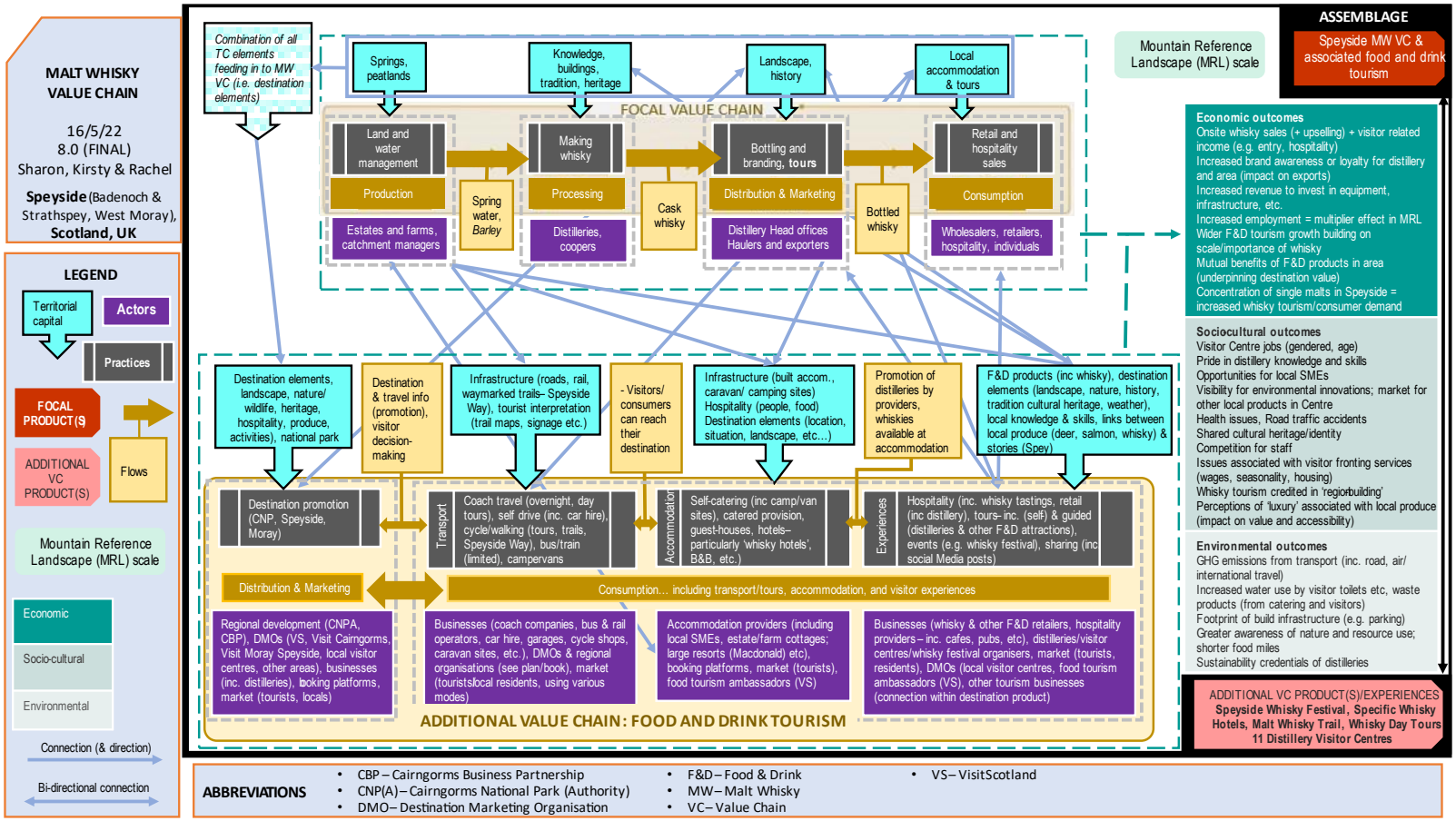
Reports from Autumn research on vulnerability of MWVC to climate change online https://bit.ly/3kYwFWt

MOVING
MOuntain Valorisation through INterconnectedness and Green growth

What have we done so far?

MOVING
MOuntain Valorisation through INterconnectedness and Green growth

- Initial meeting – mountains and whisky – July 2021
- Vulnerability of natural resource to climate change – October 2021
- Analysis of Value Chain – focal value chain, spatial interactions, how it interacts with food and drink tourism – workshop in May 2022
- Pan-European analysis of 23 mountain value chains – September 2022
- Youth Engagement event – October 2022


MALT WHISKY VALUE CHAIN
16/5/22
8.0 (FINAL)
Sharon, Kirsty & Rachel
Speyside (Badenoch & Strathspey, West Moray), Scotland, UK
LEGEND
Territorial capital
Actors
Practices
FOCAL PRODUCT(S)
ADDITIONAL VC PRODUCT(S)
Flows
Mountain Reference Landscape (MRL) scale
Economic
Socio-cultural
Environmental
Connection (& direction)
Bi-directional connection
Combination of all TC elements feeding in to MW VC (i.e. destination elements)
Springs, peatlands
Knowledge, buildings, tradition, heritage
Landscape, history
Local accommodation & tours
FOCAL VALUE CHAIN
Land and water management
Production
Estates and farms, catchment managers
Spring water, Barley
Making whisky
Processing
Distilleries, coopers
Cask whisky
Bottling and branding, tours
Distribution & Marketing
Distillery Head offices Haulers and exporters
Bottled whisky
Retail and hospitality sales
Consumption
Wholesalers, retailers, hospitality, individuals
Mountain Reference Landscape (MRL) scale
ASSEMBLAGE
Speyside MW VC & associated food and drink tourism
Economic outcomes
Onsite whisky sales (+ upselling) + visitor related income (e.g. entry, hospitality)
Increased brand awareness or loyalty for distillery and area (impact on exports)
Increased revenue to invest in equipment, infrastructure, etc.
Increased employment = multiplier effect in MRL
Wider F&D tourism growth building on scale/importance of whisky
Mutual benefits of F&D products in area (underpinning destination value)
Concentration of single malts in Speyside = increased whisky tourism/consumer demand
Sociocultural outcomes
Visitor Centre jobs (gendered, age)
Pride in distillery knowledge and skills
Opportunities for local SMEs
Visibility for environmental innovations; market for other local products in Centre
Health issues, Road traffic accidents
Shared cultural heritage/identity
Competition for staff
Issues associated with visitor fronting services (wages, seasonality, housing)
Whisky tourism credited in 'regionbuilding'
Perceptions of 'luxury' associated with local produce (impact on value and accessibility)
Environmental outcomes
GHG emissions from transport (inc. road, air/ international travel)
Increased water use by visitor toilets etc, waste products (from catering and visitors)
Footprint of build infrastructure (e.g. parking)
Greater awareness of nature and resource use; shorter food miles
Sustainability credentials of distilleries
ADDITIONAL VC PRODUCT(S)/EXPERIENCES
Speyside Whisky Festival, Specific Whisky Hotels, Malt Whisky Trail, Whisky Day Tours
11 Distillery Visitor Centres
Destination elements, landscape, nature/ wildlife, heritage, hospitality, produce, activities), national park
Destination & travel info (promotion), visitor decision-making
Infrastructure (roads, rail, waymarked trails– Speyside Way), tourist interpretation (trail maps, signage etc.)
- Visitors/ consumers can reach their destination
Infrastructure (built accom., caravan/ camping sites) Hospitality (people, food) Destination elements (location, situation, landscape, etc...)
Promotion of distilleries by providers, whiskies available at accommodation
F&D products (inc whisky), destination elements (landscape, nature, history, tradition cultural heritage, weather), local knowledge & skills, links between local produce (deer, salmon, whisky) & stories (Spey)
Destination promotion (CNP, Speyside, Moray)
Transport
Coach travel (overnight, day tours), self drive (inc. car hire), cycle/walking (tours, trails, Speyside Way), bus/train (limited), campervans
Accommodation
Self-catering (inc camp/van sites), catered provision, guest-houses, hotels– particularly 'whisky hotels', B&B, etc.)
Experiences
Hospitality (inc. whisky tastings, retail (inc distillery), tours– inc. (self) & guided (distilleries & other F&D attractions), events (e.g. whisky festival), sharing (inc social Media posts)
Distribution & Marketing
Consumption... including transport/tours, accommodation, and visitor experiences
Regional development (CNPA, CBP), DMOs (VS, Visit Cairngorms, Visit Moray Speyside, local visitor centres, other areas), businesses (inc. distilleries), booking platforms, market (tourists, locals)
Businesses (coach companies, bus & rail operators, car hire, garages, cycle shops, caravan sites, etc.), DMOs & regional organisations (see plan/book), market (touristslocal residents, using various modes)
Accommodation providers (including local SMEs, estate/farm cottages; large resorts (Macdonald) etc), booking platforms, market (tourists), food tourism ambassadors (VS)
Businesses (whisky & other F&D retailers, hospitality providers– inc. cafes, pubs, etc), distilleries/visitor centres/whisky festival organisers, market (tourists, residents), DMOs (local visitor centres, food tourism ambassadors (VS), other tourism businesses (connection within destination product)
ADDITIONAL VALUE CHAIN: FOOD AND DRINK TOURISM
ABBREVIATIONS
CBP – Cairngorms Business Partnership
CNP(A) – Cairngorms National Park (Authority)
DMO – Destination Marketing Organisation
F&D – Food & Drink
MW – Malt Whisky
VC – Value Chain
VS – VisitScotland

Desired outcomes

MOVING
MOuntain Valorisation through INterconnectedness and Green growth

Maximising profitability of food and drink businesses while enhancing brand values of environmental stewardship, quality, provenance and heritage

Youth Engagement – October 2022

Visit to distillery

They want to see wellbeing economy, local food, environmental improvements by 2040

Get this by more youth involvement, vocational education, behaviour change, local housing

Barriers are transport, access to land and housing, lack of paid involvement in decision making, seasonal jobs

Focus of today's meeting

MOVING
MOuntain Valorisation through INterconnectedness and Green growth

Vulnerability/resilience assessment of 'value chain assemblage'

- VC-A = whisky production as part of wider food and drink tourism in upper Speyside
- Focussed on current situation (not looking backwards or forwards)
- Assessment against environmental, social, economic and policy changes

Terminology

MOVING
MOuntain Valorisation through INterconnectedness and Green growth

Vulnerability is the inability of a system to cope with a threat

Resilience is the ability of a system to cope with a threat

A system can be **exposed** to a threat and **impacted** by a threat

The ability to cope depends on adaptive capacity

Adaptive capacity arises from a combination of mechanisms and ability to mobilise these mechanisms

Vulnerability or resilience = **(exposure x impact) – adaptive capacity**

MOVING
MOuntain VAlorisation THROUGH INterconnectedness AND Green Growth

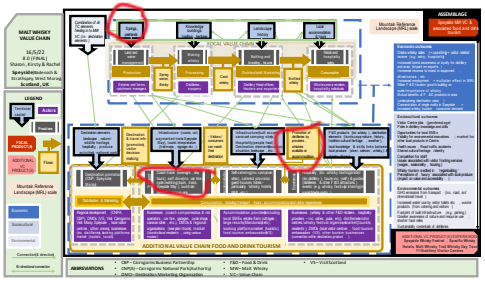
Threats to elements of VC-A

Exposure of elements to threats

Impacts of threats on elements

Mechanisms to adapt to threats

Ability to adapt



Methodology

MOVING
MOuntain Valorisation through INterconnectedness and Green growth

Expert Review

- Choice of threats to consider
- Narrative of effects of threats on VC-A

Validation & scoring

- Today's workshop

Post-workshop processing

- Our results shared with you via draft report (December 2022)
- Comparative by Czech colleagues across 23 Mountain Value Chains

Short-list of threats

Table 1 Overview of the threats to mountain regions

Environmental	Social and economic	Political and Institutional
Drought	Land use changes	Legislation changes
Air Temperature change	Mass tourism and associated infrastructure	Incentives and subsidies changes
Water Temperature Change	Demographic changes	Changes in the political system
Extreme weather events	Life-style changes (post-productivism)	
Flooding	Change in traditional practices	
Wildfires	Market changes – consumer demand changes	
Soil condition	Change in knowledge production and use	
Use of natural resources – renewable and non-renewable	Technological innovation (digitization)	
Biodiversity Change	Society polarization (rich vs poor)	
Non-native invasive species	Inflation	
Air quality	Energy prices	
Water Quality	Pandemic situations	
Soil quality		

Reference: Authors' description based on literature review (see p.4 for details)

Environmental – drought (2.6)

Social – demographic (2.3)

Economic – inflation (2.3)

Political – legislation (1.6)

Needed to pick 2-6 exogenous negative threats and relate them to1-3 elements of the VC-A

Description of threats (1)

Water temperature and low flows:

Changes in precipitation and heat leading to low flows and increased water temperature from springs and rivers

This threat can be considered in terms of these elements:

Spring and river water for private water supplies, food and drink processing, cattle waterings

Destination image

Demographics:

Overall population growth in areas but outmigration of youth

Demographic change can be considered in terms of:

Availability of **skilled labour** for distilleries and food/drink tourism

Availability of **affordable housing** for distillery and food/drink tourism workers

Description of threats (2)

MOVING
MOuntain Valorization through INterconnectedness and Green growth

Inflation:

increased costs of inputs leading to increased costs of products

Inflation can be considered in terms of:

Visitors to Speyside food and drink trails

Investment in processing and visitor infrastructure

Policy:

duty on beers, wines and spirits;

achieving net zero in land use sector

Policy can be considered in terms of:

Overall demand for malt whisky and other products

Landscape mosaic of grazed pastures, woodlands and moorland

Description of threats (3)

MOVING
MOuntain Valorization through INterconnectedness and Green growth

Malting barley capacity:

Lack of malting barley capacity for distilling in Scotland meaning that some barley is processed in England

Can be considered in terms of:

Whisky production problems when supply is limited

Net zero targets harder to reach when barley travels larger distances

Breakout Discussion

MOVING
MOuntain Valorisation through INterconnectedness and Green growth

- Have we identified the most relevant threats to whisky production as part of Upper Speyside food and drink tourism?
- Have we identified the most relevant elements of the value chain assemblage that relate to the threats?
- Are the linkages logical and convincing?
- What, if anything, do we need to add before we score them?

Scoring

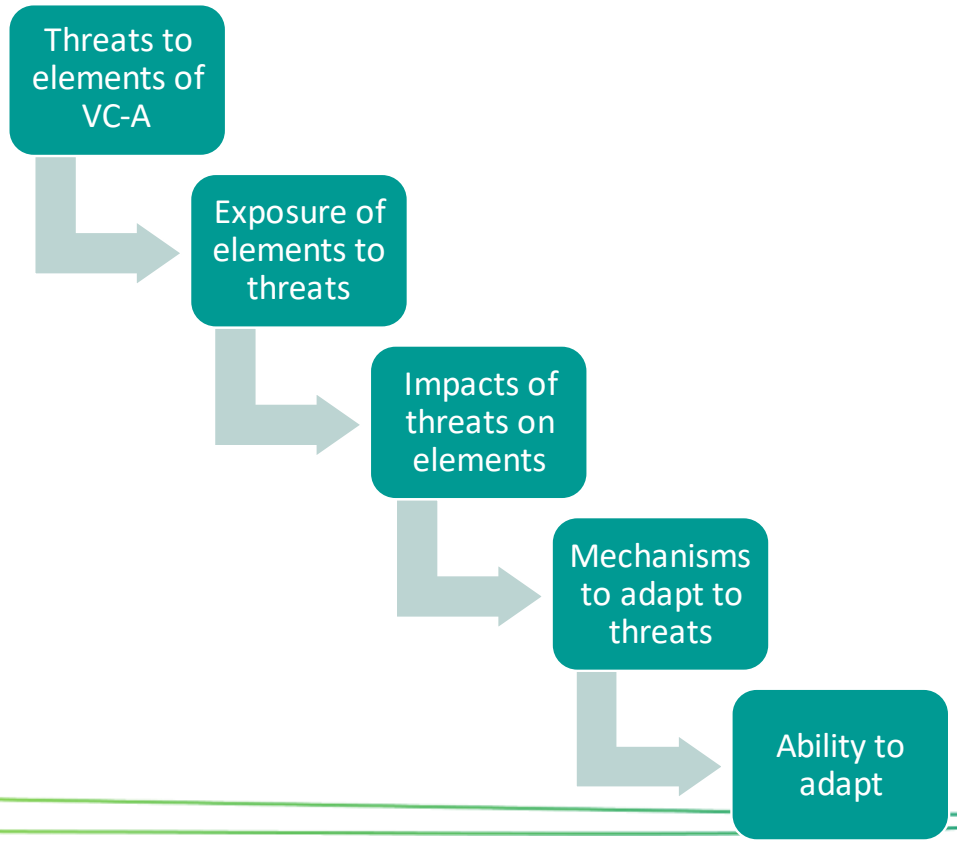
Exposure means that the threat applies to that element in Upper Speyside

Impacts means that the threat has a negative effect on that element in Upper Speyside

Score in terms of your perception of how the VC-A works (you may differ as you have different roles in the VC-A).

Based on own experience, skills and our discussions this morning

https://hutton.qualtrics.com/jfe/form/SV_1LCsloGcWqlrmpo



MOVING
MOuntain Valorisation through INterconnectedness and Green growth

We will now discuss the Adaptative Capacity(AC) Mechanisms

Threat	What elements are threatened	AC approach
Water temperature and low flows (reduced precipitation and increased low flows, increased water temperature)	Spring and river water for private water supplies, food and drink processing, cattle waterings Destination image	Water saving and heat reduction technologies in homes, buildings, distilleries, farmyards Flexible production plans Riparian woodlands & leaky dams Catchment restoration success stories
Demographic change (population growth, outmigration of youth)	Availability of skilled labour for distilleries and food/drink tourism Availability of affordable housing for distillery and food/drink tourism workers	Training, apprenticeships, promote and change perceptions of industry to young people Wider services, facilities in area Payment of living wage CNPP affordable housing targets Highland planning regulations Tied housing for distillery workers

Threat	What elements are threatened	AC approach
Inflation (increased costs of inputs leading to increased costs of products)	Visitors to Speyside food and drink trails Investment in processing and visitor infrastructure	Tactical added value to visitor experience Fixing input costs Distillers supporting farmers/communities/ businesses to reduce their energy costs Energy efficiency and generation measures and behaviours in distilleries and other buildings; longer term investment in green hydrogen
Policy (duty on beers, wines and spirits; achieving net zero in land use sector)	Overall demand for malt whisky and other products Landscape mosaic of grazed pastures, woodlands and moorland	Marketing strategies Agro-forestry and peatland restoration through public and private funding Extensification of beef industry
Malting barley capacity (capacity of UK to produce malt barley used in whisky production)	Whisky production F&D net zero targets	Invest in Scottish next generation malting facilities Low(er) carbon transport to other maltings (esp for brewing malt)

Adaptive Capacity Mechanism Scoring

MOVING
MOuntain Valorisation through INterconnectedness and Green growth

Please score to what extent the sector or social group you represent can actually 'mobilise' these adaptive capacity mechanisms in Upper Speyside

Score in terms of your perception of how the VC-A works (you may differ as you have different roles in the VC-A).

Based on own experience, skills and our discussions this afternoon

https://hutton.qualtrics.com/jfe/form/SV_1BItzFl9keVAE5M

Vulnerability & Resilience Perceptions

MOVING
MOuntain Valorisation through INterconnectedness and Green growth

While we wait for the scores…

Do you think that whisky production as part of wider food and drink tourism in the Upper Speyside is **vulnerable** to threats?

Is there anything else that could or should be done to make the VC -A sustainable for future generations? (e.g. persist over time, without damaging the environmental, economic or social capital in the area)

Scoring results (1)

Threat	Elements	Average Exposure Score	Average Impact Score
Water temp & low flows	Spring and river water for private water suppli food and drink processing, cattle waterings	4.60	5.29
	Destination Image	3.75	4.75
Demographic profile	Availability of skilled labour for distilleries a food/drink tourism	5.71	5.67
	Availability of affordable housing for distiller food/drink tourism workers	5.86	5.33
Inflation	Visitors to Speyside food and drink trails	5.57	4.67
	Investment in processing and visitor infrastru	5.14	4.20
Changes in policy	Overall demand for malt whisky and other products	4.57	4.17
	Landscape mosaic of grazed pastures, woodla and moorland	3.17	3.20
Malting capacity	Whisky production	4.43	4.17
	Achieving net zero targets	3.80	3.60

Note:
1 = hardly any exposure/no impact
7 = extremely exposed/extreme impact

Scoring results (2)

Adaptive Capacity Mechanism	Ability to mobilise average score
Water saving technologies in homes, buildings, distilleries, farmyards	4.71
Flexible Production Plans	3.57
Riparian woodlands and leaky dams	4.33
Catchment restoration	4.33
Training, apprenticeships, promote and change perception of industry to young people	6.14
Wider services, facilities in area	4.00
Payment of living wage	4.71
CNPP affordable housing targets	4.00
Highland council planning regulations	3.67
Tied housing for distillery workers	3.33

Scoring results (3)

Adaptive Capacity Mechanism	Ability to mobilise average score
Tactical added value to visitor experiences	4.86
Fixing input cost	3.50
Distillers supporting farmers/communities/businesses to reduce their energy costs	4.33
Energy efficiency and generation measures and behaviours in distilleries and other buildings; longer term investment in green hydrogen	5.00
Marketing strategies	5.57
Agro-forestry and peatland restoration through public and private funding	4.00
Extensification of beef industry	2.67
Invest in Scottish next generation facilities	3.43
Low(er) caron transport to other maltings	3.71

Any further thoughts or comments?

Next Steps

MOVING
MOuntain Valorisation through INterconnectedness and Green growth

https://hutton.qualtrics.com/jfe/form/SV_bHrECtwfx4jIot8

- Feedback forms
- Report by mid December
- Final suggestions for 'upgrading' the VC -A Feb 23
- Further research on clustering VCs (innovation, governance, gender)
- Further research on foresight and shared socio -economic pathways
- What would be useful for you? What would turn this into more of an exchange?

MOVING
MOuntain Valorisation through INterconnectedness and Green growth

Thank you!

https://www.moving-h2020.eu/

https://www.hutton.ac.uk/research/projects/moving

@MOVINGH2020

Kirsty.Blackstock@hutton.ac.uk

MOVING receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 818194. The content of this document does not reflect the official opinion of the European Union. Responsibility for the information and views expressed therein lies entirely with the author(s).

H2020 research is supported by platform funding from Scottish Government Rural and Environmental Science and Analytical Services (RESAS) funding

33