



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

# **Modelling Policies for Multifunctional Agriculture and Rural Development – a Norwegian Approach**

**Karen Refsgaard and Sjur Spildo Prestegard**

Norwegian Agricultural Economics Research Institute  
Karen.Refsgaard@nilf.no



**Paper prepared for presentation at the 107<sup>th</sup> EAAE Seminar "*Modelling of Agricultural and Rural Development Policies*". Sevilla, Spain, January 29<sup>th</sup> -February 1<sup>st</sup>, 2008**

*Copyright 2007 by [Karen Refsgaard and Sjur Spildo Prestegard]. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.*

## Abstract

*This paper outlines the development and use of a policy model for multifunctional agriculture and rural development. The model is an important part of the EU research project, TOP-MARD (Towards a Policy Model for Multifunctional Agriculture and Rural Development).. It sets the discourse on multifunctional agriculture in the context of what OECD calls the ‘New Rural Paradigm’, and explores the ways in which both market and non-market ‘functions’ of agriculture and farm households link with economic development and quality of life in different rural territories, and how different kinds of policies influence these linkages. We develop a policy model based on an approach closer to ecological economics, adopting a systems analytic approach. We seek to capture both commodity and non-commodity relationships between farms, rural economies and quality of life. In this paper the model is applied to the Norwegian study area, Hordaland County, exploring how different policy scenarios might impact on agricultures different functions, rural economic development and quality of life.*

**Key words: multifunctionality, agriculture, rural development, dynamic simulation modelling, territorial approach, policy scenario**

### 1. A new approach to research on multifunctionality

In TOP-MARD we are moving the ‘multifunctionality’ discourse into the ‘new rural policy paradigm’ by researching how the various *functions of the agricultural sector* in any given *territory*<sup>1</sup>, affect the sustainable economic development of that territory<sup>2</sup> and quality of life of people living in it, and with how different policies (not only those connected to farming) and modes of governance affect these relationships and related outcomes over time. We are thus concerned with the *dynamics* of development in different kinds of rural *place*. The various market and non-market functions of agriculture (positive and negative) enter into this dynamic system since they affect desiderata and outcomes relating to things like landscape, environment, local quality food, local labour markets and entrepreneurship, tourism, recreation and so on. According to our emerging theory of rural development (Bryden & Dawe, 1998; Terluin, 2003; Bryden & Hart 2004; Johnson 2006), these and other public and quasi-public goods are externalities that act as important ‘inputs’ into new rural activities in rural areas including tourism, recreation, and niche product manufacture. They are, we argue, the under-recognised rural equivalent of ‘external economies’ in theories of urban clustering, agglomeration, city regions etc.

The model is a ‘policy model’ in the sense that it is designed to assess the dynamic impacts on these commodity and non-commodity relationships of a range of different policies. Thus policies not only influence the use and supply of commodities and non-commodities on farms, but also the transformation of non-commodities into other local economic activity and quality of life and over time. Here we cannot only be concerned with policies directly associated with agriculture or ‘rural development’ but also policies encourage enterprises and non-government organisations to utilise the multifunctions of agriculture, as well as policies linking these functions more directly with local quality of life. Relevant policies are for example:

---

<sup>1</sup> A ‘region’, ‘county’, or ‘study area’. These are commonly NUTS III or smaller, depending on the country.

<sup>2</sup> We take it as axiomatic from a wide range of sources, including the regulation establishing the European Agricultural Fund for Rural Development and the Treaties, that the overarching goal of rural policy – and the main test of its efficacy – is ‘sustainable territorial development’ in rural areas, using the broad concept of sustainability in economic, social, cultural and environmental terms.

- agri-environmental ('second pillar') policies act on the supply of a limited range of public and semi-public goods 'produced' by farmers;
- 'narrow' and 'integrated' rural development policies such as the various LEADER programmes and their national parallels (POMO, PRODER, Regionen AKITV) act more on the linkages between market and non-market functions of agriculture and the other enterprises that utilise the public and private goods involved, such as cheese producers, cheese routes, tourism, transport, local markets, etc.
- Public access policies which give citizens rights to utilise and enjoy landscapes and biodiversity.

Our key hypothesis in TOP-MARD is that the 'rate of transformation' of public and private goods on farms and by farm households into 'territorial development' and quality of life of territorial residents cannot be taken for granted, and our associated hypotheses about the factors influencing whether and to what extent that transformation process occurs in any region derive from earlier work on understanding the causes of 'differential economic performance' in rural areas of Europe, and especially by RUREMPLI (Terluin & Post, 2001) and by DORA (Bryden & Hart, 2004).

In DORA it was found that intangible factors were often as important as tangible factors in determining outcomes, and that the relationships between tangible and intangible factors were very important in determining the effectiveness of public policy interventions. However, DORA was both 'exploratory', and largely based on qualitative research.

In Norway, several studies argue that in addition to the production of food agriculture contributes to the production of public goods such as national food security, environmental benefits (cultural landscape, land conservation, flood control, biodiversity, and recreation), cultural heritage, and viable rural areas. This is also referred to as agriculture's multifunctional role, in other words, that agriculture produces more than just food and fibres (Prestegard, 2005, p.233). These other goods cannot be treated separately as market commodities. A free market could therefore lead to a situation where too little of these goods are produced in relation to the actual demand of the public. However, very few studies in Norway have tried to analyse the linkages between multifunctional agriculture and rural development and Quality of Life of the residents and how different policies influence on these linkages. In this paper, we try to do that.

In TOP-MARD we decided to adopt an approach closer to emerging ecological economics, and specifically to adopt a systems analytic approach allowing exploration of the dynamics of complex systems. The different components shaping the development of rural areas all influence each other and cannot be understood in isolation. These include components such as activities created by farmers, local entrepreneurs, local organisations and local population and the effects on landscape, culture, history and rural social life, and also formal and informal institutions, governance and policies of the place are important components. These components are met and affected by needs of the residents of different age groups and tourists resulting in final impacts on rural economy and quality of life and through that also demographics and migration. To understand multifunctionality and the interactions in this rural setting we use systems modelling (STELLA software).

## **1.2 Case Study Area Description**

Hordaland has a long history of people diversifying their income – farmers working in for example construction and fishermen having a small piece of land and some sheep. Since the objective of TOP-MARD is, among others, to investigate the linkages between farms and farming and the rural communities as such, we found Hordaland to be a relevant study area because farming seems to be embedded in many parts of rural activity in the region.

The county is about 15.000 km<sup>2</sup> with a landscape of mountains, fjords, glaciers and islands. The population is 450.000 of which 240.000 live in Bergen, and the balance in rural areas and small

settlements. The population of Hordaland is increasing. The reason for this is excess of births and immigration from abroad while the domestic net migration is close to zero, however the immigrants mostly live in the Bergen area. Most of the people live in the coastal areas, on the narrow strip of farmland along the fjords and in the bigger valleys. In the past 15 years, Bergen and most adjacent municipalities together with Stord have experienced a two-digit population growth while the population in the municipalities along the Hardangerfjord decreased by more than 10 %. The percentage of the working-age population and of early retirees is somewhat higher in Bergen than in the remainder of the county and the percentage of females is highest in the Bergen area. The rural areas in Hordaland have been going through changes in relation to the technological development within the primary industries, infrastructure and other industry. The magnitude of these changes on the local communities has been dependent on the distance from urban centres, availability of jobs and the possibility of combining small scale farming with other sources of income.

The industrial sector employs 16%, services 73% and agriculture 3%, the latter consisting of part-time and small-scale farms. Nearly a third of the farms have additional activities like local food, wildlife experiences, green care, hydropower, wood processing, and contracting. Although farming contributes with a small portion to the county's revenue, it is still an important factor in many peoples life also for people not relying on farming as their source of income. The average income was Euro 8,595 in 2006, see tables 1 and 2 below, however the income from agriculture differs a lot with one third of the farmers have no positive income from farming at all. The numbers indicate that most of the farmers are part time farmers. The main sources of income for farmers are salary, wages, and self-employment being three times the income from farming.

**Table 1: Income from farming**

Income from farming in total	Euro 33.375 million (NOK 267 million)
Average Income per farmer from farming (3.883 farms)	Euro 8.595 (NOK 68.761)
No positive income	34%
Income Euro 1-6.250	27.9%
Income Euro 6.251-12500	12.9%
Income Euro 12.501-31.250	19.2%
Income Euro 31.251-50.000	5.2%
Income above Euro 50.001	0.8%

Source: www.ssb.no (2006)

**Table 2 The average income numbers for farmers (not only from farming) are:**

Source of income:	Euro
Farming	8.595
Salary and wages	21.317
Self-employment	3.558
Pensions	2.766
Capital etc.	2.500
Total income	38.736 (NOK 309.872)

Source: www.ssb.no (2006)

Agricultural land in Hordaland was 42,260 ha in 2004 and productive forest 240,260 ha, both being smaller proportions than the rest of the country. Farmers in Hordaland are mainly livestock farmers. In some municipalities fruit growing is substantial, but in the county as such 97% of total agricultural land is being used for the production of grass. 3,883 farms received support from the governmental production support scheme in 2004. On the average, agricultural land including rented land per farm has risen from 7.2 ha in 1990 to 11.4 ha in 2002, of which 38 % was rented land being hired from

neighbouring farms that have reduced or shut down their farming activities. The large number of farms is below the average size, which corresponds with the income data.

**Table 3 Farm size numbers from 2002**

Size <sup>3</sup>	Number of farms
0.5-4.9 ha	1.484
5-9.9 ha	1.632
10-19.9 ha	1.292
20-29.9 ha	293
Above 30 ha	None

Farms in Hordaland, as in the rest of Norway, are with a very few exceptions owned by the farmers themselves. Farmers typically live on their land. The settlement pattern in rural areas is the lone standing farms with some villages with a few industrial enterprises and basic services supply. It is fair to say that farming in Hordaland, as most places, have undergone substantial changes. Many of the smaller farms are no longer in operation, and the holdings that continue farming, are becoming larger. Marginal land is abandoned and eventually overgrown. At the same time modern machinery has made it possible to drain and flat new land. So even if some steep and bumpy farmland is abandoned, the total area of cultivated land has been relatively stable. New cultivation methods change the landscape. The valley sides are overgrown by trees and scrub, and pebbly riverbanks and moraines are flattened, covered by soil becoming grassland. These new cultivation methods change the character and image of farmed land.

## 2.1 Traditional commodities from Farming

Milk production is the most important production in terms of employment and value creation from commodities. Today, there are about 1,100 dairy farmers in the county, with an average herd size of 12.9 cow years and an annual dairy delivery of 72,800 litres of milk (Tine, herd recording scheme 2004).

The production of beef in Norway is mainly a by-product of milk production with dual-purpose breeds. Only few farms keep specialised beef breeds. In recent years there has been an increase of suckler beef production, both in Hordaland and nation-wide. The market is demanding meat qualities that can not be provided by the standard Norwegian breed (Norwegian Red).

Traditionally, Hordaland has been a sheep farming region. Access to huge areas of rough grazing land is a major asset. Sheep farms are normally small and can be found throughout the entire county. From 1989 to 2004, the production of sheep meat in Hordaland decreased by about 33%, whereas sheep meat production increased nation-wide in the same 15-year period. One important cause of this development in Hordaland is the decline of coastal agriculture.

In addition, goat and other livestock also appear as production a few places in Hordaland.

Hordaland is known for its fruit production. The majestic Hardanger Fjord is famous for its steep slopes dotted with small, picturesque fruit farms. Here, fruit has been grown for centuries, mainly apples, but also a fair amount of plums and sweet cherry. Pears used to be a major crop, but the production has declined considerably. Fruit growing in western Norway has been combined with livestock farming, usually sheep. In recent years, though, the trend has been to focus entirely on fruit. There may be several reasons for this: declining profitability in sheep farming, land-use conflicts between forage and fruit production, and contamination of forage crops from pesticide spray drift.

---

<sup>3</sup> Outlying field and rough grazing is not included

Many farms include some forest land. In 2004, Hordaland produced 83.000m<sup>3</sup> of timber at a value of Euro 3 million. For Norway as a whole, the corresponding figures were 8.183.000m<sup>3</sup> and Euro 306.25 million. Nearly half of the harvested wood in Hordaland was used as firewood.

## 2.2 Farm diversification

Out of a total of 3,767 farms in Hordaland about 1435 farms had additional activities with some kind of on-farm diversification<sup>4</sup>. The activities for farmers with multifunctions included mainly the following areas:

- Renting out area, buildings or machines
- Machine contracting
- Added value and local food
- Marginal area enterprises like extreme sport, renting our hunting and fishing rights etc.
- Farm tourism activities (e.g. fishing, hunting, hiring out boats),
- Other services like green care
- Hydroelectric power plant,
- Other biological production like firewood and timber production

Many of the farmers were engaged in a variety of activities and services. The most common activity is machinery contracting. This was followed by processing own timber, renting out farmland, and farm tourism activities like hiring out cottages. On average farmers used 271 hours on additional on-farm activities in 2002.

In areas close to cities and other urban centres, alternative use of farm capital may give higher returns on equity than traditional farm operations. An increasing number of applications for re-zoning land indicate that farmland is under considerable pressure in these areas.

## 2.3 Entrepreneurs with linkages to agriculture

These non-commodities and commodities produced from the agriculture often constitute inputs or external economies for other rural enterprises or the general public. In Hordaland tourism sector is closely related to the landscape and indirectly therefore to the management of the landscape by agriculture. Other resources – like hunting and fishing rights, rights for hydropower, processing of food or water are other also utilised by businesses and entrepreneurs outside agriculture. The entrepreneurs in Hordaland were specifically engaged in:

- tourism – accommodation, guiding, adventure, etc,
- hunting experiences,
- production of drinking water,
- small scale meat industry,
- small scale food production, and
- supplier of equipment and consultancy for small scale hydroelectric plants.

The companies used the external effects of farming (especially landscape) or the farms resources directly or indirectly in their production, or for marketing purposes.

## 2.4 The general welfare and quality of life in the area

These non-commodities and commodities produced often constitute inputs or external economies for other rural enterprises or the general public.

---

<sup>4</sup> An additional on-farm activity is an activity that is managed by the owner or the spouse and which utilizes land, buildings and/or machines on the farm unit. The activity is meant to give an income and/or employment for the owner and his/her family.

### 3. Modelling MFA, rural development and Quality of Life relationships

While commodities from enterprises in the local economy mainly are captured in conventional models like input-output tables, non-commodities are not. In our model we seek to capture both commodity and non-commodity relationships between farms, rural economies and quality of life. Surveys among farmers and entrepreneurs have been carried out together with surveys about quality of life issues among residents to consider the importance of non-commodities from multifunctional agriculture in the region for utilities from natural, social and cultural capital in addition to human and built capital.

The characteristics of the problematic include the following main parts

- Rural regions
  - Multifunctional Agriculture,
  - Rural Development
  - Quality of Life
- Interconnections and Dynamics
  - Agronomic, ecological, economic, social and cultural dimensions
- Policy scenarios

These are entered into a dynamic simulation model used as software called STELLA. Using this type of model has the advantage that the model is dynamic, it is well suited for group learning and interactivity and it contain possibilities for mixtures of quantitative and qualitative relationships.

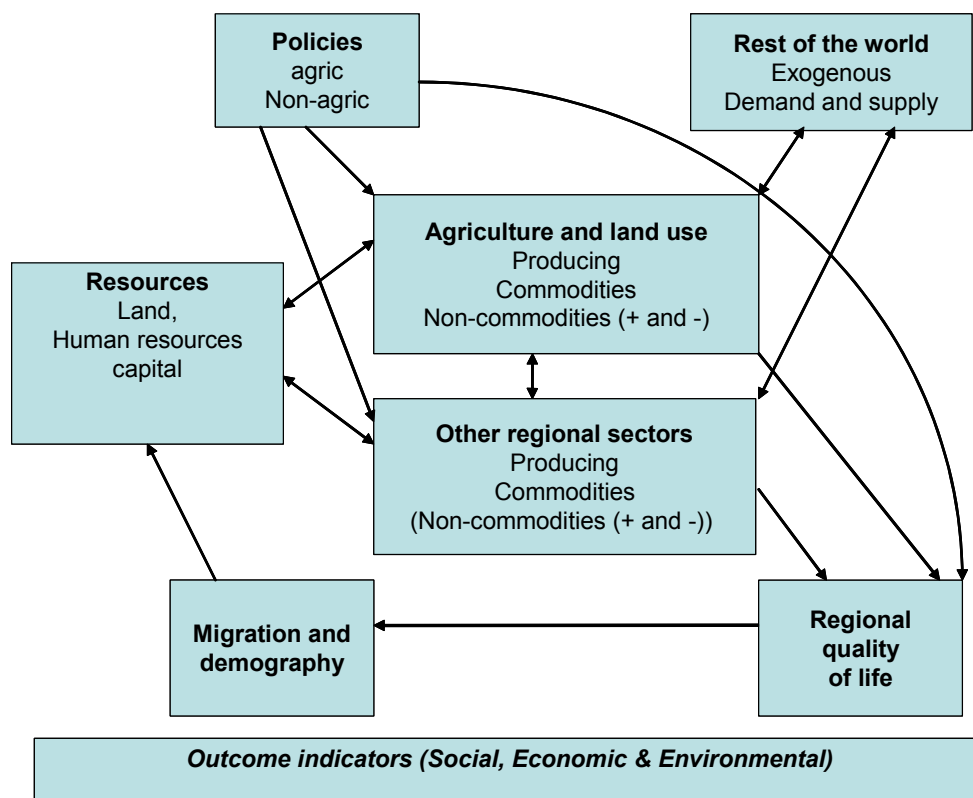


Figure 1: The relationships between the different components of the POMMARD model

To model the linkages between regional economic activities, the social system and the ecosystem model we used a capital approach similar to that applied in ecological economics (Erickson et al.



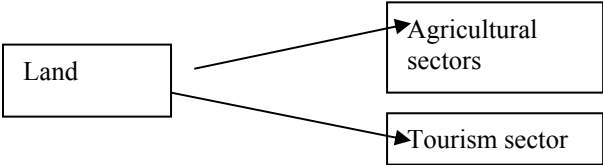
2004). In this approach capital is viewed as a stock of productive resources from which flow the goods and services that support human welfare and economic development. Unlike many traditional economic models, this model is supply driven with demand constraints. In our approach, capital is divided into human, built, social, cultural and natural capital. These capitals are combined with labour and raw materials according to alternative production systems and input-output relationships to produce economic goods and services, quality of life and associated social welfare.

In the model we limited this capital approach largely to the natural, human, and built capital. However we dealt with social and cultural capital mainly outside the model although certain elements of both were considered in the Quality of Life sector. In Figure 1 below the general relationships between the different components of the model are shown. The three types of capital are included in the resources component.

The data in the model are based on Statistics, on surveys about multifunctions among farmers, entrepreneurial activities among entrepreneurs with linkages to agriculture and quality of life for residents in the area.

### 3.1 Land

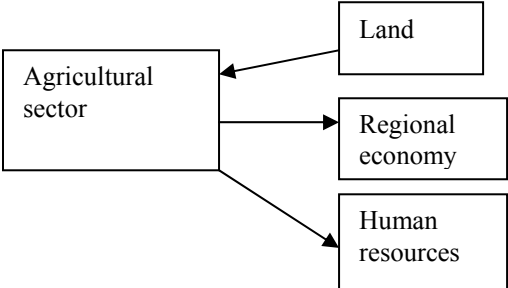
Land use has been chosen as the key variable for natural capital because the amount, distribution and use of (rural) land for different purposes are the primary determinants of regional economic, social and environmental activities. The land stocks include annual crops, permanent crops, grass land, forest land and other land. Furthermore, ownership and use of land are closely related to agricultural policy regulations. Land has impacts **on both agricultural and tourism sector**



### 3.2 Economic activities

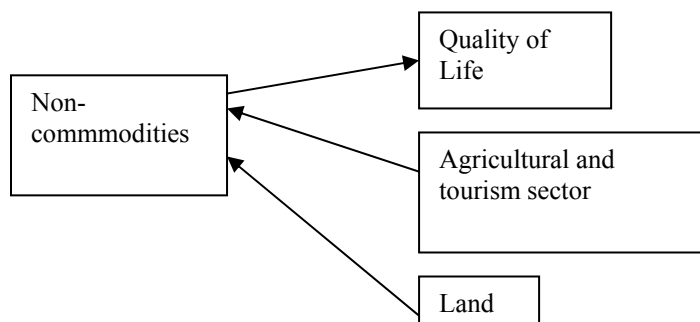
The economic activities include agriculture as farm production units as these are the major decision units. The tourism sector was also dealt with separately, as this was the most common sector involved in transforming non-commodities into local services in the 11 study areas.

The agricultural sector being impacted by land, impacting on regional economy and human resources. The agricultural sector consists of different production systems being dairy, sheep, beef, fruit, and other (multifunctional) activities. The sector produces a wide range of different traditional marketed commodities like milk, fruit, meat and timber and less traditional ones like wool, meals, bednights, energy and hunting rights. In additional they produced non-marketed commodities (positive or negative) like biodiversity and phosphorus run-off. The sector creates a demand for labour, for land use and other inputs from the regional economy.



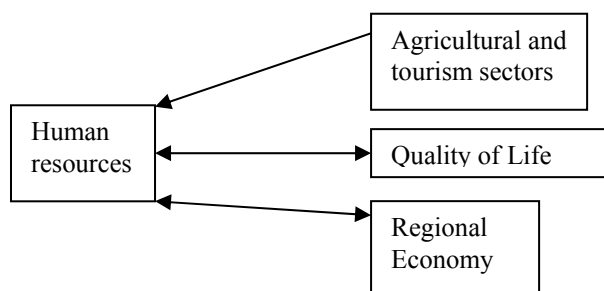
### 3.3 Non-commodities

The non-commodities impact on quality of life and are affected by the agricultural and the tourism sector as well as land. We get information about the value of the benefits and disadvantages through indicators for land cover and change, Shannon index, Mineral fertilizer use, Excess Nitrogen in the system, Biodiversity, Stocking rate, CO2 etc. There are of course also impacts on the social and cultural aspects to consider, but they are not modeled at this stage. The important point about this sector is that the non-commodities traditionally are not considered in regional economic models. However, they are normally considered in quality of life analyses and so they are also included in the POMMARD model.



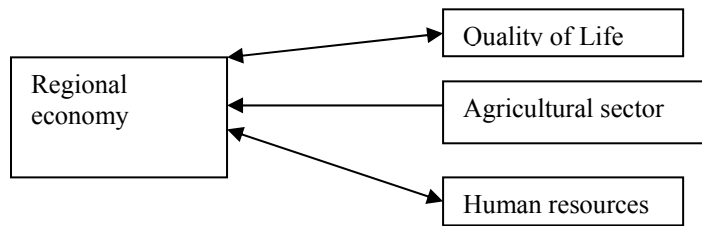
### 3.4 Human Resources

The Human Resources sector consists of the population stock categorised by age groups and educational level and the population flow being both natural change and migration. The natural change involves an integrated and straightforward demographic model. The stock of labour supply is given by the population. Labour demand is given by the employers demand in the regional economy including agriculture and tourism, while the supply is decided through the natural population change and net migration driven by quality of life.



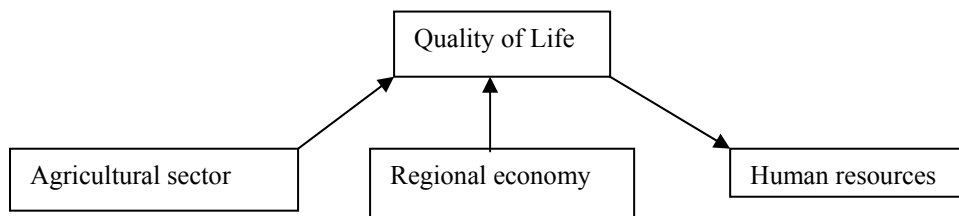
### 3.5 The Regional Economy

The regional economy sector comprises a regional Social Accounting Matrix (SAM) except for the agricultural and forestry sector which is being modelled outside. The radical inventions here are two-fold. First there is a linkage to quality of life through the demand created by in-migrants being attracted to the area by quality of life factors. Secondly there is a linkage to the quality of life sector where income changes cause variations in the regional quality of life.



### 3.5 Quality of Life

The Quality of Life sector is the most innovative part of the model. It is impacted both by the agricultural sector and the regional economy and impacts in turn on the human resources sector. The agricultural sector affects the quality of life in the region through the way of managing agriculture and land and through that the stock of natural capital, while the regional economy impacts on quality of life through the income level in the region. The human resources are impacted through the attractiveness of the region for inward migration. Finally the quality of life gives us indicators for overall quality of life changes in the region.



### 3.6 Policies

The policy box embraces potential policy scenarios as exogenous influences on the regional systems. The model permits the analysis of a range of policies which influence land use and other decisions related to multifunctional agricultural activities. Policy may also directly or indirectly affect local non-agricultural economic activities that make use of those agricultural multi-functions. This is one of the novel advantages of the model.

### 3.7 Demand

The demand box represents other exogenous influences and constraints on the regional system. While the model is supply driven, based on decisions related to production systems and land allocations, some sectors are influenced by external demand conditions. Prices of exports for example determine the income of the region's residents. External wages may affect immigration rates. These exogenous variables will typically change only to reflect the global and EU-wide consequences of policy changes.

### 3.8 Indicators

The indicators are meant to give a range of information about the performance of the territory, as measured by migration patterns, employment rates and also more complex indicators such as social cohesion, quality of life etc. Some of these indicators can be calculated directly from the model, while others need additional information from surveys of the territory. The regional economy links the activities where there exists a market and thereby also gives values for the economic performance indicators. However the overall performance of each territory is measured through indicators of quality of life.

## 4. National policies in Norway

As a non-EU member, Norway has its own agricultural and rural development policies. These policies are aimed for different purposes and different people as well as implemented by different institutions, such as the Ministry of Agriculture and Food, the Ministry of Local Government and Regional Development (KRD), the Ministry of Trade and Industry, the County Governor of Hordaland, Innovation Norway, Hordaland County, the local municipalities in Hordaland, and the Norwegian Public Roads Administration. In the following, an overview of the relevant policies and instruments is given.

The relevant policies affecting and related to multifunctional activities, to rural development, to the quality of life of the residents and to the migration of different groups are quite broad. There are several policies that in one way or the other impact multifunctional activities in agricultural businesses and related businesses that use agricultural products or services, being it market price support to agricultural products, acreage support, headage support, support for environmental attempts, social welfare schemes, or support for businesses to develop outdoor activities like extreme sport, hiking, horse riding etc.. However, there are other policies that have indirect effects on multifunctional agriculture and rural economy/settlement like for example bus services to provide access and existence of schools being of major importance for the family farms.

The aim of the policies for the rural areas in Norway has been to level out the economic conditions for an equal service offer between municipalities and counties to maintain the settlement structure and sustain viable local communities. The government is emphasizing that people should have free choice to settle wherever they want ("White Paper no 21 (2005-2006)). They prioritize to (K. Nakken, KRD 2007):

- Real freedom of choice about where to live
- Regional strategy to sustain the current pattern of settlements
- Facilitating economic developments in all parts of the country
- Facilitating fair distribution of growth between cities and rural areas

In Norway, the regional (district) policy is divided into a "narrow" and a "broad" policy (see Prestegard, S.S. and A. Hegrenes, 2007) and the country is divided into zones for regional policy measures. In addition there is a particular zone for attempts in Nord-Troms and Finnmark which among other benefit from reduced income tax, lower energy taxes and depreciation of student loans. (<http://www.ssb.no/vis/samfunnspeilet/utg/200702/06/art-2007-04-18-01.html> ).

### 4.1 The regional policy

The "broad" regional policy is, for instance, sector policies that have an effect on the possibilities of achieving regional policy goals. relative high resource use for infrastructure in the districts (roads etc.), decentralisation of public places of employment and colleges, The measures fall into two broad categories<sup>5</sup> (KRD, 2005):

- Category A: Measures that have "district" policy aims, or give preferential treatment to regions with weak industrial base, small labour markets or long distance to larger centres.

---

<sup>5</sup> Own translation.

- Category B: Measures implemented in order to compensate some regions for disadvantages, or measures that have effects in some “districts” due to specific circumstances, and also are of particular importance for industrial development, local economies and settlement.

The broad policy covers the

- Distribution and Regional Policy: All sectors
- Income for municipalities
- Health policy for elderly etc.
- Transport and communication
- Fisheries + some agricultural policy outlines (encourage and build up and down)
- Building knowledge (regional coll./inst. etc.)
- Innovation policy (facilitation)

The narrow regional policy is about the extra effort from KRD. It is carried out by the Ministry of Local Government and Regional Development (KRD) and is a special chapter in the state budget. Important measures are regional development grants to county municipalities, and compensation for regionally differentiated social security contributions., subsidizing of energy demanding industry, and investment grants means under the Municipal and Regional ministry for small and medium sized businesses. for business related development attempts and transport support.

- Regional aid/regional differentiated support. The General Purpose Grant Scheme
  - The Equivalence Scheme
  - Regional support (more to smaller municipalities)
  - Northern Norway
- It has three implementation areas
  - SIVA network
  - Innovation Norway
  - The Research Council of Norway

#### 4.2 Agricultural policy

Agricultural policy is, as mentioned above, part of the “broad” regional (district) policy. Regionally differentiated price support for milk, meat, eggs and vegetables is in Category A. Farms in central regions do not receive such support while farms in Northern Norway receive the highest support. Farms in Hordaland are among those who receive support at “medium” level. The larger part of the agricultural policy measures is in Category B. All farms might receive such support, but usually the rates are highest for farms in remote areas. Farms in Hordaland do get rather high support, but not the highest support rates. Acreage support, headage support, a special support for milk production, and vacation and replacement subsidy are the largest agricultural policy items in Category B. Another, and smaller, measure is the “Rural development grants”. The Rural Development Grants (NOK 241 million in 2006) have been allocated to the 19 counties based on criteria such as the number of holdings, utilised agricultural area, and agricultural employment as a percentage of total employment in each county. The administrative responsibility is divided between the Agricultural Departments of the County Governors and Innovation Norway. Innovation Norway is responsible for the farm-business oriented measures, while the Agricultural Departments of the County Governors are responsible for other measures.

Norwegian agricultural and rural policy has mainly had a top-down approach and has been centrally governed. However, there have been some support programmes and measures with a more bottom-up approach, some of these have been connected to rural development initiatives. Recently, some minor parts of the agricultural policy have been delegated from central government bodies to regional authorities (county authorities) and to the municipalities. For example, the administrative responsibility for specific environmental and regional measures, as well as for forest-related funds allocated via the Agricultural Development Fund, was transferred to the municipalities in 2004. Local governments shall draw up a brief long-term strategy with budget proposals for the various objectives,

and must submit annual status reports to the County Governor regarding the use of the funds (NOK 130 million in 2006). In 2005, a regional environmental programme amounting to NOK 350 million was established. Each county was assigned the responsibility for establishing instruments and schemes enabling the achievement of the environmental challenges that have received the highest priority in the region. Each of these schemes is to be based on one of the following main areas:

- Measures aimed at maintaining the cultural landscape, including promoting the use of mountain dairy farming, and promoting active use of grazing resources;
- Measures aimed at pollution reduction.

All 19 counties have now established regional environmental programmes in agreement with county trade associations.

As to the impact of different policy scenarios, the impacts on land use, production systems and other entry points from the policy changes will be estimated using interviews with key agents and POMMARD modelling.

## **5. Impacts of different policies – putting it all together**

To assess the dynamic impacts of different policy scenarios on these relationships different scenarios are compared to a reference run of existing policies. One scenario will be implementation of possible outcomes of the ongoing WTO agricultural negotiations in Norway as well as simulation of a liberalization of the Norwegian agricultural policy. Other scenarios will implement increased governmental spending through regional programmes and increased use of measures to maintain agricultural activities or stimulate farmers to invent new businesses. Finally, consequences of increased subsidies to entrepreneurs and local community actors outside the agricultural sector will be analysed.

The model is used to see how the policy scenarios impact at territorial level on rural economic development, on quality of life for the residents using different indicators for these. We want to analyse the policy impacts of:

- Production of farm commodities & non-commodities
- Transformation of commodities & non-commodities into territorial development and quality of life
- The regional economy
- The regional quality of life
- Costs of investment
- Costs of production and marketing
- Governance

For example we can check how different stocks and flows are changing. E.g. how will a change in 'Pillar 2' type policies impact on territorial financial flows as well as things like land use and production of commodities and non-commodities, and the transformation of CO and NCO into territorial development and quality of life.

## **6. The policy scenarios in Norway**

In TOP-MARD, the following seven different policy scenarios have been developed and analysed, including a baseline or reference scenario.

1. Baseline 2007-13 policies in EU.
2. 50% cut in annual direct payments P1 reduction in year n, staying the same for the next period. Non reallocation of funds. Teams to decide consequential.
  1. Annual farm income changes, and
  2. land use changes/production changes
  3. NCO changes
3. Rebalance 2007-13 P2 to give 100% to axis 3, continuing over 7 years.
4. Rebalance 2007-2013 P2 to give 100% to axis 2, continuing over 7 years.

5. 50% increase in annual regional policy spend in the study area (compared with baseline) continuing over 7 years (EU + national). Impacts on I/O via FD, plus on QoL.
6. Energy shortage/100% increase in energy prices over 7 years. Study areas to decide what this does to land use. Needs a bio-energy production system.
7. 100% increase in tourism demand over 7 years. Introduced as a gradual increase. Each study area to decide how to introduce this (seasonality, etc.).

Since Norway is a non-EU member and has its own agricultural and rural policy, we had to “adapt” these policy scenarios to “similar” changes in Norwegian policies as far as possible.

In scenario 2, for example, we have tried to implement a possible outcome of the ongoing WTO agricultural negotiations in Norway as well as simulation of a liberalization of the Norwegian agricultural policy. In Norway, it is difficult to put the different measures into the EU classification of Pillar 1 or Pillar 2 measures. For example, the Norwegian broad-based acreage and cultural landscape schemes fall somewhat in between Pillar 1 and Pillar 2 measures in the EU. Since the Stella model has been under development until recently, we have, at the time of writing this paper, still not developed the seven scenarios in detail.

## 7. Conclusions

By the time of the seminar we will be able to present model results for Hordaland.

We know that shifts in policy and governance have implications for how commodities and non-commodities are ‘transformed’ into territorial rural development and Quality of Life. However the processes are complex. But with the POMMARD model developed in the TOP-MARD project we are able to analyze rural economies and quality of life, and trace impacts of policies through to a set of clear outcomes. And we are able to deal with dynamic and feedback relationships

## References

- Bryden, J. M. & Dawe, S. P. (1998). Development Strategies for Remote Rural regions: What do we know so far. Keynote paper for the OECD International Conference on remote Rural Areas - developing through natural and cultural assets. Albarracin, Spain, 5-6 November 1998
- Bryden, J. and Hart, K. (Eds.) (2004). *A New Approach to Rural Development in Europe*. The Edwin Mellen Press.
- <http://www.ssb.no/vis/samfunnsspeilet/utg/200702/06/art-2007-04-18-01.html>.
- Johnson, TG (2006). [forthcoming paper on theory of rural development]
- Ministry of Local Government and Regional Development (2005): White Paper no 21 (2005-2006)
- Prestegard, S.S. 2005. Multifunctional agriculture, policy measures and the WTO: the Norwegian case. *Food Economics* 1: 151-162.
- Prestegard, S.S. and A. Hegrenes, 2007. Agriculture and rural development policy in Norway. Proceedings from Workshop on Rural Development Policies in the Nordic Countries. 10 – 11 October 2006, Nordregio, Stockholm.
- Terluin, I.J. (2003). Differences in economic development in rural regions of advanced countries: an overview and critical analysis of theories. *Journal of Rural Studies* 19: 327-344
- Terluin, I and Post, J (2000) *Employment Dynamics in Rural Europe*, CABI