

Expected and Uncertain

What experts expect, and what they cannot predict, for the futures of Europe's remote rural and mountain regions

A Briefing Paper

Results of the MARGISTAR Delphi Study
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Executive Summary

Europe's mountain and remote rural areas supply much of the continent's water, food, timber, energy and biodiversity, yet many are losing people, services and economic influence. To understand where these regions are heading, MARGISTAR convened an online Delphi conference involving 23 experts from across Europe. Through this structured expert-elicitation process, participants assessed 28 drivers of change, considering both their potential impact on the future of mountain and remote rural regions over the next ten years and beyond, and the degree of uncertainty how each driver might develop. The approach was designed to draw together informed expert judgement and identify where there was greater convergence or uncertainty about future change. This MARGISTAR briefing sets out what the experts said and what it means for those who make policy for these territories.

What the experts agree on. The panel's strongest agreement concerns a set of trends it expects to continue in every plausible future:

- **Climate hazards will intensify.** Floods, wildfires, storms and droughts were rated the most consequential driver of all: 91% of the panel rated their impact high or very high.
- **People will keep leaving, and those who stay will be older.** Out-migration, depopulation and population ageing were each rated high impact by the panel, and fewer than one in five considered ageing uncertain.
- **Nature conservation and local development will keep colliding.** Conflicts between protecting nature and local economic or infrastructure needs were rated high impact by 87%, and differing views on the value of nature between locals and policy-makers by 83%.
- **Local services will continue to erode.** The loss of health services, schools and shops (83%) and poor access to essential services (78%) are expected, not feared: only 17% of the panel considered either uncertain.
- **Weak local capacity will persist unless addressed.** Limited institutional, governance and implementation capacity was consistently rated high impact and low uncertainty.

These are the predictable elements of the future. Waiting for more information will not change them; the cost of responding late will.

What the experts cannot predict. Five drivers combine high impact with genuine uncertainty about how they will unfold. These are the critical uncertainties: the questions on which the future of these regions turns.

- **Can local capacity to adapt keep pace with the speed of climate change?** The panel is confident the climate is changing fast; it is not confident that mountain communities and institutions can adapt in time.
- **How far will biodiversity loss and ecosystem degradation go?**
- **How will climate adaptation itself unfold?** Which measures, funded by whom, with what results on the ground.
- **Will tourism remain the economic mainstay, and what will overdependence on it cost?**
- **How severe will water scarcity become?** The single most agreed uncertainty in the exercise: 70% of the panel rated it hard to predict.

Four of these five are facets of one question, whether mountain social-ecological systems can adapt as fast as the climate is changing. The fifth is about the economy: whether these regions stay tied to a seasonal, externally exposed sector or diversify. Together they define the range of futures for which policy must be ready.

What this means for policy. The results call for two kinds of response. For the predictable trends, the case for action is already made: a guaranteed floor of essential services, universal connectivity and financed local capacity are "no-regret" commitments that pay off in every scenario. For the critical uncertainties, policy needs to be robust rather than optimised, working across a range of outcomes instead of assuming one, and adaptive, with clear signposts and the authority to change course as the picture becomes clearer. Section 5 sets out the policy issues and strategic choices in detail; Section 1 explains how the numbers should be read.

1. About this Briefing

Purpose and approach

MARGISTAR (COST Action CA21125) is a European forum for the revitalisation of marginalised mountain areas. As part of its foresight work, it ran a Delphi exercise: a structured, anonymous consultation in which a panel of experts responds to the same questions over several rounds, so that a wide spread of views can be gathered without the pressures of a face-to-face meeting. Earlier stages of the study generated and consolidated a list of drivers of change for remote rural and mountain regions. In Round 1, 26 valid respondents answered open questions on present and future issues and problems; their answers were broken into 400 individual mentions and consolidated into 121 distinct candidate items (54 present, 67 future), each traceable back to the original responses behind it. In Round 2, 23 respondents from the previous round rated these 101 panel-kept items on importance from 1 to 5. Items were included in the following round when the median was 4 or above and at least 70% of respondents rated them 4 or 5, and excluded when the median was below 3 and fewer than 50% rated them 4 or 5. Out of 101 items, 61 fell into a borderline band that the panel reviewed directly. The panel's review of this borderline band brought the list forward to the 28 drivers rated in Round 3. The final stage, reported here, asked the panel to rate the resulting 28 drivers on impact (how far the driver could shape the future of these regions) and uncertainty (how difficult its direction, pace, scale or outcome is to predict over the next ten years or more), each on a five-point scale from 1 (Very low) to 5 (Very high).

Panel and validity

The survey export contained 24 responses. One was excluded because the respondent did not affirm all consent statements and left the ratings blank, leaving 23 valid responses; all 23 rated all 28 drivers on both dimensions, a panel size well within the 12–18 usually recommended for Delphi ranking rounds. The dataset has been de-identified (respondents R01 to R23) and no names, addresses or IP data are retained. The panel is expert but not representative: it is research-led and self-selected, so local authorities, businesses and residents speak here mainly through those who study and work with them.

Method and classification rule

In keeping with Delphi convention, the median and interquartile range are the primary statistics; the mean, standard deviation and the share rating a dimension 4 or 5 are reported to aid interpretation. Drivers were classified from their medians with the quadrant boundary at 3.5 on each axis. A driver is a critical uncertainty when both medians are 4 or 5; an important future driver when impact is high but uncertainty below 4; on the watch list when the reverse holds; and lower priority when both are below 4. A stricter rule, requiring at least 70% of the panel to rate both dimensions 4–5, was also tested.

2. What the Panel Said

The headline result is easily stated. The panel agrees strongly about what matters and only moderately about what is unpredictable. Twenty-seven of the 28 drivers were rated high impact, and for most of them at least seven in ten panellists rated impact high or very high. Uncertainty ratings, by contrast, cluster in the middle of the scale. The result is the pattern shown in Figure 1: a dense band of consequential drivers across the top of the matrix, with a handful edging rightwards into genuine uncertainty.



Figure 1 Impact-uncertainty matrix, mean scores ($n = 23$; colour = median-based category; quadrant split at 3.5)

Reading the matrix

Each driver is plotted by its mean uncertainty (horizontal axis) and mean impact (vertical axis); colour shows the category assigned from the medians, which is the primary basis for classification. The four quadrants carry different implications for policy:

- **Critical uncertainties (top right, red).** High impact and hard to predict: five drivers. These are the axes around which alternative futures should be built, and the outcomes against which policy should be tested for robustness.
- **Important future drivers (top left, blue).** High impact but expected: twenty-two drivers. These are the predetermined elements that every scenario shares and that no-regret policy should address now.
- **Watch list (bottom right, yellow).** Uncertain but lower impact: no drivers. The list had already been filtered for relevance, so nothing the panel regards as unpredictable is also regarded as unimportant.
- **Lower priority (bottom left, grey).** One driver, declining trust between communities and institutions (D28), sits just below the impact threshold.

Three features of Figure 1 deserve attention. First, the five red points are separated from the blue cluster by a small margin on the horizontal axis. Second, the highest-impact drivers, climate hazards and out-migration, sit well inside the blue zone: the panel regards their arrival as near-certain. Third, the two ageing drivers (D15, D16) are the clear outliers on the left; nothing else in the exercise is treated as so predictable. Table 1 on the following page gives the full statistics for every driver.

Table 1 Delphi Study results by driver (n = 23). Median and mean on the 1–5 scale; “% 4-5” is the share rating the dimension High or Very high; critical uncertainties shaded.

ID	Driver	Imp. med.	Imp. mean	Imp. % 4-5	Unc. med.	Unc. mean	Unc. % 4-5	Category
D01	Mismatch between climate change speed and local adaptive capacity	4	4.00	78%	4	3.57	57%	Critical uncertainty
D02	Biodiversity loss and ecosystem degradation	4	3.96	74%	4	3.30	52%	Critical uncertainty
D03	Climate change adaptation	4	3.96	74%	4	3.30	57%	Critical uncertainty
D04	Overdependence on tourism for economic development	4	3.74	61%	4	3.48	52%	Critical uncertainty
D05	Water scarcity	4	3.83	57%	4	3.61	70%	Critical uncertainty
D06	Climate change impacts and increasing natural hazards	5	4.52	91%	3	3.09	39%	Important driver
D07	Increasing climate-related hazards (floods, wildfires, storms)	5	4.39	83%	3	3.26	43%	Important driver
D08	Outmigration and depopulation	5	4.26	78%	3	3.09	39%	Important driver
D09	Conflicts between nature conservation and local development	4	4.13	87%	3	3.04	35%	Important driver
D10	Loss of local services (health, schools, shops)	4	4.13	83%	3	2.87	17%	Important driver
D11	Diverging views on the value of nature: locals vs policy-makers	4	3.96	83%	3	3.26	48%	Important driver
D12	Need for improved local governance, education and participation	4	3.96	78%	3	3.00	35%	Important driver
D13	Outmigration and depopulation (b)	4	4.17	78%	3	3.04	35%	Important driver
D14	Poor accessibility to essential services	4	4.00	78%	3	2.83	17%	Important driver
D15	Population ageing	4	4.13	78%	2	2.30	17%	Important driver
D16	Population ageing (b)	4	4.09	78%	2	2.48	9%	Important driver
D17	Conflicts between land use, conservation and development	4	3.96	74%	3	3.22	48%	Important driver
D18	Limited education and training access; school closures	4	3.83	74%	3	2.96	30%	Important driver
D19	Weak local value chains; value captured elsewhere	4	3.78	74%	3	3.22	35%	Important driver
D20	Limited economic diversification	4	3.78	70%	3	3.00	26%	Important driver
D21	Limited local job opportunities	4	3.78	70%	3	3.09	35%	Important driver
D22	Cultural heritage and traditional knowledge at risk	4	3.74	65%	3	3.00	26%	Important driver
D23	Land abandonment	4	3.83	65%	3	3.09	26%	Important driver
D24	Political marginalisation of regions with decreasing population	4	3.65	65%	3	3.00	43%	Important driver
D25	Weak local institutional and project implementation capacity	4	3.70	61%	3	3.22	30%	Important driver
D26	Loss of cultural heritage and traditional knowledge (b)	4	3.48	57%	3	3.04	30%	Important driver
D27	Declining local human and institutional capacity	4	3.52	52%	3	2.96	30%	Important driver
D28	Declining trust between local communities and institutions	3	3.48	48%	3	3.22	39%	Lower priority

Notes. Drivers are listed in the order of the analysis workbook, grouped by category. Drivers marked (b) restate a driver that appears earlier in the list and were rated very similarly by the same respondents (see Section 1, How to read the results). Impact was defined as how far the driver could shape the future of mountainous and sparsely populated rural areas; uncertainty as how difficult its future direction, pace, scale or outcome is to predict over the next ten years or more. Both were rated on a five-point scale (1 = Very low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very high). Categories are assigned from medians: critical uncertainty when both medians are 4 or 5; important driver when impact is 4 or 5 and uncertainty below 4; lower priority when both are below 4.

3. The Critical Uncertainties

Five drivers meet the classification rule: median impact of 4 and median uncertainty of 4. Impact agreement is solid for the first three and weaker for the last two; uncertainty agreement is moderate throughout, peaking at 70% for water scarcity. For each, the bullets below give the ratings and then say what, on the evidence of the panel's scores, the uncertainty is actually about.

- **D01 Mismatch between climate change speed and local adaptive capacity.** The panel is confident the climate is changing fast but not confident that the institutions, budgets, skills and workforce of mountain areas can respond in time.
- **D02 Biodiversity loss and ecosystem degradation.** The open questions are the extent, pace and reversibility of loss, and how it interacts with land abandonment, spontaneous reforestation, changing fire regimes and human–wildlife conflict.
- **D03 Climate change adaptation.** The uncertainty concerns which adaptation measures will be taken, funded by whom, at what scale, and with what results on the ground.
- **D04 Overdependence on tourism for economic development.** The only critical uncertainty that is economic rather than ecological, and the one with the weakest impact agreement. The uncertainty is about visitor demand under a changing climate, the future of snow-dependent products, the ownership and seasonality of the sector, and whether alternative income sources emerge.
- **D05 Water scarcity.** Water is the medium through which climate stress reaches agriculture, hydropower, tourism and settlements alike but water scarcity also had the strongest agreement on uncertainty anywhere in the exercise.

Reading the five together

Taken together, the five drivers point to a connected system of environmental and economic pressures rather than five separate concerns. Four describe one system under stress: the climate is changing at a pace that may outrun adaptation, with water and biodiversity as the media through which that stress is felt. The open question is whether adaptation and restoration become a condition for development, funding skilled local work and reducing hazard risk, or a new burden on communities that carry environmental responsibility without the resources or voice to discharge it. The fifth, tourism dependence, is the economic counterpart: whether mountain economies stay tied to a seasonal, externally exposed sector or diversify, including through payment for the ecosystem services they provide. What the panel is uncertain about, in other words, is precisely the set of choices that policy has so far left open.

What the critical uncertainties are not

The five are not the drivers the panel rates as most consequential. Climate hazards (D06), out-migration (D08) and the loss of local services (D10) all outscore them on impact, but the panel treats their arrival as near-certain. The distinction the panel draws is between the certainty of the pressure and the uncertainty of the response, and it is the response that ends up in the critical quadrant. Nor is the list closed. Three drivers fall just short of the rule i.e., diverging views on the value of nature between locals and policy-makers (D11), conflicts between land use, conservation and development (D17) and the political marginalisation of shrinking regions (D24). All three concern the politics of who decides.

Policy issue. Uncertainty of this kind cannot be planned away. Policy for mountain areas needs to remain effective whether adaptation keeps pace with climate change or falls behind, and whether tourism remains the dominant income source or is displaced. Instruments optimised for one expected outcome, a resort investment that assumes reliable snow or a restoration target that assumes continued grazing, are the most exposed.

Strategic policy choice. *How should EU, national and regional instruments be designed to remain robust across the plausible range of the five critical uncertainties, rather than optimised for a single expected trajectory?*

4. Important Future Drivers: the Predetermined Elements

Twenty-two drivers are high impact but not, in the panel's view, highly uncertain. They are best read in clusters, because the panel rated related drivers in closely similar ways. The percentages below are the share of the panel rating impact, and then uncertainty, high or very high.

- **Climate hazards (D06, D07).** The highest impact ratings in the exercise, the panel expects floods, wildfires, storms and droughts to intensify; what it cannot predict is whether adaptation keeps pace (Section 3).
- **The demographic spiral (D08, D13, D15, D16).** For out-migration and depopulation, uncertainty is the lowest in the exercise. Ageing in particular is treated as a settled fact of the next two decades.
- **Services and access (D10, D14, D18).** The panel expects service withdrawal to continue on current policy; it does not regard the outcome as open e.g., Loss of local services (83%), poor accessibility to essential services (78%) and limited education and training access (74%). Uncertainty is rated from 17 to 30%.
- **Nature–development tensions (D09, D11, D17).** Conflicts between conservation and local development (87%, the second-highest impact agreement in the exercise), diverging views on the value of nature between locals and policy-makers (83%) and land-use conflicts (74%). Uncertainty (35-48%) is the highest in this group.
- **Economy and value capture (D19, D20, D21, D23).** Weak local value chains (74%), limited diversification (70%), limited local jobs (70%) and land abandonment (65%) are important drivers with strong convergence and uncertainty convergence of 26-35%. Narrow, externally dependent economies are expected to persist unless deliberately diversified.
- **Governance and capacity (D12, D24, D25, D27).** There is general agreement on the need for better local governance and participation (78%), political marginalisation of shrinking regions (65%), weak institutional and implementation capacity (61%) and declining human capacity (52%). Uncertainty is slightly higher at 30 to 43%. Declining trust between communities and institutions (D28) sits just below the impact threshold.
- **Culture and heritage (D22, D26).** Cultural heritage and traditional knowledge at risk (65% and 57%) are high with relatively low uncertainty (26-30%). The panel expects the erosion of place-based knowledge to continue with depopulation.

What the low uncertainty ratings mean

The lowest uncertainty ratings are the most informative. Only 9-17% of the panel considered population ageing, the loss of local services or poor accessibility highly uncertain: the demographic spiral is treated not as a risk but as a baseline. The same is true, more surprisingly, of climate hazards. Their increase is judged near-certain; what is uncertain is whether adaptation can keep up, which is why D01 rather than D06 appears among the critical uncertainties. The governance and capacity drivers carry a particular warning: rated high impact and low uncertainty, they say that the panel expects weak local capacity to persist unless it is deliberately addressed, and that the funds and plans already in place will continue to under-deliver for that reason.

Policy issue. Predetermined elements are where “no-regret” policy belongs. A guaranteed floor of essential services, universal connectivity and financed local capacity are responses to trends the panel expects in every future; their case does not depend on how the critical uncertainties resolve. Because their direction is not in doubt, delay brings no new information, only higher cost.

Strategic policy choice. Which trends should be treated as fixed constraints in every scenario, and which commitments, a service floor, connectivity as a right, embedded technical capacity, are justified regardless of how the future unfolds?

5. Implications for Scenarios and Policy

The Delphi separates the future of remote rural and mountain regions into two parts: a set of trends the panel expects whatever happens, and a small set of genuinely open questions. Each part calls for a different kind of policy, and the two together call for a way of governing that can tell, over time, which way the open questions are resolving. This section sets out the implications under four headings, each closing with the policy issue it raises and the strategic choice it poses.

5.1 A scenario logic built on the critical uncertainties

The results point to a scenario logic built on two axes. The first is drawn from the climate cluster (D01, D03, D05, D02): whether adaptive capacity keeps pace with the speed of climate change or is outrun by it. The second is drawn from D04: whether mountain economies remain tourism-dependent and/or diversify, including through remuneration for the ecosystem services they provide. The predetermined elements, ageing, out-migration, pressure on services and rising hazard frequency, form the backdrop to all four combinations.

Table 2 A candidate scenario matrix derived from the critical uncertainties (editorial construction)

	Tourism-dependent economies	Diversified economies with ecosystem-service income
Adaptation keeps pace with climate change	Managed seasons: hazards contained, but value still leaks out and seasonality persists	Strategic-asset mountains: adaptation funded, value retained locally, hazards managed
Adaptation is outrun by climate change	Stranded resorts: snow, water and biodiversity losses hit a single-sector economy	Resilient but poorer: diversified livelihoods absorb shocks that governance cannot prevent

Policy issue. Scenarios are only useful if they are used. The four combinations in Table 2 are a test bench: any proposed instrument for mountain territories, an investment programme, a restoration plan, a funding envelope, can be asked how it performs in each cell. Instruments that only make sense in one cell, typically the top-right, are the ones that need redesign.

Strategic policy choice. *Should the scenario set be adopted as a standard test for major policies and investments in mountain territories, and at which level, EU, national or regional, should that test be applied?*

5.2 Robust policy for the critical uncertainties

Much current investment in mountain areas is implicitly a bet on one outcome. Winter-tourism infrastructure assumes reliable snow; irrigation and hydropower schemes assume historic river flows; restoration targets assume that grazing and forestry will continue to manage the land; tourism-led development assumes that visitor demand is stable and that its costs can be absorbed locally. The panel's ratings suggest that none of these assumptions can be treated as safe. The risk is a rigidity trap: regions become locked into infrastructure, sectors or development models that are difficult to adjust as conditions change. A robust policy is one that performs acceptably whether or not the assumption holds. It favours investments that retain value under several outcomes, stages commitments so that later phases can be reshaped, and avoids locking regions into a single source of income, a single sector or a single adaptation pathway.

Policy issue. Robustness has a price. Diversified, staged and reversible investments may cost more, or deliver less under the expected scenario than investments optimised for a single anticipated outcome. But where future conditions are deeply uncertain, appraisal based primarily on the highest projected return or the fastest spend risks systematically favouring more fragile options. Robust portfolio approaches offer a way to address this by assessing investments across a range of plausible future conditions rather than against a single central case. Methods are available for working with different forms of uncertainty, including situations where probabilities cannot be assigned reliably and outcomes are instead represented through ranges or intervals.

For mountain territories, incorporating this kind of robustness into appraisal and eligibility rules should therefore be treated as a core requirement rather than an optional additional criterion.

Strategic policy choice. *Where or to what extent should policy accept a higher cost in the expected scenario in exchange for lower exposure in the others, and which categories of investment, snow-dependent tourism, water infrastructure, restoration commitments, should be required to demonstrate performance under both poles of each critical uncertainty before public funds are committed?*

5.3 No-regret commitments for the predetermined trends

The trends the panel expects in every future, ageing, out-migration, the loss of local services, more frequent hazards and weak local capacity, are the domain of no-regret policy. Because their direction is not in doubt, delay brings no new information, only higher cost: a school closed is hard to reopen, a health service withdrawn changes household decisions immediately, and hazard damage is far more expensive to repair than to prevent. The panel's ratings support three commitments in particular: a guaranteed floor of essential services delivered through distributed, mobile and digital models where traditional scale is no longer viable; universal connectivity as foundational infrastructure; and financed technical capacity for small administrations so that funds already available can be absorbed and used.

Policy issue. Adaptive management is easy to endorse and difficult to institutionalise. Multi-year funding envelopes and long-term plans provide stability but can lock in assumptions that no longer hold; short project cycles allow adjustment but can undermine continuity. The panel's findings on governance and capacity suggest that many territories may lack the institutional capacity needed both to interpret emerging evidence and to act on it. The challenge is therefore to combine long-term, place-based commitment with formal mechanisms for reviewing assumptions, reassessing uncertainty and changing course when the evidence warrants it.

Strategic policy choice. *What minimum of services, connectivity and administrative capacity should be guaranteed in every mountain territory regardless of population trend, how should it be financed across EU, national and regional budgets, and what forms of concentration above that floor remain compatible with territorial equity?*

5.4 Adaptive governance: signposts, triggers and authority

The uncertainties identified by the panel should not be treated as fixed. As snow conditions, river flows, species trends, tourism markets and other drivers evolve, new evidence will show how conditions are changing, even if uncertainty about their longer-term impacts remains. Policy can be designed to learn from this evidence rather than waiting for uncertainty to disappear. This requires indicators that track how key drivers are developing, pre-agreed triggers that specify when policy or investment should change, and an actor with the authority and the resources to act when those triggers are reached. It also requires periodic reassessment of the underlying uncertainties, including, where appropriate, renewed expert elicitation to test whether expectations about the importance and likely impacts of particular drivers have changed. Without these mechanisms, monitoring risks producing reports rather than decisions.

Policy issue. Adaptive management is easy to endorse and hard to institutionalise. Multi-year funding envelopes and long-term plans give stability but can lock in yesterday's assumptions; short project cycles allow change but destroy continuity. The panel's low uncertainty ratings for governance and capacity drivers suggest that, left alone, neither the monitoring nor the authority to act will emerge locally. The issue is how to combine long-term, place-based commitment with a formal mechanism for changing course.

Strategic policy choice. *Which indicators should be monitored for each critical uncertainty, what pre-agreed triggers should attach to them, and who, local partnerships, Member States or EU programmes, should hold the authority and the funds to change course when a trigger is crossed?*

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