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REGIONAL DEVELOPMENT OPTIONS ON A LOCAL SCALE BEYOND 2013 – THE CASE OF CAITHNESS AND SUTHERLAND (SCOTLAND, UK)

Holger Bergmann[1] and Kenneth J. Thomson[2]

[1]Department of Agricultural Economics and Rural Development, Göttingen, Germany

[2]Department of Geography & Environment, Aberdeen, Scotland UK

E-mails: h.bergmann@abdn.ac.uk and k.j.thomson@abdn.ac.uk.

Abstract

With the latest reform of EU Structural Policy, the Highlands and Islands have been excluded from further support by Structural Funds beyond 2013, but the new Scottish Rural Development Programme has increased CAP Pillar 2 expenditures in Scotland. A modified version of a system dynamics model constructed for an EU-wide case-study project (TOP-MARD) was used to simulate the effects of these and other policy changes in Caithness and Sutherland (C&S), a remote rural area in Northern Scotland. Several alternative modelling scenarios were developed, mostly relating to reconfigurations of Pillar 2 spending within the area. The modelling results, i.e. projections from 2001 to 2021, are discussed in terms of agricultural employment, regional population, and economic trends. It is shown that by targeting Pillar 2 money to non-agricultural rural development measures instead of to farm investments, less favoured area or agri-environmental schemes, the long-term trends in severe depopulation, ageing and de-industrialisation in the area can be alleviated but not avoided. Finally, some conclusions are drawn, both about the implications of the results for sustainability in C&S, and in general for future sustainable rural development policy.

Keywords: rural development, CAP reform, Scotland, Pillar 2, regional modelling

JEL codes: Q01, Q18, R23, R50

REGIONAL DEVELOPMENT OPTIONS ON A LOCAL SCALE BEYOND 2013 – THE CASE OF CAITHNESS AND SUTHERLAND (SCOTLAND, UK) [1]

Holger Bergmann[1] and Kenneth J. Thomson[2]

[1]University of Göttingen [2]University of Aberdeen

1 Introduction

The Highlands and Islands (H&I) of Scotland are famous all over the world for whisky, beautiful landscapes and low population densities, but also - as a recent review of rural policy in Scotland (OECD 2008) shows - a perpetual economic problem. The reasons for this problem as well as for the core strengths of the region can directly be linked to events since the late 18th century, e.g. clearances, out-migration, post-feudalism, and the survival of crofting (Wightman 1986). In comparison to developing or Eastern European countries (Poland, Hungary, etc.), the quality of life and GDP per capita in the H&I area are high. For this reason, the H&I area will lose all eligibility for EU structural funds after 2013. However, the fundamental economic features (high job dependency on public services, primary sector employment, net out-migration, demographic ageing, transport, etc.) as well as social problems (alcoholism, unemployment, poor accessibility to services, etc.) remain, and will even be aggravated by the loss of funding.

However, total funding (mostly from Scottish rather than EU sources) under Pillar 2 (rural development) measures of the Common Agricultural Policy (CAP) is due to be more than doubled under the new Scottish Rural Development Programme (SRDP) from roughly £600 million to about £1.6 billion over the period to 2013, as part of the national strategy of sustainable economic growth within a "greener, wealthier and fairer, healthier, safer and stronger, smarter" Scotland (Scottish Government, 2007).

While in the period 2000 to 2006 Pillar 2 funding was concentrated on the Less Favoured Area, afforestation and agri-environmental schemes, the SRDP will deliver measures through:

- Crofting Counties Agricultural Grant Scheme
- Food Processing, Marketing and Co-operation Grant Scheme
- Forestry Commission Challenge Funds
- The LEADER initiative
- Less Favoured Area Support Scheme
- Rural Priorities - Rural Development Contracts
- Skills Development Scheme

Table 1 shows that 61% of SRDP spending will take place under Axis 2 in order to support the Less Favoured Areas and the environment via a number of agri-environmental schemes. This is followed by an Axis 1 share of 22% supporting on-farm investments such as setting

[1] We are grateful for helpful comments during this research from the people of Caithness and Sutherland, and specifically to Eann Sinclair, Anna MacConnell and Katrina MacNab. This publication derives from the EU-funded project 'Towards a Policy Model of Multifunctional Agriculture and Rural Development' (TOP-MARD), with collaborating partners: the University of Highlands and Islands, UK (co-ordinator); the Agricultural University of Athens, Greece; the Institute for Rural Development Research, Germany; the Federal Institute for Less-Favoured and Mountainous Areas, Austria; the Autonomous University of Barcelona, Spain; the Rural Economy and Research Centre, Teagasc, Ireland; the University of Rome, Italy; the Nordic Centre for Spatial Development, Sweden; the Norwegian Agricultural Economics Research Institute.

up young farmers (an innovation in UK terms, at the wish of the new Scottish administration in 2007), food quality schemes, etc. Only 17% of the funding goes into "real" Axes 3 and 4 rural development, e.g. LEADER groups, local development strategies, etc., which can be seen as substituting for part of the decreased Structural Funds spending.

Table 1: Expenditures under SRDP 2007 to 2013 (€ million)

Axis/ Measure	Public Expenditure	Private Expenditure	Totals	Share
Axis 1 (On-farm investments, etc.)	370.8	316.4	687.3	22%
Axis 2 (LFASS, Agri-Environmental Schemes)	1641.8	230.7	1872.5	61%
Axis 3 (Rural Development)	300.8	90.6	391.34	13%
Axis 4 (LEADER)	61.4	61.4	122.8	4%
Total	2,378.4	697.2	3,075.6	100%

Source: Scottish Government 2007

As Vandermeulen et al. (2006) stress, there is a need to research the multifunctionality of agriculture (MFA) as an element and basic condition for territorial rural development. Through case studies and modelling in eleven (11) NUTS3 regions throughout Europe, the TOP-MARD project analysed on a territorial scale how MFA affects rural development, as well as exploring further the meaning of "sustainable rural development".

2 Background: the modelling approach

The main target of the TOP-MARD research project was the development of the concept of agricultural multifunctionality as instrumental in the attainment and analysis of sustainable rural development policy on a territorial scale. In this understanding, the TOP-MARD approach, in comparison to those of FAO and the OECD, develops the concept of MFA in focussing on

- regions rather than nations or individual farms
- links between policies for rural development and those for agriculture
- public goods and services.

The three possible frameworks for analysing MFA focus have been described in the context of the "Roles of Agriculture" project of the FAO (FAO 2002), differentiating between:
(1) the supply side (positive approach)
(2) the demand side (normative approach) and
(3) the territorial way to analyse the theoretical problem (holistic approach).

The supply vision of MFA defines it mainly in terms of joint or linked outputs of farm production which can be private or public goods, main or secondary targets of production and intentionally produced or not (Romstad *et al.* 2000; Vatn, 2000, 2002; Romstad, 2004). On the other hand, normative (demand driven) approaches (Casini *et al.*, 2004; Blandford and Boisvert, 2004) describe the role of agriculture in the process of rural development mainly as driven by the useful functions (production, protection and social roles, cf. Bergmann and Thomson, 2007, p.8) of agriculture for society. The "territorial" approach of POMMARD has been described in more detail by Johnson *et al*. (2008).

However, Vandermeulen et al. (2006) stress that there is a need to research MFA as an element as well as basic condition for territorial rural development. Through case studies, the TOP-MARD project analysed on a territorial scale how MFA affects rural development. The most innovative part of TOP-MARD was the building of a dynamic systems model (POMMARD) to elucidate and explore the relationships between dynamics of different regional policies over time on agriculture, the environment, the regional economy and quality of life. In this respect, the TOP-MARD project went beyond conventional demand-driven modelling (for a description of existing demand-driven modelling activities, see for example Zander *et al.*, 2008).

The POMMARD model (a Policy Model of Multifunctionality of Agriculture and Rural Development) is built with the Stella© software (ISEE, 2007), and represents stocks and flows using user-defined variables, parameters, equations and time periods. According to the supplier, Stella's "intuitive icon-based graphical interface simplifies model building" and understanding, and involves data input and output, via spreadsheets and "convertors". The TOP-MARD use of this software was intended to both cover the wide range of project interests, and to enable modelling to be done by some national teams who were not familiar with quantitative analysis across this range, e.g. input-output analysis, agri-environmental features, or QoL measurement.

The scientific approach behind POMMARD is based on Leontief (1953), Johnson (1986) and on the approach developed in TOP-MARD by Johnson *et al*. (2008) in which dynamic (recursive) regional developments are simulated using a region-specific Social Accounting Matrix (SAM), institutional and capitals (e.g. natural, social, material capitals etc.), and Quality of Life indicators.

POMMARD is used to simulate the behaviour of a rural region as a whole (i.e. not individual farms or other businesses) in terms of its demography, economy, environment and QoL over a number of years (at least 15, in the case of TOP-MARD). It contains 11 modules: land use (see below), agriculture, non-commodity (environmental) outputs or NCOs, economy, capital investment, human resources (demography), quality of life (QoL), and tourism, together with initial conditions, scenario controls, and output indicators (i.e. the major model results). Although the overall structure seems somewhat arbitrary, the supply-driven and dynamic nature of the relationships between agricultural multifunctionality and territorial rural development captures rural realities better than conventional partial or general equilibrium models. Figure 1 depicts the graphical model interfaces.

In detail, the agriculture module for Caithness and Sutherland (C&S)[2] differentiates three basic production systems based on a dualistic approach to farming in the area.

a) *Farming* – understood in this context as a form of modern farming that refers to the commercialised production of livestock, poultry, fish, and crops, using techno-scientific and economic methods. Farming produces mainly food and fibre but also such by-products as environmental protection (and pollution). The individual farmer is assumed as a purely profit and utility maximiser, ignoring positive and negative production externalities that are not paid for (compensated) or regulated.

b) *Crofting* – described by the "Committee of Inquiry on Crofting" (CIC; 2008, 4) as "a system of land tenure; a croft is a small land holding, regulated through the Crofting Acts, situated within one of the former crofting countries – Argyll, Inverness-shire, Ross and Cromarty, Sutherland, Caithness, Orkney and Shetland." This system is marked by multiple functions (the supply of goods and services for society) ranging food and fibre, housing, environmental protection, population maintenance, pride and sense of cultural identity, and resilience to external shocks. It is assumed that to be a

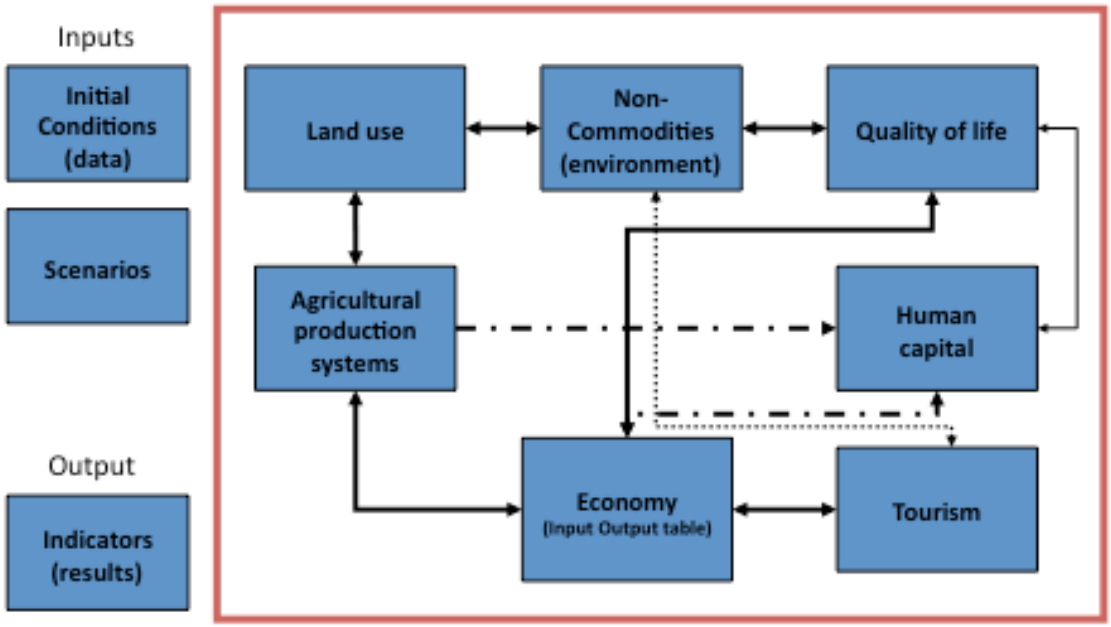
[2] The application of POMMARD to other TOP-MARD case study regions involved different specifications of the agricultural module of POMMARD.

"crofter" is partly a lifestyle choice, so that crofters are utility-satisfiers rather than profit-maximisers.

c) *Forestry*- understood in model terms as a separate land use system, which produces wood and timber mainly for the extra-regional export. In C&S, it has a steadily increasing land-use share in the POMMARD model, following the assumption that crofter woodland as well as other afforestation schemes compensate on average more than agricultural returns.

The primary engines of the model are final demand by economic sector (23 in the core model), and land use by up to 8 agricultural (and other, e.g. forestry) production systems. Such uses, specified by shares of total regional area, determine the amounts of labour employed in these systems, and the output of farm commodities and environmental non-commodities. The regional economy is modelled via an input-output table to which a "households" row and column are added, while the Investment module modifies the capacity of each sector. However, unlike many models of economic relationships, the model is partially supply-oriented, insofar as agricultural activity supplements the demand drivers.

Figure 1: The Structure of the POMMARD Model



Source: Bergmann and Thomson (2008, 4).

The regional population is modelled in some detail, e.g. four age groups and six educational levels, i.e. in and after each of primary (age 14), secondary (age 19), and tertiary education, respectively (age 22). These 24 age-education cohorts are represented in the employment and migration vectors[3].

[3] Current work on POMMARD is differentiating also by gender and by more detailed age groups..

The core version of POMMARD was under development throughout 2007 and 2008, and a preliminary version was delivered to the 11 case study area teams in November 2007, along with a 90-page manual. This version required “beta testing”, i.e. checking for evaluation and correctness by its users. The calibration of the model was mainly done by comparing projected model outputs and published population projections. While other models use more sophisticated approaches to calibration (e.g. CAPRI with PmP, Heckelei and Britz, 1999), calibration in POMMARD was basically done on the bases of existing prognoses of economic and demographic developments in the area under question. Calibration was done by comparing the statistical “real” data between 2001 and 2007 with the POMMARD results for the period. In some cases, the differences between reality and estimation were small, while in other cases (Germany, Scotland) the calibration needed adjustment of the labour force participation rate coefficients.

3 Caithness and Sutherland

The two (former) counties of Caithness and Sutherland form the most northern part of the British mainland, and with 38,973 residents in 2001 have one of the lowest population densities in Europe, i.e. about 5 persons per km² (UK average: 246). While Scotland (and the Highlands) saw an increase in population between 1991 and 2005, Caithness was one of a small number of counties (along with the Western Isles) which saw a decrease, due to young persons, out-migrating while retirees and other older people moved in. Net out-migration is foreseen to continue at between 100 and 200 persons annually until the year 2025 (General Register of Scotland (GROS), 2006), leading to a further depopulation of the area.

The transport infrastructure in the region is generally concentrated on the east coast, and is dominated by single-track roads, especially in the hinterland. However, the major A9 road connects the major settlements of Wick (population 2007: 7,800) and Thurso (8,200) to Inverness, along with a railway to Inverness, ferry links to the Orkney and Shetland Islands, and an airport at Wick with UK destinations.

Even compared to other parts of the Scottish Highlands, Caithness and Sutherland are marked by low accessibility to public services and to large urban centres. In terms of the Scottish Index of Multiple Deprivation (SIMD 2004 & 2006; a measure of income, accessibility, crime rates, education, health and employment), some wards in the region (Brora, Wick) are amongst the most deprived in Scotland, although some wards (mostly in Thurso, and one in Wick) are relatively well off by Scottish standards.

The economy of Caithness and Sutherland is marked by a duality of enterprises in terms of employee size. Compared to Scotland and the UK as a whole, the area has few large or middle-sized enterprises, although the two biggest employers alone provided 10% of all jobs. Of the 1,701 enterprises in the area in 2003, 88% had between 1 to 10 employees while 8 (including the Dounreay nuclear experimental site, where most of the 8 provided services) employed more than 200 employees, more than 20% of all workers in Caithness and Sutherland. The decommissioning of the Dounreay site accounts for 1,150 full-time equivalent (FTE) jobs (7% of all jobs) and nearly a third of all manufacturing and construction jobs.

Total employment in the area is dominated by the service sector (public and private). However, secondary-sector businesses, especially in construction, have a higher share of employment than in Scotland as a whole. The share of jobs in the primary sector in Caithness and Sutherland is lower than the Scottish average, probably because the dominant farm type is crofting (with 3,321 registered crofts), often part-time. The agricultural and other economic statistics present a challenge in regional modelling, since one person can be counted as an employee as well as a farmer or crofter, resulting in over- or underestimation of the economic importance of different sectors.

Average wages and salaries in Caithness and Sutherland are 85% of the Scottish average, while living costs are about the same as in urban areas although spending on transport is 5-10% higher. Housing costs were about 50% lower than the Scottish average in 2003. However, as in the rest of the UK, housing prices in Caithness and Sutherland more than doubled between 2003 and 2007 (HIE 2007).

As part of TOP-MARD discussions with local experts in Caithness and Sutherland, a SWOT (Strength, Weaknesses, Opportunities and Threats) analysis was undertaken covering experiences from the past as well as identifying likely future assets of the region (Table 2). While peripheral location and production difficulties are seen as major disadvantages for the competitiveness of local agricultural production and the related economy, natural heritage and resources are considered as core strengths which are increasingly valued by regional and non-regional populations. The main opportunities are seen as re-orientation towards high-quality products, the use of renewable energies and the continuation of tourism development in the region.

Table 2: SWOT Analysis for Caithness and Sutherland

Strengths	1) Skilled and well trained labour force 2) Rich natural heritage
Weaknesses	1) Remoteness 2) Decline of population
Opportunities	1) Tourism 2) Renewable energies 3) Local food branding
Threats	1) Out-migration of young and skilled people 2) Further centralisation of the private sector, government and the "third sector" 3) Local dependencies on one major employer

Source: Bergmann and Thomson (2006)

Despite these potentials for additional value added and diversification, there are challenges for the future sustainable rural development of the C&S region: These challenges can be quite place-specific and relate particularly to the threat of continued out-migration (especially of young people aged between 18 and 29), to the governance problems of a peripheral region within centralised national (Scottish and British) administration, and for some sub-areas around Dounreay to the overwhelming labour market importance of the single most important employer. The loss of skilled labour, whether in the primary or secondary sectors, threatens to become a major problem in attracting and setting up new enterprises within the region.

Differentiating elements of the SWOT analysis are that the strength of C&S is the large number of well-educated and/or skilled persons. To some extent, this was also considered by local experts to be the largest threat, as most of such people have jobs with the single biggest employer in the region, at Dounreay Site Restoration ltd or mostly called the Dounreay decommissioning site[4].

The major weakness of the C&S economy was seen in the out-migration of young skilled persons. Paradoxically, this is linked to a major strength of the area – the high level of its

[4] Having worked in the area between 2005 and 2008, the authors saw at least three changes in the name and at least four changes in the overall structure of the Dounreay decommissioning operation, as well as different target closure dates (now given as 31 March 2025).

educational institutions. This weakness may be overcome by the opportunities offered by price developments in the energy markets, in the development of research on and production of renewable energies and in investment in the manufacturing and export of local products.

The sustainability and success of policies related to MFA and RD can be measured by more than 57 indicators (Bryden, 2002,14f. and Bryden et al., 2004) including those for biodiversity (cf. Schuyster, 2007, 18f. with 25 other indicators) or Quality of Life (Eurofund, 2008, with some 150 indicators). In most cases, a specific policy claims to support certain kinds of sustainability, e.g. agricultural policy claims to ensure sustainable food production, demographic policies in rural areas support the sustainability of rural communities, and economic development policies claim to support the sustainable economic development.

In order to facilitate the interpretation of its results for the general public, the TOP-MARD project used 24 indicators. However, based on the SWOT analysis and expert interviews, Bergmann *et al*. (2007) argue that a much smaller number is sufficient, and here we have chosen the following 6 indicators to assess sustainability on a C&S scale for the years 2007, 2015 and 2020:

- Demographics – population size, and the share of the under-20 age cohort (as a measure of community viability)
- Land use – farm employment (as a measure of the agricultural retraction function in case of an economic downturn))
- Economy – regional employment in the secondary and tertiary sectors combined (as a measure of sustainable economic development)
- Population development– annual regional net migration balance (as a measure of sustainable demography)
- Environment – amount of natural capital (as a measure of ecological sustainability)

It is certain that there will be a shift in CAP expenditures towards Pillar 2 in order to strengthen environmental land management, rural development (including investments in the farming sector) and social cohesion. With the CAP Health Check and ongoing discussions on LFAs and the redesign of EU rural development policy up to and beyond 2013 (McGranahan & Thomson 2008; EC 2008) there is underway a shift from the support of farm production towards a more holistic rural development policy. There is already an increase of modulation in the ongoing planning period of CAP until 2013. We expect that modulation will become more and more important and so Pillar 2. How this shift will be managed in detail naturally remains an open political question, e.g. whether linear (gradual) or by a sudden shock ("reform"). As the latest decisions show, there might be a period of transition in which Pillar 1 as well as Pillar 2 stays equally important (EC 2008).

The distribution of additional funds in Pillar 2 to the different axes (including the LEADER approach) is subject to "horse trading". While some farm interests insist that the money shifted from Pillar 1 is "theirs" and should therefore continue to be used to support farming, directly or indirectly, other groups demand more money for their purposes. As these interests seem to be becoming more influential, it is likely that future regulations and Commission proposals for the new planning period (2013 to 2019) will reflect this new power balance. A further shift of funds from Pillar 1 to Pillar 2, as well as within Pillar 2 from Axis 1 to Axis 2 and/or 3 seems therefore quite likely.

Five scenarios have been specified:

(a) a "Baseline" scenario, including all regional and national changes taking place in and beyond 2006/7 (most prominently the introduction of Single Farm Payments [SFPs])

(b) an "Axis 1" scenario in which all Pillar 2 funds are spent in Axis 1 to improve the competitiveness of the agricultural sector,

(c) an “Axis 2” scenario in which all Pillar 2 funds are spent in Axis 2 to provide agri-environmental goods and services as well as to support agriculture in Less Favoured Areas.
(d) An “Axis 3” scenario in which all Pillar 2 funds are spent in Axis 3 to improve the quality of life and competitiveness of rural areas,
(e) A “modulation” scenario in which Pillar 1 expenditures are decreased by 50% and the funds released are spent in Pillar 2, proportionately to existing Axis shares.

4 A sustainable future for Caithness and Sutherland through CAP Reform?

The **baseline** includes the assumption that by 2030/31 the Dounreay decommissioning site will be closed as well as an annual decreasing population by 100 heads due to out-migration of school-leavers and fewer returnees after they finished university than in other peri-urban rural areas. Overall until 2020 total population will decrease by 4,700 heads as table 3 shows and the share of younger persons will decrease significantly. Furthermore, with expected annual labour productivity increases of 1.5% in agriculture, a decrease in agricultural employment can be expected. As Dounreay is decommissioned with labour-intensive activities between 2007 and 2013 in a first period labour demand increases. Between 2013 and 2020 labour demand in the secondary and tertiary sector will decrease by some 2,000 FTEs. . Annual migration numbers fluctuate as table 3 shows, with Dounreay’s labour demand as well as with Quality of Life in-migration of retirees and Quality of Life out-migration of younger persons.

Table 3: Baseline indicators of sustainability in C&S, 2001 to 2020

Indicator	Unit	2001	2007	2015	2020
Total population	head	38,972	38,367	36,061	34,263
Age cohort 0 to 19	head	9,177	7,737	6,794	6,262
Agric. employment	head	2,325	2,117	1,869	1,728
Non-ag. employment	head	12,850	13,682	12,056	11,137
Annual net migration	head	-383	934	286	144
Biodiversity	none	281,193	281,526	281,970	282,248

Source: own calculations

As younger persons (under 20) are very likely to migrate for job and higher education opportunities, their population share decreases more than proportionally. As Table 3 shows, the biodiversity richness of the area will increase slightly over time, since the relevant afforestation schemes (including those on crofting land) pay attractive premiums, with over-proportional loss of agricultural employment in the area.

The effects of the scenarios are presented for the year 2015 (table 4) and 2020 (table 5). Regarding total population, the Axis 1, Axis 3 and “modulation” scenarios increase it as well as the number of under 19 year olds. The best scenario, with an increase of 8.6% in this regard, is the Axis 3 scenario, followed by the Axis 1 scenario, while investment in Axis 2 decreases population by 0.1%, well within the margin of error. The results for the younger age cohorts are similar.

Table 4: Sustainability indicators for scenarios in C&S, 2015 (baseline = 100)

	Baseline	Axis 1	Axis 2	Axis 3	Modulation
Total population	100.0	103.1	99.9	108.6	102.4
Age cohort 0 to 19	100.0	101.8	100.0	105.2	101.0
Ag Employment	100.0	91.9	100.0	99.9	98.3
Non Ag Employment	100.0	104.4	99.8	111.6	103.6
Annual net-migration	100.0	53.5	99.7	75.5	102.8
Biodiversity indicator	100.0	100.1	100.0	100.1	100.3

Source: own calculations.

Non-agricultural employment development is best in the Axis 3 scenario, at +11.6%, followed by the Axis 1 scenario (+4.4%). The Axis 2 scenario leads to a decrease of employment of 0.2%. Agricultural employment stays stable in all scenarios apart from the Axis 1 one, in which due to the increase in agricultural labour productivity it decreases by 8.9%, followed by the modulation scenario with -1.7%. Available natural capital increases in all scenarios, largest in the modulation scenario (by some +60%), followed by 19.5% in the Axis 1 and Axis 3 scenarios. In the Axis 2 scenario natural capital stays at the main baseline level. Biodiversity is slightly increased by 0.1% by all scenarios in comparison with the baseline

Table 5 confirms the above trends for the modulation and Axis 3 scenarios. As time goes on, the effects of Axis 1, Axis 3 and modulation scenarios become more distinct; population size increases in the Axis 3, Axis 1 and modulation scenarios compared to the main baseline. Quite obviously most indicators presented here show that investing into regional development measures and education, as being done with Axis 3 ,is the way foreword under the assumptions taken.

Table 5: Sustainability indicators for scenarios in C&S, 2020 (baseline = 100)

	Main Baseline	Axis 1	Axis 2	Axis 3	Modulation
Total Population	100	103	100	109	104
Age cohort 0 to 19	100	102	100	107	102
Ag Employment	100	86	100	99	101
Non Ag Employment	100	105	100	113	107
Annual net-migration	100	113	100	156	185
Biodiversity indicator	100	101	100	101	101

Source: own calculations.

5 Discussion and Conclusions

The task of assessing the impacts of different EU policies regarding the implementation of SRD policies in Caithness and Sutherland is complex (Dwyer 2005; Bergmann & Thomson 2008). The H&I area will have lost most structural funds by 2010, but the model results show that with the introduction of the new SRDP these losses are more than compensated under the assumption that commodity prices will stay at a somewhat higher level than between 2000 and 2006. Although funding for the period 2007 to 2013 is now fixed, one must ask how SRDP should be developed after the 2008Health Check, the LFA schemes review, and beyond 2013.

This paper shows that there are several paths open for the development of SRD policy beyond 2013, depending on what politicians and the general public think is appropriate. These paths can be characterised by taking the positions of the farming community, nature protection interests and the rural dwellers. Accordingly, one would expect that farmers would prefer the Axis 1 scenario; the Axis 2 scenario would be preferred by environmentalists and urban dwellers, and the Axis 3 scenario by rural dwellers.

The Axis 1 scenario would increase population size, biodiversity and the number of persons under 20 years old. Due to the labour-saving effects of investments, this scenario would significantly decrease the overall use of farm labour. Annual in-migration is lower than in the baseline, and so would lead overall to less out-migration than the other scenarios. Overall, this scenario therefore seems to be good for the rural population but bad for the farming community.

With the Axis 2 scenario (agri-environmental schemes as well as LFA support being prominent in C&S), more spending in Axis 2 is not able to support SRD in C&S, as all key indicators are at baseline levels or lower. Therefore, spending more funds to support the production of environmental goods and services by farming and forestry seems not to support SRD.

In terms of most indicators, the Axis 3 and modulation scenarios would indeed support SRD in Caithness and Sutherland.

Overall, the results suggest that Axis 3 investment, even at the expense of the regional farming sector, can attain successful rural development.

Amongst the modelled scenarios, investing in the environment is the worst choice from a rural development point of view, and this result supports the argument that in a region in which wilderness and landscapes are not scarce, nor under great threat, such investment is unnecessary and even inefficient from a local point of view.

Regarding the modelling experience, the model was also used in 2008 to model the impact of the Water Framework Directive on a regional scale as well as the long-term effects of investing in the horse industry in two German regions. It is therefore clear that the chosen approach is useful for assessments on a regional scale (Bergmann 2008). However, in some modules (esp. non-commodities), the approach is based on arbitrary relations that need some more development, as well as the extension of the approach to reflect the interrelation between regions and nations needing sustainable development.

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