RESAS RD 3.4.1 Demographic change in remote areas

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A Backcasting Scenario Framework for Demographic Sustainability in the Scottish SPA

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CONTENTS

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Figures

Maps

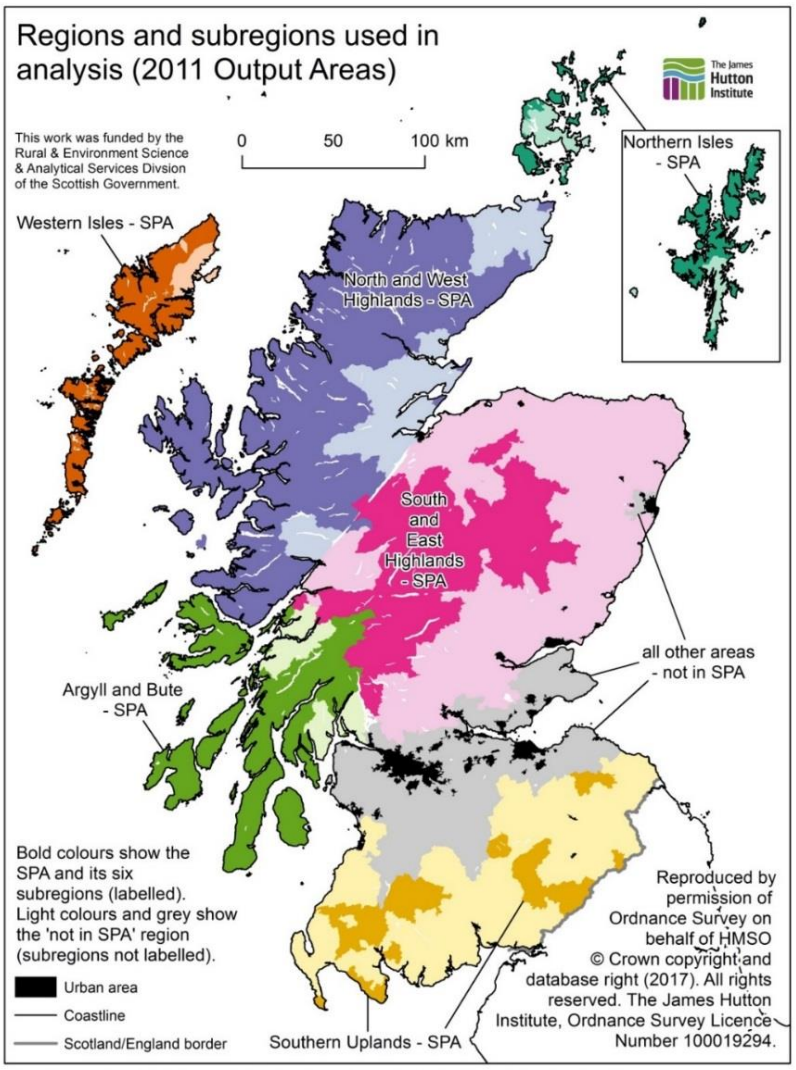
1. Introduction

This working paper is the eighth in a series of outputs of a project funded by the Scottish Government's Rural and Environment Science and Analytical Services (RESAS) division's 2016-2020 Strategic Research Programme[1]. More precisely this work has been carried out under Research Deliverable 3.4.1. The research question addressed by this project is "How do population changes affect the social and economic resilience of the sparsely populated areas (SPA) of Scotland."

The story so far…

All the working papers produced by RD3.4.1 are available for download from the project's web page (http://www.hutton.ac.uk/research/projects/demographic-change-remote-areas.)

Map 1: The Sparsely Populated Area (SPA) of Scotland and its sub-regions



The calculation of the SPA is described in Working Paper 1, available for download at the project webpage: http://www.hutton.ac.uk/research/projects/demographic-change-remote-areas.
SPA/not in SPA areas and subregions, and urban areas derived from 2011 Output Area Boundaries: Clipped to the coastline (MHW) © Crown copyright. Data supplied by National Records of Scotland. Areas classified by Scottish Government Urban Rural Classification 2013-2014, based on information in Lookup Files (http://www.gov.scot/Resource/0046/00464793.zip) © Crown copyright. Contains public sector information licensed under the Open Government Licence v3.0. Scotland/England border from Ordnance Survey Strategi® data, coastline from Ordnance Survey Boundary-Line™ data. Colour scheme adapted from information at http://colorbrewer2.org/ © Cynthia Brewer, Mark Harrower and The Pennsylvania State University.

[1] http://www.gov.scot/Topics/Research/About/EBAR/StrategicResearch/strategicresearch2016-21/srp2016-21 [accessed 31st January 2017]

The first step in in our project was to define more precisely the territory which is commonly referred to as "remote" or "sparsely populated". This question was addressed by our first working paper (Copus and Hopkins, 2017). It describes how we identified the SPA of Scotland, using Geographic Information System (GIS) analysis which took account not only of sparsity but also the size of the population which is accessible within thirty minutes travel time. Following this, the SPA has been divided into six "sub-regions" (Map 1), as a framework to allow investigation of local differences in demographic trends, economic activity, and potential consequences for provision of services.

Our second working paper (Hopkins and Copus, 2018) provides a summary of what is known about demographic change (1991-2037) in the SPA, from the Population Census, the annual Special Area Population Estimates (SAPE) and Sub-Council Area Projections (SCAP). The next paper (Copus 2018) reported population projections to 2046, tailored to the SPA sub-regions, and using a spreadsheet model adapted to the challenges of the relatively small populations involved.

Working papers 5 and 6 (Hopkins and Copus 2018a and 2018b) provide accounts of the current situation and recent trends in employment and small business activity, and land use, in the SPA. Finally Working Papers 4 and 7 (Wilson and Copus 2018a, Wilson and Copus 2018b) report on an initial review and classification of service provision in the SPA, the selection of "exemplar services" as the focus of more detailed investigations, and an analysis of how the provision of these services is changing within and outwith the SPA.

The structure of this working paper

The initial task of this working paper is to present an introduction to foresight and scenario analysis as methodologies. These take many slightly different forms, but also overlap in many respects. We will attempt to provide an overview of the range of approaches, their inputs and requirements, constituent activities, and outcomes. We will then specify the objectives of the current exercise, outline the processes, and the expected benefits to the project. A semi-quantitative backcasting approach will be proposed, in which the normative goal will be to maintain the population of the SPA at current levels. Two key components will be:

(i) A resumé of past demographic trends and processes of economic change, together with "business as usual" population projections.

(ii) A structured and systematic summary of the range of likely trajectories of development between the present and 2050. The two key axes of change which are relevant to demographic trends are economic restructuring and paradigms for rural and regional development, (albeit in the Scottish context "mainstreamed" within a range of sectoral and/or place based policies).

These two axes of change will be used to define four contrasting scenarios for 2030 and for 2050.

Later sections of the report will describe the constituent tasks required to implement the backcasting exercise, which will be a combination of desk-based analysis and collation of evidence, the application of the demographic projection model (Working Paper 3), and development of policy implications, interspersed with two rounds of stakeholder validation.

2. Scenario and Foresight Analysis

What are they?

Scenario and foresight analysis are part of a family of future oriented approaches which are collectively termed *Future Studies*. The use of Foresight expanded very rapidly in the 1990s and the first decade of this century, in association with the increasing popularity of innovation policy and economic development models which emphasised technology and the knowledge-based economy. The European Foresight Monitoring Network (EFMN), identified 2,000 foresight exercises (worldwide), of which they were able to describe in detail almost 900 (Popper 2008 p63).

Foresight analysis and scenario analysis are slightly different but often overlapping activities. Broadly speaking scenarios are a methodological device which commonly features within Foresight initiatives. However it is possible to carry out foresight without scenarios, and for scenarios to be outside a foresight context.

Foresight is commonly used within the context of strategic thinking about national competiveness, though it can also "deal with issues like demographic change, transport issues, environmental problems and other social, political and cultural factors" (Gavignan et al 2001 p4). A very wide range of methodologies have been employed in foresight – Varum and Melo (2010 p356) refer to "methodological chaos". The EFMN survey identified 25 discreet methodologies (Popper op cit p71). Some of these are highly quantitative, others are mainly qualitative (Gavignan et al op cit p23-25, 27).

Some foresight exercises are "top down", conducted by expert panels, others have extensive participation of a wide range of stakeholders (Gavignan et al op cit p20). The former are more likely to be "product oriented", (the predictions are the goal), whilst the latter are more likely to be "process oriented" (Gavignan et al op cit p21). Thus some would claim that Foresight is intrinsically participatory and oriented towards improving the shared knowledge base for (policy) decision making. Indeed, it can even build networked governance capacity: "Foresight involves bring together key agents of change and sources of knowledge, in order to develop *strategic visions* and *anticipatory intelligence*… Foresight is often explicitly intended to establish *networks* of knowledgeable agents…" (Gavignan et al op cit p3).

Some Foresight exercises are exploratory, or "outward bound" (Gavignan et al op cit p26). Such forecasting approaches seek to answer the question "what kind of futures are possible or likely?" By contrast "backcasting" focuses on the question "how can we achieve the future that we want?" These are variously described as "normative", "anticipatory", or "inward bound".

Similarly Börjeson et al (2006) propose a typology of scenario approaches (Figure 1) which distinguishes "three basically different modes of thinking about the future" (ibid p725), i.e. *predictive*, (What will happen?); *explorative* (What can Happen?); and *normative* (How can a specific target be reached?). Each of these they further divide into two sub-groups, "distinguished by different angles of approach to the questions defining the categories." (Ibid). Broadly speaking Böjeson et al's "Normative" scenarios equate to backcasting.

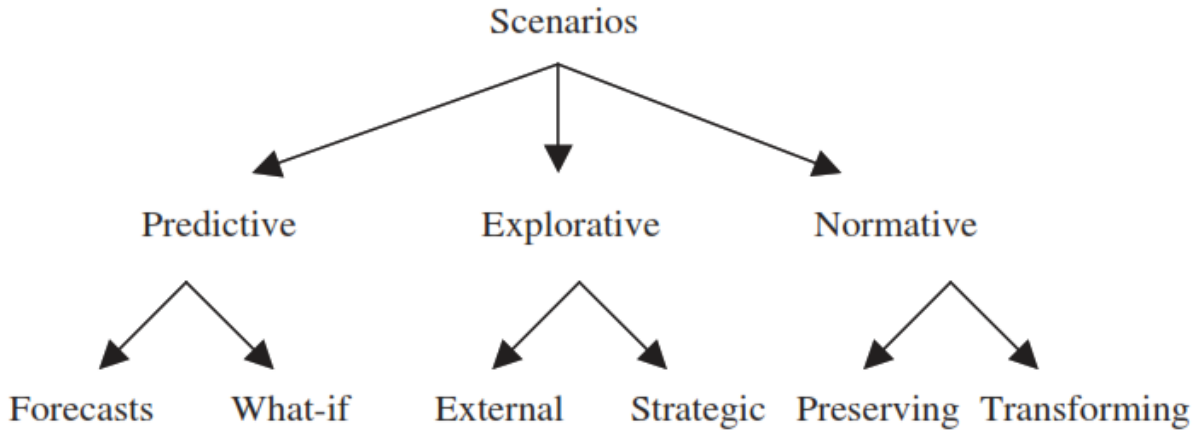


Figure 1: A typology of Scenario Approaches
Source: Börjeson et al (2006) p725

Quist and Vergragt (2006) describe how backcasting methods originated in the field of energy policy, during the 1990s, but have subsequently become popular across a range of fields, notably in the context of sustainable technology strategies. They also show that early approaches featured quantitative modelling, but that more recently participatory approaches have become increasingly important. They conclude: "The essence [of backcasting] consists of generating desirable sustainable future visions and turning these, through backcasting analysis, design activities, and analysis, into follow-up agendas, planning for actions and realising follow-up activities."(Ibid p1041).

Höjer and Mattsson (2000 p613) argue that "backcasting and different forecasting approaches are complementary". Exploratory foresight can first identify "where current trends are leading towards an unfavourable state" (Ibid), whilst subsequent "backcasting" approaches being used to identify a preferable vision of the future, to understand how trends should change in order to deliver that vision, and to formulate strategies which can deliver those changes. Thus "forecasting methods are necessary because they inform the backcaster when backcasting is required." (Ibid).

Some examples from rural development

An example of the use of exploratory scenarios in the context of rural development is provided by Lowe and Ward's study of the future of rural England (Lowe and Ward 2009). In some ways this exercise stands alone in terms of its methodology, which is essentially quantitative, but heavily dependent upon expert judgements. In essence the analysis is carried out on English Local Authority Districts, which are initially classified into eight types, using a factor/cluster analysis, based upon 15 variables from a variety of sources. The second stage involve a set of "change drivers" which were derived from the indicators used to create the typology. This process is not fully explained. Expert judgement is then used to create a matrix between the seven types of rural District and the change drivers – indicating the likely direction of change, and three levels of strength. A monte carlo simulation technique was then used to identify the most likely outcome of the combination of rural types and change drivers. The outcome was framed in terms of shifts between types over the twenty year projection period. Three scenarios were identified and described (Consumption Countryside, 21st Century Good Life, and The Rise of the Rurbs. The authors describe their scenarios as "statistical constructs for use in public debate and decision making" (Ibid p1330). It is interesting to note that much judgement was necessary and many assumptions had been made before the stakeholders became involved, commenting upon the draft scenarios. This does not seem to be in the spirit of the

participatory stakeholder Foresight process advocated by, for example, the FOREN report (Gavignan et al op cit).

Fuller-Love et al (2006) describe a scenario analysis focused upon the development prospects for rural mid-Wales. In this case a range of stakeholders were invited to a carefully structured workshop/brainstorming event, and taken through a series of stages, identifying key driving forces, identifying and developing scenarios, and then discussing policy implications and action planning. The process led to the identification of four scenarios; ("lifestyle", "cool", "niche markets" and "growth centres"). The role of the researchers seems to be primarily as coordinators, moderators, scribes, and reporters. Again the authors stress the value of the exercise in that "it engendered a sense of partnership and greater awareness of the longer term development of a strategic response which will be necessary for economic regeneration…." (Ibid p299).

Moving out to a European scale the EURURALIS project (Westhoek et al 2006) considered the development of land use and the rural economy (especially agriculture) through to 2030. Unusually the project sought to build upon the many previous scenario exercises. The approach incorporated a number of pre-existing quantitative models. Four mutually exclusive scenarios (Global Economy, Global Co-operation, Continental Markets and Regional Communities) were structured around two "axes of uncertainty" – globalisation and level of regulation. The scenarios themselves consisted of a mix of modelling results and "storylines" composed by experts. Clearly this was very much a "top-down" or expert-led methodology, and the authors acknowledge (Ibid p18) that "The quality and acceptance of the storylines could have been improved if they had been developed in a stakeholder process." In contrast to the previous example this was an exercise in which the perceived benefit/outcome was the content, delivered to an audience in the form of a CD full of data and expert interpretation, rather than any collective discovery process experienced by the stakeholders.

Another European project (FARO-EU) also began from a "meta analysis" of previous scenario exercises (Metzger et al 2010). They caution however against the development of "accepted views" of the future, a tendency for unquestioning consensus. They proceed to develop two broad scenarios – the first, labelled "marketeer" takes a neo liberal view of the future, whilst the second emphasizing solidarity and inclusion, is dubbed "musketeer" (all for one and one for all). An interesting twist in the methodology was the exploration of the potential impact of personal judgement – essentially optimism or pessimism on the part of the scenario creators. They conclude: (p5) "Personal judgement and interpretation can greatly influence scenario outcomes and can even lead to the development of scenario paradigms that limit the range of uncertainty that is covered by the scenarios. It is of great importance to make these judgements explicit in scenario development, especially when exploring broad consequences of alternative policy directions that may be based in political worldviews."

Implications for our project

In the context of our own research on the Scottish SPA there are at least two reasons for moving on from the forecasting approach of our third working paper (Copus 2018) and adopting a backcasting methodology for the second phase of the project:

- The first is that in demographic terms it is relatively uncontroversial to define the desired end point as population stability – i.e. the maintenance of the total SPA population at a level equivalent to the present. More specifically, it is reasonable to set the target as achieving a sustainable population structure by the year 2046. Such sustainability would involve both

natural increase (requiring both reasonable fertility and mortality rates, and a "healthy" age structure) and a steady pattern of migration.

- The second reason for using a backcasting approach is that, by focusing on the desired outcome it is the most efficient way to apply limited resources to the key policy objective of our research; identifying what interventions could deliver population stabilisation for the SPA.

> *… the power of backcasting: it shows us how to get it right going forward from today to prevent hindsight regrets in our future.* Valerie Keller, Backcasting to the future. Huff Post Blog 4th May 2013

3. How could a backcasting approach be implemented?

In this section we provide an overview of the proposed backcasting approach. Further detail relating to different stages is explored in subsequent sections.

As we have already noted, there is no standard procedure for implementing foresight in general, or backcasting in particular. Most examples combine two or more of the following: 1. Quantitative forecasting. 2. Qualitative "vision building" by the authors of the foresight, usually based upon a literature review. 3. Consultation of an expert stakeholder panel. We propose to employ all of these in a process summarised by Figure 2.

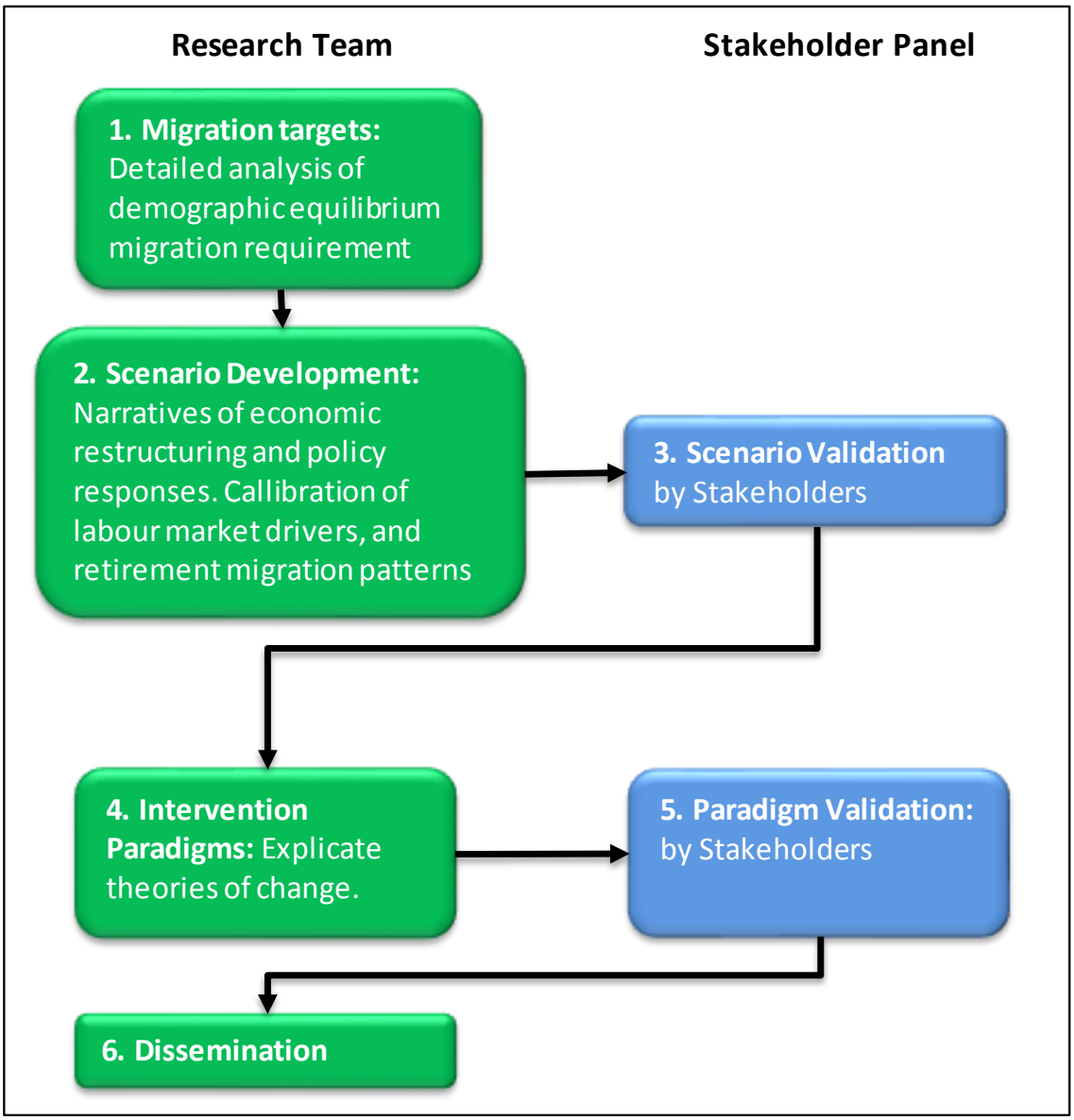


Figure 2: Overview of the Proposed Backcasting Process

Before describing the six steps it will be helpful to explain some underlying assumptions:

1. In order to keep the proposed backcasting "model" manageable in terms of complexity, it will be "driven" by the assumption that population sustainability for the SPA can only be achieved through substantial in-migration of persons of working age, and in particular younger persons who either bring children with them or will start a family after they arrive. This means that once we know how many in-migrants are required we can translate this into a scenario for the number of jobs which need to be created or relocated, in order to draw in those migrants. Of course, in reality, patterns of migration also respond to various other drivers, (notably retirement, see below) outside the labour market. However, for the sake of clarity we will assume that in-migration will be *primarily* a response to labour market pull factors.
2. Retirement migration will likely be an important feature of the SPA in the future, although it will not directly, or in the longer term, provide a solution to the anticipated demographic shrinkage – indeed it will make the age structure and vital rates, even worse. We will need to explore ways to incorporate this aspect into the scenarios.
3. The following step-by-step process would ideally be carried out in each of the six SPA sub-areas, in order to explore regional specificities. However, resource constraints will probably not allow this. One option could be to combine the Island Areas, and the Highland sub-areas, and to structure the exercise around the three-fold division of: Island Areas, Highlands, and Southern Uplands.
4. Scenarios will be generated initially for 2030. Once the 2030 exercise is complete the feasibility of 2050 scenarios will be considered.

Step 1 Migration Targets: The starting point for the exercise will be to use the projection model described in Working Paper 3 to produce (for each SPA sub-area) a detailed analysis of the migration required to stabilise the population by 2030 and 2050. This analysis should be disaggregated by age and gender. Some decisions will need to be made about the age structure of migration. It may be helpful to carry out sensitivity analysis of different scenarios – for example between in-migration of young people, immediately after completing higher or further education (i.e. 20-25 years) or more mature people, with established careers and families (30-35 yrs). It may be that several migration scenarios should be considered, associated with different narratives, and that these should be compared with current patterns, and stakeholder assumptions about likely future trends in their sub-area.

Step 2 Scenario Development: On the basis of the migration requirements established in Step 1 the research team will build scenarios of employment profiles by which these migration levels might be sustained. These scenarios will have both narrative and quantitative elements. The narrative element will be informed and structured by the academic and policy literature about likely future trends, but also by alternative interpretations of future policy contexts and paradigms, as determined, for example, by Brexit and the scope of devolved powers. The quantitative element will centre upon a table of employment by broad sector, which takes a baseline from the most recent Business Register and Employment Survey (BRES) data (Working Paper 5), perhaps supplemented or adjusted to take account of known issues (such as non-VAT registered self-employment). This baseline table will then be manipulated to represent the migration "pull factor" required to keep the SPA population at baseline level. Each scenario employment table will have a different sectoral configuration, in accordance with its distinctive development path, and informed by the narrative component of the scenario. The scenarios should be presented in a structured and standardised format which makes comparisons relatively straightforward. Such scenarios are not intended to illustrate a fixed set of discrete alternative paths, but rather to illustrate a range of contrasting possibilities. In particular, the employment structure tables will not be formally or mathematically

"modelled". Rather they are intended to represent an informed view of how the employment structure might evolve, given the trajectories of change represented by the two axes of Table 1. It is envisaged, however, that the migration implications of the employment changes will be incorporated into the projection model, and that, by trial and error, they will be constrained to achieve the backcasting goal of population sustainability at baseline levels.

Step 3 Scenario Validation: The third step involves a panel of stakeholders who are familiar with the economy and social conditions in the sub-area concerned. Such stakeholders might be Council officers, members of local business representative bodies (e.g. Chamber of Commerce), from the third sector or local educational institutions. Their task will be to assess the validity and internal consistency of the different scenarios presented to them. This will be carried out in a very structured 1 day workshop. The scenarios will subsequently be refined on the basis of the assessment and inputs of the stakeholders.

Step 4 Intervention Paradigms: In this step the understanding of different trajectories for the SPA form the basis of alternative intervention paradigms. The refined scenarios will provide a platform for developing a set of alternative "theories of change" or action plans, which explicitly spell out what needs to happen if the goal of population sustainability is to be achieved.

Step 5 Paradigm Validation: These action plans should subsequently be assessed and subject to a "reality check" by the stakeholder panel. Probably this would best be carried out in a one day workshop.

Step 6 Dissemination: The final stage, carried out by the research team, would be documentation of the exercise. Initially this would take the form of a concise report for each of the parts of the SPA. Subsequently a comparative report would be compiled, for the national policy audience, and as a basis for academic dissemination.

4. Recent Trends as inputs to Backcasting Scenarios

Recent trends in population change, employment and entrepreneurship, service provision and land use are important components of a framework upon which different scenarios for the future of the SPA may be constructed. Each of these elements are interrelated in a complex system of relationships. As in all such systems, it is not easy to distinguish causes from effects. However, in our analysis, for convenience, population change is viewed as the "dependent variable", whilst the others are mostly independent. In other words the objective of our foresight analysis is to understand how different scenarios of future change, expressed in terms of economic activity, land use and service provision, are likely to impact upon migration, and therefore upon the population development of the SPA. Demographic change may also have a recursive effect upon service provision, leading to secondary population effects. Similarly land use change may lead to secondary adjustments in economic activity. This network of assumed causal relationships is illustrated in Figure 3.

Figure 3: Socio-economic trends as a framework for Foresight

The following brief descriptions summarise what we have so far learned about each of these components, in order to highlight their potential role in the foresight scenarios.

Demographic trends – the dependent variable…

The second of our working papers (Hopkins and Copus 2017) showed that unlike the rest of rural Scotland, and urban Scotland, the SPA has experienced demographic shrinkage since the 1990s. The decline in overall numbers has been combined with a change in composition – not so much an increase in older people, but rather a reduction in the number of children.

In terms of the two components of population change, natural increase and migration, "shrinkage" has resulted from the age structure legacy of selective out-migration during the final decades of the last century. The consequence is a population which is unable to sustain itself, and which without substantial net in-migration will inevitably decline.

Our third working paper (Copus 2018) presented population projections for the SPA. These indicated that, if current trends continue, the total population of the SPA would decline by about a quarter by the year 2046, and that the working age population would contract by about 30%.

The phrase "if current trends continue" is a crucial qualifier to these findings. Population projections require assumptions to be made about fertility and mortality rates, and about in-, and out-migration. Conventionally these assumptions are based upon rates from the recent past. In the case of fertility and mortality such assumptions are hard to question – since these are determined by cultural mores and physiological constraints, which vary little across the country, and change very slowly. Migration is much more variable and volatile. A common way to reflect this is to re-run the projections with different assumptions about migration, for example 5% or 10% on either side of the established trend. Generally, this is treated as a kind of sensitivity analysis, not connected to any rationale about future changes in economic activity, lifestyles or such like.

In the proposed foresight analysis adjustments to migration rates (fine tuned according to age and gender) will be linked to (or justified by) assumptions about the future of economic activity, land use and service provision. In this way it will be possible to explore the demographic implications of a variety of future scenarios. Of course, the alternative projections will only be as sound as the assumptions upon which they are based. However, it is important to recognise that the "business as usual" assumption of the continuation of trends observed in the recent past is equally a subjective choice.

Trends in Economic Activity (Employment and Entrepreneurship)

Working paper 5 (Hopkins and Copus 2018b) collates available information about economic activity in the SPA, both in terms of statistics, recent reports and expert opinion. It is framed by three questions:

1. *What is the total workforce in the SPA, and to what extent are SPA residents occupied by activities within its boundaries, rather than working outside it?* This question addresses the issue of the extent to which the SPA is a collection of self-contained labour markets, as opposed to being the outer fringes of functional areas centred upon towns and cities elsewhere in Scotland. This is a very important background question since the answer determines the extent to which key drivers for future economic trends will be endogenous to the SPA, or determined by events and trends occurring elsewhere in Scotland.
2. *How does the economic structure of the SPA differ from the rest of rural Scotland?* Do sparsity and remoteness impart 'signature characteristics'? The answer to this question directs us towards economic sectors which are of particular interest, and which, in combination, can help us to envisage the likely future of the SPA economy. The conventional assumption is, of course, that remote and sparsely populated areas are largely focused upon primary activities (agriculture, forestry and fishing). This is already no longer the case, and the quality and accuracy of our foresight exercise will depend heavily upon our understanding of likely trends in other sectors. There are at least two ways to conceive the future evolution of the SPA economic structure: The first would focus upon key growth sectors (such as tourism and recreation, or cultural/arts-based activities), and emphasise the increasing specificity of the SPA. The second would do the exact opposite, envisaging the "mainstreaming" or convergence of the SPA economy, as information and communications technology, "territorial servitization[2]", and the

[2] Servitization (Lafuente et al 2017) refers to the blurring/convergence between economic activities which manufacture goods and those which provide services, both on an individual enterprise level and as sectors of the economy. Since most knowledge based services can be delivered "virtually", this is seen as weakening the power of agglomeration, and reducing the advantages of urban environments as locations for economic activity.

rise of distributed manufacturing[3], increasingly allow the SPA to compete with accessible areas on a more equal footing.

3. *What are the recent trends in key economic activities in the SPA?* Whilst it is important to take account of potential radical changes in the SPA economy, there is nevertheless much to be learned, with respect to the established activities, from the recent past. The overall picture (Working Paper 5) seems to suggest (a) relative inertia in the farming/crofting sector, perhaps due to the scarcity of alternative employment. (b) A slower growth in service employment than elsewhere in rural Scotland, perhaps due to the association of technological change with centralisation?

Trends in Land Use

For the purposes of our foresight exercise land use change is not viewed as having a direct impact upon population change. Instead land use is seen as determined by economic activity, but also as having a recursive effect upon economic activity, which cycles through to demographic impacts (Figure 1). To illustrate this with an example, the extensification of agricultural land use may result in enhancement (or degradation) of environmental public goods, which will have an impact upon leisure and tourism activity, which may increase (or decrease) employment in the hospitality sector, resulting in migration of people to staff hotels, restaurants, guiding and experience services etc. In the longer term perspective the indirectness of the relationship makes little difference in practice of course, though it is important to be clear from a theoretical point of view.

The analysis of June Agricultural Census data in our working paper on agricultural land use confirm that SPA holdings are generally larger in total area, but have a relatively small proportion of cropland, and large areas of grassland and rough grazing. Perhaps more interestingly the analysis reveals an established tendency towards extensification over the past two decades or more, with reductions in cropland, increases in improved grass, an 18% reduction in cattle numbers, and a 37% reduction in the number of sheep. These trends in livestock numbers have been fairly steady since the mid-1990s, suggesting that they have not been triggered by any particular changes in policy or subsidies, but rather to long-term shifts in consumer preferences, demand and prices.

Of course, at the time of writing there is considerable uncertainty about the future of agricultural policy after BREXIT, and the extent to which farm subsidies will continue after the CAP is removed. However it would seem highly unlikely that future farm policy would reverse or ameliorate the trend towards extensification. Indeed it may well accelerate it. This is an aspect which will need to be reflected in specific scenarios for different kinds of future agricultural policy.

New approaches to service provision

Levels of service provision can have a direct impact upon levels of migration into and out of an area, if residents perceive that the level of availability fails to meet their subjective requirements. However the reorganisation of services which has taken place in recent decades (perhaps most conspicuously in terms of school and medical facility closures, but also, more recently, involving bank branches, petrol stations, general stores and so on) is often, at least in part, triggered by demographic shrinkage. Of course this is only one factor, others include changing technology,

[3] Distributed manufacturing is a term used to describe a business model which makes intense use of information technology, allowing it to produce or assemble goods close to the final consumer (e.g. through 3d printing.) It is closely related to the Industry 4.0 concept. Again this by-passes the conventional process of agglomeration.

consumer expectations and spending patterns, together with privatisation and the spread of "New Public Management" principles.

Over the past couple of decades rural service provision has been the subject of numerous research projects, and a fair number of policy statements. In our own project we have suggested a comprehensive classification of services which are relevant to migration motivation, we have local and regional stakeholder opinion about key service issues in the SPA (Working Paper 4). We have also carried out an analysis of the changing service access point provision for key services in the SPA and in the rest of Scotland (Working Paper 7). Stakeholder feedback on these deliverables has led us to several conclusions:

- That it is not so much the availability or accessibility of a few key services that determines the "livability" of the SPA, but the subjective perception by local residents of the full concert of services as they present themselves (qualitatively as well as quantitatively). Such perceptions vary according to the age and socio-economic characteristics of the SPA resident. This leads to questions about the validity of indices of service accessibility, such as that incorporated in the SIMD – especially in terms of the selection of services, and their weighting within the index.
- That change in service "quality" is not just about distance to the nearest access point, or doorstep costs. It is also about a range of more subtle characteristics, which cannot be measured and incorporated in a GIS analysis.
- That the response to rising costs, or the impact of austerity does not necessarily lead to a simple reduction of access points. Other adjustments may be preferred, which are more difficult to analyse in terms of a simple GIS analysis of accessibility. The clustering of schools in Highland, which results in savings without unacceptable school closures are a good example.

As a consequence of these findings the plan for the SGI component of the project has moved away from attempting a comprehensive GIS analysis of access to exemplar services, to a more nuanced exploration of the role of the "concert" of services as a motivation for (in or out) migration within selected SPA sub-areas. The starting point for this will be a reassessment of the SIMD Access to Services domain, coupled with a stakeholder and consumer consultation designed to uncover the subjective prioritisation across the range of SGI.

The findings from this element of the project will not be available in time for the initial development of the four scenarios, but it is hoped to incorporate them in a subsequent revised version.

5. A Structured Look Forward: Scenario Dimensions for the SPA

A commonly used device in foresight exercises is to reduce the complexity of future change to two orthogonal axes, and to use these as a basis to distinguish four contrasting scenarios. This is a helpful structuring device. In the context of this project it would seem appropriate that one of these axes should reflect the potential implications of BREXIT and its knock-on effects on Scottish rural policy. The other might helpfully encapsulate two extremes of anticipated paths in terms of exogenously driven structural change in the SPA economy.

The Policy Axis

In terms of the first of these, the choice (in basic terms) is between a continuation of the current approach (largely powered by EU funding), which despite a succession of reforms remains very sectorally (farming) focused, and compensatory in ethos. One extreme policy option might be to retain the structures and the intervention logic, and simply replace EU funding with national. This is represented by "Policy Continuity" at the left-hand end of the horizontal axis in Figure 4.

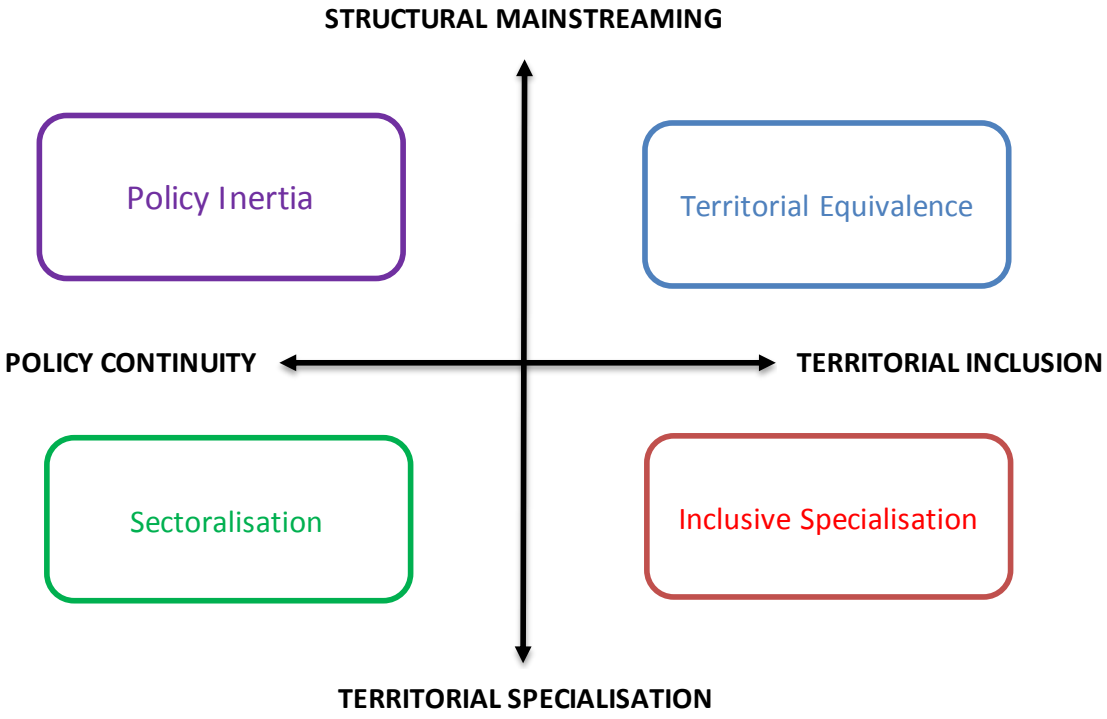


Figure 4: Four Future Scenarios for the SPA

Perhaps more likely is reorientation of rural policy to reflect the inclusion objectives of the Scottish Government, and to adapt it to better fit into the National Performance Framework and more coherent with the Economic Strategy[4]. This may well be subject to some (indirect) constraints from the UK government, but at the extreme (right hand end of the horizontal axis) could take the form of a policy "reboot" in favour of a territorial version of inclusion principles.

[4] Scottish Government (2015) Scotland's Economic Strategy (https://www.gov.scot/publications/scotlands-economic-strategy/)

The Restructuring Axis

The vertical axis of Figure 4 is an attempt to generalise from a vast literature on likely future trends in the structure of rural economic activity. At one extreme these point to the "mainstreaming" of the economy of rural and remote areas as new communications technology and the expanding role of services break down the agglomeration effects which have until recently underpinned urban-rural structural differences and complementarities. In this extreme perspective the economy of the SPA becomes increasingly similar to that of more accessible and densely populated areas of Scotland.

On the other hand, many see the future of remote rural areas as dependent upon maximising the value of their unique territorial assets – valorising their public goods, "shared value" approaches (Porter and Kramer 2011), and "relocalisation" (Sonnino and Marsden 2006). This points to, for example, expansion of tourism, recreation, and the "experience economy", adding value to local products, short supply chains and so on. This logic of "territorial specialisation" is fundamentally different to "mainstreaming" and it will be helpful to explore the potential of this as a discrete development path, even though, in reality we must acknowledge that both forms of change are already taking place in the SPA.

Four Scenarios:

The two axes suggest four scenarios. Interestingly two of them seem to imply that policy will be working "with the trend" to some extent, whilst in the other two policy and "market driven" restructuring seem to be heading in the different directions.

Thus in the top right of Figure 4 the ***Territorial Equivalence*** scenario would see a (non-sectoral) territorial inclusion policy paradigm complementing the mainstreaming of the SPA economy, whilst in the ***Sectoralisation*** scenario (bottom left), specialisation based upon territorial assets would be supported by a sectoral policy which has developed only incrementally from the current SRDP.

By contrast, in the ***Policy Inertia*** scenario (top left) a continuing sectoral rural policy is set against a backdrop of structural mainstreaming, and in the bottom right ***Inclusive Specialisation*** scenario, policy to promote territorial inclusion (regardless of sector) confronts development focused in specific sectors.

Diversity within the SPA

The three scenario components above are likely to affect different parts of the SPA in different ways. For this reason, we suggest that the four scenarios be applied and assessed to the Islands, Highlands and Southern Uplands SPA separately. Furthermore, it is entirely possible that different parts of these three areas may be more likely to follow different scenarios. The scenario assessment approach should (as far as possible) accommodate this kind of heterogeneity.

Objective and Task Specification

The envisaged backcasting exercise will be carried out during the 2019-20 project year, under the following deliverable:

O3.5: Backcasting Exercise (Working Papers and Stakeholder Consultation)

The backcasting exercise planned in Working Paper 8 will be implemented. This is envisaged as a semi-quantitative (narrative) exercise, based upon four contrasting scenarios, reflecting two axes of differentiation (policy paradigm and economic restructuring) and the normative goal of increasing net migration to the point where the population of the SPA will be sustained at current levels.

The objective may be broken down into the following tasks:

1. Calculate the net migration requirement for stabilisation of population at current levels in respect to each of the SPA sub-areas, for 2030 and 2050. These should be aggregated to three areas, Islands, Highland and Southern Upland. Sensitivity analysis of different age profiles should be carried out. They should be further expressed in terms of the number of "household" migrants required (taking account of assumptions about accompanying dependents).
2. Develop a baseline economic (employment) structure for the Islands, Highland and Southern Uplands SPA. This should be structured according to five-year cohorts to match the projection model. It should include estimates of non-VAT registered self-employment.
3. Develop a working paper which summarises the academic literature relating to the two alternative restructuring scenarios (key sector focus and mainstreaming). This will explain the conceptual arguments for each, and as far as possible, provide examples of both trends from comparable geographical contexts. The working paper will provide a theoretical basis for the economic restructuring element of the four scenarios.
4. Insofar as the post-BREXIT policy landscape becomes clearer during the course of 2019, review all related policy announcements, evaluations, media coverage and academic analysis. This to be summarised in a working paper which will underly the policy axis of the four scenarios.
5. Construct four scenarios for 2030 for the three parts of the SPA. These will comprise two elements: (a) An adjusted employment table, in which the increase in jobs satisfies the migration requirement (taking account of dependents). (b) A narrative describing and explaining the drivers of the trends and the outcome. These four scenarios (X three areas) will be concisely summarised in a standard format, and in an accessible style.
6. If time and evidence allows repeat step 5 for 2050
7. The four 2030 scenarios (and if available the four 2050 scenarios) for each part of the SPA will be presented at stakeholder workshops within each area. The stakeholder's evaluations and suggestions will be used to fine-tune the four scenarios.
8. Publish a full report and a research brief describing the findings.

During the 2020-21 project year the Backcasting results will be developed into an intervention logic:

O6.1 Future Orientated Intervention Logic

In consultation with key stakeholders this will consider the findings of all preceding tasks as an evidence base to support the development of a future-oriented intervention logic tailored to the needs of the Sparsely Populated Areas. In other words rural/regional policy should not only respond to current issues and challenges, but should have a clear rationale in relation to anticipated future trends, especially with respect to demography, where sophisticated forecasting tools are available. This task will continue into 2020-21.

This will involve 3 tasks:

1. Desk-based review of the scenarios in order to formulate key interventions which could support the trajectory of economic restructuring towards the goal of population sustainability.
2. Stakeholder consultation to assess the validity and feasibility of the intervention logic.
3. Publish a full report and a research brief describing the findings.

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