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4.5 Essential differences of objectives and instruments of Swiss agricultural policy in comparison to those of the EU*

Rudi Staub and Klaus Steininger

4.5.1 History of Swiss agricultural policy

The essential contents of Swiss agricultural policy were founded in the years of deficiency and crisis in the beginning of this century and in the economy of the Second World War ("the Battle of Production"). This led to the formulation of a general objective for agriculture in the Swiss Constitution, the Law for Agriculture of 1951: *"to maintain both a sound economic environment for the professional farmer, and a productive and efficient agriculture capable of satisfying the needs of the country"*. The main tasks for agriculture were the maintenance of the food supply in normal periods, provision for periods of import disturbances, and the long-term maintenance of production potentials. Since the beginning of the seventies, the maintenance of the landscape and the decentralisation of settlement have become more significant. The increasing distance between the actual agricultural market and that demanded by market forces implied a higher need for regulations by the Federation and led to the promulgation of approximately 50 decrees within the dairy sphere alone. The areas of agriculture and nutrition claimed about 9% of the total federal expenditure. Regulations within the agricultural market were directed toward an improvement of the production base, the security of price and distribution, as well as regional and social adjustment measures. Essential instruments governed the restriction of imports (customs and import quotas), promotion of exports (subsidies), internal organisation of the market (price guides, guarantees of purchase, utilisation and marketing of the produce), structural improvements (investment loans) as well as regional and social compensation payments (cost and cultivation contributions). Central points for the mountainous areas were regulations concerning the dairy and meat markets as well as compensation payments for disadvantageous production conditions.

Milk market

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During the twenties and thirties, several measures were implemented for the protection of Swiss production. Ever since, the half-private, half-federal Swiss Cheese Union has been charged with the support of milk prices. Years of overproduction of milk led to the introduction of milk quotas for individual farms in 1977. Milk quotas together with price and sale guarantees became the most important regulations within the milk market (Rieder et al. 1992).

Meat market

The regulation for cattle slaughter was developed from the market controls of the Second World War, and specifically the determination of a band of price guides for meat. The market was opened for imports if the market prices reached the upper limit of the band; at the lower limit the Federation bought the surplus. By relief purchases of breeding and production cattle, animal breeding was supported in the mountainous areas. Animal breeding was already a traditional activity in the mountains where costs are lower in comparison with farms in the valleys. Traditional exchanges thus developed between the valleys and the mountains. The mountainous areas produce the breeding and productive animals that are used in the milk production of the valley (Rieder et al. 1992).

Agricultural Policy 2002

A re-orientation of agricultural policy started in 1992 with the publication of the 7th Report on Agriculture (on the situation of Swiss agriculture). The reasons for this development were the following:

- ❑ the almost total saturation of the agricultural products markets,
- ❑ a change in the attitude of the population concerning agriculture,
- ❑ new requirements in the field of ecology,
- ❑ the increasing international integration.

The European integration of Switzerland, and especially the GATT/WTO negotiations, required a reduction of internal price supports, a facilitated access to the market for foreign agricultural products, and a reduction of export subsidies. The traditional price supports have thus been restricted. However, possibilities for compensation have been opened up through direct payments, which are in conformance with WTO-agreements and are not bound on products. As a consequence, in 1993 additional direct payments for income security and for particular ecological achievements (e.g. integrated and organic production) were introduced. These payments should facilitate the realisation of appropriate income levels on the one hand, and compensation for improvements made in the common interest on the other. At that point

the separation of price and income policies started. These direct payments have become one of the most important instruments of Swiss agricultural policy. In 1998 about 1.5 billion ECUs were paid to 79,479 farms, which corresponds to 1,500 ECUs per hectare of agricultural area. The average contribution per hectare is higher for smaller farms and for farms subject to less advantageous production conditions.

This was the basis for the fundamental reform of Swiss Agricultural Legislation (Agricultural Policy 2002). In 1998, the new Agricultural Law was passed, and consequently most regulations were abolished or adapted. Most of the regulations came into force on January 1st 1999 or on May 5th 1999 (at the end of the milk year). Some periods of transition run until 2001, so the new instruments will be fully effective from 2002 on. Central objectives were the improvement of competitiveness by a wide-ranging reduction in price and market controls as well as the promotion of the sustainability of agricultural production. Through these measures, Swiss agriculture will gradually prepare itself for the international opening of agricultural markets. The most important changes for the mountainous areas were the following:

- abolition of the guaranteed milk price
- abolition of compulsory delivery and milk purchase guarantees
- more flexibility in milk quotas (without regard to the area)
- reduction of price and market controls for beef cattle and meat, abolition of surplus buying of breeding and productive livestock from the mountainous areas
- predication of direct payments on ecological performance (proof of a minimum standard of integrated production)
- abolition of a basic contribution per farm
- contributions for meat production based on roughage consumption now given to keepers of various animal species (to this point only to keepers of cows)

These regulations came into effect in 1999 and therefore had a substantial influence on the contents of this research project.

4.5.2 Comparison of EU and Swiss objectives

The method for the elaboration and analysis of the objectives has been thoroughly discussed in Section 4.4. Some particularities of the systems of objectives of the EU and Switzerland will be pointed out subsequently. With regard to fundamental objectives, the level of agreement between the Swiss and EU agricultural policies is relatively high. This is a consequence of the fact that both agricultural zones have traditionally pursued similar agricultural policies (closed markets, price subsidies); as a result, both are confronted with similar problems (high

subsidy costs, overproduction). In addition, both are compelled to open their agricultural markets in compliance with GATT/WTO and to reorient their agricultural policies. Therefore the differences lie mainly in a different weighing of individual issues. A comparison of Switzerland and the EU produced the following results:

- Switzerland shows a pronounced concentration on objectives. This is a result in particular of the political system, which is characterised by a demand for explanations and of formulation of objectives because of the highly developed participation of the citizens (plebiscite). Moreover, there was an additional need for orientation because of the introduction of the Agricultural Policy 2002. However, the number of as yet unfulfilled objectives is relatively high.
- Objectives are concentrated on ecological aspects. In comparison with other countries, objectives concerning the environment are relatively precise and concern in particular the protection of soil and water resources as well as the maintenance of biodiversity and landscape structures. In this context, sustainable land use and protection of the landscape play an important role. Regard for the sensitive environment in Switzerland has led to the formulation of ecological objectives and their integration into agricultural policy (especially through direct payments). Environmental concerns are also essential conditions for the direct payments.
- In comparison to neighbouring countries, objectives concerning social aspects are of higher importance. In view of the high proportion of mountainous area of the total area high priority has always been set on the maintenance of decentralised settlement in the alpine areas of difficult economic circumstances. This can be seen within the regulations in the clear differentiation regarding zones of different levels of difficulty.
- Economic objectives are understated. Objectives that are frequent in the neighbouring countries, such as co-operation between agriculture and tourism and diversification, are either not present or are of minor importance compared to the objective of income security. This shows the intention behind Agricultural Policy 2002 to admit a freer development of market forces. As a consequence, reductions in income can be expected. On the other hand co-operation between agriculture and tourism will gain in importance.

4.5.3 Instruments of Swiss agricultural policy

Corresponding to the selection of instruments of the EU (see Section 4.3), essential laws and regulations were also determined for the Swiss mountain area. They were classified according to their effects. However, this classification is not always definite, as individual instruments often concern different spheres. They were classified with regard to the crucial point of their effect. The groups of instruments as well as the particular instruments that were identified as the most important for Swiss mountain agriculture by the regional experts are presented in detail in the following. Essential differences to EU instruments have been identified.

Changes in European agricultural policy can be expected through the realisation of Agenda 2000. For the comparison of the EU to Switzerland, the following aspect concerning the levels of legislation has to be considered: European institutions set up frame legislation that has to be either integrated into laws and regulations at the national level, or executed as defined by the EU. In Switzerland laws and regulations are passed by the Federation and executed primarily by the cantons. As a consequence, the Swiss instruments (Table 4.20) presented in this context are in general placed at a lower legal level compared to EU or national documents of the EU member states. This gives an explanation for the partly higher level of detail in the design of the instruments.

Table 4.20: List of essential instruments for agriculture in the mountain area

Number of document	Title of the document (because of the lack of official english terms of the Swiss documents they are listed in french)
SR 910.1	Loi fédérale du 29 avril 1998 sur l'agriculture (Loi sur l'agriculture, LAgr)
SR 910.12	Ordonnance du 28 mai 1997 concernant la protection des appellations d'origine et des indications géographiques des produits agricoles et des produits agricoles transformés (Ordonnance sur les AOP et les IGP)
SR 910.13	Ordonnance du 7 décembre 1998 sur les paiements directs versés dans l'agriculture (Ordonnance sur les paiements directs, OPD)
SR 910.132.4	Ordonnance du DFE du 7 décembre 1998 sur les systèmes de stabulation particulièrement respectueux des animaux (Ordonnance SST)
SR 910.132.5	Ordonnance du DFE du 7 décembre 1998 sur les sorties régulières en plein air d'animaux de rente (Ordonnance SRPA)
SR 910.133	Ordonnance du 7 décembre 1998 sur les contributions d'estivage dans l'agriculture (Ordonnance sur les contributions d'estivage, OCest)
SR 910.17	Ordonnance du 7 décembre 1998 sur les contributions à la surface et à la transformation dans la culture des champs (Ordonnance sur les contributions à la culture des champs OCCC)
SR 910.18	Ordonnance du 22 septembre 1997 sur l'agriculture biologique et la désignation des produits végétaux et des denrées alimentaires biologiques (Ordonnance sur l'agriculture biologique)
SR 913.1	Ordonnance du 7 décembre 1998 sur les améliorations structurelles dans l'agriculture (Ordonnance sur les améliorations structurelles, OAS)

Table 4.20: continued

SR 915.1	Ordonnance du 13 décembre 1993 sur la formation professionnelle agri cole (OFPA)
SR 916.01	Ordonnance générale du 7 décembre 1998 sur l'importation de produits agricoles (Ordonnance sur les importations agricoles, OIAgr)
SR 916.010	Ordonnance du 7 décembre 1998 sur l'aide à la promotion des ventes de produits agricoles (Ordonnance sur la promotion des ventes de produits agricoles)
SR 916.310.31	Ordonnance de l'OFAG du 7 décembre 1998 sur l'octroi de contributions dans l'élevage

SR 916.341	Ordonnance du 7 décembre 1998 sur les marchés du bétail de boucherie et de la viande (Ordonnance sur le bétail de boucherie, OBB)
SR 916.350.101	Ordonnance du 7 décembre 1998 concernant le contingentement de la production laitière (Ordonnance sur le contingentement laitier, OCL)
SR 916.351.0	Ordonnance du 7 décembre 1998 concernant l'assurance et le contrôle de la qualité dans l'économie laitière (Ordonnance sur la qualité du lait, OQL)
SR 916.344	Ordonnance du 7 décembre 1998 sur les effectifs maximums dans la production de viande et d'oeufs (Ordonnance sur les effectifs maximums, OEM)
SR 919.118	Ordonnance du 7 décembre 1998 sur l'évaluation de la durabilité de l'agriculture
SR 942.359.1	Ordonnance du 7 décembre 1998 concernant le prix-cible, les suppléments et les aides dans le domaine du lait (Ordonnance sur le soutien du prix du lait, OSL)
SR 901.1	Loi fédérale du 21 mars 1997 sur l'aide aux investissements dans les régions de montagne (LIM)
SR 901.3	Arrêté fédéral du 21 mars 1997 instituant une aide à l'évolution structurelle en milieu rural
SR 211.412.11	Loi fédérale du 4 octobre 1991 sur le droit foncier rural (LDFR)
SR 451	Loi fédérale du 1 ^{er} juillet 1966 sur la protection de la nature et du paysage (LPN)
SR 700	Loi fédérale du 22 juin 1979 sur l'aménagement du territoire (loi sur l'aménagement du territoire, LAT)
SR 814.01	Loi fédérale du 7 octobre 1983 sur la protection de l'environnement (Loi sur la protection de l'environnement, LPE)
SR 814.20	Loi fédérale du 24 janvier 1991 sur la protection des eaux (LEaux)
SR 836.1	Loi fédérale du 20 juin 1952 sur les allocations familiales dans l'agriculture (LFA)
SR 843	Loi fédérale du 4 octobre 1974 encourageant la construction et l'accession à la propriété de logements

Priorities of the Swiss agricultural policy

price-guarantee			accompanying measures			structure strengthening			
			direct payments		environ- mental measure				
quantity control	price support	quality requirements	direct payments with environmental requirements	direct payments without environmental requirements	protection of the environment	marketing	production	vocational training measures	regional development

Ordonnance sur le contingentement laitier, (OCL)	Ordonnance sur le soutien du prix du lait, (OSL) Contributions dans l'élevage L'importation de produits agricoles (Ordonnance sur les importations agricoles, OIAgr) (Ordonnance sur le bétail de boucherie, OBB)	Assurance et le contrôle de la qualité dans l'économie laitière	Ordonnance sur les paiements directs (OPD) Detention d'animaux (SST / SRPA) Ordonnance sur les contributions à la culture des champs (OCCC) Ordonnance sur les contributions d'estivage (OCest)	Allocations familiales (FLA)	Ordonnance concernant protecteur pour plants Loi sur la protection de l'environnement (LPE) Loi sur la protection des eaux (Leaux) Loi sur la protection de la nature et du paysage (NHG)	Protection des appellations d'origine (GUB/GGA) Ordonnance sur la promotion des ventes de produits agricoles	Droit foncier rural (LDfR) Loi sur l'aménagement du territoire (LAT) Ordonnance sur les améliorations structurelles (OAS) Droit concernant construction et l'accession à la propriété de logements dans les Alpes	Ordonnance sur la formation professionnelle agricole (OFPA)	Loi sur l'aide aux investissements dans les régions de montagne (LIM) Arrêté fédéral instituant une aide à l'évolution structurelle en milieu rural
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Figure 4.27: Priorities of the Swiss agricultural policy

4.5.3.1 Contents of the instruments relevant to Swiss mountain areas and differences to EU-instruments

Quantity control

Milk production as a third of total production plays an important role in Swiss agriculture. Quantity control of milk became necessary due to years of overproduction. As a consequence, the limitation of quotas has been introduced (Regulation on the Limitation of Quotas, SR 916.350.101).

Objectives: The adaptation of the quantity of milk to the conditions of the market, a limit on the expense of milk production, as well as control of the price.

Measures: The quota of milk is the quantity which is allowed to be sold by the producer during one year ("milk year"). This measure indirectly supports prices. Since 1999, the trading of quotas is permitted. Through such trading, producers are capable of reacting to market conditions more flexibly, and of taking full advantage of their production potentials. The transfer of quotas is no longer bound to the existing agricultural environment, however ecological performance is the precondition for the purchase of quotas (see below). In order to avoid the loss of quotas in the mountain areas and to maintain the production potential in disadvantaged areas, the transfer of quotas from mountain areas to the valleys is prohibited.

Comparison to the EU: Limitations of production, such as the milk quota, are regulated in the EU by the member states. This is also true for the trade of milk quotas.

Price support

The support of prices has traditionally been organised within the milk and meat spheres by a guiding price set by the Federation. This price freeze has been reduced by Agricultural Policy 2002. Besides price support, import regulations and market relief measures are important elements of price regulation in Switzerland.

The guiding price has been replaced by a target price which is 10% lower. This serves only as a measurement, a level of orientation for use in the composition of agricultural policy; the real milk price is subject to private agreement between producer and purchaser. Prices are additionally supported by contributions to home sales and the export of products. The period of validity of the present legislation is restricted to 10 years (**Regulation on Target Price, Allowances, and Aid in the Dairy Farming Area, SR 942.359.1**) A further reduction of price supports can be expected assuming that present intentions at the global level (WTO

etc.) and Swiss agricultural policy continue to aspire to an approximation in Switzerland of conditions that exist in the European area.

Objectives: The security of essential income components based on product price and support for agricultural products.

Measures: The Federal Council fixes a target price for milk, and if the market price happens to diverge from that target price, an adjustment of agricultural policy and also of the target price may be necessary. The target price serves as an orientation level for negotiations between producers and purchasers. Due to the producers' **additional expenses** (e.g. for milk processed into cheese and milk produced without silage), milk becomes less expensive for processing industries, so they are able to produce cheese at competitive prices and to export increasingly without subsidies. **Contributions for home sale and export** aim at an improvement of selling conditions (e.g. the export of cheese to countries outside of the EU).

Comparison with the EU: The EU annually promulgates fixed guiding prices for milk and dairy products. If the market price falls below that guiding price, market intervention becomes necessary. This system is also maintained within Agenda 2000, but guiding prices are gradually reduced. Contributions for home sales and exports support the improvement of selling conditions. On the other hand, there are no contributions for milk processed into cheese as a measure for the reduction of prices.

In Switzerland the price levels for agricultural products are higher than in other countries. This is why the protection of the domestic market from low-priced imports is of major importance (**General Regulation on the Import of Agricultural Products, SR 916.01**). In accordance with WTO negotiations, customs barriers have replaced the former import restrictions. In the future, these customs barriers will be reduced per international agreements.

Objective: The protection of the home market from imported, low-priced agricultural products.

Measures: Import controls follow a differentiated periodic implementation of the **customs burden** as part of the **customs limits**. Minimal market access must be guaranteed. Imports allowed at a reduced tax rate through the customs limits are sold to the highest bidder. For the import to be admitted at the customs limit rate, the existence of such a home industry (e.g., in the case of the meat industry) is also necessary (overtaking of similar Swiss products). Imports outside of the customs limits are highly taxed and are thus of less importance.

Comparison with the EU: Standard import controls are the common customs duties. Agenda 2000 provides for customs limits and import licences for individual market areas. In distribution, various procedures could be applied; however a commitment to home production or an increase to the high bid are not planned.

Market relief is possible through the buying up and storage of the products or through the support of exports. Most important for the mountain economy, outside of the milk sector, was above all the relief buying of breeding and productive stock out of the mountain region. This device was replaced under the aegis of Agricultural Policy 2002 (**Regulation on Meat Stock and the Meat Market, SR 916.341**) by market relief measures to prevent short range price collapses. One important export support for the meat market focuses on breeding and productive stock (**Regulation on the Allowance of Contributions to Animal Husbandry, SR 916.310.31**). Market relief measures in other areas, for example for fruit, are less significant for the mountain areas.

Objective: The continued maintenance of the minimum price.

Measures: As market relief, the removal of the customs limit charge entitlements can be forced by frozen prices. Moreover, voluntary storage actions are possible, the costs are financed by the meat fund, which are in turn defrayed through a dedicated portion of the revenues generated from meat import duties. In extraordinary situations (i.e. an epidemic), the Federation can arrange financing.

Comparison with the EU: The EU also provides market relief measures, in particular the buying up of specific products (e.g., beef and butter) at an intervention price. There is also aid available for private storage concerns. Aside from these active measures, a customs regulation for imports, and a system of compensation for exports stabilise the common market. A complex financial and personnel system controlling imports as exists in Switzerland however is still neither provided for nor applied.

Quality requirements

Quality requirements should improve the marketability of products. As yet, only the essential characteristics of quality control have been established by the Federation. In the future, detailed requirements, for example milk quality, should be agreed upon directly between producers and consumers (**Regulation on Quality Security and Quality Control in the Milk Sector, SR 916.351.0**). In the case of meat production, the state should guaranty impartial quality classification.

Objective: The dependable maintenance of product quality.

Measures: The establishment of responsibilities within management as well as organization of the inspection and consultation boards, and the establishment of essential basic requirements (e.g., germ content).

Comparison to the EU: Different products have different quality standards. These standards apply both to products produced inside of the community and to those imported from outside. A higher importance in the EU will be ascribed to the protection of quality, which is shown in the example that the quality standards in general requirements apply to both price support measures as well as to buy-ups at an intervention price.

Direct payments

Direct payments are distinguished between those which have environmental requirements and those without such directions.

Since the introduction of direct payments in 1993, an improvement of the environmental situation in agriculture has been achieved, the largest part of that improvement coming through the promotion of Integrated Production (IP). IP managed areas increased concomitantly through 1998 to approximately 77% of the total agricultural usable areas. In this light, new requirements were established for a general reorientation of Agricultural Policy 2002 in which ecological direct payments (excepting summer contributions) were linked to general ecological operational performance in conformance with the IP standard (e.g., proper dung proportions, at least 7% ecologically disused areas, instructions for the use of plant processing materials, and observance of the animal protection law). Direct payments are also linked to operational requirements (e.g., work minimum, minimum size), as well as maximum values (the manager's income, property, size of livestock herds).

In addition, financial aid for the usage of alpine pastures during summer, also bound to the minimal environmental duty, is still of central importance for the mountain areas.

Direct payments independent of environmental duties have passed into the background since the agricultural reform. Relevant to the income situations of agricultural concerns are the **family allowances** (child and household), which since 1952 have assisted agricultural workers and small farmers (who are subject to mountain and area wage limits). These are socio-politically motivated payments corresponding not to ecological duties, but to the improvement of the social situations of farm families with children, and of low-wage earning agricultural employees.

The central instrument is the **Regulation on Direct Payments in Agriculture (SR 910.13)**, which differentiates between general and ecological direct payments.

Objective: The division of general economic and ecological objectives as well as a mitigation of natural production disadvantages.

Measures: General direct payments:

A uniform **area contribution** per hectare as a basic contribution to income security will be paid. There are also **contributions for the maintenance of raw-fodder consuming productive animals** (beef cattle, bisons, sheep, llamas, etc.) depending on the species. For the individual agricultural zones (arable land-zone up to mountain zones IV) there are contribution limits based on different maximum herd size per hectare. The herds are reduced depending on the amount of milk marketed (production management).

Contributions for animal maintenance under difficult production conditions (formed into steps according to the agricultural zone) should reflect the natural production disadvantages of the hill and mountain situation. Due to unfavourable conditions, hay production should be implemented in these zones and maintained through the **slope contribution** for slopes and steep situations (greater than 18% inclination).

Ecological contributions:

Ecological contributions will be assessed for ecological compensation areas as extensively used meadows, less intensively used meadows, straw fields, hedge-, field- and shoreline woods, colourful fallow, rotation fallow, preserve areas within arable land as well as specific fruit orchards. Detailed minimum standards are bound to the individual areas (extension, cultivation management, term of contract, etc.). There are also areas which do indeed satisfy the ecological performance proof (see above) and so could get the necessary 7% ecological arrangement, for which however no contributions will be paid out, as for example extensively used meadows, forest meadows, single trees drywalls, unsecured natural trails.

Especially encouraged will be **extensive production of grain and rape** as well as **biological agriculture**. The contribution for biological agriculture is contingent upon the type of cultivation and is formed into steps. For the grassland areas it is relatively small. In this area in the future, the market should guarantee better prices for biological products, making this form of production more attractive. There is also a special support of animal-friendly husbandry techniques such as roomier stalls and regulated free running.

Comparison to the EU: There are both common direct payments and national direct payments, which are based on national rights in the EU. Since the Agrarian Reform of 1992, the European Union guarantees different direct payments for beef cattle and cows as well as for specific cultivated plants (area and animal maintenance contributions). Limiting cultivation intensity should oppose quantitative increases. The same conditions exist for all of the member states. The level of the contributions for different cultivated plants and for shutdowns is derived as a function of the amount of arable land, the reference yield, plus a basic contribution. With regard to contributions for beef cattle, mother cows and male beef cattle take the highest priority. Direct payments made on their behalf will be of the maximum levels. Given a shortfall, the maximum limit will be adjusted and distributed among all direct payments.

The member states have the option of mitigating production disadvantages in difficult areas through several direct payments, which will be stepped in value to reflect the extent of the natural disadvantages. The member states could further differentiate the direct payments for example based on ecologically friendly cultivation methods, though the levels of the payments may not be raised over those named in the European frame law, leaving the individual member states very little leeway in this regard.

The essential differences in comparison to the Swiss system are that many direct payments are not linked to ecological duties (exception 2078/92), that area contributions are dependent on cultivation type, and that reductions in animal contributions on a few species have been implemented, all of which producing significant differences in the levels of support. This is how the Swiss system overcomes the limits on the highest allowable amounts paid in the community.

The Agrarian Reform Agenda 2000 allows animal and area-based supplementary contributions, and raises the maximum allowable high limits (mother cows, milk cows, basic award) in steps. This process is linked to the economic duty, and the individual member states make their assertions with regard "*to the special situation of the agricultural areas in question*".

There is no EU requirement for all member states which links direct payments to compliance with uniform ecological minimum requirements (e.g. the IP standard). The specified levels of the contribution amounts do not reach those of Switzerland (e.g. the green land contribution for 2002: 350 ECU's vis-à-vis Switzerland's actual area contribution of 750 ECU's).

In the area of environmental duties-linked ecological direct payments (2078/92) there is however for the individual member states a good deal of leeway for the imposition of measures. Direct payments may be

granted for the implementation of biological cultivation techniques, the restriction of dung and plant protection materials, the extensive use of the areas, the reduction of the animal stock, the breeding of endangered animals, and a cessation of the ploughing of fields. The frame law reduces the level of the different ecological payments, possibly causing further stock-ups on the part of the member states, as shown by the example of Austria.

In the area of animal protection direct payments there exists in the EU nowadays no analogous regulation or exemption that would permit such direct payments to be made to the states.

In the area of family allowances in the EU there is no comparable direct payment that is directed exclusively at the agricultural family. However the lack in Switzerland of a pre-retirement regulation is currently being addressed.

Objective of the Regulation Concerning the Contribution to Agriculture because of summer usage of alpine pastures (SR 910.133) is the realisation of alpine economic benefits.

Measures: A summertime stock contribution will be paid out. This contribution is predicated upon different environmental instructions (minimal meadow fields per LU, a ban on nitrogenous dung, etc.).

Comparison to the EU: The EU has no analogous support. Payments are only possible within the frame of the compromise for complicated production conditions. Here in any case the relatively strict higher limits of the contribution levels would be problematic.

Protection of the environment

Switzerland has strong ecological regulations in general. Especially significant for the mountain regions are the **water** and **animal protection laws**. In the area of water protection, most important are the proper dung composition balance and the prescribed capacities for farm-dung minimum storage, designed to fit the cantons' individual climactic realities, and could be raised when taking into consideration the entire country's areas. The water protection law has been providing an extensive investment impetus to agricultural operations, and is at the present time largely realised. The observance of the water and animal protection regulations is a basic prerequisite for the continuance of direct payments. The determinations represent a significant factor for the operations' management considering their capital needs in case of a shortfall, which could provoke a difficult problem for the farm.

The **Nature and Homeland Law** is significant for the farmer, especially with regard to the protection of special structured areas with high natural importance (biotopes). The awards which are bound on the

maintenance of these areas can constitute essential income components for individual operations.

Comparison to the EU: The water and animal protection supports of the EU are not as strong as in Switzerland; this is due partially to higher production costs.

Marketing

Marketing under the aegis of Agricultural Policy 2002 were newly organised and the earlier half-state marketing organisations (Cheese Union, Butyra) dissolved. The producers and processors should now be responsible for the marketing of their products, a situation which, due to the conditions of the past few years, is indeed becoming more frequently the case.

The opportunity to register an agricultural trademark was established in 1997 (**Regulation on the Protection of Source Names and Geographical Specifications for Agricultural Products, SR 910.12**). This law regulates the extent of protection and the entrance and control procedure for agricultural products and establishes the basis for the creation of labels for agricultural products. It is most important for export products, as it provides for easier access to external markets, and so in the future should increase in significance. The availability of financial support to encourage wider distribution of agricultural products has recently been instituted to replace marketing organisations (**Regulation on the Support of Distribution, SR 916.010**). The Federation can take up to a 50% interest in the costs incurred in the marketing and communications areas of agricultural products, on the regional and national levels, as well as abroad.

Comparison to the EU: Through the framework of the Agrarian Reform of 1992, the EU has regulated the protection of geographical specifications and source products. Provision has been made within the framework to address marketing problems, for example through investments (Reg. 951/97), or regional development (LEADER II). The EU concentrate more on the establishment of competent marketing organisations (support of the unions, etc.) and less on the actual marketing of the agricultural products.

Production basis

The availability of appropriate operational product basis is the pre-requisite for the Swiss agricultural competitiveness. Here were essential above all the rules regarding the ground (ground / inheritance, Space Planning Law) as well as the support of operational infrastructure improvement.

In view of the high cost of real estate in Switzerland, the securing of agricultural production area was of central importance, especially when considering the existence of other land interests (e.g. tourist and settlement areas). The **Space Planning Law** regulates the cost development of agricultural land through the production of single use zones. Also, since the 1998 revision, certain new commercial activities (e.g. horse hotels, vacation on the farm) have been instituted. The **Federal Law on Farm Land Rights** regulates the acquisition of agricultural businesses, lands (concession duty) and hereditary shares. The law stipulates that the acquisition of an operation is permitted only by the self-employed. Of central significance for the mountain regions is support of improvement of the agricultural production basis (**Regulation on Agricultural Structural Improvement, SR 913.1**). The Federation gives financial help for structural improvement in the form of contributions as well as investment credits. So-called "A-Funds-Perdu-Contributions" will be brought into effect for community works ground improvement (e.g. land apportionment and water supply), for individual operations' projects (e.g. courtyard approach roads) as well as for individual farm, alpine and common buildings (such as local cheese factories) in the mountain area. Also available are new contributions for ecologically directed initiatives, such as land acquisition for the reverse-formation of small waters, the creation of ecological network development, and awards for especially animal-friendly stall maintenance systems.

Further investment credits can be granted, for example one-time start help for young farmers, for construction or renovation of living or farm buildings, or for the purchase by a lessee of a farm operation. The long-range viability of the operation must be proven to obtain investment help, and it must also satisfy among others the ecological performance test. A good percentage of the investments are part of a stimulation investment action, which has been underway through the past decade. In this light, seen internationally, the Swiss farms in the mountain areas can boast of a high modernisation and development standard.

Comparison to the EU: The EU likewise grants aid and investment credits for independent operations and young farmers. These are as a rule hard and fast goals, such as improvement of marketing or product quality, or bound to the environment. The EU's promotion of investment in independent operations follows the Swiss example of contribution payment closely, but in Switzerland there is stronger support between the mountain and valley areas than in the EU (Stucki et al. 1994)

Vocational training measures

The human resources at hand should indicate the need for farmer vocational training. The central concern is the promotion of understanding of commercial, technical, social and ecological associations.

In addition, consultations with independent operations should improve the technical and commercial operational management and thereby, social conditions. Consultative services will support such objectives. An operation counsellor is responsible in each case for a large number of farmers (**Regulation on Agricultural Professional Training, SR 915.1**).

Comparison to the EU: Aid within the EU is available for the member states' continued training of farmers, but the foundation of consultative services is left to the member states themselves.

Regional development

The central support of regional development is the **Federal Law on Investment Aid for the Mountain Area (SR 901.1)**, through which the Federation has since 1974 made loans or provided contributions on interest on outstanding financing from infrastructure projects. Requirements for the aid is a regional development promoter as well as a development concept.

Regio Plus, introduced in 1998 (**Regulation on the Support of Structural Changes in the Countryside, SR 901.3**) should promote the proliferation of mechanisms, structures and systems aimed at strengthening co-operation and experience exchanges among regional actors, which should in turn engender regional development of the countryside. In this respect, the instrument provides impetus to project promotion and supports above all projects of an exemplary character.

Comparison to the EU: The program LEADER has been implemented by the EU especially to promote countryside development initiatives within specific areas (Objectives 1 & 5b), particularly the experience exchange of regional actors and innovative measures for new developments in the countryside.

4.5.4 Selected effects of the Swiss Agrarian Reform in comparison to EU

The objective of the maintenance of agricultural production over many years required an intensive support of the agricultural product price. This support was increasingly replaced by similarly high direct payments. Switzerland, next to Norway and Japan, can count itself among the international top spenders with respect to general active support in the agricultural area; the entire extent is about twice as high

as in the EU (OECD 1997). This fully represents one of the essential differences between Switzerland and the EU. This strong promotion has corresponding influences on agricultural structures. In comparison to the other alpine states, for example, in the mountain area of Switzerland there is a greater number of operations that could be characterised as being relatively small, though highly lucrative. Considering the significance of the mountain region within the total land area, the arrangement concerning difficult production conditions has at all times been a particularly central issue in Swiss agricultural policy. Accordingly, eight different production zones were differentiated, from agricultural areas to mountain zones I-IV. In this system, difficulties are analysed and categorised, then more strongly financed than is the case in the EU to offset the difficulties. Given especially the structural policy, the Swiss mountain regions enjoy an essentially better situation than do those in the EU (Rieder 1998).

Through the aids of direct payments and strong difficulty differentiation, area farming use has been able to obtain significant support. At this time therefore, even in the more unfavourable cases, as opposed to the situation in the alpine regions, vacancies on the areas are very rare indeed. Thus in general the expanses of agricultural use areas have not changed in the last thirty years.

The high direct payments made possible a direction of agriculture toward an enduring production. The new linking of all direct payments to an ecological standard (IP's evidence of ecological performance) may cause the decline of conventional production and thus provoke a forbearance in the misuse of the ecological resources earth, air, and water.

Along with that has the requirement of maintaining 7% ecologically disused areas driven on the operations an increase in the worth of this land, which farmers frequently considered as useless; to the farmers' attractive individual locally expressed supports (e.g. for extensive meadows and hedges), can be added the positive effects in the sense of the methods of cultivation as well as maintenance of biodiversity. Because of the support, animal-friendly maintenance systems have proliferated.

The linking of direct payments to ecological and animal protection concerns has won the approval of the general public, as reflected in the population's arguments for the necessity of direct payments and in their actual requirement of them. Such a situation has developed as a consequence of the fully effective measures directed toward an ecologically oriented shape of the mountain economy.

Such a strong ecological linking of direct payments with the minimum standards is not planned in the EU during the conversion to Agenda 2000. In addition, the EC in comparison to Switzerland pays

out a relatively small contribution level and therefore presents to the farmer a smaller incentive. Promotions for animal protection are completely lacking.

The significance and success of the Swiss agricultural political measures must be judged in the light of the germane economic, ecological and social points (**Regulation on the Judgement of the Condition of Agriculture, SR 919.118**). Among others should be considered, as much as the ecological measures allow, the objectives set in mitigating the ecological burden and the corresponding positive effects achieved on biodiversity. At the present time, such analyses are in progress (Bundesamt für Landwirtschaft, 1998). A corresponding comprehensive mandate is lacking in the EU.

With the new Swiss Agricultural Policy 2002, agriculture will be subject to market forces. The system of state-fixed guiding prices with a guaranty of purchase, that in spite of Agenda 2000 will be preserved in the EU, will be discontinued. Market relief measures are only in special situations permissible. A difference compared to EU policy is the allowance of imports, which will provoke price deflation of domestic products (e.g. the binding of customs revenues to objectives and measurements, and the possibility of the domestic market being taken over by import quotas). Here the price gap in comparison to foreign products as well as the lack of agricultural products are used to support the domestic products. A further opening of the markets will decrease these possibilities.

In general it can be observed parallel reforms of Switzerland's Agricultural Policy and those of the EU. Given their basically higher direct payments, Switzerland has the larger business leeway, but also has to deal with the negative consequences of the market liberalisation. Further, the direct payments would be bound in an essentially higher degree on the fulfilment of ecological criteria, producing a workable possibility of influence on agricultural ecological issues.

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4.6 Further analysis of the model regions: Relevant instruments, farm strategies, environmental impacts

*Roland Kals, Richard Dietrich, Alex Agethle, Peter Eggenberger, Hans Josef Kienzl,
Flavio V. Ruffini, Rudi Staub, Erich Tasser and Christine Vigl*

4.6.1 Expert interviews

4.6.1.1 Introduction

After defining the various cluster classes and selecting model regions for each class, the expert interviews were intended as a first step to provide specific information about each model region concerning:

- the importance of EU-regulations and directives
- the quality of conversion of EU-instruments into national or regional law
- the effects of EU-instruments on farm strategies
- the main problems and needs of farmers
- the necessary measures for the future

Pre-tests with a preliminary questionnaire were executed which led to some minor modifications of the questionnaire.

For each model region ten to twenty experts were selected from different fields:

- Administration
- Farmers' organisation
- Co-operatives or marketing institutions
- Regional development institutions
- Science and research
- Nature protection institutions

Main criteria for the selection of experts was their knowledge of the regional mountain agriculture. Although the involvement and the specific expertise of the experts were differing it seemed useful to have different perspectives to draw a realistic picture of the effects of EU-instruments on agriculture and the farmers in the region.

4.6.1.2 Structure of the questionnaire

First, experts were asked about the importance of single EU-regulations and directives for the agriculture in the model regions. This led to a ranking of EU-regulations for each model region. Additionally

the quality of national conversion or implementation of each regulation through the national and provincial offices was questioned.

Main emphasis of the survey was laid on a list of farm strategies. These farm strategies are indicating possible changes in land use or farm management. One question asked directly for the three main farm strategies in the model region.

These farm strategies also served as indicators for the effects of specific groups of policy instruments. All EU-regulations were systemised into such groups of instruments (for details see Section 4.3). This led to nine different groups of EU-instruments like price regulations, direct payments with environmental obligations, etc..

The effects on the farm strategies could be attributed positively or negatively on a scale from -2 to +2 by the experts. In case of a strong influence on the farm strategy (-2 or +2) experts were further asked for any positive or negative environmental effects. As results for the latter were only few and too vague, potential environmental effects of changes in farm strategies will be assessed at a later stage, based on scientific knowledge.

The complete list of farming strategies was slightly remodelled for the farmers survey by using the results of the expert interviews.

The expert questionnaire consists also of a list of open questions regarding the general situation of agriculture like the state of mind of farmers (a scale from 0 - 10), the main problems for farmers and wishes for the future agricultural policy of the EU for the model region.

The main results of the expert interviews are presented in the following sections first for each model region and second as an overview of all regions focusing on the effects of groups of EU-instruments on farm strategies.

4.6.1.3 Results in the model regions

Unterland-Überetsch

This Italian model region is mainly characterised by a high number of farms specialised in permanent crops and a high number of family and non-family workers per agricultural area.

Because of the rather high fruit and wine prices of some years ago as well as of the high agricultural productivity in the Unterland-Überetsch the overall atmosphere is considerably better than in the other model regions of the Italian alpine region. The state of mind of farmers is rated with almost 5 in a scale of ten.

Prospects for the future are mixed as prices for fruits will most likely decrease, due to a fierce competition on the national and international markets. The wine market seems to be more stable. Farms are quite small with almost no possibility to increase their size. The necessary introduction of new fruit varieties on the market is a difficult process and the planting of fruit trees needs high investments, which are more difficult to finance when prices for apples are continuously falling.

Main regulations for the region are clearly connected with dominant land use features (Table 4.21):

Table 4.21: The main regulations in Unterland-Überetsch

Regulation	Importance (1 to 4)	Implementati on quality (-2 to +2)
R 2200/96 on the common organisation of the market in fruit and vegetables	3.3	1.3
R 822/87 on the common organisation of the market in wine	3.7	0.7
R 823/97 laying down special provisions relating to quality wines produced in specified regions	3.5	1.0
R 951/97 on improving the processing and marketing conditions for agricultural products	3.2	1.6
D 91/414 concerning the placing of plant protection products on the market	3.1	1.0

Those EU-instruments which support the marketing as well as quality requirements for such products are highly relevant for the region. This model region is quite untypical as regulations containing direct payments are of no major importance.

The main farm strategies in the region are:

- Specialisation
- Modernisation
- Increase in labour intensive land use activities

Strategies are clearly reacting to the economic pressure through specialisation and modernisation. Limited farm size and a lack of available areas, which disables the enlargement of farms, forces up an even more intensive farming on the available fields.

South Tyrolean mountain region

The South Tyrolean mountain region is mainly characterised by small farms, an extremely low rate of farm closures, a high increase in part time farming and an extremely high rate of permanent grassland in relation to the total agricultural area.

The state of mind is somewhere in the middle of all regions with 4.1.

Main problem is the falling of prices for milk, meat and timber as main products on the one hand and the rising of production costs on the other hand. Possibilities for the future development are limited due to small structured farms, no land to grow in size and missing alternatives for the current products.

Instruments supporting marketing like Regulations 952/97, 2081/92 and 804/68 are prominent showing the importance of the product related income for agriculture in the model region. Following are direct payments through Regulation 2078/92 (environmental measures) and 950/97 (compensatory allowance) (Table 4.22).

Table 4.22: The main regulations in the South Tyrolean mountain region

Regulation	Importance (1 to 4)	Implementati on quality (-2 to +2)
R 952/97 on producer groups and associations thereof	3.8	1.3

Table 4.22: continued

R 2078/92 on agricultural productive methods compatible with the requirements of the protection of the environment and the maintenance of the countryside	3.4	0.9
R 2081/92 on the protection of geographical indications and designations of origin for agricultural products and foodstuffs	3.4	1.1
R 804/68 common organisation of the market in milk and milk products	3.3	1.9
R 950/97 on improving the efficiency of agricultural structures	3.2	1.2

The main farm strategies in the region are:

- Specialisation
- Increase of part time farming
- and Intensification.

High milk quotas as well as marketing support measures are resulting in specialisation of the South Tyrolean mountain farmers on milk products. Nevertheless too small farms, the low milk price and comparatively high costs of production as well as a lack of possibilities to extend the farms are leading to the fact that quite a number of farmers are forced to practice a second occupation.

For those staying full-time farmers intensification offers a possibility to compensate the disadvantages due to the small structures and the low prices. They increase their milk production by importing fodder. In South Tyrol this is still possible as the milk quota is regulated by the province and thus does not limit the milk production.

Piave

Agricultural activities in the region are underdeveloped compared to average standards of production with mostly small farms and many part time farmers. The share of older people working in agriculture is above average. Farmer's state of mind is assessed 2.3, which is very low. Only few farms have secured the continuation of activities in the next generation.

Table 4.23: The main regulations in Piave

Regulation	Importance (1 to 4)	Implementati on quality (-2 to +2)
D 92/46 health rules for the production and placing on the market of raw milk, heat treated milk and milk based products	4	0.3
R 804/68 common organisation of the market in milk and milk products	4	-0.3
R 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside	3.7	1
R 2052/88 on the tasks of the Structural Funds and their effectiveness and on co-ordination of their activities between themselves and with the operations of the European Investment Bank and the other existing financial instruments	3.6	0.4
R 1765/92 establishing a support system for producers of certain arable crops	3.5	1.8

Regulations securing direct payments are most important. The Piave area on its valley floor grows vast acres of cereals, and hence the Regulation 1765/92 is important in this area.

On the upper terrain of the model region, in the more mountainous area, dairy farming is the main activity and hence the importance of Regulation 804/68 and Directive 92/46. The quality of implementation especially for the Regulation 804/68 is termed to be rather unsatisfying mainly because of the lacking milk quota (Table 4.23).

The main farm strategies in the region are:

- Modernisation
- Specialisation
- Abandonment of agricultural land.

Modernisation and specialisation are seen as the main consequences of the EU-policy. There has also been an increase in organic production, while there was a net decrease of agricultural area. This has been stated by the fact that many farmers have rented out land or sold it to gain some extra income. Strategies show a clear split of the today's farms as some are active in adapting the farm to modern operations

whereas others are heading towards abandonment of land which is a clear sign of resignation.

Carnia

The model region Carnia is characterised by a decrease in agricultural area, extremely small farms, an increase in the percentage of old farms and an extremely high rate of farm closures.

Carnia region has the lowest value in terms of farmer's state of mind with a value of 2.2. Farmers problems are too much bureaucracy and over-abundance of regulations restricting the way of farming.

Farmers are old aged. This leads to a pessimistic view of the future with little hope that their children will take up agricultural activity.

Table 4.24: The main regulations in Carnia

Regulation	Importance (1 to 4)	Implementati on quality (-2 to +2)
D 92/46 health rules for the production and placing on the market of raw milk, heat treated milk and milk based products	3.8	-0.8
R 950/97 on improving the efficiency of agricultural structures	3.4	0.9
R 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside	3.3	0.8
R 2081/92 on the protection of geographical indications and designations of origin for agricultural products and foodstuffs	3.3	0
R 2082/92 on certificates of specific character for agricultural products and foodstuffs	3.1	0.2

Since the farms of the area specialise on dairy farming, it is the directive concerning milk quality that affects the farmers the most. The amount of cows owned and the size of the farms in the Carnia area are very small, this means that EU regulations which emphasise the need for control on the quality of milk and hygiene, act as a big restraint to the small farm owners. This pushes a certain part of the farmers to close down. This can also be seen by the low implementation rates given for Directive 92/46 in Table 4.24.

Furthermore direct payments through Regulation 950/97 and 2078/92 are most important.

The main farm strategies in the region are:

- Modernisation
- Abandonment of agricultural land
- Food processing and direct marketing

To conform to the EU regulations, especially concerning milk hygiene, the farmers are forced to modernise their machines and equipment.

Another pattern which can be found throughout the Carnia area, is the abandonment of land which leads to a decrease of agricultural area.

The origin or specific character of some produce seems to take an important place and is expressed in the farm strategies, as an increase in direct sales has been noticed in the area.

Murau

In the Murau model region a large number of people are still working in the primary sector but there are strong trends towards part time farming.

This Austrian region is just below the average in the farmer's state of mind with a value of 3.2.

Succession of farms is not secured in many cases. Organic farming is widely spread with very motivated youngsters. As productivity generally is very low some intensification process is happening. Direct payments are important but are area-bound therefore obstructing the leasehold market giving active farmers no possibility to increase the size of their farm.

Table 4.25: The main regulations in Murau

Regulation	Importance (1 to 4)	Implementati on quality (-2 to +2)
R 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside	3.7	1.4
R 804/68 common organisation of the market in milk and milk products	3.7	1.1
R 950/97 on improving the efficiency of agricultural structures	3.3	0.6
R 2092/91 on organic production of agricultural products	3.3	1.3
R 2052/88 on the tasks of the Structural Funds and their effectiveness and on co- ordination of their activities between themselves and with the operations of the European Investment Bank and the other existing financial instruments	3.0	1.6

Regulation 2078/92 is accepted very well, also including the highest premiums for organic production defined by Regulation 2092/91. Regulation 950/97 is granting compensatory allowances which are heavily co-financed by the Austrian state and the province thereby securing production in mountainous regions.

Milk quotas are meagre and play an important income role. The price to buy additional quotas is unreasonably high. Nevertheless Regulation 804/68 received a quite high value for its implementation quality (Table 4.25).

Measures based on the structural fund are quite important and well implemented, bringing considerable investments into the region.

The main farm strategies in the region are:

- Increase of part time farming
- Change to organic production
- Increased share of imported fodder

The first two strategies both help to increase household income whether by looking for occupation outside the agricultural sector or by producing organic food. The import of fodder (mainly cereal) is a measure to compensate the lack of agricultural land and to increase the output of milk and meat.

Innsbruck Land

This model region in Austria is dominated by dairy farming in rather small farm holdings. It is third highest in the state of mind of farmers with a value of 5. This result can be attributed to direct payments which are considerably high for farmers in the region on the one hand and continuously falling prices and rising production costs on the other hand.

Farmers are forced to change their self-understanding being paid less for their high quality products and gaining their income more and more through premiums for providing public goods like landscape husbandry. It is understandable that this is causing a problem regarding the self understanding of farmers. Direct payment are also seen as a rather insecure income source.

Increasing bureaucratic work for direct payments is giving the farmers the feeling of dependence on the authorities.

Table 4.26: The main regulations in Innsbruck Land

Regulation	Importance (1 to 4)	Implementati on quality (-2 to +2)
R 950/97 on improving the efficiency of agricultural structures	4	1.2
R 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside	3.7	1.2
R 4254/88 laying down provisions for implementing Regulation (EEC) No 2052/88 as regards the European Regional Development Fund	3.3	-0.5

R 2092/91 on organic production of agricultural products	3	0.8
D 92/46 health rules for the production and placing on the market of raw milk, heat treated milk and milk based products	2.8	-1
R 804/68 common organisation of the market in milk and milk products	2.8	0

The main regulations are covering most important direct payments to farmers (Table 4.26). Regulation 2078/92 has a wide range of special measures in Austria which are well accepted and also important for the upkeeping of economically unattractive cultivation methods. A general support to mountain farming with considerable co-financing in Austria is given through Regulation 950/97.

Regulations concerning the milk production are important as well, but seen in a more negative light due to limited quotas and almost unreasonable quality standards for small mountain milk producers.

Regional development activities can give some incentives for common activities in the region and are a special new feature since the EU membership of Austria.

The main farm strategies in the region are:

- Modernisation
- Increase of part time farming
- Food processing and direct marketing

Using partly the new income source of direct payments, many farmers take the opportunity to modernise their farm and prepare themselves for awaited difficult times ahead. The trend towards part time farming is holding on, also due to good job opportunities in the region.

As prices are falling the strategy of food processing and direct marketing is meant to earn an additional income through upgrading raw materials and staying a full time farmer.

Garmisch-Partenkirchen

This model region at the foothills of the German Alps is dominated by intensive grassland farming with over 70% of part time farmers.

With a state of mind level for the farmers of 3.6 the region is just below the average of the model regions. This is caused by falling milk and meat prices and increasing bureaucratic work for the farmers. This will cause the further closing down of farms and a structural change in the region.

Table 4.27: The main regulations in Garmisch-Partenkirchen

Regulation	Importance	Implementati on quality
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	(1 to 4)	(-2 to +2)
R 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside	3.7	1.4
R 91/676 concerning the protection of waters against pollution caused by nitrates from agricultural sources	3.5	0.8
D 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market	3.5	1.5
D 92/46 health rules for the production and placing on the market of raw milk, heat treated milk and milk based products	3.3	0
R 804/68 common organisation of the market in milk and milk products	3.1	1.0
R 950/97 on improving the efficiency of agricultural structures	3	1.2

The importance of the Regulation 2078/92 as well as the importance of the Bavarian implementing measure called KULAP is confirmed by all experts. The classification of the importance with 3.7 and the quality of the implementation with +1.4 is the highest of all instruments in this region (Table 4.27).

With 3.5 the Directive 91/676 is classified very high because of the high intensity of grassland schemes. This indicates a high awareness of environmental issues by the experts.

Directive 92/46 was classified with 3.3. The neutral value of 0 for the quality of implementation reflects the different assessments of the experts. Positive assessments concern the contents of the directive. The neutral or negative classifications relate to the negative impact of the duty of modernisation, which causes big financial worries especially to small producers.

The importance of Regulation 804/68 for the region was classified with 3.1. The implementation of the quota for milk has obtained a quite high value of +1, because of "the big engagement of the state of Bavaria in this sector".

Regulation 950/97 has a positive effect on the change of landscape structure.

The main farm strategies in the region are:

- Increase of part time farming
- Specialisation
- Food processing and direct marketing

Lots of farmers are looking for a work outside agriculture and for opportunities to reduce production costs through specialisation in order to substitute income losses. Additionally direct marketing strategies should lead to better product prices.

Toggenburg

This Swiss model region is situated in the lower Alps dominated by grassland and forest. Agriculture is very important in the region.

The state of mind of farmers is assessed with a value 4.1, which is little above average of all model regions.

A main problem is the dependence on the cheese market, where already an overproduction exists. A further problem is the liberalisation of the market following the "New Agricultural Policy 2002" and the foreseen decline of the milk price.

Table 4.28: The main regulations in Toggenburg

Regulation	Importance (1 to 4)	Implementati on quality (-2 to +2)
SR 910.13 on direct payments in agriculture	3.9	
SR 916.350.101 on a milk quota system	3.5	
SR 915.1 on agricultural education	3.4	
SR 913.1 on improving the efficiency of agricultural structures	3.2	
SR 916.350 on subsidies in the milk sector	3	

The implementation quality for Switzerland shown in Table 4.28 could not be answered as regulations are developed and implemented just on the national level.

With the new agricultural policy direct payments are gaining the most prominent position with 3.9. Additionally the dependence on the milk market is expressed by the importance of two other regulations. The high rank of the regulation on agricultural education is very interesting and probably shows the importance of professionalism in Swiss farming.

The expected main farm strategies following the new agricultural policy in the region are:

- Change of intensity of grassland schemes (mainly extensification)
- Specialisation of production
- Increase of part time farming

For most of the farms arising difficulties at the milk market and increasing direct payments are reasons for pursuing extensification as main strategy. This is partially linked with an increase in part time farming. Specialisation, which is also a major farm strategy can be seen as an adjustment to compensate product price losses by lowering production costs. A smaller group of farmers will nevertheless intensify their production to overcome price losses.

Mittelbünden-Davos

The second Swiss model region in the central Alps is dominated by grassland, forest and non-productive areas.

The state of mind of farmers is 5.2, which is higher than in the other Swiss region of Toggenburg and second best of all model regions.

Main problems which farmers are facing are the decay of prices for the milk and meat and the loss of the traditional take-over guarantee. Important national markets are at a too great distance.

Main regulations for the region are (Table 4.29):

Table 4.29: The main regulations in Mittelbünden-Davos

Regulation	Importance (1 to 4)	Implementati on quality (-2 to +2)
SR 910.13 on direct payments in agriculture	4	
SR 910.133 on payments for alpine grazing in summer	3.3	
SR 916.350 on subsidies in the milk sector	3.3	
SR 913.1 on improving the efficiency of agricultural structures	3.2	
SR 916.341 on the market slaughter cattle and beef	2.9	

Implementation quality is again not assessed for this region.

Regulations guaranteeing direct payments to compensate price losses are again seen as most important.

The traditional form of alpine grazing in summer and its up-keeping plays a very important role in this region. Therefore such payments are important and were given a high value.

Other important regulations are helping to improve the efficiency of agriculture or the marketing of slaughter cattle and beef as an important product.

The main farm strategies in the region are:

- Change of intensity of grassland schemes (mainly extensification)
- Increase in organic production
- Increase of part time farming

The influence of direct payments on the first two strategies is obvious. The increase of part time farming is a by-product of extensification. Compared to other regions Mittelbünden-Davos is still on a very low level concerning part time farming. As a result of that strategy and to reduce farm labour, milk production is changed to cattle breeding.

Alpes-de-Haute-Provence

The French model region is located at the foothills of the southern French Alps with a high rate of farmers with sheep and goat breeding. There is a particularly strong decrease of part-time farming.

The mood of the farmers in the region is the most positive of all. According to the agricultural experts the current atmosphere among the farmers is valued with 6.1.

Table 4.30: The main regulations in Alpes-de-Haute-Provence

Regulation	Importance (1 to 4)	Implementati on quality (-2 to +2)
R 2052/88 on the tasks of the Structural Funds and their effectiveness	3.7	
R 3013/89 on the common organisation of the market in sheepmeat and goatmeat	3.6	
R 950/97 on improving the efficiency of agricultural structures	3.6	0.2
R 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside	3	0.3
R 2066/92 amending Regulation (EEC) No 805/68 on the common organisation of the market in beef and veal and repealing Regulation (EEC) No 468/87 laying down general rules applying to the special premium for beef producers and Regulation (EEC) No 1357/80 introducing a system of premiums for maintaining suckler cows	3	1

All mentioned regulations deal with premiums for different measures (Table 4.30). Regulation 2052/88 is particularly important for the sample-region with its national application measure called PDR (Plan du Développement Rural).

Regulation 3013/89, the interventions for sheep and goat breeding (PCO = Prime Compensatoire Ovine), is one of the most important sources of income for the farmers in the model region. The quality of implementation of the regulation is rather positive. The reason seems to be its simple handling which allows an easy implementation.

Regulation 950/97 was obtained an importance of 3.6 out of 4 points. This regulation is, according to the experts, one of the most important agricultural measures in the model region. Farmers receive an additional annual payment for the compensation of the permanent natural disadvantages.

Regulation 2078/92 is characterised by a multitude of national application measures. The most important of these measures for the model region is an incentive for extensification of the agricultural land use.

The main farm strategies are:

- Increase of farm size
- Modernisation
- Specialisation

Farms in the region try to enlarge their farms as the most important strategy. The other strategies are also important to compete with the growing economic pressure in agriculture. All three strategies can be seen as means to enhance production for some goods and thereby reduce production costs.

4.6.1.4 Common results of the expert interviews

Main EU - regulations

After a detailed description of each model region the following sections give an overview on some common results.

Summing up the average importance of each regulation of each model region, leads to the following list of the five most important council regulations. Table 4.31 gives some indication on a general importance of the various regulations in all model regions.

Table 4.31: The main regulations in the model regions

Number of document	Title of the document
R 2078/92	on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside
R 950/97	on improving the efficiency of agricultural structures
R 952/97	on producer groups and associations thereof
D 91/676	concerning the protection of waters against pollution caused by nitrates from agricultural sources
R 2081/92	on the protection of geographical indications and designations of origin for agricultural products and foodstuffs

The most important regulations for all model regions together were identified as Regulation 2078/92 and Regulation 950/97, both of which are contributing direct payments to the farms.

The legal counterparts of these two most important EU regulations in Switzerland are ranked first and fourth in importance there. The second place in Switzerland is occupied by the regulations on alpine grazing in summer and the milk quota system.

Next in importance by average is Regulation 952/97 although it appears only in the South Tyrolean mountain region in the list of important regulations. The important role of this regulation lies in financial support mainly for marketing co-operatives.

The prominent role of the Nitrate directive even for mountain farming is quite surprising. Although only mentioned as being important in the region of Garmisch-Partenkirchen, the values given by the experts are in average on a general high level.

The regulation for the protection of geographical indications, mentioned already as important in Carnia and the South Tyrolean mountain region, is also important on a general level.

Main farm strategies

Taking all model regions together results in a picture of the three major farm strategies in the different model regions of the Alps as presented in Section 4.6.3.1.

	Modernisation	Increase of part time farming	Specialisation	Food processing and direct marketing	Abandonment of agricultural land	Increase in organic production	Other strategies
Unterland-Überetsch							Increase labour intensive
Alpes-de-Haute-Provence							Increase of farm size
Carnia							
Piave							
S. Tyrolean mountain region							Intensification
Murau							Fodder export
Innsbruck Land							
Garmisch-Partenkirchen							
Toggenburg							Extensification
Mittelbünden-Davos							Extensification

Figure 4.28: The main farm strategies in the model regions

When distinguishing between southern and northern model regions, "Modernisation" can be found as a very important strategy mainly in the "south" and "Increase in part time farming" as a major strategy in the "north". Specialisation is of main importance in most countries of the Alps except Austria, Carnia region and Mittelbünden-Davos in Switzerland.

Switzerland is with two of its main strategies in line with other countries of the Alps. The change of intensity (mainly "Extensification" – strategy) seems to be a Swiss speciality probably as an effect of price losses for important products, which in turn makes existing subsidies for extensification measures more attractive.

Effects of policy instruments on farm strategies

Each policy instrument is substantiated by a bundle of regulations. For a detailed explanation of the groups see Section 4.3. Although the grouping of regulations in Switzerland was slightly different the answers by Swiss experts for the effect of the groups of instruments on farm strategies are comparable and therefore included in this section.

The following groups of instruments were differentiated:

- Quantity control
- Price support
- Quality requirements
- Direct payments with environmental requirements
- Direct payments without environmental requirements
- Marketing
- Production support
- Vocational training measures
- Regional development

The general importance of these groups of instruments was rated differently from region to region by the experts. Asked about the importance of the instruments, "price support" was not classified "very important" in any of the model regions (but three "minor important") and "vocational training measures" was assessed only once "very important" (but also three "minor important"). Therefore the effects on farm strategies of these two policy instruments, although they are included in Figure 4.29, can not be weighted the same as other "very important" instruments like "direct payments with environmental requirements" or "quantity control". Nevertheless all policy instruments were rated important or very important in nearly all regions.

In the expert interviews these groups of instruments were put into a causal relation with the farm strategies. As it was possible for the experts to rate the effects on farm strategies negatively or positively from -2 to +2, all values in-between can be found and theoretically a

total of 22 farm strategies (eleven strategies with two directions) could be attributed.

In Figure 4.29 an overview of the countable effects of each group of instruments upon the different farm strategies in all model regions is given. The selection is based on an interpretation of the ten tables each showing the effects of one policy instruments. Only effects that are rated below -0.5 or above $+0.5$ were counted as important and were taken into account. Single or contradicting effects for one farm strategy were not considered. Therefore the picture shows 14 important farm strategies out of the 22 possible, which are effected by policy instruments.

Dark fields indicate that the effects on the farm strategy can be found in more than 3 model regions. Grey fields indicate effects in two or three model regions. Blank or white fields indicate that no countable effect is given.

	Modernisation	Increase of part time farming	Specialisation	Food processing and direct marketing	Increase in organic production	Increase of farm size	Decrease of land abandonment	Decrease of farm abandonment	Other strategies
Quantity control	Black	Grey	Black	Black	White	Black	White	White	Increase of farm abandonment/ Increase imp. Fodder
Price support	Black	White	Black	White	Grey	Black	White	White	Increase imp. fodder/Intens. of grassland
Quality requirements	Black	Grey	Black	Black	Black	White	White	White	Increase of farm abandonment
Direct payments with envir. requir.	Black	White	White	White	Black	Black	Black	Black	Extensification/ Decrease imp. Fodder
Direct payments without envir. requir.	Black	White	Grey	White	White	Black	Grey	Grey	Intens. of grassland
Marketing	Black	White	Black	Black	Black	White	Grey	Grey	Incr. labour intens./Incr imp fodder/Intens. of grassland
Production support	Black	White	Black	Black	White	Black	Black	Black	Intens. of grassland/Incr. labour intens. /Incr imp fodder
Vocational training measures	Black	White	Black	Black	Black	White	Grey	Black	Decrease imp. fodder
Regional development	Black	White	Black	Black	Black	Grey	White	Black	Incr. labour intensive

Figure 4.29: Overview of the effects of policy instruments on farm strategies. Counting of effects (< -0.5 or > 0.5): 1 region or contradictory ... blank squares; 2-3 regions ... grey squares; > 3 regions ... black squares.

A clear result is that part time farming, which is an important farm strategy, is no direct effect of policy instruments, whereas modernisation and specialisation are important effects of almost all

policy instruments. Other farm strategies mainly effected by EU-instruments in many model regions are food processing/direct marketing, organic production and the increase of farm size.

Many important instruments have a clear effect on the increase of farm size to name another important farm strategy. This is certainly in line with the structural change going on currently in agriculture.

On the other hand it can be clearly stated that the instruments quantity control, price support and quality requirements do not have any effect on the avoidance of the abandonment of agricultural land or farms. On the contrary, the first and third instrument even increase farm abandonment.

Looking at the last column with the effects on intensification or extensification of grassland, most EU-instruments can be divided into two groups causing the one or the other. Important for the extensification of grassland schemes are direct payments with environmental requirements.

4.6.1.5 Use of expert interview results

The main function of the results of the expert survey was to build hypotheses about possible effects of EU policy instruments and to use them for the development of the questionnaire for the farmer survey.

The net of information gathered through the expert interviews gave an idea about

- the main EU-regulations in different model regions,
- the main farm strategies in different model regions,
- the effects of groups of EU instruments on farm strategies,
- the general importance of groups of EU instruments in different model regions.

Although the answers were quite hypothetical, they gave still hints for related issues which had to be covered in the further project work. The different characteristics between the model regions also became more evident.

Further it became evident, that some of the EU-regulations and related instrument groups would not necessarily be covered in the farm survey.

It also became clear that related environmental effects to farm strategies could not be gathered through the expert surveys and must be substantiated through a more detailed questioning in the farmer interviews and further interpretation based on scientific knowledge.

All this helped to build a questionnaire for the farm survey broad enough to cover all the different regional peculiarities.

4.6.2 Brief analysis of the landscape pattern

4.6.2.1 Aim and method

Supplementing the results of statistical investigation and expert interviews, it seems useful to chart the status of the cultivated landscape in nature.

Due to limited human resources, this analysis had to be informal (descriptive-qualitative technique), in practice carried out as a "scanning" of landscape-units.

The applied method is rather simple: Starting from the thesis that the more alpine agriculture is orientated towards sustainability the more ecological aspects of landscape will persist in stable condition, a representative selection of criteria were laid down, that had to ensure a clear assessment.

According to the definition of environmental impacts of alpine agriculture (which was deliberately extended) five groups of criteria were set up (see Table 4.32):

The "soil"-complex shall provide some information about actual denudation. "Water" stands for any remarkable influence on (in common) surface water, "flora /fauna / habitat" shall outline the character of hemeroby, "visual aspects" contain general information on the changing within landscape. Supplemental information ("vitality of farming") concerns with rural settings and considers well conditioned farms to be an essential premise for sustainable alpine agriculture.

In addition, some general information about geological characteristics, configuration of farm land as well as types of settlement is given.

Overlapping of contents was unavoidable to a certain degree. To obtain a general view on the condition of landscape this seems acceptable. In particular it was not possible to survey the whole region within reasonable expenditure. Thus only some of the most representative territorial units were discussed.

The chosen indicators are shown below:

Table 4.32: Analysis of the landscape structure: relevant indicators

Class / indicator	Arguments	Weight (in %)
Soil		sum: 100
Evidences of rapid mass movement	In alpine regions mass movement is of great importance, implication with changing land use is proven by enquiries	70
Sheet erosion	Implication with waxing cultivation of maize	30
Water		sum: 100

Class / indicator	Arguments	Weight (in %)
Noticeable eutrophication	In alpine waters increased portions of nutrients are observable without technical devices	10
Extensive buffers along riverbanks	Insufficient buffers indicate a higher risk of water pollution by fertilizing activities	60
Regulation of torrents	Indicates the sealing of the watercourses	30
Flora / fauna (habitat)		sum: 100
Nature conservation areas	Important component of ecological compensation areas	10
Wetlands	Important component of ecological compensation areas	15
Cuts by infrastructure (e.g. roads, circuit lines)	Values the coherence of landscape units	20
Condition of forest edges	If in good condition, high importance for ecological compensation can be assumed	20
Dimension of extensive cultivated areas	Gives information about biological diversity	35
Scenery		sum: 100
Small structures within the landscape pattern	Important impression of the variety of landscape pattern	30
Recent afforestation	Conspicuous element of the mutation of landscape	10
Big clear cuttings	Conspicuous indicates risky forestry, especially at mountainsides	30
Permanent fallows	Indicates mutations of land use	10
Scenic harmony of buildings	Supplementing indicator	10
Specific agricultural techniques creating visual impacts	Indicates the dimension of scenic harmony or, on the other hand, of visual impairment	10
Vitality of farming activity		sum: 100
Construction activity at farms (renewal, modernisation)	Indicates the vitality of local farming	40
Condition of agricultural roads	Important element of modern farming	30
Conflicts between farm sites and non-agricultural activities (e.g. remaining fields among settlements)	Indication for restricted agricultural plant management by claims of neuralgic neighbourhood	30

First, surveyors had to subdivide the region into homogeneous parts, using topographic borders such as ridges, glens, etc. Next step was the assessment of the observed criteria within the selected territorial unit. The survey was based on visual observation, commonly starting from significant viewpoints. Anecumene was not surveyed.

The screening covers 10 territories matching with regions created by fuzzy cluster analysis (see Table 4.33) and was carried out in spring and summer 1999.

Table 4.33: Model region and analysed territories

Model region	Belongs to cluster no. ..	Number of investigated territorial units
Unterland-Überetsch (I)	1	6
Alpes-de-Haute-Provence (F)	2	1
Murau (A)	3	11
South-Tyrolean mountain region (I)	3	2

Piave (I)	4	2
Carnia (I)	5	6
Mittelbünden-Davos (CH)	6	27
Garmisch-Partenkirchen (D)	7	1
Innsbruck Land (A)	7	1
Toggenburg (CH)	8	20

Each indicator had to be rated 1 (relatively best) to 5 (relatively worst). Results were summarised by regions at which each indicator was considered with a certain weight (see Table 4.32 and Section 4.6.2.4). So it was taken into account that indicators share unequal importance within their respective class on the one hand and unequal to observe on the other hand.

Because of the multidisciplinary composite of the survey team, it should be emphasized that inconsistencies in classification results have to be expected. The desired calibration (e. g. by cross-country assessment) could not be performed as financial and time resources were limited. Therefore the discussion of results needs adequate caution.

4.6.2.2 Important results within indicator-classes

Well graded soil-indicators

Most soil indicators are graded good or medium. Generally, soil erosion seems to be negligible whereas mass wasting has some importance. In particular the situation in Carnia is judged unfavourable: mass wasting at steep slopes can be frequently observed. Slides and slumps of certain amount, like debris from avalanches or mud flows, are reported from Innsbruck Land, Garmisch-Partenkirchen and in Unterland-Überetsch limited to the more mountainous parts. Naturally there exists a clear correlation with high relief and high slope-inclination. Moreover extraordinary avalanches and floods in winter 1999 left grave remnants in Garmisch-Partenkirchen, Toggenburg and Mittelbünden-Davos.

Direct effects of current land use can be found in special cases such as soil injury by treading cattle or road-construction in steep terrain. A connection between sheet erosion and pastured skiing slopes is reported from Garmisch-Partenkirchen.

Deficits at the watercourses

Unterland-Überetsch is valued particularly bad. Rivers often have lost their natural character, river banks scarcely show satisfactory quality, pollution of ponds and drainages are widely spread.

Water quality is also assessed unfavourable in Alpes-de-Hautes-Provence, here insufficient buffers between arable land and river beds seem to be the main problem. In the Swiss regions the situation along river banks is substantially better because of legal regulations. Ecological and scenic problems caused by intense construction against torrents are mainly reported from the South Tyrolean mountain region and Garmisch-Partenkirchen. Torrent regulation in Alpes-de-Haute-Provence is rare in general; more frequent only around densely settled areas. In these cases construction is so generous, that rivers can find sufficient space for deposition of debris.

Deficits referring ecological compensation

Within this subgroup Unterland-Überetsch is valued badly again. Wetlands, areas of extensive land use and well shaped forest-edges are very rare as well, accompanied by substantial disrupting of landscape by streets or other infrastructure. Small shaped nature reserves are frequent but they lack in ecologically sufficient continuity.

Garmisch-Partenkirchen, Innsbruck Land and South Tyrolean mountain region are classified in a similarly unpropitious way: i. e. bad shaped fringes or rare areas of higher ecological quality. Even though in Garmisch-Partenkirchen small shaped bogs can be found repetitively in the cultivated area.

It is interesting that the regions Toggenburg and Mittelbünden-Davos are valued remarkably good, although the intensity of land use is considerable. It can be assumed that portions of natural structures within the cultivated area - which are legally provided - exert an effect. In addition, the region of Toggenburg contains numerous moors of national reputation.

Although the condition in the Piave-region is not good in general, the extended wetlands along river Piave should be mentioned.

In most regions (except Alpes-de-Haute-Provence, Carnia and Piave) a continuum between cultivated area and woodland is rare, although this deficiency is often improved by bights, bulges and single groups of trees.

Strengths and weaknesses of the scenery

The spectrum of grading within this category is wide. In Unterland-Überetsch, Garmisch-Partenkirchen and Innsbruck Land diversity of small structures shows obvious deficiencies, as other indicators remain in actually good or excellent condition. Best ratings can be found in Alpes-de-Haute-Provence, designated as "a paradise in biodiversity" . Rich structures within the cultivated land are also reported from Carnia

(hedges, stone fences, humpbacked pastures) and Piave (little woods, orchards, willow-trees, tiny wetlands).

In no region replacement of cultivated area by woods seems to be an important alternative today. Recent afforestation requires only few and small areas. Massive dimensioned clearings, partially at steep slopes can be found at some places in Murau-Region.

Fallows are frequently in Alpes-de-Haute-Provence, Piave and especially in Carnia. This fits well with the great decline in husbandry as shown by statistical data. In Carnia this evolution seems to have reached an interim end as there fallows often are converted into woods.

Bail-silage is conspicuous in every region. A special visual evidence is reported from Garmisch-Partenkirchen and Murau and the grass-land areas of Unterland-Überetsch.

Economic stability of farming

Three groups can be clearly divided. Best conditions are found in the South Tyrolean mountain area, Toggenburg and Murau. The situation seems to be extraordinarily unfavourable in Carnia and Piave. In Piave deficiencies in infrastructure and bad condition of farm buildings is frequent.

4.6.2.3 Comparison of selected sample regions

In the following, four groups of regions are briefly portrayed. The grouping bases on characteristic sets of statistical data from which one would expect significant and similar expression in the scenery.

Table 4.35 to Table 4.37 show some specific annotations in supplement.

Regions with significant proportions of permanent fallow

Significant proportions of fallow (Alpes-de-Haute-Provence: 18.1%, Carnia: 13.0%, Piave 2.45%) indicate the decline of agriculture. Actually abandoned land has a significant impact there. The prevalence of fallows at slopes - as found in Alpes-de-Haute-Provence -indicates the increased separation between favoured and less favoured areas. The field study also reveals that farm buildings are in a bad condition and there is little construction activity which differs significantly from the situation in the other model regions.

In comparison with other regions eco-structures are substantial. The outstanding proportion of wooded areas in the Carnia-region (supposed to be an indication because of the succession on former cultivated areas?) can obviously not prevent erosion. Surely the extraordinary steepness of terrain also takes an important influence. Within the

grassland-dominated regions of Carnia and Piave the lack of modernisation in agriculture leads to another visual aspect: Bail silage (anywhere else a significant "furniture" within the scenery) can hardly be found.

Regions with dominance of grassland and high percentage of employees in agriculture

One common attribute of the South Tyrolean mountain region, Toggenburg and Murau is the good classification in soil erosion. Considering the substantial inclination of slopes within each of these regions, a stabilising effect by area-covering agriculture (percentage of abandoned land < 1.2 %) can be assumed.

Remarkable intensity of land use in mountainous South-Tyrol and Toggenburg (e. g. large LU densities) fits well with small portions of extensive usable agricultural area and wetlands. But in the lower productive Murau the ratio of above indicators is better and afforestation becomes more essential.

Preconditions in infrastructure look particularly good in South Tyrolean mountain region, agricultural roads and construction are rated best. High regional attraction leads to a high competition in land use between agricultural and non- agricultural interests.

Regions with dominance of grassland, low percentage of employees in agriculture and increasing touristic activities of farmers

Besides agricultural aspects, each of these regions can be featured as "classic" in alpine tourism. There agriculture finds itself in rising competition with non-agricultural demands such as housing or touristic devices.

Due to dominating grassland soil erosion and eutrophication of water is not outstanding. In Garmisch-Partenkirchen and Innsbruck Land moderate to low shares of extensive areas, combined with rising disruption of land and poor forest edges, reflect an overall pressure upon landscape, probably steered by non-agricultural activities as adverted by (in comparison) low cattle densities.

The Mittelbünden-Davos region by some aspects shows differences from the other two regions. Despite highest density of LU and strongly declining farms disquieting environmental impacts seem not to occur. Rather it could be mentioned that there is some lack in nature conservation areas and extensively cultivated areas. So this dynamics of agriculture seems quite similar with Alpes-de-Haute-Provence. Overall a compensative influence of Swiss legislature can be assumed.

Unterland-Überetsch – an outstanding region

This region is possibly the most intensively cultivated of all studied areas. The massive proportion of permanent crops actually shows heavy charges on water quality and the shape of waterbeds. Detaching of areas is very frequent, forest hemlines, extensively cultivated areas and subtile structures are poor. A highly specialised agriculture with "industrial" image takes strong influences on the scenery on the one hand and collides heavily with competing utilisation on the other hand.

4.6.2.4 Synopsis

Evaluating the results by the mean value, in total four qualities can be found (Table 4.34):

Expressed with the mentioned rating from 1 to 5 Swiss regions do best (2.14 respectively 2.17), followed by Murau, Piave and Alpes-de-Haute-Provence (2.27 to 2.35) with an apparent gap. The third group is even more clearly apart (Garmisch-Partenkirchen, South-Tyrolean mountain region, Carnia and Innsbruck Land; 2.68 to 2.85). The South-Tyrolean Unterland-Überetsch marks the end of the range (3.28) with the worst conditions.

Table 4.34: Synopsis of the inspected factors in comparison with important statistic

Indicator	Alpes-de-H. P.	Carnia	Plave	S.-Tyrolean mountain region	Murau	Toggenburg	Garmisch-Partenk.	Innsbruck-Land	Mittebünden-Davos	Unterland-Überetsch
Mass wasting	2.0	4.0	1.0	2.5	1.40	1.7	3.0	3.0	1.8	3.0
Sheet flow / hill erosion	1.0	2.0	1.0	1.5	1.0	1.2	2.0	1.0	1.0	2.0
Eutrophication	3.0	3.0	2.5	2.0	1.1	1.9	2.0	1.0	1.1	5.0
Extensive Buffers	4.0	2.0	1.5	3.0	2.6	1.6	2.0	3.0	2.5	4.0
Torrent regulation	2.0	3.0	3.0	4.5	3.0	2.3	4.0	3.0	2.2	5.0
Nature conservation areas	4.0	4.0	2.0	3.5	3.6	3.6	1.0	3.0	3.6	1.0
Wetlands	4.0	3.0	3.5	3.5	3.6	3.6	3.0	3.0	2.0	3.0
Segregation by infrastructure	2.0	3.0	3.0	3.0	2.2	3.2	4.0	5.0	2.6	5.0
Forest hemlines	2.0	2.0	2.0	4.5	3.3	3.0	4.0	4.0	2.3	4.0
Extensive cultivated areas	3.0	2.0	2.5	4.0	3.0	3.8	3.0	4.0	3.2	5.0
Subtile structures	1.0	2.0	2.0	3.5	2.8	3.0	4.0	4.0	2.8	4.0
Afforestation	1.0	2.0	1.0	1.0	2.4	1.0	1.0	2.0	1.0	3.0
Big clear cutting	1.0	1.0	1.0	2.0	2.9	1.0	2.0	1.0	1.0	2.0
Permanent fallows	3.0	4.0	3.5	1.0	1.5	1.0	1.0	1.0	1.0	1.0
Harmony of buildings	2.0	3.0	3.0	2.5	2.2	2.2	3.0	3.0	2.8	3.0
Specific agricultural techniques	1.0	1.0	2.5	2.5	2.6	1.6	3.0	1.0	2.0	4.0
Construction on farms	4.0	4.0	4.0	1.0	2.4	2.9	3.0	3.0	2.8	1.0
Agrarian roads	1.0	4.0	4.0	1.0	1.7	1.1	1.0	1.0	1.7	1.0
Conflicts with non-agrarians	2.0	2.0	3.5	3.5	1.5	1.9	3.0	4.0	2.0	5.0
Overall intensity of construction	1.0	3.0	2.3	3.0	1.2	1.9	1.0	3.0	2.2	3.0
Shape of settlement	H	H	H,G,S	V,H,G,S	V,H	VH	H	H	G	A,B,C
Visual impression of landscape	D	D	C,D	B	B,C,D	B,C	C	C	C	K,S,L
Geology	K	K,L	K,L	S,L	(K),S,L	K(L)	K	S	K,S	
Mean altitude of settlement (m SL)	645	711	368	991	952	790	744	983	1,136	294
Relative relief (m)	594	1,534	1,363	1,566	1,250	810	1,433	1,253	1,390	1,134
Inclination of hillslopes (classified)	1	4	2	3	2	2	3	4	3	3
Percentage of wood	22.8%	72%	45.9%	38.9%	53.6%	25.1%	41.28%	33.4%	17.9%	47%
Percentage of abandoned land	18.11%	13.04%	2.45%	1.20%	0.76%	0.05%	0.41%	0.31%	0.25%	0.70%
Employment rate	38.14	39.23	43.49	45.71	43.15	46.23	47.12	46.66	52.45	46.47
Percentage of employees in agriculture	5.18	5.48	3.10	20.65	16.53	13.79	1.59	2.97	4.91	13.71
Population movement	11.27	-1.41	0.83	-0.76	-6.10	3.89	9.23	8.17	3.74	4.29
Percentage of farm closures	-19.23	-14.95	-22.58	10.53	1.73	-9.48	-5.12	1.83	-23.28	-2.39
Percentage of farmers over 45 years of age	71.15	82.03	82.54	61.26	58.92	56.26	66.45	61.54	57.09	70.75
Percentage of part time farming	40.71	90.82	80.76	46.76	57.15	19.32	82.59	73.55	13.96	63.18
Perc. of small farms (under 5 ha s of UAA)	27.67	94.28	88.49	51.71	34.39	15.50	56.18	45.98	11.07	91.29
Cattle-large animal unit (LU) per UAA	0.25	0.41	0.71	1.72	1.34	1.82	0.75	1.44	2.15	1.54
Perc. of intens. perm. grassland / UAA	16.85	93.26	82.31	95.22	85.79	90.10	89.71	82.03	92.38	7.09
Perc. of arable land / UAA	76.69	4.95	16.43	2.40	13.98	0.14	0.59	17.67	6.86	0.62
Perc. of permanent crops / UAA	4.77	0.64	0.71	2.18	0.02	0.01	0.00	0.14	0.04	91.83
Perc. of farms spec. in pasture farming	24.11	9.53	14.27	49.25	23.33	86.02	79.25	75.59	96.56	0.70
Perc. of farms spec. in permanent crops	7.91	1.61	0.56	3.76	0.32	0.31	0.00	0.59	0.00	94.99

values

Visual impression by cultivated landscape
 A: lack of structures, often combined with big fields
 B: reasonable structured
 C: well structured
 D: rich structured, often combined with tiny fields

Geology in rough
 K: sedimentary rock (carbonate)
 S: silicate rock
 L: grid, sand, clay

Predominant shape of settlement
 V: scattered
 H: clustered
 G: compact
 S: urban

Classification remarkable good
Classification remarkable bad
 Outstanding figures are drawn in red

Table 4.35: *Alpes-de-Haute-Provence, Carnia, Piave: Additional remarks*

	Alpes-de-Haute-Provence (F)	Carnia (I)	Piave (I)
Mass wasting	Only sporadic on marly soil, since in most cases plain areas or gentle slopes are under cultivation and steep slopes are wooded	Some mass wasting at steep slopes; immediate connection with farming intensity can not be found	-
Noticeable eutrophication	Noticeable in major valleys; since there exist only few waters, nutritive substances concentrate	-	Although assumed as an effect of tourism it could not be noticed
Extensive buffers between cultivated area and riverbanks	Rather poor; abrupt changes between intensive cultivated land and naturally shaped areas are frequent	-	-
Regulation work and water protection	Constructions are rare in general; more frequent around more densely settled areas; shape of construction is spacious, rivers find sufficient width for deposition of debris	-	-
Nature conservation areas	Biotic conservation areas are small-sized; whole region belongs to "la Réserve Géologique" (geological conservation area)		Biotic conservation areas within the ecumene are small-sized, except "Parco Nazionale Dolomiti Bellunesi" covering high altitude areas
Wetlands	Rare	-	Extended wetlands along river Piave
Cuts by infrastructure (e.g. roads, circuit lines)	Not remarkable because of low density of settlement	Cuts by main roads	-
Condition of forest hemlines	In general forest edges are in good condition	-	-
Dimension of extensively cultivated areas	Dry grasslands are frequent	Very frequent	-
Subtile structures within the landscape ("Kleinstrukturen")	"A paradise for biodiversity"	Rich structures within the cultivated area: hedges, stone fences, "Buckelwiesen"; nevertheless the region looks rather monotonous as an effect of massive shares of woodland	Rich pattern within the cultivated area: little woods, orchards, willow-trees, tiny wetlands
Recent afforestation	-	No active afforestation, however natural successions at several places	-
Big clear cuttings	-	In the whole region low activity in forestry	-
Permanent fallows	Scattered among woodlands	-	-

	Alpes-de-Haute-Provence (F)	Carnia (I)	Piave (I)
Harmony of buildings	Mostly in good harmony with landscape, in more densely settled areas (around Digne, Sisteron) architectural quality grows less	-	-
Specific agricultural techniques creating visual impacts	-	Silage bales are sporadically present (Valle del But)	Silage bales, silos for concentrates
Building activity on farms (modernisation)	Condition of buildings seems to be rather bad	-	-
Condition of agricultural roads	Astonishing dense network of tar-asphalted roads	-	-
Conflicts between farm sites and non-agricultural activities (e.g. remaining fields among settlements)	At the periphery of main localities (Digne, Sisteron)	-	At the valley ground: massive building activities among the agricultural properties for domiciles and fabrics or shopping centers as well

Table 4.36: South Tyrolean mountain region, Toggenburg, Murau: Additional remarks

	South Tyrolean mountain region (I)	Toggenburg (CH)	Murau (A)
Mass wasting	At river banks sporadic earth slides of less dimension; at slopes frequent erosions near forest roads, skiing lanes and military training areas	Evidences of avalanches (Winter 1999) and water (Summer 1999), but no causal connection with agricultural activities	At river banks sporadic earth slides of less dimension, immediate connection to human activities can not be seen
Sheet flow or rill erosion	-	-	Not present, since rare plough land which is arranged at flat areas in most cases
Noticeable eutrophication	-	Intensively cultivated areas expel nutritive substances into the rivers.	In general very high quality of fluent and steady waters as well
Extensive buffers between cultivated area and riverbanks	-	In common, local woods at the river banks, obligate distance between river bank and intensively cultivated area is respected; within settled areas covering is slight	River banks are frequently covered with wood of good condition
Regulation work and water protection	-	In several cases protection is built very massive. Affluents mostly show natural beds	Regulations of river Mur and its main affluents are rather old and well-covered with vegetation
Nature conservation areas	Naturpark Texelgruppe and several areas of protected biodiversity	-	Spacious conservation areas of less protection-status, significant moorland protected by Ramsar-convention ("Hörfeld-Moor")

	South Tyrolean mountain region (I)	Toggenburg (CH)	Murau (A)
Wetlands	More frequent at higher altitudes, at alpine pastures and forests	Many moors of national reputation	Outside of "Hörfeld-Moor" rather rare; isolated and small occurrence except at Mur Valley and in the south east of the region
Cuts by infrastructure (e.g. roads, circuit lines)	Numerous forest roads	On slopes only moderate; in most cases small roads exist to scattered farm sites; distinct influences exist by ski lifts in higher altitudes, concerning grassland and wooded zones	Cuts by main roads or other infrastructures is not remarkable
Condition of forest hemlines	-	Dominance of abrupt change between forest and cultivated land	Varying conditions; "hard cut" hems are frequent
Dimension of extensive cultivated areas	At higher altitudes: grassland combined with larches ("Lärchwiesen")	Extremely varying occurrence closely corresponding with altitude	Not frequent; reduced to steep-sloped areas
Subtile structures within the landscape	-	Strongly varying with intensity of land use and the presence of flowing water (which in common is accompanied by bushes and tiny woods)	Varies widely; rich structures occur in the north-western parts, while south-east is provided rather poor
Recent afforestation	-	Only for reparation of damages caused by avalanches; no tendencies to afforestation because of strong desire for cultivated land	Rare and of less dimensions
Big clear cuttings	-	Almost none, cutting of single trees dominates by far	More frequent at the slopes of Mur Valley
Permanent fallows	Rare; sporadic at alpine pastures or at less favoured grassland ("Lärchwiesen")	Cultivated area is very desired, fallows therefore not exists	Only in few cases, since cultivated area is desired
Harmony of buildings	-	Varies widely; in scattered settled areas normally good harmony of buildings and landscape pattern; deviations can be found very often in tourism zones and in the urban sprawl of Wattwil	Problematical in single cases, in general satisfying
Specific agricultural techniques creating visual impacts	Bail silage, silos for concentrates and (mostly at higher altitudes) levelled areas are eye catching elements contrasting with traditional fences and "Lärchwiesen"	Bail silage is handled frequently, deposited normally around agricultural buildings	Wide-spread tendency to silage, with silage bails scattered over the area; at the other hand and meanwhile very rare: traditional earning methods with hay pillars ("Heumandeln")

	South Tyrolean mountain region (I)	Toggenburg (CH)	Murau (A)
Construction activity on farms (modernisation)		-	Vivid activities, modernisation of stables is frequent
Condition of agricultural roads		Approach roads to farms are in good condition; in single cases problems with the width of roads may exist	Road network is in very good condition, asphalted, roads fit for trucking even to the topmost farmhouse are standard
Conflicts between farm sites and non-agricultural activities	At the main valley conflicts between plants and touristic facilities are possible, this applies near the strong growing settlements	Sporadic conflicts with tourism or, in more intensively settled areas, with residences	Due to less settlement activities no particular conflicts are visible

Table 4.37: Garmisch-Partenkirchen, Innsbruck Land, Mittelbünden-Davos: Additional remarks

	Garmisch-Partenkirchen (D)	Innsbruck Land (A)	Mittelbünden-Davos (CH)
Mass wasting	Sporadic slides in altimontaneous and subalpine positions, triggered by declining alpine pasturing; near the bottom of valleys mass movement by avalanches and torrents in particular during winter and spring 1999	Only some minor problems; in 1999 not as much affected as other Tyrol regions	Some damages by torrents (august 1998) and avalanches (winter 1998-1999), damaging several minor roads
Sheet flow or rill erosion	Limited to skiing slopes used as pastures in summer	Some risk due to new skiing slopes	-
Noticeable eutrophication	Some impureness at river Loisach downstream Garmisch-Partenkirchen, otherwise excellent quality of water	No problems	Eutrophication is low in general. Periodical inputs by fertilisation of adjacent grassland
Extensive buffers between cultivated area and riverbanks	Interspersed frequently, in some cases newly planted	Reduced to 5 m strips by law also mostly along new river bed constructions; an effort for an extension to 10 m did not pass legislation	At steep slopes coppices protecting erosion are frequent; in several cases extensive grassland in even areas; low occurrence within settlements (e.g. Town of Davos)
Regulation and water protection	Constructions very often at the main valleys and torrents near valley ground	Almost no river especially in the Stubai Valley is without anthropogenic influence due to regulation and water protection measures, which were extended after a major flood in 1985/86; Protective measures against avalanches are numerous	Protecting constructions at torrents are numerous and very intensified and high dimensioned near settlements; major rivers are straightened but keep their natural beds, partially combined with natural characteristic of flow

	Garmisch-Partenkirchen (D)	Innsbruck Land (A)	Mittelbünden-Davos (CH)
Nature conservation areas	Remarkable nature conservation zones (e.g. Ammergebirge, Wettersteingebirge, Karwendel)	Widespread conservation areas (e.g. Stubai Alps, Kalkkögl)	-
Wetlands	Numerous small wetlands among cultivated areas	Only fragmented spots with natural wetland characteristics; most important: Lüsener Moor	-
Cuts by infrastructure	Mainly in Loisach Valley by federal trunk road	Very high amount of touristic infrastructure (ski lifts) in Stubaital and Sellrain	In steeper areas only little cuts by local roads and wires. Sometimes impairments by ski lifts especially in forested areas; at the main valley (Thusis/Davos) strong interference by national and local roads, railway, settlements
Condition of forest hemlines	-	-	"Classic" transition from forest to agricultural land; therefore tiered forest hemlines do not occur but bights and isolated groups of conifers; near settlements hemlines are in rather bad condition
Dimension of extensive cultivated areas	Very voluminous in "humpy" areas between Garmisch-Partenkirchen and Mittenwald ("Buckelwiesen").	-	Each farm earning direct payment has to have areas of ecological compensation (at least 7% whole of the area); share of such area is rather high therefore; extensive pasturing of steep slopes is widely spread
Subtle structures within the landscape	Rarely near the bottom of valleys, more frequent in "humpy" grassland between Garmisch-Partenkirchen and Mittenwald	Most of the structures were removed in the former decades	Structures at slopes are much more better than at the bottom of valley; varying strongly in subject to specific favour
Recent afforestation	Only small areas	Only slightly	Hardly, because of desire for cultivated land reduces interests in afforestation
Big clear cuttings	-	Not visible	Not visible as most of the forest protects against avalanches; cutting of single trees is dominating
Permanent fallows	-	Seldom at extremely inclined slopes	Not existent, because of strong demand for arable land

	Garmisch-Partenkirchen (D)	Innsbruck Land (A)	Mittelbünden-Davos (CH)
Harmony of buildings	Good in general, except some road buildings	Quite good due to touristic demands	Good harmony as traditional materials and styles are commonly spread; moderate interferences caused by touristic infrastructure (chalets, hotels)
Specific agricultural techniques creating visual impacts	The proportion of silo fodder is increasing, which can be seen by number and size of deposits; otherwise traditional cropping by hand is widely spread at steep slopes	Hardly seen	Bail silage is subordinated with little affects at the scenery
Construction activity on farms (modernisation)	Renewal of stables, in some cases hay deposits as well	Many new or renovated agricultural buildings	Renewal and enlarging of stables
Condition of agricultural roads	In practice each alpine pasture is reached by a road that can be used by trucks	Good to allow mechanisation on most sites	Agricultural roads general are in good condition except some narrow ways at steep slopes
Conflicts between farm sites and non-agricultural activities	Conflicts are numerous within the Garmisch-Partenkirchen basin, caused by a very strong demand for residences at the one hand and weak land use planning at the other	-	On the valley bottom conflicts are rather frequent especially in urban and touristic regions

4.7 Farm-specific influences

Christine Vigl, Hans Josef Kienzl, Klaus Steininger and Andreas Hilbert

4.7.1 Status of farm-specific characteristics in the research project

4.7.1.1 Farm level as main focus of the project

According to the research approach, which has been outlined in Section 2.2, it is necessary to elaborate the environmental effects of agro-political instruments. The measures concerning Europe or Switzerland, which have been illustrated in the Sections 4.3 or 4.5, mainly have an effect on farm-level and influence the farmers' behaviour. This means that the EU-instruments influence the choice of strategies of the various farmers and exert an influence on the environmental parameters and the environmental components (see Section 2.2.1).

With regard to the evaluation of the promotion instruments this means that the importance and the effects of the instruments are to be observed on farm-level. Therefore, the main emphasis of the analysis in this research project has been put on the farm level. So all information on the use of premiums, on farm-internal consequences and on the motives for these actions are obtained directly from the farmers.

4.7.1.2 Influencing factors on farm level

As described in Section 2.2.1, the following factors exert an influence on the choice of strategies:

- Regional parameters such as natural, socio-economic and cultural conditions
- Farm parameters such as labourers, areas and types of management, farm economic orientation, livestock
- Promotion instruments (amount of promotion including the requirements that have to be met)

This means that along with the content structure of the EU-instruments (cf. Section 4.3) and the regional conditions, especially the initial basis of the farm has a decisive effect on the choice of strategies. In order to determine effectively all the farm parameters, those characteristics have been elaborated which describe the structure of a farm effectively and which seem to be suitable for a collection within the various regions. In this connection the registration of the present situation, the consideration of the changes that have been made in the last years (especially with regard to the type of management), as well as a preview of planned changes are of interest. Along with the recording of nominally ascertainable values of certain farm parameters (labourers, management areas, farm economic orientation, etc.), it was also necessary, with regard to already made or planned changes of actions (management, main emphasis of the farm, etc.), to record the reasons for these steps.

4.7.1.3 Selection of subjects and survey of parameters at farm level

On the basis of the following information those topics have been chosen which have been useful and suitable for the above mentioned task: knowledge of agricultural statistics, knowledge of the experiences of the various partners and knowledge concerning the regional characteristics gained in the expert interviews. The following table shows the topics and the respective farm characteristics or the necessary pieces of information which are to be recorded:

Table 4.38: Topics which were questioned within the farmer survey at the farm level

<i>Topics which were questioned within the farmer survey at the farm level</i>	
Labourers	Number of persons living at the farm, sex, year of birth, part of working time used at the farm, pension, work outside the farm

	including information on the sector, information on the presence at the farm (daily, weekly commuter)
Agricultural surfaces	Total farm area, information on following characteristics for all allotments: area, altitude, state of possession, purchase during the last years, handicaps, type of culture, number of cuts, application of mineral fertiliser and of pesticides, integrated production, application of herbicides, irrigation, access, measures during the last years (consolidation of farm land, planishing, ameliorative measurements etc.), past changes the type of culture, estimation of future changes of the type of culture, information on purchase or tenancy during the last years Cultivation of alpine pastures (number of day with pasture, number of livestock)
Livestock	Actual number of livestock: cattle, sheep, pigs, goats, horses, poultry Information on the livestock 5 years ago Information on the probable development of the livestock Purchase of concentrates, hay, silage
Products	Kind and quantity of products, information on the way of sale (direct-marketing, sale by a co-operative, by others) Information on the quota of milk (quantity, purchase, sale during the last 5 years)
Machinery	Number of tractors, cart, spraying machines for control of insects and herb (incl. year of construction) Possibility to stock slurry / liquid manure or organic manure
Buildings	Number of apartments at the farm, state of the buildings (farm buildings, residential buildings), stable (way of keeping the cattle, etc.)

Table 4.38: continued

Consultation	Use of consultation
Income from tourism activities	Offer of holidays at the farm, number of beds, number of seats for gastronomic activities
Received subsidies	Information on received subsidies (EU, national, etc.), changes in the way of cultivation
General information	information on succession at the farm, past strategies for cultivation, future strategies for cultivation, information on their contentment, etc.

4.7.2 Concept of the survey

4.7.2.1 Method: the interview

Under consideration of the task the decision was made to use the methods of empirical sociology for the survey of the specific farm characteristics. This seemed to be most appropriate for carrying out a corresponding survey in all model regions which is the pre-condition for securing a comparative analysis of the results.

In the present research project face-to-face interviews with the farmers were chosen. These interviews were made with single persons on the base of a questionnaire which had strictly to be followed. All of the interviewed persons were confronted with the same number of questions formulated in the same way and sequence.

4.7.2.2 Design of the interview

For the interviews the relevant subjects presented in Section 4.7.1.3 were integrated in a questionnaire by formulating defined parameters respectively information to be surveyed at the farm. During the preparation of the questionnaire great importance was attached to a clear structure and an unmistakable formulation in order to secure and support a standardised and comparable survey.

Considering the level of detail of the contents to be surveyed and the availability of the farmers the questionnaire was designed for a duration of one hour on the average. In total the questionnaire consisted of 27 questions; partly additional questions going more into detail (15 in total) were asked. The questionnaire contained 5 "open" questions in order to find out the motivation for particular ways of action and the general disposition of the farmers. "Open" questions are characterised by the fact that they do not propose any categories of answers. For the remaining questions specific categories of answers were formulated. Pre-tests were made in all ten model regions in order to avoid

misunderstandings in the formulation of the questions and to estimate the probable need of time.

The detailed design of the questionnaire with all investigated contents and categories of answers is attached in the annex of this document. An overview of the parameters that were surveyed is presented in Section 4.7.1.3.

4.7.2.3 Interviewers

The interviews in the ten model regions were made by 32 interviewers. Most interviewers were competent in terms of the overall topic and had a good knowledge of the respective area of investigation. They were initiated into the questionnaire by the responsible of each model region personally. In this context the interviewers were informed on organisational-technical facts how to make the interview in general and on which aspects have to be considered in particular.

During the interview the questioned farmers were in general willing to answer the questions and were interested in taking part at the survey. Hardly anyone refused. The willingness to provide information included also to answer some delicate questions such as the size of received EU-subsidies and/or the national respectively regional contributions.

4.7.3 Sampling

After fixing the aim of the farmer interviews and creating the corresponding questionnaire, the next problem that had to be solved was the selection of the sample. In general, there are two different methods for sampling: either by a complete census or by a partial census. Because of the large population of all interesting objects in the study - there are 17,603 farms [agricultural census 1990] in the ten different model regions - a complete census did not seem to be the right way due to time and cost limitations. Therefore, a partial census was chosen.

To perform such a partial census, random and non-random methods could be used. Although the random samples are - from a methodical point of view - better than the non-random ones, the decision often falls in favour of non-random sampling techniques within empirical studies. But this is reasonable, too, because these samples are easier to create and the corresponding results are next best to the results obtained by the random techniques if the realisation of the sample is well done - as for example by using the so-called quota-sample method.

Therefore, it was necessary to take two relevant attributes into account: the membership to the model region and the quota of part-

time and full-time farmers. To consider the first characteristics, 100 farmers should be interviewed in each model region, so that the total sample size would be 1,000 objects in sum. By choosing this sample size, the following inaccuracies result: considering the whole sample of 1,000 farmers and analysing the important class of categorical data, a maximum deviation of about 3.0 per cent can be expected - assumed that the significance level is five per cent, as usual. Looking at the model regions, the inaccuracy should be worse and vary between 7.2 per cent in Alpes-de-Haute-Provence and 9.7 per cent in Unterland-Überetsch but could be accepted, too. Finally, it is important to point out that these calculations are only correct if a pure random sample is drawn (see e.g. Bankhofer and Hilbert 1998). Nevertheless, the results could basically be used to validate the high quality of the sample.

The second quota criterion concerning the full-time and part-time farmers should guarantee the consideration of the different types of farmers within each model region. But if there were less than 30 per cent of one of the two types in a region, the interviewers were instructed to ask at least 30 farmers to improve the expressiveness of the study. For the rest, the farmers to be asked were selected at random.

4.7.4 Data evaluation

The data obtained in the survey of 1,000 farms have represented the raw data for the analysis of the data. The 'open' questions have been coded via 'special coding'. The answers have been put into five to ten categories of answers which have been assigned a numerical code. Afterwards the code-book has been compiled for the computer-aided evaluation and each answer in the questionnaire has been assigned a special code. The input and evaluation of the data has been carried out with the aid of the statistics programme SPSS.

4.7.5 Essential data of the interview results

The structure of the farms and the regional environment decide fundamentally which farm strategies are pursued. Moreover, the EU-instruments influence the choice of farm strategies and they, in turn, influence the environment (see Section 4.7.1.2).

Without anticipating hypotheses about the relations between the farm parameters and the farm strategies, in the following the farm characteristics will be shown and an overview of the agricultural structures in the model regions will be given. Apart from the general characteristics, the multitude of information gained from the farmer

interviews also shows the peculiarities and problems of agriculture in the various regions.

In the following technical, economic as well as environmental farm characteristics in the respective model regions are shown. The technical parameters provide information about the structure of the farms in the region.

- What is the size of the farms?
- What role do livestock industry, permanent crops and arable land play?
- How many farms do cattle, goat or pig raising?
- What is the number of animals per farm?

Along with the information on the livestock the technical farm parameters also provide information on the agriculturally used area, the cultivated crops as well as on the leased areas.

The economical parameters indicate the farmers' income from farming and its distribution on the single products. Moreover, the total income of the farms is indicated.

- What is the income from agricultural production per hectare of reduced usable agricultural area?
- What is the income from agricultural production per labourer?
- How many different types of premiums do the farmers claim?
- What is the income from EU-premiums and/or national or regional premiums?

Along with the technical and economical parameters, environmental parameters are given. The percentage of biologically and extensively used reduced usable agricultural area of the total reduced usable agricultural area or the intensity of land use of permanent grassland provide information on the environmental compatibility of the farms.

- How many large animal units (LU) are kept per hectare reduced usable agricultural area?
- How much mineral fertilisation is used on the reduced usable agricultural area?
- What is the percentage of the extensively or biologically managed area of the reduced usable agricultural area?
- What is the percentage of the extensively used permanent grassland of the total permanent grassland?

Technical parameters:

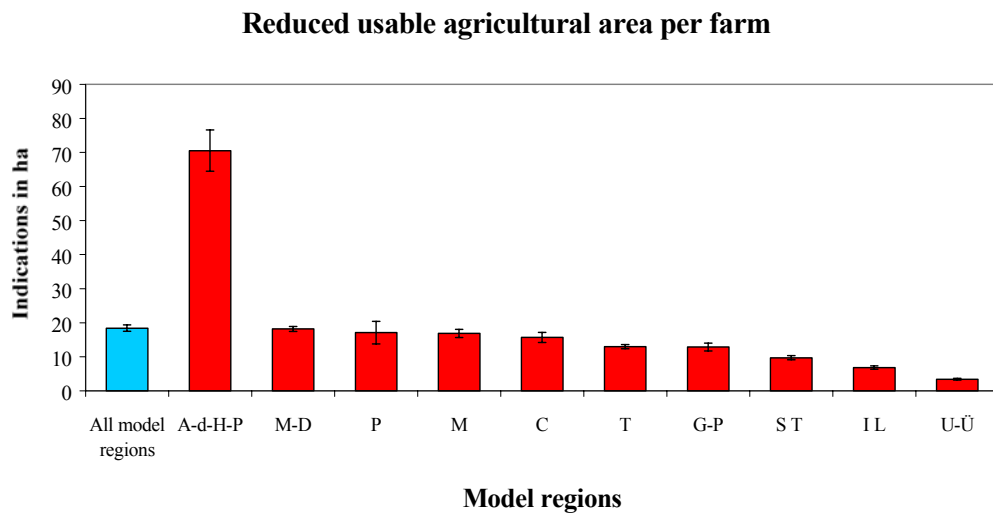


Figure 4.30: Reduced usable agricultural area per farm, mean, s.e. (Abbreviations: A-d-H-P = Alpes-de-Haute-Provence; M-D = Mittelbünden-Davos; P = Piave; M = Murau; C = Carnia; T = Toggenburg; G-P = Garmisch-Partenkirchen; S T = South Tyrolean mountain region; I L = Innsbruck Land; U-Ü = Unterland-Überetsch)

The average farm size, which was measured in proportion to the reduced usable agricultural area, is 18.4 ha. Especially small farms are to be found in the model regions South Tyrolean mountain region, Innsbruck Land and Unterland-Überetsch. With 70.5 ha reduced usable agricultural area per farm the model region Alpes-de-Haute-Provence is far above the average. The high number of farm closures in this area in the last decades favours the size of the farms because of the resulting availability of areas. The percentage of leased land of the reduced usable agricultural area is 45%. A further reason for the above-average farm sizes in the Alpes-de-Haute-Provence is the promotion of farm amalgamations.

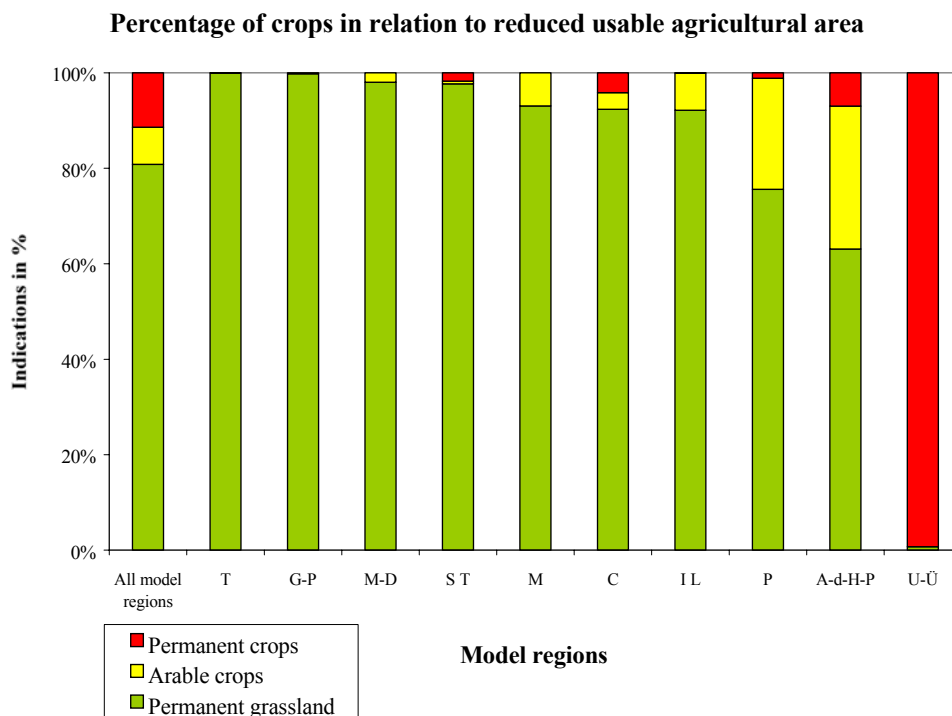


Figure 4.31: Percentage of crops in relation to reduced usable agricultural area, mean, s.e. (Abbreviation see Figure 4.30)

Figure 4.31 shows the various crops which are cultivated on the reduced usable agricultural areas. The permanent grassland is predominating in almost all regions, with the exception of the model region Unterland-Überetsch. In the Alps on average 81% of the reduced usable agricultural area is used for the cultivation of permanent grassland, 8% for arable crops and 11% for permanent crops. In the last decades the arable crops area in the Alps has decreased considerably. Most of the arable area was changed into permanent grassland. Only in the model regions Piave and Alpes-de-Haute-Provence arable crops still play an important role. In the model region Unterland-Überetsch the intensively used permanent crops areas play the major role: 99% of the reduced usable agricultural area. Also in the Alpes-de-Haute-Provence permanent crops areas are worth mentioning. Permanent crops are to be found primarily in regions in a climatically favourable location.

Percentage of leased land in relation to reduced usable agricultural area

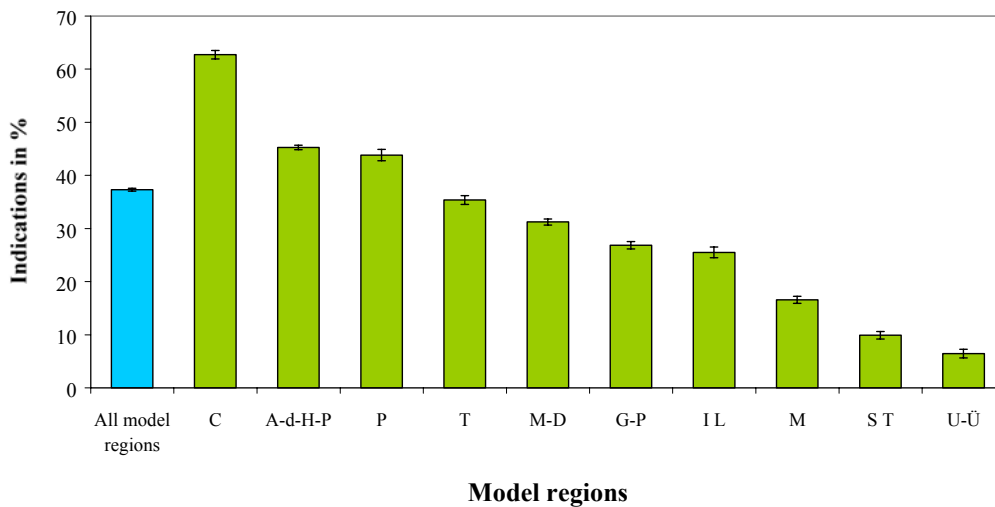


Figure 4.32: Percentage of leased land in relation to reduced usable agricultural area, mean, s.e. (Abbreviation see Figure 4.30)

In 1999 an average of 37% of the reduced usable agricultural area of the interviewed farms in the model regions are cultivated as leased land. There are clear differences between the individual model regions. In those model regions, in which many farms have been closed over the last decades, far more areas have been leased because of the availability of areas than in those model regions where this change has not taken place. In regions with a high percentage of farm closures farm expansions could be carried out mainly by leasing.

Sheep and goats large animal units per farm

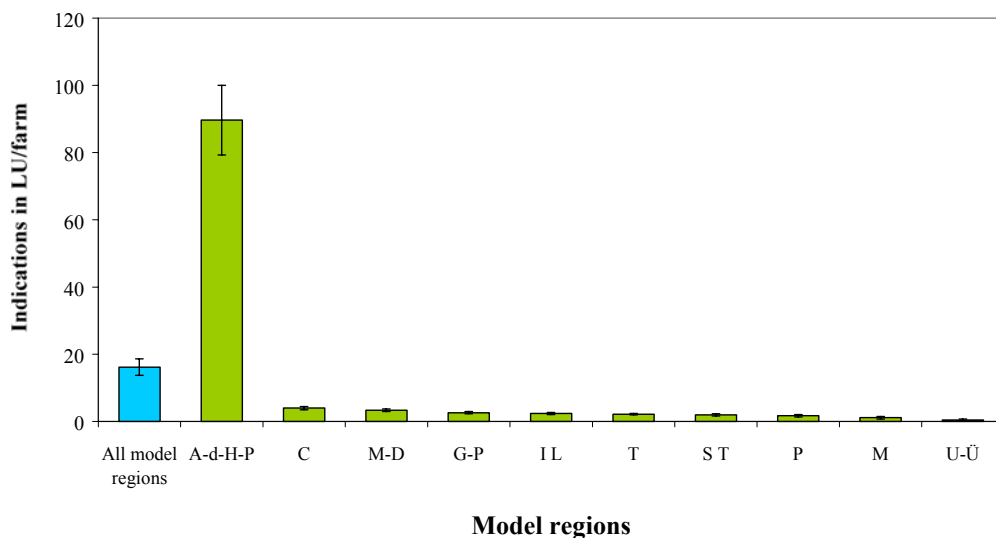


Figure 4.33: Sheep and goats large animal units per farm, mean, s.e. (Abbreviation see Figure 4.30)

The examination of the farms interviewed with regard to livestock raising shows a strong predominance of cattle raising. 70% of all farms raise cattle. Model regions with a low number of cattle farmers are Piave, Alpes-de-Haute-Provence and Unterland-Überetsch, that is, those areas which have a considerable percentage of permanent and arable crops of the reduced usable agricultural area. The average number of cattle per farm is 19 LU (1 cow up to 2 years = 0.5 LU, 1 cow older than 2 years = 1.0 LU). Sheep and goat raising are much less important. Every third farm in the model regions raises sheep or goats and only every fourth farm raises pigs. In most regions, however, only a low number of pigs, sheep and goats are raised, except for France which has 57 pig LU (1 pig under 50 kg = 0.10 LU, 1 pig over 50 kg = 0.20 LU) and 90 sheep and goats LU (1 goat = 0.15 LU, 1 sheep = 0.15 LU) per farm. This high number of pig LU or sheep and goats LU is due to the specialisation of French farms. Many farms in France are either specialised in sheep or in pig raising.

A further technical parameter of the farms in the model regions is the percentage of non-agricultural employment in relation to the total employment of the farm couple. This parameter shows the percentage of the work done outside the farm. On average one third of the work is done outside the farm. There are no big differences between the model regions. The model region Unterland-Überetsch shows the highest percentage of non-agricultural employment. With a mean of 3.4 hectares reduced usable agricultural area per farm, Unterland-Überetsch cultivates the smallest areas. These are crop areas with work-intensive cultivation and season-dependent quotas of work.

Economic parameters:

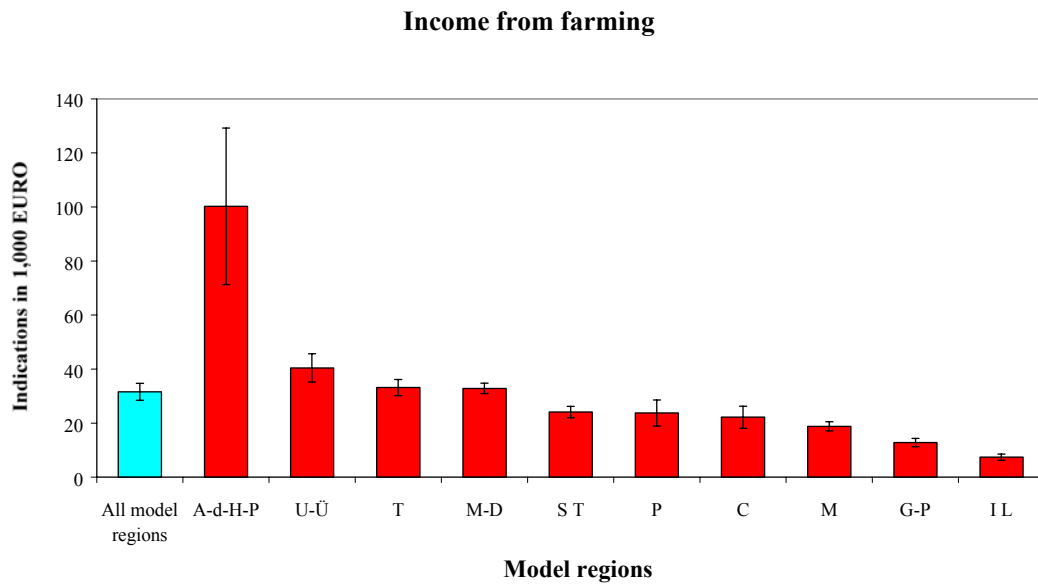


Figure 4.34: Income from farming, mean, s.e. (Abbreviation see Figure 4.30)

On average the annual income from agriculture per farm amounts to 31,600€. The above-average size of the French farms is reflected in the high income from agriculture. With an income of over 100,000€, the farmers in France stand out clearly from the rest of the farmers. The lowest income is obtained by the farmers in Innsbruck Land with 7,400€. The farms in Innsbruck, where cattle raising is predominant, have an extremely small size. They are not cultivated intensively; furthermore, the farms in Innsbruck Land show a high percentage of part time farming.

With the exception of the model regions Alpes-de-Haute-Provence and Unterland-Überetsch, the sale of milk and milk products is the central source of income from agriculture. The two Swiss model regions Toggenburg and Mittelbünden-Davos show the highest percentage of meat sales. Only in Piave and France, however, do arable crops constitute a considerable percentage of the income from agriculture. In Unterland-Überetsch permanent crops are the only source of income. In Alpes-de-Haute-Provence they play an important role, too.

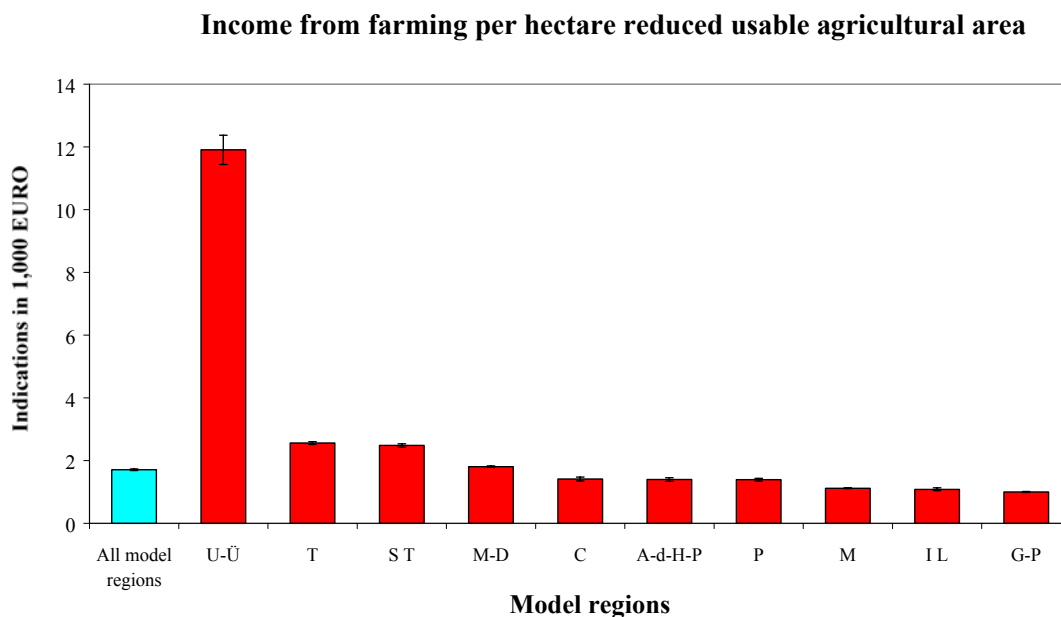


Figure 4.35: Income from farming per hectare reduced usable agricultural area, mean, s.e. (Abbreviation see Figure 4.30)

The annual income from agriculture per hectare reduced usable agricultural area amounts to an average of 1,700€€. The income per hectare reduced usable agricultural area depends very heavily on the type of cultivated crop. The highest income per hectare reduced usable agricultural area is obtained by farms with permanent crops. Because of numerous permanent crops, the highest income per hectare reduced usable agricultural area (12,000€€) is obtained in Unterland-Überetsch. Despite the predominance of grassland farming with cattle raising, the incomes in Toggenburg and in the South Tyrolean mountain region are also astonishingly high. In comparison with other model regions which have the main focus on grassland farming, these regions are in the leading group with an income of about 2,500€€.

Income from farming per actually laborer at the farm

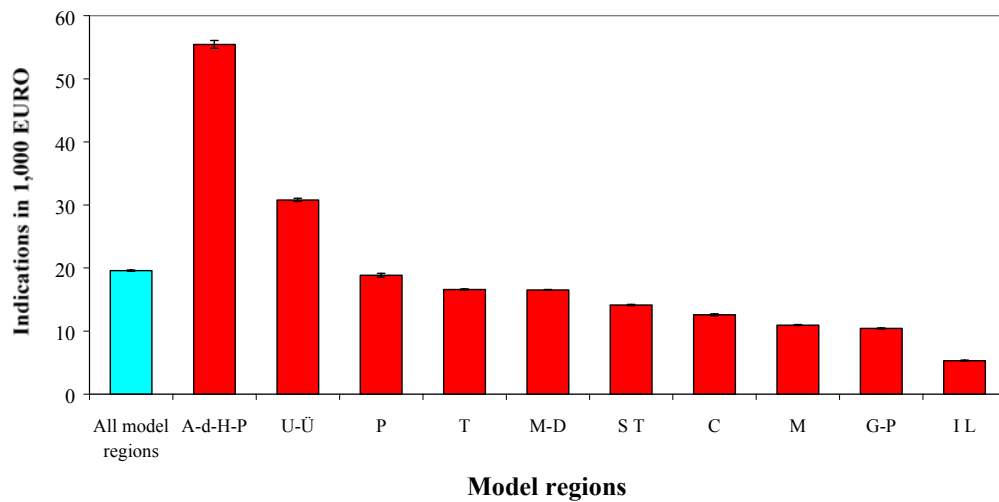


Figure 4.36: Income from farming per actually labourer at the farm, mean, s.e. (Abbreviation see Figure 4.30)

Total income of farm

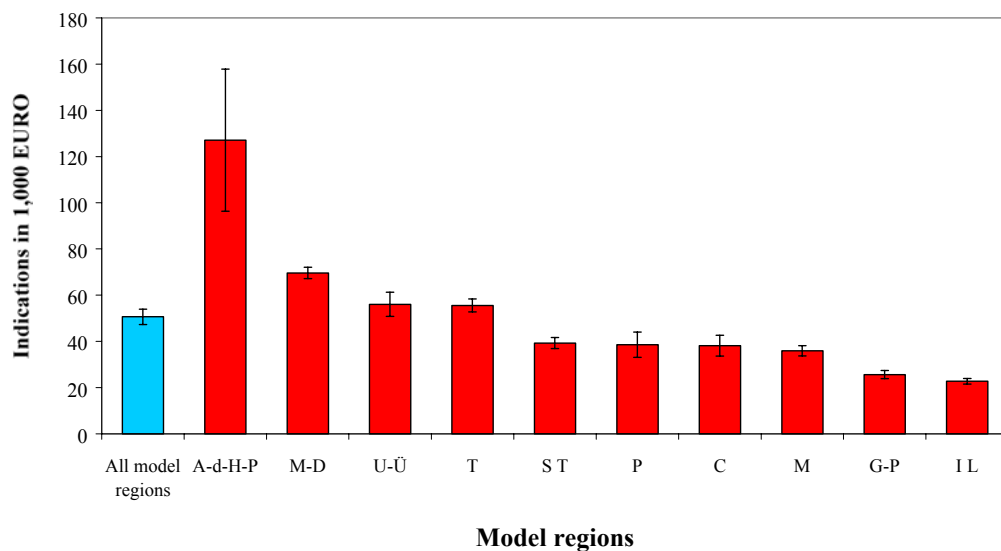


Figure 4.37: Total income of farm, mean, s.e. (Abbreviation see Figure 4.30)

On average one labourer makes 19,600€€ per year in the model regions. There are great differences between the individual model regions. Especially the model regions with a high percentage of permanent and arable crops differ clearly from the permanent grassland regions. While the grassland regions have an income of 5,000€ to

17,000€€ per labourer, the income in the regions of Alpes-de-Haute-Provence and Unterland-Überetsch is above 30,000€€. Because of its larger farms, Alpes-de-Haute-Provence obtains the highest income per labourer.

The total annual incomes of the farms has been calculated by adding up the incomes from the sale of agricultural products, from agri-tourism, from EU-premiums and/or the national or regional premiums, the incomes from non-agricultural employment as well as from pensions. Besides the proceeds of the sale of products, the premiums and the subsidiary income of the farm couple, also the pensions of the farm couple have been taken into account in the calculation of the total income because they play an important role in the running of farms.

The mean annual total income of the farms is 50,500€€. Alpes-de-Haute-Provence is again in the leading position with 127,000€€.

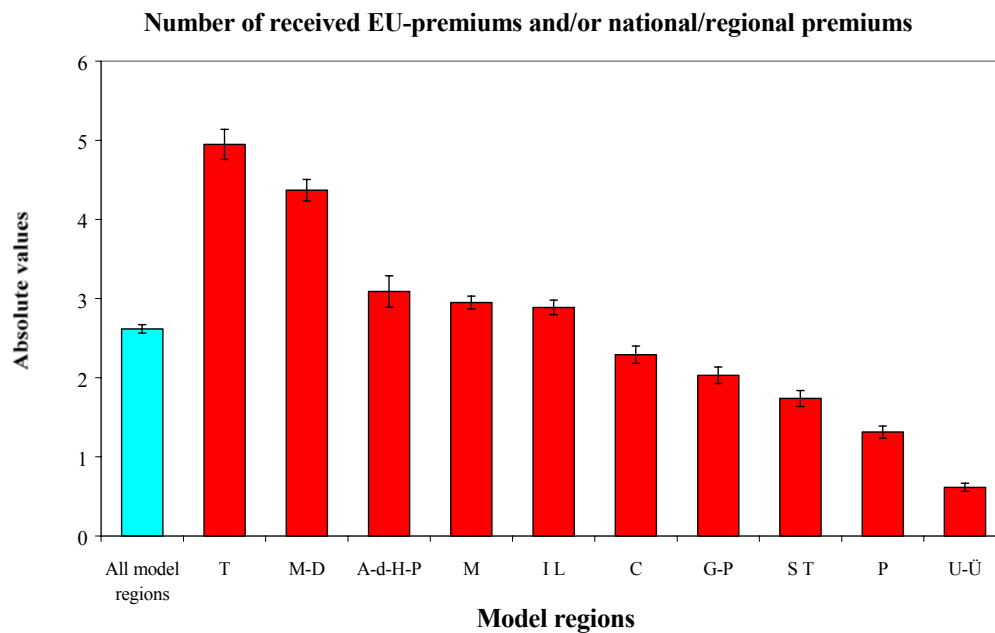


Figure 4.38: Number of received EU-premiums and/or national/regional premiums, mean, s.e. (Abbreviation see Figure 4.30)

In the model regions the incomes from EU-premiums and/or the national or regional premiums consist of two to three different premiums on average. The following premiums have been distinguished:

- ❑ Direct payments with environmental requirements:
 - Environmentally compatible production methods*
 - Afforestation measures in agriculture*
 - Integrated production*
 - Others*
- ❑ Direct payments without environmental requirements:

- Livestock premiums*
- Compensation allowances*
- Grain premium*
- Others*
- Marketing
- Production:
 - Modernisation*
 - Diversification*
 - Setting-up aid*
 - Others*
- Vocational training measures
- Regional development:
 - Regional development programmes*
 - Measures for improving infrastructures*

There are great differences between the model regions. Whereas the incomes in Switzerland come from four to five different premiums, in Austria and France they come only from three premiums. Garmisch-Partenkirchen and the Italian model regions, however, claim only an average of two or fewer premiums.

Income from EU-premiums and/or national/regional premiums per hectare reduced usable agricultural area

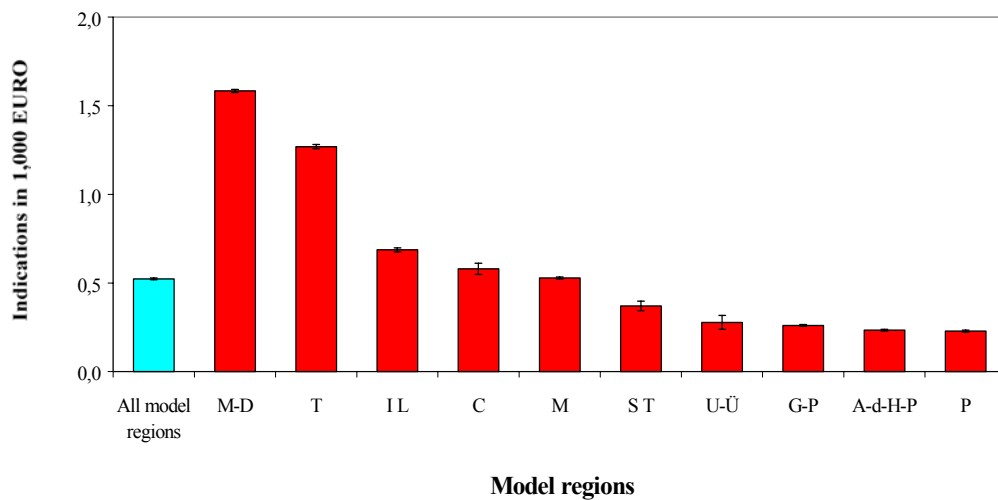


Figure 4.39: Income from EU-premiums and/or national/regional premiums per hectare reduced usable agricultural area, mean, s.e. (Abbreviation see Figure 4.30)

The Swiss farmers receive the highest premiums per hectare reduced usable agricultural area, followed by the farmers in Austria and Carnia who, however, receive considerably lower premiums per hectare reduced usable agricultural area.

At this point it is necessary to consider the effect of EU-regulations. What is the difference between farms with high premiums per hectare reduced usable agricultural area and those with low premiums? Is there a connection between the amount of premium per hectare reduced usable agricultural area and ecological farming? Are the areas in Switzerland, Austria and Carnia cultivated more ecologically than those in other model regions or are there no differences?

Income from EU-premiums and/or national/regional premiums

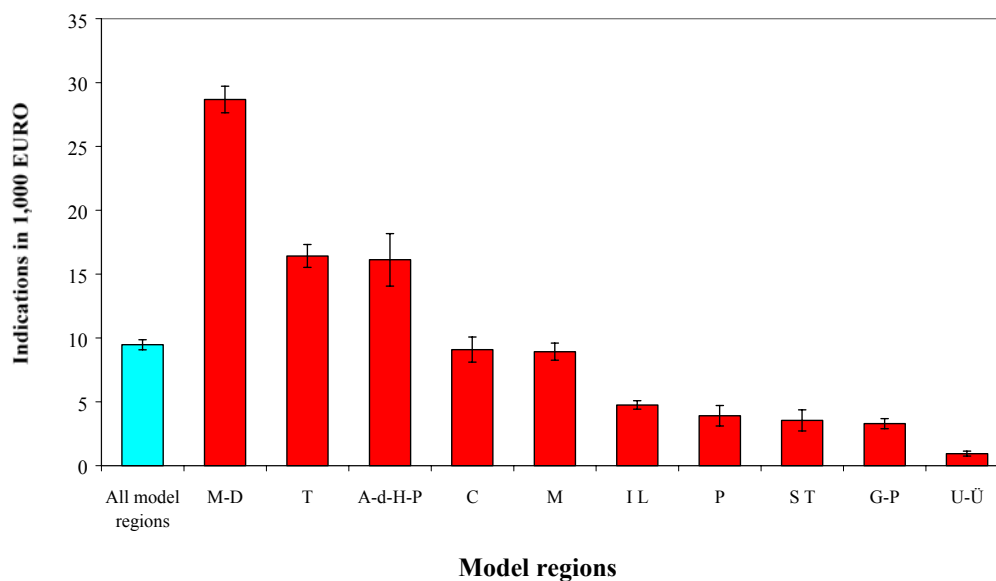


Figure 4.40: Income from EU-premiums and/or national/regional premiums, mean, s.e. (Abbreviation see Figure 4.30)

On average the EU-premiums and/or national or regional premiums amount to 9,500€€. The highest premiums are granted to the farmers in the Swiss model regions, that is, in those regions outside the EU. With 29,000€€ (Mittelbünden-Davos) and 16,000€€ (Toggenburg) the premiums are far above the average. In Switzerland the premiums are closely connected with ecological requirements, and they are particularly high in comparison with the EU model regions. Thanks to farms with large areas, also the farmers in Alpes-de-Haute-Provence receive high premiums (16,000€€) since the majority of the premiums is area-dependent. The three Italian model regions Piave, Unterland-Überetsch and the South Tyrolean mountain region as well as Garmisch-Partenkirchen receive the lowest premiums.

Especially in the Swiss model regions and in France, but also in Austria and Carnia, the premiums constitute an important source of income.

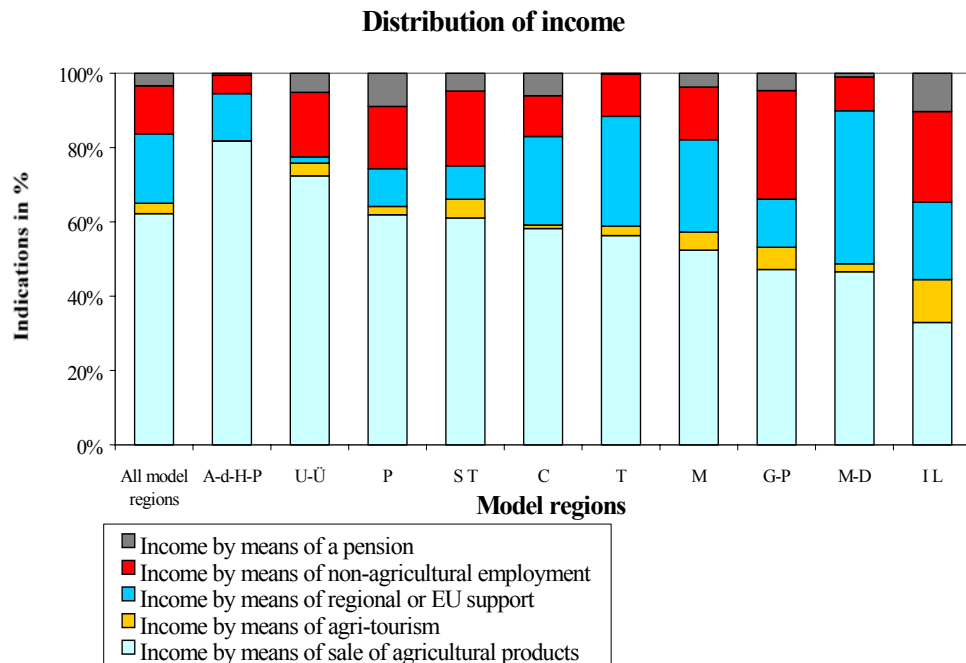


Figure 4.41: Distribution of income, mean, s.e. (Abbreviation see Figure 4.30)

Whereas in France over 80% of the incomes come from agriculture, the distribution of income is completely different in Innsbruck (Figure 4.41). There the incomes from agriculture, the EU-premiums as well as the incomes from non-agricultural employment amount to approximately the same sum. Innsbruck Land and Garmisch-Partenkirchen, as representatives of the tourism regions (see Section 4.1.1), show a relatively high income from agri-tourism.

Environmental parameters:

The intensity of agricultural production with livestock raising can be measured by using the density of livestock which is expressed in LU per hectare reduced UAA (LU/ha reduced UAA). On average the farms in the regions keep 1.1 LU/ha reduced UAA. The South Tyrolean mountain region shows the highest density of livestock (1.6 LU/ha reduced UAA), followed by Toggenburg (1.4 LU/ha reduced UAA) and Innsbruck Land (1.3 LU/ha reduced UAA).

Mineral fertilisation per hectare reduced usable agricultural area

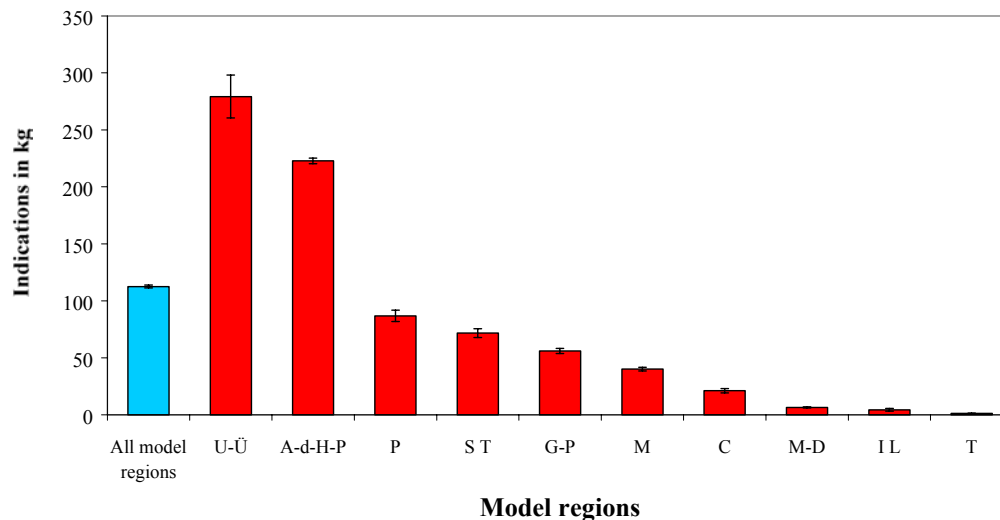


Figure 4.42: Mineral fertilisation per hectare reduced usable agricultural area, s.e. (Abbreviation see Figure 4.30)

A further indicator of the intensity of agricultural production is the mineral fertilisation per hectare reduced usable agricultural area. On average 113 kg of mineral fertiliser per hectare reduced usable agricultural area are used. There are considerable differences between the individual model regions. The mineral fertilisation in the model regions with a high percentage of permanent crops or arable crops is much higher than in model regions where grassland farming predominates. Especially the two Swiss model regions, Innsbruck Land and Carnia do without mineral fertilisers. In comparison to other model regions with the main focus on permanent grassland (1 - 56 kg per hectare reduced UAA), in the South Tyrolean mountain region, with 98% permanent grassland of the total reduced UAA, mineral fertilisers are used frequently (72 kg per ha reduced UAA).

Extensively and biologically used reduced usable agricultural area

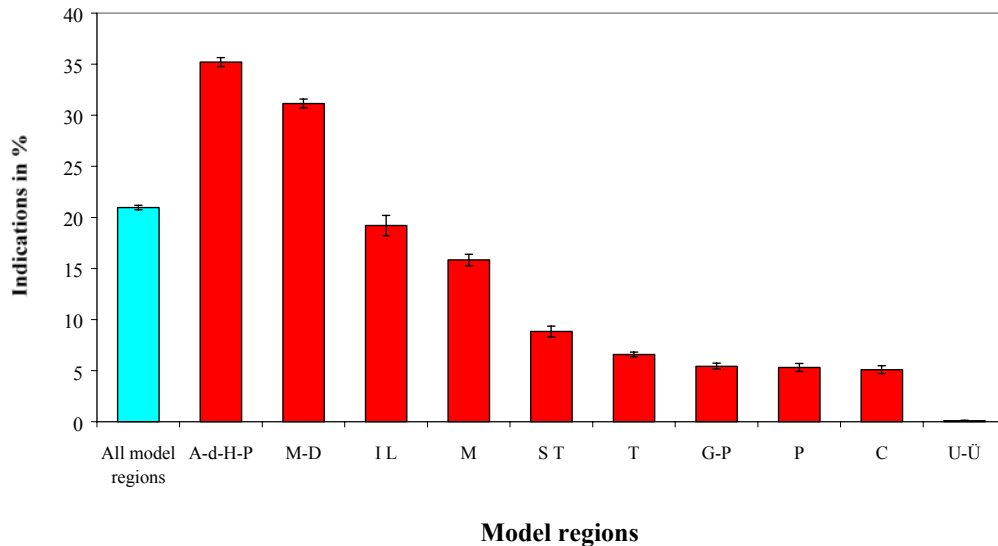


Figure 4.43: Extensively and biologically used reduced usable agricultural area, mean, s.e. (Abbreviation see Figure 4.30)

On average two out of ten hectares reduced usable agricultural area in the model regions are used extensively or biologically. There are great differences between the model regions. Whereas in Unterland-Überetsch one cannot find extensively or biologically used areas, in Alpes-de-Haute-Provence and in Mittelbünden-Davos over 30% of the reduced usable agricultural area are used extensively. The high percentage of extensively used reduced UAA in the model region Alpes-de-Haute-Provence is due to the numerous sheep raising farms. They use 46% of their reduced UAA extensively. The values of Murau and Innsbruck Land are between 15 and 20%. In all the other model regions the percentage of extensively or biologically used reduced UAA is lower.

The examination of the permanent grassland in the individual model regions reveals again considerable differences. On average 5.4% of the permanent grassland are used intensively, 81.5% are used medium-intensively and 13.1% are used extensively. The South Tyrolean mountain region shows the highest percentage of intensively used permanent grassland area (19.5%). The highest percentage of extensively used permanent grassland can be found in Alpes-de-Haute-Provence (38.2%) because of the numerous sheep farmers, followed by Mittelbünden-Davos (28.6%).

The classification of the alpine area by means of the cluster analysis resulted in the formation of various agricultural regions which differ considerably from each other. The results of the farmer interviews

clearly reflect the different conditions in the individual model regions as well as the differences between the individual model regions. The characteristics described above clearly show the different farm structures as well as the very different types of land use and management intensities. These different characteristics also found their expression in the different incomes and environmental values.

References:

- cf. Noelle-Neumann, E., Schulz, W. and Wilke, J. (1994) Fischer Lexikon Publizistik Massenkommunikation. Frankfurt am Main. S. 267
- Bankhofer, U., Hilbert A. (1998) Bestimmungsgrößen des Stichprobenumfangs, WIST, Heft 7, 27. Jahrgang.

4.8 Elements of the complex "agricultural policy – environment" and explanation of these effects

Klaus Steininger, Ernst Mattanovich, Alex Agethle and Erich Tasser

4.8.1 Task and concept

The objective of this research project – the evaluation of instruments of European Agricultural Policy – has been pursued by an analysis of the effects of instruments on the farms and their impacts on the environment. Since instruments have no direct effects on the environment a so-called "transmission mechanism" has been used. In this mechanism impulses given by agricultural instruments on the environment are analysed. In this context the strategies of a farm are the core of this transmission mechanism which is presented in Figure 2.2 (Section 2.2). The farm strategies express the decision-making process of the farmers and depend on certain factors of influence. These can be extern factors of influence, as the agricultural policy or regional conditions (e. g. natural conditions). Intern factors of influence comprise among others the availability of means of production (e. g. labourers, usable agricultural area, buildings, machinery).

Apart from that also other factors have an influence on the choice of the farm strategy. These factors are based on culture, mentality and prevailing attitudes of the farmers and can show important regional differences within the alpine area. However, in the context of this project a survey of the system of values and attitudes and its consideration within the present task is not possible. Nevertheless, efforts were made to get information in particular on the occasion of the interviews in the farms. The farmers' statements on this subject (in

case they have been obtained) have been integrated in the interpretation of the results.

The single factors of influence (agricultural policy, regional parameter and farm parameters) are presented in Table 4.39 - Table 4.41 in addition to their description in other sections. Twelve farm strategies judged as relevant for the task are shortly presented in Section 4.8.5.

The last part of the transmission mechanism is the relation between farm strategies, environmental parameters and environmental components. The choice of one or several strategies has an important influence on the processes at a farm and by that on the environmental components. The influence on an environmental parameter has consequently direct impacts on the environmental components. By this transmission mechanism the impulses of agricultural instruments finally reach the level of environmental components.

In order to design a model of decision-making processes at farms and the resulting impacts on the environment a complex of effects has been formed. According to bipolar systematics agricultural instruments (as well as regional and farm parameters) have been set in relation to farm strategies. On the basis of a profound examination of literature and results from interviews with experts hypotheses have been formulated. These hypotheses have subsequently been verified or falsified using means of statistics. By this method it became possible to focus heterogenous information on the influence of the agricultural policy on the environment and to subject it to oligo-causal considerations.

4.8.2 Instruments of agricultural policy and their classification

The focus has been set on the instruments of agricultural policy, because they are the basis for the design of evaluation. For this purpose instruments have not been regarded individually, but they have been classified according to their effects. Groups of instruments (e. g. quality control, direct payments etc.) have been attributed to following classes:

- price-guarantee
- accompanying measures
- structure strengthening measures

This procedure is justified by an easier handling of a great number of instruments. The instruments of the European Union are presented in detail in Section 4.3, the instruments of Switzerland in Section 4.5. Only those categories of measures which are relevant for further investigations are presented in the following overview.

Table 4.39: Categories of measures of the instruments of agricultural policy

Classes	Categories of measures (examples)
price - guarantee	quantity control (quota regime, import license)
	price support (intervention price, aid for private storage, etc.) quality requirements (standard of quality of products and production)
accompanying measures	direct payments with environmental requirements (aid for extensification for various products, substantial reductions in the use of fertilisers and plant-production products, additional amount, etc.)
	direct payments without environmental requirements (suckler cow premium, deseasonalisation premium, processing premium, compensatory allowances in less-favoured agricultural areas, etc.)
	environmental measures; protection of the environment
structure strengthening	marketing (investment aid to producer groups and associations, etc.)
	production (modernisation, diversification, etc.)
	vocational training measures (training for farmers, etc.)
	regional development (regional development programmes, measures for improving infrastructure)

The most important hypotheses on the relation between agricultural instruments and farm strategies will be discussed in Section 4.8.7.

4.8.3 Parameters at farm level

Parameters at farm level are intern parameters. They are investigated as factors of influence with regard to their effects on the farm strategies. In this context important factors are the use, the availability respectively the restrictions of means of production (labourers, usable agricultural area, live-stock, buildings, machinery, etc.).

Table 4.40: Farm parameters and their definition

Farm parameters	definition
Reduced usable agricultural area	area of agriculturally used land
Handicaps because of inclination	proportion of steep slopes to the reduced usable agricultural area
Altitude	average altitude of the reduced usable agricultural area
Permanent grassland	proportion of extensive permanent grassland to total permanent grassland (without alpine pastures)
	proportion of middle intensive permanent grassland to total permanent grassland (without alpine pastures)
Permanent crops	proportion of biologically treated permanent crops to the total permanent crops
	proportion of permanent crops treated with Integrated Production - management
Arable land	proportion of biologically treated arable land to total arable land
Access	proportion of allotments where an access with great machines is possible (set in relation to the reduced usable agricultural area)

	area)
Available potential of labourers	number of persons over 16 years including farmer's couple, which are working at farm, working outside of the farm or attending school
Effective working time at farm	total working time which is spent at farm (farmer's couple, all persons over 16 years, employed labourers at farm
Age	average age of the farmer's couple
Succession of farm	personal assessment by the farmers concerning the succession of farm
Intensity of training	number of used consultations facilities
Farm buildings	state of the farm buildings
Composition of income	proportion of working time for activities outside the farm within the total working time (also including pension)
Pension	use of a pension
Membership	membership in a co-operative
Assessment of the actual situation of income	personal assessment of the farmers concerning their situation of income (scale 1 - 10)
Proportion tenancy - property	proportion of reduced usable agricultural area in property to total reduced usable agricultural area

4.8.4 Regional parameters

The decision of a farmer to choose one or several strategies depends to a high extent on regional conditions. Those parameters judged as relevant for the task and as appropriate for a survey at farm level are presented in Table 4.41.

Table 4.41: Regional parameters and their definition

Regional parameters	definition
Employment	employment rate
Population movement	development of population over ten years as a result of migration in proportion to the population of the year of basis
Market	proportion of income as a result of direct marketing to the total income
Intensity of cultivation	proportion of reduced usable agricultural area with biological or extensive management to total reduced usable agricultural area
Co-operatives (sales)	proportion of income with sale over co-operatives to the total income
Consultation	number of used consultation facilities
Factor of farm abandonment	factor of farm abandonment

4.8.5 Farm strategies

Farm strategies have a central position within this research project. On the one hand they express influences by extern (agricultural policy, regional conditions) and intern factors (farm parameters). On the other hand farm strategies are characterised by the fact that their effects on the environment are well comprehensible. The requirements for farm strategies within this research project can be summarised as following:

- Representation of ways of cultivation concerning the use of means of production (labourers, land use, live-stock, machinery, etc.). Each farm strategy characterises a specific technical-economic orientation of a farm.
- Representation of extern and intern parameters which influence the use of means of production. Each farm strategy is promoted or hindered by certain factors of influence.
- Representation of ways of cultivation concerning their effects on the environment. Each farm strategy is characterised by specific effects on the environment.

A range of farm strategies meeting these requirements has been elaborated on the basis of knowledge on alpine agricultural structures and with the support of literature. The selected farm strategies have been checked on their completeness by experts (see Section 4.6.1). On the basis of knowledge on the regions some farm strategies have been added and precised in their content. All relevant farm strategies and their contents are presented in Table 4.42.

Table 4.42: Farm strategies in the alpine area

farm strategy	remark
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Optimisation of subsidies	The use of means of production is exclusively orientated by subsidies respectively by conditions on which subsidies are bound
Labour-intensive way of cultivation	The farmer sets the priority of his activities on labour-intensive cultures (fruit, wine, small fruits, etc.)
Non-agricultural income activities	The farmer aims at an income from non-agricultural activities in addition to the farm income
Direct marketing	The farmer sells his products by direct marketing
Refinement	The farmer processes his own products which leads to an increase of the value added.

Table 4.42: continued

Tenancy / purchase	The farmer increases the "area" as a mean of production by tenancy or purchase
Intensification	The intensity of land use per area unit is increased (e. g. by increased irrigation, fertilisation, by a higher number of cuts)
Extensification	The intensity of land use per area unit is decreased (e. g. by renunciation of the use of fertiliser and chemical plant-protective agents, decrease of the number of live-stock units per hectare)
Specialisation	The farmer concentrates on one type of production (e. g. milk production, cattle fattening, cattle rearing, etc.)
Diversification	The farmer tries out a new form of production (without major investments)
Modernisation	The farm is increasingly mechanised, investments in farm buildings are made.
Management	The farmer uses different consultation facilities in order to improve the management of the means of production

These farm strategies have been selected with the aim to consider all relevant alternatives of action. An essential point for the understanding is that the single strategies do not exclude each other. That means a farmer can pursue several farm strategies at the same time.

4.8.6 Environmental parameters

Environmental parameters are necessary in order to describe the relation between farm strategies and the environments affected. Environmental parameters are specified at farm level and reveal activities relevant for the environment. They can be characterised as direct consequences of farm strategies on the one hand, on the other hand they have certain effects on environment components. The environment components relevant for the task are the following:

- soil (stability, compaction)
- water (quality, quantity)
- diversity of species (flora, fauna)
- diversity of landscape
- air
- material balance

Following environmental parameters which have certain effects on the environment components listed above have been taken into account:

Table 4.43: Environmental parameters

environmental parameter	remark
Fallow land I	proportion of fallow land (less than five years) to the reduced usable agricultural area and total fallow land
Fallow land II	proportion of fallow land (more than five years) to the reduced usable agricultural area and total fallow land
Permanent grassland I (extensive)	proportion of extensive permanent grassland to total permanent grassland (without alpine pastures)
Permanent grassland II (middle intensive)	proportion of middle-intensive permanent grassland to total permanent grassland (without alpine pastures)

Table 4.43: continued

Permanent grassland III (intensive)	proportion of intensive permanent grassland to total permanent grassland (without alpine pastures)
Arable land I (biological management)	proportion of arable land with biological management to total arable land
Arable land II (conventional management)	proportion of arable land with conventional management to total arable land
Permanent crops I (biological management)	proportion of permanent crops with biological management to total permanent crops
Permanent crops II (integrated production)	proportion of permanent crops with integrated production-management to total permanent crops
Permanent crops III (conventional management)	proportion of permanent crops with conventional management to total permanent crops
Land consolidation	proportion of area which has been consolidated within the last years to the reduced usable agricultural area
Planishing	proportion of area planished within the last years to the reduced usable agricultural area
Drainage	proportion of area drained within the last years to the reduced usable agricultural area
Clearing of stones	proportion of area where clearing of stones has taken place within the last years to the reduced usable agricultural area
Steep slopes with one cut LU/ha	proportion of steep slopes mown once a year to the total area of meadows
Application of pesticides	large animal unit per hectare excluding alpine pastures
	proportion of area where pesticides are used to the total area of permanent crops and arable land

chemical weed control	proportion of reduced usable agricultural area with chemical treatment to the total reduced usable agricultural area
Purchase of concentrates	amount of purchased feed divided by the reduced usable agricultural area
Equipment with tractors	existence of a tractor with a weight of more than 3 tons
Storage period of liquid manure	storage capacity of slurry or liquid manure divided by the daily produced amount of liquid manure (liquid manure from cattle and pigs)

4.8.7 Complex "agricultural policy – farm strategies"

4.8.7.1 Introduction

The complex "agricultural policy – farm strategies" is the first part of the transmission mechanism applied within this research project. In this part the relations between instruments of the agricultural policy at European and national level and alternatives of action at farm level are described. That means that those relations are presented which become perceptible in alpine agriculture as direct consequences of the agricultural policy. This part of the transmission mechanism plays an important role within this research project. This is why the hypotheses (that means the presentation of the assumed relations) in this context will be described more into detail than for the other complexes.

4.8.7.2 Presentation of the matrix

The assumed relations are presented in a two-dimensional matrix. The axis of agricultural policy is formed by a classification of agricultural instruments of the European Union (see Section 4.3) and Switzerland (see Section 4.5). The second axis is formed by the farm strategies presented in Section 4.8.5. Subsequently hypotheses have been formulated on the basis of literature, knowledge from the interviews with experts and the experiences of the research team. Positive relationships were marked with a "+", negative relationships with a "-". Where effects have been assumed to occur in both directions, they were marked with "+/-". Empty fields as well as the symbol "~" signify that no relevant effects have been assumed. In Table 4.44 all hypotheses are presented. In the following section selected hypotheses will be explained in detail.

Table 4.44: Agricultural policy – farm strategies

Farm strategies	Quantity control	Price support	Quality requirements	Direct payments with environmental requirements			Direct payments without environmental requirements			Environmental measures	Marketing	Production				Regional development		
				R 2078/92; R 746/96	R 2092/97	R 2080/92	Integrated production	Other	Animal premium			Compensatory allowances	Corn premium	Other	Modernisation (R 950/97)	Diversification	Setting-up aid to young farmers (R 950/97)	Other
Optimisation of subsidies		+		+					+								+	
Labour-intensive way of cultivation	+	+		-	-													
Non-agricultural income activities		-										+		-			+	+
Direct marketing	+	-	-		+		+					-	+				+	+
Refinement	+	-	-									-		-			+	+
Tenancy / purchase	-	+		+			+											
Intensification	-	+		-	-	+/~					+/-	+		+				+
Extensification		-		+		+						-						-
Specialisation		+			+		+	+				+		+			+	
Diversification	+	-					-	+					+					
Modernisation			+		+					+	+	+		+	+	+	+	+
Management			+	+	+					+	+					+	+	

4.8.7.3 Presentation of selected hypotheses

In the following a range of hypotheses, that means assumed relations between instruments of agricultural policy and farm strategies, will be presented. However, due to the high number of hypotheses formulated in the beginning only a selection of them can be presented.

Corn premium promotes the farm strategy "optimisation of subsidies"

The corn premium promotes the use of several types of subsidies and therefore the farm strategy "optimisation of subsidies". Thus, a positive relation has been assumed.

Regulation 2078/92 and regulation 746/96 impede the farm strategy "labour-intensive way of cultivation"

Following assumption is the basis for this hypothesis: Regulation 2078/92 is mainly used by farms with cultivation of grassland or arable land and only less by farms with permanent crops. This priority is determined by national programs for the implementation of Regulation 2078/92. Only in a few states measures on the basis of this regulation for farms with permanent crops are provided. Under this pre-condition a negative relation between Regulation 2078/92 and the farm strategy "labour-intensive way of cultivation" has been assumed.

Compensatory allowances in less favoured agricultural areas impede the farm strategy "non-agricultural income activities"

Direct payments as compensatory allowances improve the situation of income of a farm and reduces the financial necessity of non-agricultural income activities. Thus, a negative effect has been assumed.

Corn premium impedes the farm strategy "non-agricultural income activities"

As well as the compensatory allowances the corn premium as a further direct payment improves the situation of income of a farm and reduces the financial necessity of non-agricultural income activities. Thus, a negative hypothesis has been formulated.

Measures for modernisation promote the farm strategy "non-agricultural income activities"

Due to major investments measures for modernisation increase the financial necessity for non-agricultural income activities. Additionally they contribute to a reduction of intern expenditures of time which can

consequently be spent on non-agricultural income activities. Thus, a positive relation has been assumed.

Measures for integrated production promote the farm strategy "direct marketing"

Measures for integrated production improve the quality of products in the sense of a more extensive / biological production. This type of products is more demanded in the context of direct marketing than of other marketing measures. Thus, a positive relation has been assumed.

Animal premium impede the farm strategy "direct marketing"

Animal premium lead to an intensification of the cultivation and promote ways of action which are not demanded in the context of direct marketing. Thus, animal premium impede an increase in the importance of direct marketing, a negative relation has been assumed.

Regulation 2078/92 and regulation Reg. 746/96 impede the farm strategy "intensification"

The requirements bound to the regulations aiming at an environmentally appropriate agricultural production are in conflict with intensification (application of mineral fertiliser, LU / ha >2, etc.). Thus, a negative hypothesis has been formulated.

Environmental measures impede the farm strategy "intensification"

Environmental measures have a limit on the intensity of cultivation and therefore impede any further intensification. Thus, a negative relation has been assumed.

Regulation 2078/92 and 746/96 promote the farm strategy "extensification"

The requirements bound to these regulations promote extensive cultivation and thus extensification (no application of mineral fertiliser, LU / ha <1.4, etc.). Thus, a positive relation has been assumed.

Corn premium impedes the farm strategy "extensification"

A premium bound to the production of corn promotes the cultivation of arable land compared to the cultivation of permanent grassland. Since the cultivation of arable land respectively the production of corn is generally characterised by a more considerable use of means of production, this instrument is in conflict with extensification. Thus, a negative hypothesis has been formulated.

Environmental measures promote the farm strategy "extensification"

Environmental measures are favourable for ways of cultivation adapted to the environment and consequently promote extensification. Thus, a positive relation has been assumed.

Animal premium promote the farm strategy "specialisation"

Animal premium promote a higher number of live-stock and the extension of the branch livestock production which is a particular form of specialisation. Thus, a positive relation has been assumed.

Environmental measures promote the farm strategy "management"

The realisation of environmental measures leads to an increased necessity to analyse how to cultivate the land in an economically optimal way under present conditions. Thus, this instrument promotes the farm strategy "management" (increased consultation, etc.), a positive relation is assumed.

4.8.8 Complex "farm parameters– farm strategies"***4.8.8.1 Introduction***

This complex contains relations between internal factors of influence (farm parameters) and the selected farm strategies. Both factors are situated at farm level. Farm parameters supply information on the availability of a range of means of production. Thus, they have an important influence on the choice of the farm strategy (see Section 4.7 and 4.8.4).

4.8.8.2 Presentation of the matrix

The complex "farm parameters – farm strategies" is presented in a two-dimensional matrix. Farm parameters (see Section 4.8.3) are situated on the first axis. The second axis is formed by the farm strategies. According to the previous matrix positive relationships were marked with a "+", negative relationships with a "-". Where effects have been assumed to occur in both directions, they were marked with "+/-". In the Table 4.45 all hypotheses are presented.

Table 4.45: Farm parameters– farm strategies

Farm strategy	Handicaps because of inclination <i>the steeper</i>			PGL extensive	Culture			Access <i>the better</i>	Available potential of workers <i>the more</i>	Effective working time at farm <i>the more</i>	Effective working time at farm per ha reduced agricultural area <i>the more</i>	Succession		Farm buildings		Composition of income <i>the more non-agricultural income</i>	Pension	Membership in a co-operative	Assessment of the actual situation of income <i>the better</i>	Proportion tenancy / property <i>the more in property</i>
	Total reduced agricultural area <i>the more</i>	Altitude <i>the higher</i>			PGL middle-intensive	AL biological production	PC biological production					PC integrated production	sure	not sure	Intensity of consultation <i>the higher</i>					
Optimisation of subsidies	+	+	+	+	+	+	+		+	-	-	+	+	+	+	-	+	-	+	
Labour-intensive way of cultivation	-	-	-	-	-	-			+	+	+	-			+	-	+			
Non-agricultural income activities	+/-	+/-	+				+		+	-	-			+	+	+	-	-		
Direct marketing					+	+			+	+	+	-		+			-	+/-		
Refinement									+	+	+	-		+	+	-	-	-		
Tenancy / purchase		+		+	+	+	+	-	+	+	+	-	+	-	+	-	-	-		
Intensification	+/-	-	-	-	-	-	+	+	+						+	-	-	-		
Extensification	+/-	+	+	+	+	+	-	-	-				+		-	+				
Specialisation	+/-								+	+			+	+			+			
Diversification	+		-				+	+	+			-		+			-		-	
Modernisation	+				-		-		-	-	-	-	+	-	+	+	+	+	+	
Management									-	-	-	+		+	+		+	+		

4.8.8.3 Presentation of selected hypotheses

In the following some of the hypotheses summarising relevant relations between farm parameters and farm strategies are commented:

Areas situated at higher altitudes impede the farm strategy "intensification"

The production conditions of agricultural areas at higher altitudes are in conflict with a more intensive cultivation (increased mowing, higher density of live-stock, etc.). Thus, a negative relation has been assumed.

A higher proportion of steep slopes promotes the farm strategy "optimisation of subsidies"

A higher proportion of steep slopes promotes the use of different types of subsidies aiming at a compensation of handicaps for the cultivation of less favoured areas. Thus, a positive relation has been assumed.

Sure succession promotes the farm strategy "tenancy / purchase"

Sure succession makes possible a long-term planning of the means of production. This concerns in particular the availability of usable agricultural areas which often can only be maintained in the long-term. Thus, a positive relation has been assumed.

Higher proportion of income from non-agricultural activities promotes the farm strategy "extensification"

A higher proportion of income from non-agricultural activities improves the situation of income of a farm. As a consequence, the financial necessity to produce a higher quantity of agricultural products is reduced. Thus, a positive relation has been assumed.

Payment of a pension impedes the farm strategy "non-agricultural income activities"

The payment of a pension to at least one person at a farm improves the income situation of a farm and reduces the financial necessity for "non-agricultural income activities". Thus, a negative relation has been assumed.

Payment of a pension promotes the farm strategy "extensification"

The payment of a pension improves the total income of a farm and so reduces the financial necessity for a more intensive production

respectively a quantitative increase in production. Thus, a positive relation has been assumed.

Membership in co-operatives promotes the farm strategy "optimisation of subsidies"

Members of co-operatives have better access to information and therefore are more likely to use a greater number of subsidies funds. Thus, a positive relation has been assumed.

Membership in co-operatives impedes / promotes the farm strategy "direct marketing"

For the negative hypothesis following assumption has been made: Members of co-operatives use these institutions to market their products. Their motivation to use other marketing possibilities, such as direct marketing, is less distinct. The positive relation is based on the assumption that beside the classical co-operatives also co-operatives with the single goal of establishing structures for direct marketing have been founded. Following this a positive relation can be assumed.

4.8.9 Complex "region – farm strategies"

4.8.9.1 Introduction

This complex presents the relations between regional parameters and farm strategies. This means that the regional influence on the choice of a farm strategy is analysed. In this context the regional level as well as the farm level are concerned. The importance of this complex lies in regional different conditions which can cause different effects in regard to instruments or measures.

4.8.9.2 Presentation of the matrix

The complex "region – farm strategies" is presented in a two-dimensional matrix. The axis of regional factors of influence is formed by regional parameters (see Section 4.8.4). The second axis is formed by the farm strategies. According to the previous matrix positive relationships were marked with a "+", negative relationships with a "-". In the Table 4.46 all relations and effects are presented.

Table 4.46: Regional parameters – farm strategies

Farm strategy	Employment	Population movement	Market	Intensity of cultivation	Co-operatives (sales)	Consultation	Factor of farm abandonment
Optimisation of subsidies						+	+
Labour-intensive way of cultivation	-					+	
Non-agricultural income activities	+		-				-
Direct marketing			+		-		
Refinement			+		-		
Tenancy / purchase	-				+		+
Intensification	-				+		
Extensification	+						
Specialisation	+				+	+	
Diversification	-		+		-		
Modernisation	+					+	
Management					+	+	

4.8.9.3 Presentation of selected hypotheses

In the following some of the hypotheses summarising relevant relations between regional parameters and farm strategies are commented:

A higher proportion of income due to sale over co-operatives promotes the farm strategy "intensification"

A higher proportion of income from sales over co-operatives reduces the expenditures for marketing. As a consequence a higher part of the means of production can be used for a higher output of production. Additionally an intensive way of cultivation requires a certain guarantee of purchase which can be obtained more easily with a membership in a co-operative than with other marketing measures. Thus, a positive relation has been assumed.

A higher proportion of income due to sale over co-operatives promotes the farm strategy "specialisation"

A higher proportion of income from sales over co-operatives guarantees a well organised marketing channel. Therefore a further quantitative increase of a few number of products is promoted. A positive relation has been assumed.

A higher proportion of income due to sale over co-operatives impedes the farm strategy "diversification"

A higher proportion of income from sales over co-operatives promotes the production of a limited number of products. The guarantee of purchase reduces the necessity to consider product alternatives and , thus, impedes the farm strategy "diversification". A negative relation has been assumed.

Higher intensity of consultation promotes the farm strategy "optimisation of subsidies"

A higher number of consultations which have been called on improves the level of information concerning subsidies and conditions bound to these subsidies. Thus, a positive relation has been assumed.

Higher intensity of consultation promotes the farm strategy "specialisation"

A higher number of consultations which have been called on improves the level of information concerning possibilities of specialisation at a farm. Thus, a positive relation has been assumed.

Higher intensity of consultation promotes the farm strategy "modernisation"

A higher number of consultations which have been called on improves the level of information concerning possibilities of modernisation at a farm. Thus, a positive relation has been assumed.

Increased farm abandonment promotes the farm strategy "tenancy / purchase"

A higher factor of farm abandonment leads to a higher availability of usable agricultural areas as a pre-condition for the farm strategy "tenancy / purchase". Thus, a positive relation has been assumed.

Increased farm abandonment impedes the farm strategy "Non-agricultural income activities"

A higher regional factor of farm abandonment leads to a higher availability of usable agricultural area as presented above. As a consequence the quantity of production can be increased which reduces the necessity for non-agricultural income activities. Thus, a negative relation has been assumed.

4.8.10 Complex "farm strategies – environmental parameters"

4.8.10.1 Introduction

The complex "farm strategies – environmental parameters" describes influences of farm strategies on certain actions relevant for the environment (see Section 4.8.6). The complex is based on the assumption that certain farm strategies lead to specific actions relevant for the environment. Thus, this complex is part of the last step of the transmission mechanism which describes the relations between farm strategies and environment components. In conjunction with the complex "environmental parameters – environment components" (presented in Section 4.8.11) the whole transmission mechanism becomes comprehensible.

4.8.10.2 Presentation of the matrix

The complex is presented in a two-dimensional matrix. The axis causing effects is in this case formed by the twelve farm strategies. The elements of the second axis are formed by the environmental parameters presented in Section 4.8.6. Subsequently hypotheses have been formulated. Positive relations, that means the increasing importance of certain environmental parameters caused by certain farm

strategies, are expressed by a "+". Negative relations are marked with a "-". Symbols in brackets signify that this effect occurs with a minor probability.

Table 4.47: Farm strategies – environmental parameters

Environmental parameters at farm level	Optimisation of subsidies	Labour-intensive way of cultivation	Non-agricultural income activities	Direct marketing	Refinement	Tenancy / purchase	Intensification	Extensification	Specialisation	Diversification	Modernisation	Management
Fallow land I (Fallow land < five years)	+ (-)	-	+	-	-	- (+)	+ (-)	+		-	-	-
Fallow land II (Fallow land > five years)	+ (-)	-	+	-	-	- (+)	+ (-)	+		-	-	-
Permanent grassland I (extensive)	+		+	+			+/-	+/-	+/-	-		
Permanent grassland II (middle intensive)	+						+/-	+/-	+/-			
Permanent grassland III (intensive)	-	-	-				+/-	+/-	+/-	+	+	
Arable land I (biological management)	+		-	+			-	+	+/-	- (+)		+
Arable land II (conventional management)	-		-				+	-	+/-	+		
Permanent crops I (biological management)	+	+	-	+			-	+	+/-	- (+)		
Permanent crops II (integrated production)		+					+	-	+/-			
Permanent crops III (conventional management)	-	+	-				+	-	+/-	+		
Land consolidation	-		-			+	+	-		+	+	+
Planishing		+	-			+	+	-		+	+	
Drainage	-	+	-			+	+	-		+	+	
Clearing of stones	-		-			+	+	-		+	+	
Steep slopes with one cut	+		- (+)			-	-	+		-		
LU/ha	+ (-)		-	+			+	-	+/-	+		
Application of pesticides	-	+		-	-		+	-	+/-	+		-
Chemical weed control	-	+		-	-		+	-		+		-
Purchase of concentrates	-		-		+	-	+	-	+/-	+	-	
Equipment with heavy tractors						+	+	-		+	+	-
Storage period of liquid manure					-	-	-	+	+/-	-	+	+

4.8.10.3 Presentation of selected hypotheses

In the following a range of hypotheses considered as relevant for the task will be commented:

Farm strategy "optimisation of subsidies" promotes extensive permanent grassland (permanent grassland I)

The use of several instruments leads to a more extensive way of cultivation due to requirements on which payments are bound. These requirements aim at extensive types of cultivation. Thus, a positive relation has been assumed.

Farm strategy "optimisation of subsidies" promotes middle-intensive permanent grassland (permanent grassland II)

As explained in the previous hypothesis also middle-intensive ways of cultivation are promoted by specific requirements for subsidies. Also in this case, a positive relation has been assumed.

Farm strategy "optimisation of subsidies" impedes intensive permanent grassland (permanent grassland III)

On the contrary it has been assumed that the use of different types of subsidies is in conflict with an intensive cultivation. In this case the requirements for the subsidies aim at an extensive or middle-intensive way of cultivation cannot be met. Thus, a negative relation has been assumed.

Farm strategy "optimisation of subsidies" impedes purchase of concentrates

The use of different types of subsidies is in conflict with the increase of live-stock, because many subsidies are bound directly to a limitation of the number of live-stock or to ways of cultivation which by themselves require a limitation. As a consequence the need for the purchase of concentrates decreases. Thus, a negative relation has been assumed.

Farm strategy "direct marketing" impedes chemical weed control

An increased sale by direct marketing is characterised by an important demand for biological products. Thus, a conflict with chemical weed control and a negative relation has been assumed.

Farm strategy "tenancy / purchase" promotes the following measures: land consolidation, planishing, drainage, clearing of stones

An increase of the usable agricultural area augments the financial expenditures per area unit and therefore the economic necessity to draw a higher profit from the usable agricultural area. Therefore measures for a more intensive way of cultivation are required. Thus, a positive relation has been assumed.

Farm strategy "tenancy / purchase" impedes / promotes measures of laying fallow

According to the previous hypothesis in order to increase the production an augmentation of the usable agricultural area is in conflict with measures of reducing the land use, such as laying fallow land. On the other hand the tenancy or purchase of good quality agricultural area can also lead to the laying fallow of less favoured areas.

Farm strategy "tenancy / purchase" promotes the equipment with tractors

An augmentation of the usable agricultural area requires an improvement of the equipment with machinery, because of an increasing necessity for efficient and productive cultivation. Thus, a positive relation has been assumed.

Farm strategy "intensification" promotes / impedes extensive and middle-intensive permanent grassland (permanent grassland I, II)

A more intensive way of cultivation (higher number of live-stock, application of mineral fertilisers, increased purchase of concentrates, etc.) can have as well promoting as impeding effects on extensive and middle-intensive permanent grassland (permanent grassland I, II). Due to intern diversification which leads to an intensification of some parts of the usable agricultural area and to an extensification in less favoured areas promoting effects can be obtained. Impeding effects are caused by an enforced use of the usable agricultural area when the total farm area is concerned.

Farm strategy "intensification" promotes the equipment with tractors

A more intensive use of the means of production requires an improvement of the equipment with machinery and therefore the purchase of more efficient tractors. Thus, a positive relation has been assumed.

Farm strategy "extensification" promotes steep slopes with one cut

Extensive cultivation promotes the increase of areas mown only once a year. By a decrease in the live-stock the need for feed per area unit is reduced. Thus, a positive relation has been assumed.

Farm strategy "extensification" impedes a better equipment with tractors

A more extensive cultivation is opposed to an improvement of the equipment with machinery, because the intensity of land use does not require any increased necessity for the means of production "machinery". Thus, a negative relation has been assumed.

Farm strategy specialisation promotes / impedes extensive permanent grassland (permanent grassland I)

An orientation of a farm to a particular branch of production can lead to positive or negative effects on the extensive permanent grassland according to the requirements of this branch. Promoting effects can be obtained by a specialisation on natural tourism (farm tourism). Specialisations leading to a higher number of live-stock per area unit impede extensive permanent grassland. Therefore a positive as well as a negative relation have been assumed.

Farm strategy specialisation promotes / impedes the purchase of concentrates

An orientation of a farm to a particular branch of production can lead to positive or negative effects on the purchase of concentrates according to the requirements of this branch. A promoting effect is obtained by specialisations leading to an increase of live-stock per area unit and therefore to an increase in the need for feed. Impeding effects are caused by branches of specialisation provoking a reduction of the number of live-stock. Therefore a positive as well as a negative relation have been assumed.

Farm strategy diversification promotes a higher number of live-stock

A diversification of a farm is linked with an extension of the animal species kept at the farm. This can lead to an increase in the total number of live-stock. Thus, a positive relation has been assumed.

Farm strategy "modernisation" promotes the following measures: land consolidation, planishing, drainage, clearing of stones

A modernisation of a farm promotes measures favourable for a more intensive use of the usable agricultural area, such as land consolidation, planishing, drainage and clearing of stones. Due to investments for

modernisation there is an increase in requirements for the productivity of the usable agricultural area. Thus, a positive relation has been assumed.

Farm strategy "management" impedes chemical weed control

An increase in the use of consultation facilities is favourable for an efficient use of the means of production. As a consequence cultivation can be adapted to the specific production conditions. This results in a reduction of chemical weed control. Thus, a negative relation has been assumed.

4.8.11 Complex "environmental parameters – environment components"

4.8.11.1 Introduction

The complex "environmental parameter – environment components" describes the influences of the environmental parameters at farm level, that means of the actions relevant for the environment. The notion "environment" is defined by a range of environment components, that means by those parts of the environment for which effects due to environmental parameters can be expected. In conjunction with the complex "environmental parameters – environment components" (presented in Section 4.8.10) this complex is the last part of the transmission mechanism.

4.8.11.2 Presentation of the matrix

The effects are presented in a two-dimensional matrix. The axis of elements causing effects is formed by the environmental parameters. The second axis is formed by the environment components respectively subjects of protection. In the matrix the direction as well as the intensity of the effects are presented. The direction of the effects is marked with a "+" for positive and with a "-" for negative relations as in the previous sections. The measure of intensity ranges from 0-3. In total the graduation of effects ranges from -3 (highly negative relation) over 0 (no effects) to +3 (highly positive relation).

Table 4.48: Environmental parameters – environment components

Environmental parameters at farm level		Soil		Water		Diversity of species		Diversity of landscape	Air	Material balance
		stability	compaction	quality	quantity	flora	fauna			
Fallow land I (Fallow land < five years)		+2	-2	+2	+1	+3	+1	+2	+1	-1
Fallow land II (Fallow land > five years)		-1	-1 (+1)	+2	+1	+2	+2	+2	+2	-3
Permanent grassland I (extensive)		+2	-2	+1	+1	+2	+1	+3	+1	+1
Permanent grassland II (middle intensive)		-1	0	-1	+2	-1	-1	-1	-1	+2
Permanent grassland III (intensive)		-2	+2	-2	+2	-3	-2	-2	-2	+3
Arable land I (biological management)		-3	-2	-1	+2	-2	-1	-2	-1	+2
Arable land II (conventional management)		-3	-2	-2	+2	-3	-3	-2	-2	+3
Permanent crops I (biological management)		-1	+2	-1	+1	-2	-1	-2	-1	+2
Permanent crops II (integrated production)		-1	+2	-2	+1	-3	-2	-2	-2	+3
Permanent crops III (conventional management)		-2	+2	-3	+1	-3	-3	-2	-3	+3
Land consolidation		-1	+1	0	-1	-1	-2	-3	-1	(+2)
Planishing		-2	+2	-1	-2	-2	-2	-2	-1	(+2)
Drainage		+1	-1 (+1)	-1/0	0	-1 (-2)	-2	-2	-1	(+2)
Clearing of stones		-1	+1	0	+1	-1	-1	-2	0	(+2)
Proportion of steep slopes with one cut		0	0	0	-2	+2	+1	+2	+1	+1
Area of steep slopes with one cut		0	0	0	-2	+2	+1	+2	+1	+1
LU/ha (for alpine pastures)	low	+2	-2	+2	+1/0	+2	+1	+3	+1	+1
	middle	-1	+1	-1	+2/0	-1	-1	-1	-1	+2
	high	-2	+2	-3	+2/0	-3	-2	-2	-2	+3
Application of pesticides		0/-1	0/+1	-3	+1/0	-3	-3	-2	-3	0(+2)
Chemical weed control	low	-1	+1	-1	+1/0	-1	-1	-1	-2	+2
	high	-1	+1	-3	+1/0	-2	-2	-2	-3	+3
Purchase of concentrates		-1	+1	-2	+1/0	-1 (-3)	-1 (-3)	-2	-2	+2
Equipment with heavy tractors	< 3 tons	-1	+1	0	-1/0	-1	-1	0	-1	0
	> 3 tons	-1	+2	0	-2/0	-1	-2	-2	-2	0
Storage period of liquid manure	0 - 90 days	-2	+2	-3	+2/0	-3	-3	-2	-2	+3
	> 91 days	-1	+1	-1	+1/0	-2	-2	-2	-1	+2

4.8.11.3 *Presentation of the procedure*

For the determination of direction and intensity of the effects the single environmental parameters have been discussed intensively concerning their influences on the environment components. The basis for the discussion were the experience of the research team and information from the literature. They have been completed with the knowledge of local experts. The first results obtained in small interdisciplinary and multinational discussion groups have been checked in larger discussion platforms before finally determining the effects presented in Table 4.48. An exclusive analysis of literature would not have brought about satisfying results, because the environmental parameters used in this research project are only partly considered. For several relations only restricted statements could be made (in the table in *Italics*). However, following the presented procedure an appropriate consideration of the particularities of alpine agriculture was possible.

4.9 The quantification of the influence of agricultural policy on the environmental quality of the alpine region

Gottfried Tappeiner and Andreas Hilbert

4.9.1 The identification of the integrated chain of cause and effect

Agricultural policy can affect environmental quality only very indirectly; its influence is directly focused on the choice of a "farm strategy" by the affected farmers. These strategies have correspondingly specific effects upon the environment which can be quantified through the establishment of environmental parameters. The development of these indicators shows, in turn, the improvement or worsening of the quality but also of the quantity of important environmental components and environmental structures.

This indirect chain of cause and effect cannot be empirically examined and quantified in a single-stage process. Rather, it is necessary to model and to examine every step separately. Since every one of the levels of effect referred to (instruments of agricultural policy, regional parameters, farm parameters, farm strategies, environmental parameters, and environmental components) is a compound term which is composed of several partial terms, there exists a multitude of

interrelations as described in the previous section. For every possible interrelation, it was specified a priori through experts co-operating in this project whether it could be assumed that the interrelation actually exists and, if so, which sign may be expected for the relevant coefficients.

All of these hypotheses were tested on the basis of logistic regressions. The results are shown in the tables in Appendix 3 and may be consulted as a basis for many individual analyses. Within the scope of this study, though, two important points come to light:

- The empirical findings show that with the data gathered, relatively many of the assumed interrelations can be shown to be statistically insignificant, that a considerable portion of the proven interrelations shows an "unexpected" effect, and that some statistically significant interrelations were not particularly assessed as such at the expert level.

On the one hand, this finding shows that there is only little scientifically secured knowledge available on the interrelations which are researched in this project, especially with regard to the interrelation between political incentives and the behaviour of social participants on one side and environmental effects connected with them on the other. The wealth of individual results of this study makes a contribution to structuring this important field of research somewhat better and can be used as a source of hypotheses for in-depth research.

On the other hand, the results also show that limiting the interpretation of the interrelations between effects that were asserted a priori and then supported or refuted would represent a waste of information. It is, rather, necessary and sensible to interpretatively bring up for discussion all statistically significant interrelations that are found. It must be realised, though, that in so doing, the realm of inferential statistics is left behind, giving way to that of descriptive statistics. For this reason, all statements regarding significance are to be interpreted descriptively as indicators for the restricted nature of the corresponding interrelation but not as codes for probability theory.

- In order to assess the effects of agricultural policy on environmental quality in an integrated manner, individual interrelations provide unsuitable access. Rather, what is necessary is a complete "sequence of cause and effect" from political instruments on farm strategies, and, in turn, on environmental parameters.

Individual interrelations which do not fit into such a complete chain of cause and effect are not dealt with in this section.

The empirical results show that 5 of the 13 farm strategies can be proven to fit into such a chain. With the remaining 8 strategies, there is no significant interrelation demonstrable either to the instruments of agricultural policy or to the environmental parameters.

For the assessment of the results, it should be taken into account that two important parts in possible chains of cause and effect are missing in the analysis: one instrument and one "strategy".

By "instrument", it is meant the entire system of price supports, thus primarily guarantee prices and intervention prices. The effects of these instruments on farmers cannot be directly ascertained since the price

obtained is perceived as a result of the market and not as a result of the agricultural policy. It is clear, though, that measures for the support of agricultural prices have an important influence on the intensity of cultivation and on modernisation tendencies. Wherever such effects are visible in the overall chain of cause and effect, they are integrated in the interpretation.

The missing "strategy", if it can be indicated in this way, is the closing down of farms. In this study, this phenomenon can only be registered at a regional level. At the farm level the research horizon is not broad enough. It can be assumed, though, that an "overall profitability" (including non-agricultural income) which is at least satisfactory is a necessary condition for the long-term existence of a farm. In this sense, strategies that cause such a viability to appear doubtful are classified as unstable and interpreted accordingly.

4.9.2 Digression: partial results

It is all the easier to not take into consideration incomplete chains of cause and effect, since with the exceptions of the strategy of "labour-intensive cultivation" for which an influence of policy is provable, and the strategy of "farm management" which is significantly linked to environmental parameters, no relevant partial interrelations come to light. With regard to agricultural policy considerations without a direct interrelation with the environmental situation, the following points may be of interest:

- The portion of income from outside the agricultural business depends exclusively upon variables that are specific to each corresponding farm. An influence from the political or regional areas is not provable. At the same time, no interrelation can be established between this variable and the environmental parameters. However, income from outside the agricultural concern does make up an important component of the aforementioned "overall profitability" and thus an important building block for averting the choice of the "giving up the farm" strategy.
- With "direct marketing", exactly the same findings hold true: the situation at the farm exclusively determines the choice of strategy. It is seen almost as a secondary result that the two lines of marketing, that is, direct marketing and marketing through co-operatives, are substitutes from the farmer's point of view and are in competition with one another. Since this is not inevitably the case but rather is dependent upon the arrangement, especially that of the marketing by co-operatives, an interesting approach to organisation presents itself here.
- The strategy of "refinement" cannot be associated with any other influencing factor; the influences on it are decisive but are beyond the scope of our study and are presumably to be sought in the abilities and tendencies of the farmer. The same holds true for "diversification", and, as is to be expected, for those farms without an explicit strategy.
- Influences for the choice of the "expansion of cultivatable area through leasing" strategy are definitively region-specific and farm-specific. An influence by instruments of agricultural policy or an effect from the choice of this strategy on the environmental parameters is not demonstrable.

With all of these results, it is necessary to consider that the methods used in this project can establish proof of only short term and middle term influences. Longer term developments would, however, be less probable for lack of a unified agricultural policy over corresponding periods of time.

4.9.3 Methodological background

The interrelations between individual links of the chain of cause and effect were connected with each other with the help of logistic regression and, in the last stage, on the basis of the knowledge of experts. For this purpose, for each data record at farm level as many dummy variables were assigned to as there were strategies studied (a total of 15). Thus a code of 1 or 0 was assigned, depending upon whether a given farm followed a certain strategy or not, respectively. This type of coding made it possible to assign a farm to more than one strategy in a methodologically clean manner. For this reason, every strategy was also examined individually and thus was tested simultaneously without the help of a multinomial logistic regression.

All degrees of influence for a block (region, policy, farm) were included simultaneously in the regression as independent variables. Thus the variables identified by experts as being relevant were not the only ones to be included. We are also persuaded, therefore, by the interpretation in the area of descriptive statistics (see above).

The asymptotic significance, which on the basis of the 1000 available questionnaires revealed completely significant interrelations, was not used as a quality criterion. It was the hit rate that was employed. The hit rate here is the portion of the farms for which the procedure correctly reveals the pursuit of a definite strategy from among the total number of farms which pursue this strategy. A value of 69% for those who optimise subsidies thus means that 69% of the farms which carry out optimisation of subsidies have been correctly recognised by the procedure. This hit rate is without exception significantly lower than the total hit rate because farms that do not pursue a strategy because of the larger a priori probability are more correctly classified than the corresponding complementary amount.

All hit rates above 50% were viewed in the process as satisfactory. Since the portion of strategy-pursuing farms wavers around 50%, values above this level correspond to an interrelation that is more than just coincidental. The value can also therefore be set proportionally lower because the influence of individual blocks was determined separately. A simultaneous formulation would therefore produce hit rates that were significantly even higher.

For every logistic regression with a hit rate above 50% the degree of influence was then determined with significant parameters ($\alpha=5\%$). Since the regression was calculated on the basis of non-standardised variables, only the sign of the coefficient is interpreted below, not its absolute value.

In a completely analogous manner, the question was studied whether the formation of environmental parameters for a farm leads to conclusions about the strategy pursued by it. This approach is not completely non-problematic because it reverses the direction of causality: what is of interest is the effect of the strategy on the levels of the environmental parameters, what is calculated instead is the ability to identify the farm's strategy on the basis of the formation of the environmental parameters. Since, however, the procedure does not really require causality, the results obtained are perfectly useable for our problem. As a supplement and for an immediate interpretability, this formulation was expanded by an index which shows how much the average value of the environmental parameters of the farm with farm strategy X differs from the average value of all of the farms. For this purpose, the mean value of the farm with strategy X was divided by the mean value of all of the farms, so that a value greater than 1 corresponds to a level above the average and a value of less than 1 corresponds to a level below the average. This provides an environmental profile of every single strategy for all of the environmental parameters. Tables with the corresponding values for the five main strategies may be found in Appendix 4.

The link between the environmental parameters and the environmental components is difficult. This step is achieved through opinions of experts quantified in a matrix (see Table 4.48). This is not sufficient, though, because every farm strategy significantly influences an entire set of environmental parameters and this can exert totally different influences on the environmental components in sign and formation. As a rough approximation of a quantification of the "global strategy effect" on the environmental components, we added together the values of the effects matrix for the significant environmental parameters while considering the sign of the effects' interrelation. This goes to the tenable limit and must be interpreted with extreme care. At this time, however, it is the only practicable way to approximately determine the overall effect. It would be desirable and would represent a clear-cut contribution to research in sustainability if through long-term observation this connecting link between environmental parameters and environmental components could be established on a more exact basis.

4.9.4 The complete chain of cause and effect

4.9.4.1 Effects on those who optimise subsidies

The optimisation of subsidies is one of the passive strategies that is available to an agricultural business. This strategy must be classified as passive because it is oriented primarily toward the local and international pool of subsidies rather than toward content-related instructions or corresponding markets. The strategy was operationalised over the level of subsidies with respect to the usable agricultural area and over the number of received premiums. It is the first strategy with a complete chain of cause and effect whose results have been summarised in the following chart.

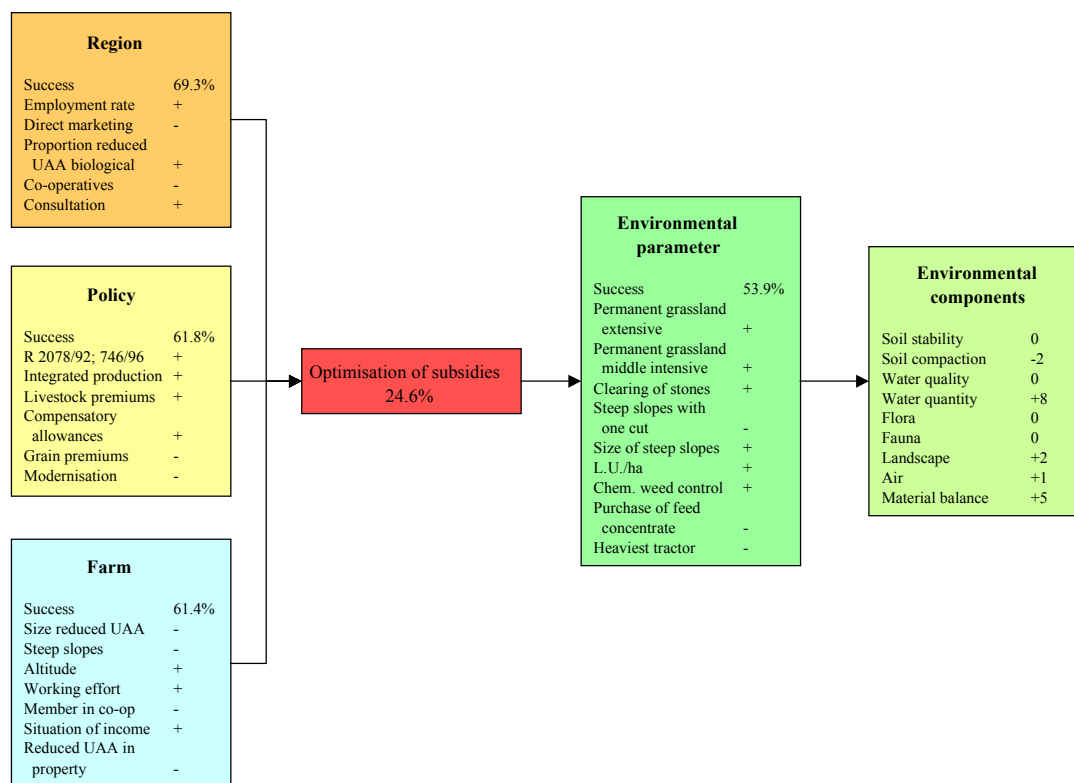


Figure 4.44: Structure of effects and success of classification of the logistic regression for the "optimisation of subsidies" farm strategy

Approximately one-fourth of the farms studied follow this strategy and the independent variables can correctly identify them nearly 100% of the time. The most successful of them are the farm parameters with a hit rate of over 94%. In comparison, the parameters of region and of agricultural policy instruments are, with 69% and 62%, respectively, rather moderately successful. The hit rates of the individual blocks of variables can roughly be used as a measure for the "meaning" of the corresponding blocks of variables for the choice of this strategy.

The farms that pursue this strategy are characterised by a rather small and steep area of land and are found at higher altitudes. They are extremely labour-intensive and those running them find their current income situation rather problematic. In short, it may be said that these are farms in unfavourable locations with a problematic farm size. However, the size of the farm also cannot easily be increased because the labour intensity is already high as a result of the basic conditions, and the family's own labour potential cannot be overextended any further.

The basic regional conditions for this strategy are a high portion of completely organically-worked land area in the region, a high rate of employment as an indicator for additional or alternative income other than from agriculture, and an intensive use of consultative services.

At first view it appears somewhat peculiar that the membership in a co-operative has a rather negative effect on the choice of this strategy. This is associated with the "passivity" of the strategy already mentioned above: the co-operative and especially the sales co-operative are a strong connecting link between farm and market. Whoever has such a connecting link at his disposal will not quickly place himself in a position of dependence on political decisions about the corresponding measures of support. The sign of direct marketing must be analysed in a completely analogous manner.

Summarising the results of both blocks of effect, this strategy is chosen by those farms with low costs for the opportunity to adapt to the subsidy guidelines. These lower costs are determined by three factors: the low productivity of agriculture, a low level of relationship to the market, and a good possibility of exploiting the labour force in other sectors.

This starting position makes it possible for the farm to respond to a "mild" stimulus for extensification (Council Regulation No. 2078/92, integrated production). Impulses toward modernisation remain ineffective against it because even with supported investment the achievable productivity cannot cover depreciation.

Within the time frame established for the project, it is not possible to study the effect of this strategy on a radical strategy — that of closing down the farm. The negative sign for modernisation and the lack of market connections make it appear probable, though, that the strategy of optimisation of subsidies in the current formulation is only an "interim strategy" toward a retreat from working the land.

In spite of this long-term aspect, the data from Figure 4.44 show that a moderate effect (a success rate of 53.9%) is provable on a series of environmental parameters. The image that is rendered is completely coherent with the blocks of influence described: no clear extensification

or even rearrangement of the organic farm but an avoidance of intensively-farmed permanent grass land (because of the subsidies) and of heavy machinery (because of profitability). Within the framework of that which is not explicitly prohibited by support directives, measures of intensification (clearing of stones, chemical weed control, LU/ha) are put in place.

The effects upon the environmental components and the environmental structures range tendentially from neutral to positive. This is especially true in comparison to several of the following strategies. For the agricultural policy instruments, direct payments yield a completely positive assessment: provided that the basic operational and regional conditions are correct, they are to be completely favoured as an environmentally legitimate economic method, even when the signals are not strong enough in the content-related and financial fields to bring about changes in basic farming.

4.9.4.2 Intensification

Nearly half of the farms examined pursue an intensification strategy in the sense that the attempt is made to raise the yield per hectare through an increase in the core production. The hit rates with these strategies are significantly weaker than with optimisation of subsidies, thus suggesting that within the framework of this study, factors that were not included do play a role. Figure 4.45 below, though, shows the most important interrelations.

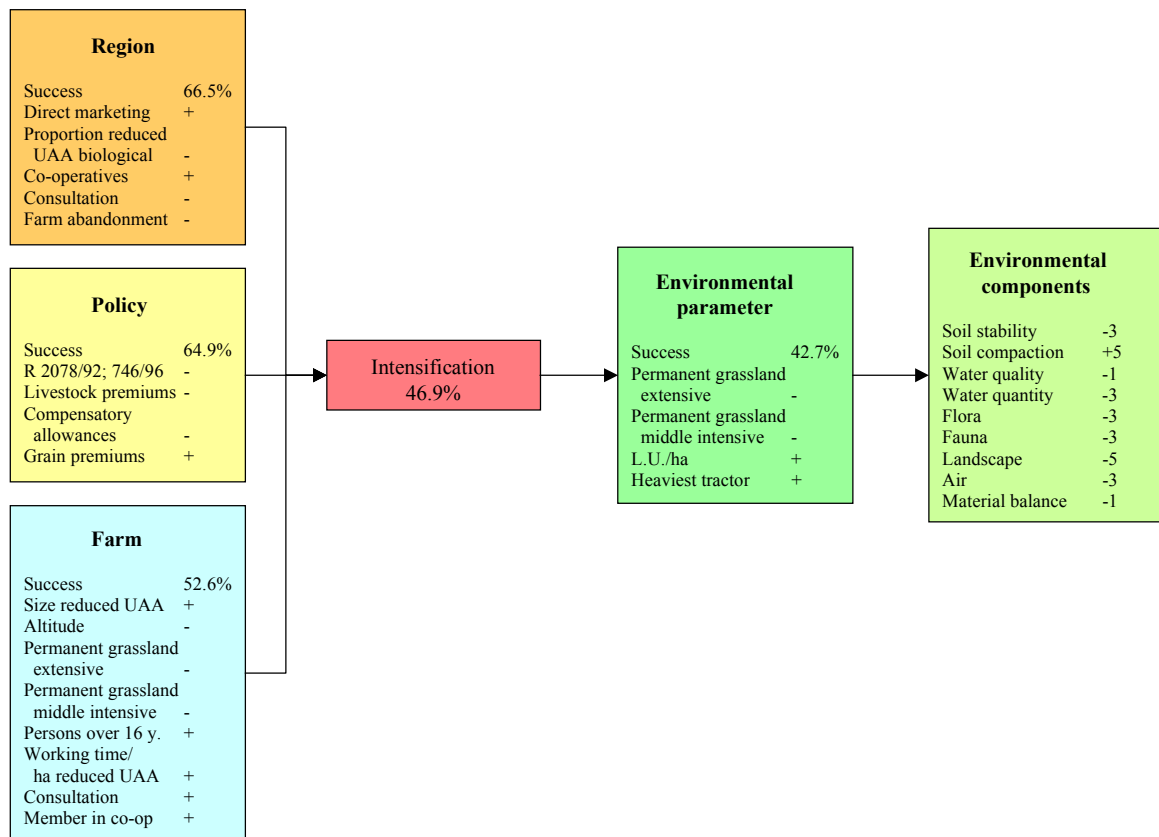


Figure 4.45: Structure of effects and success of classification of the logistic regression for the "intensification" farm strategy

The characteristics of the farm are relatively clear: above-average size, moderate altitude, sufficient labour force, and, through the co-operatives, a good connection to the market. This bundle shows that farms are dealt with which demonstrates especially favourable basic conditions for the alpine area. In a European comparison, they are of course borderline suppliers as well — they lie, though, so close to the break even point that an intensification is promising.

A good number of the farm parameters are closely connected with the regional parameters (presence of co-operatives, altitude, and size of farm). These are then also found among the significant variables in the region block. In addition, the factor of giving up the farm appears in these. This can be interpreted in such a way that it deals with farms with this strategy in situations that up until now were not acutely threatened and accordingly were stable in the past.

In the agricultural policy block, it is seen immediately that these farms take advantage of subsidies at a below-average level. An exception is represented simply by the grain premium which, because of the potential cultivatable area for grain, is used basically in favourable locations.

This diagnosis does not, however, signify that the intensification is not determined through the CAP. The difference from the preceding strategies consists merely of the fact that there the influence comes from direct payments, while in the current case it comes from price guarantees. The orientation of the intensive farmer to the market is, because of regulated prices, only an apparent one. The new orientation of the CAP in the framework of the Agenda 2000 should partially correct this misdirection.

The environmental effects of this strategy are more than clear, both at the level of environmental parameters and that of environmental components: intensively-farmed permanent grassland, high livestock density, and considerable mechanisation. The effect of this strategy on the environmental components is negative in every respect and is distinguished only by the severity of this negative influence.

To summarise in a compact manner, it can be said that through artificial market prices, farms in favourable locations and with favourable farm structures are led to finding the connection to an international market through intensification. This development leads, at least in sensitive areas such as the Alps (the database is sufficient for this alone) to clear damage of the environment. It deals with a special form of eco-dumping.

4.9.4.3 Extensification

Those who farm extensively are represented in the sample at approximately the same level quantitatively as those who farm intensively. However, the hit rate, especially that of the farm parameter, is significantly better and the association with the environmental parameters is extraordinarily tightly connected with the strategy.

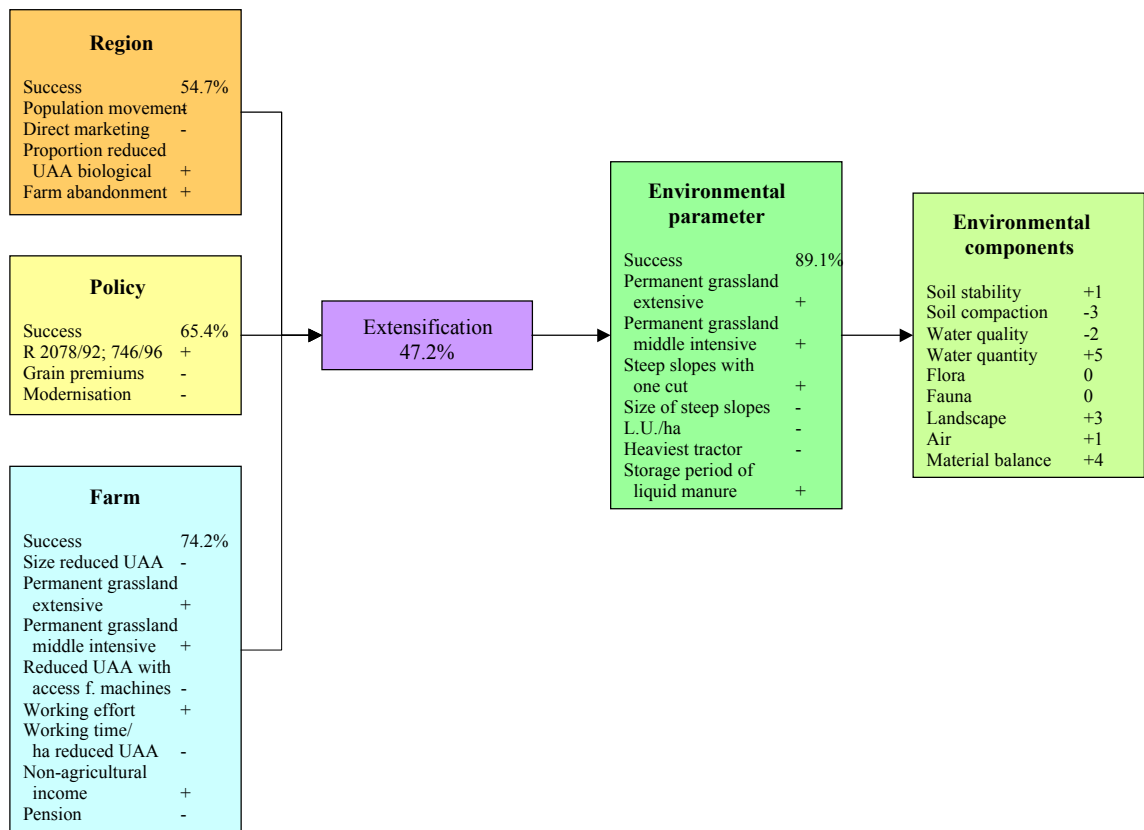


Figure 4.46: Structure of effects and success of classification of the logistic regression for the "extensification" farm strategy

For the farms, this means smaller farms with extensive usage which is sometimes forced by problematic conditions of access. In spite of the extensive farming, the necessary working effort is high (unfavourable location) and in many cases the income must be supplemented by additional non-agricultural earnings.

Since these farms are found in regions with a rather weak overall economic dynamic (one indicator is the negative balance of population movement), the possibilities of additional income as well as the possibility of direct marketing, which presupposes a certain proximity to quantitatively significant markets, are only limited suitable alternatives. Consequently, this manifests itself in a high factor of farm closures. For farms with this strategic orientation, it is a matter of immediate candidates for giving up the farm if corresponding agricultural policy and environmental policy measures are not put into place.

As the agricultural policy variable block shows, at this time these farms can only make use of subsidies in a limited fashion: for the access to modernisation supports, profitability is lacking, and the farm's own resources are sometimes lacking, as well. Only the Council Regulation No. 2078/92 and the Commission Regulation No. 746/96 in the corresponding national versions can be used.

The environmental effect of this strategy is impressive: with the exception of the diversity of species of flora and fauna for which the effect can be assessed as neutral, this strategy is a gain for all areas of the environment.

The area of conflict for this strategy is the economic instability coupled with the ecological desirability. In no other strategy does it so clearly come to light that if the positive external effects of extensive agriculture are desired, then the corresponding farms must be economically stabilised. This is a result not of market price but presumably of direct compensation for this necessary and desired performance.

4.9.4.4 Specialisation

With approximately 68%, specialisation is the most common of the strategies found. It was defined as the part of the agricultural income from the "main cultivation". This of course also includes "paired products" such as milk and meat from the raising of cattle. Conversely, from that it can be concluded that it is the exception that agricultural concerns in the Alps obtain their income equally from several product areas.

This tendency toward specialisation arises from three sources: firstly, there are locations which show such competition advantages for certain products that only one cultivation is to be found (pome fruit, for example). Secondly, it is the case that several cultivations for the area are technically predestined in a similar manner but that for reasons of cost only one cultivation can be planted within a farm (for example, wine grapes and pome fruit, or berries and vegetables). Finally, and the main reason for the alpine area, it is the case that the natural preconditions of the area make only a single cultivation appear economically justifiable.

This tendency toward specialisation is driven less by factors of policy than by the reduction of trade barriers and by favourable transport costs.

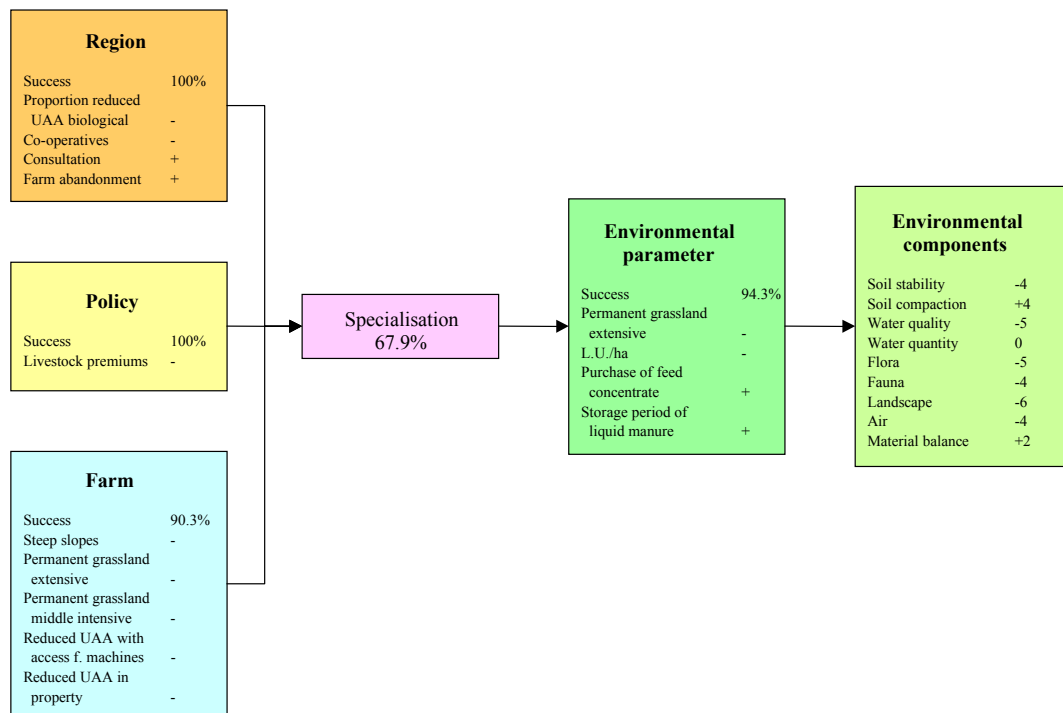


Figure 4.47: Structure of effects and success of classification of the logistic regression for the "specialisation" farm strategy

Figure 4.47 shows that this strategy is associated with a very high hit rate. In this case, though, this is somewhat misleading, because these hit rates go back to an insufficient selectivity of other strategies and to the high portion of farms which pursue this strategy. Actually, we cannot significantly associate the complementary strategy of "diversification" with the influence factors and with the environmental parameters. This means that the interpretation of this strategy is possible only in a very limited manner. What stands out, but is also intuitively clear, is that this strategy has completely negative consequences for the environmental components. Specialisation is inevitably associated with homogeneous conditions of production and thus contrary to the ecologically significant parameter of diversity.

In terms of agricultural policy it is followed from the analysis of this strategy, the fact that market forces push toward specialisation, and the fact that this specialisation brings with it problematic environmental effects. If a diverse environment is desired, then its obtainment cannot be based upon the market. What is needed is rather a conscious counter-strategy.

4.9.4.5 Modernisation

With this study, this classification was understood as the continuation or expansion of the present activity with better farm

equipment. Approximately 47% of the farms studied pursue this strategy, as seen in Figure 4.48.

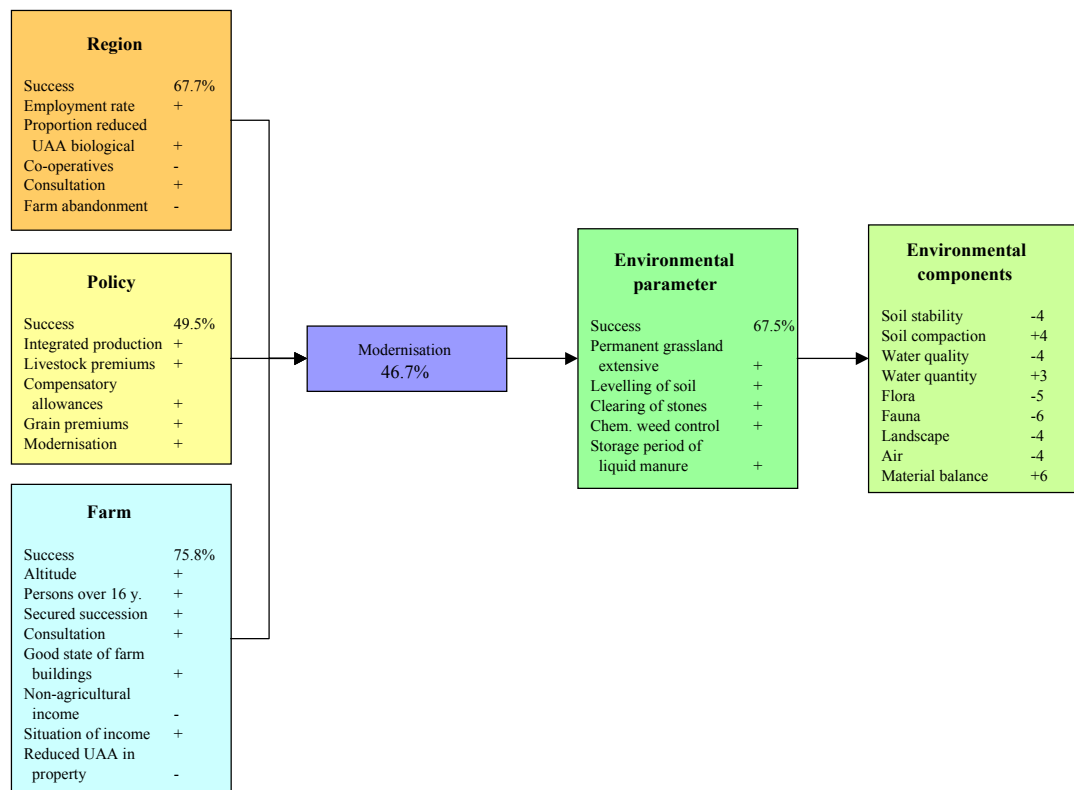


Figure 4.48: Structure of effects and success of classification of the logistic regression for the "modernisation" farm strategy

The hit rates for this strategy are rather moderate. Only the farm parameter with 75.8% carries a good result.

We find those who modernise at high altitudes, with a secure succession and with a low level of supplemental income. The assessment of the income situation is positive and since the level of giving up the farm is rather low in the region, this completely positive fundamental philosophy also seems justified.

Confidence in the future leads to investment in buildings and machines, and available land is leased under the motto of "the more modern and the more efficient, it is manageable". As opposed to intensification, with which this strategy of course is not completely free of overlap, these farms are not found in favourable locations. It is thus not completely comprehensible from where this basic optimism arises.

With regard to the environmental parameters, minor resolutions (clearing of stones, levelling, chemical weed control) are characteristic for farms with this strategy. Both the high portion of extensively used permanent grassland (predominantly a condition of climate) and a good

storage capacity for liquid manure are welcome indicator values. The latter is a consequence of general structural modernisation.

Modernisation brings with it ecologically questionable economic methods in sensitive unfavourable areas. Since modernisation through investment aid for single farms and collective plans is a direct object of agricultural policy, we have here a genuine clash of interests between the agricultural policy instrument and the environment.

4.9.5 Overall view of the results

If the attempt is made to use these rather technical results for the formulation of agricultural policy, then the following points may be emphasised:

- In unfavourable locations, and these are the especially sensitive areas in the Alps, agricultural policy definitely has a noteworthy influence on the choice of the farm strategy. If, with direct payments, clear goals are set and minimum financial thresholds are crossed, then the optimisers of subsidies can definitely be persuaded toward a sustainable economic method.

It is important in the interrelation that the subsidy strategy is unambiguous and that support appropriations in their target objective which may be contradictory (for example, Council Regulation No. 2078/92 and subsidies for investment) can only be combined with each other with demonstrable co-ordination.

- There is a large portion consisting of farms which follow a very environmentally friendly strategy of extensive farming by themselves. This arrangement that is interesting for the environment can be stabilised through a suitable agricultural and regional policy in which the compensation for the external effects at least covers the additional expenditures necessary for it. It is important here that the corresponding compensation is not associated with a minimum farm size or with the absence of a non-farm source of income, because many extensive farmers would thus fall under the critical limit of economic size.
- For the intensive farmer, direct financial contributions through agricultural policy are practically without significance, because for them the costs for the opportunity to change their farming is too high. If the attainment of an environmentally friendly economic method in these areas is desired, then there are only three ways possible: the direct way through strict production conditions as a part of environmental policy, the abolition of price supports in the form of guaranteed prices or intervention prices in order to pass correct market signals on to the producers, and the massive financial support of "model farms" with fundamental reorganisation of farms in order to install "eco-islands". The influencing of the favourable locations is the most financially costly path for sustainable agriculture.
- Modernisation is a strategy when "taking over the farm" and rather corresponds to the classic agricultural comprehension without especial consideration for the environment. Within the framework of business management, it is difficult to comprehend how such a strategy is supposed to lead to operational success in the majority of cases. There are certainly cases, though, for which this strategy is operationally "optimal". It is equally

as conceivable that an ecologically optimised modernisation (infrastructures for the efficient provision of those services necessary for the care of the environmental) is promising. Since the farmer who modernises takes advantage of consultation at an above-average rate, the support of consultancy services and not least the permanent training of consultants is an important instrument of a sustainable agricultural policy.

5 Results and Conclusions

Ulrike Tappeiner, Gottfried Tappeiner, Richard Dietrich, Roland Kals and Christine Vigl

For the first time, the SUSTALP Project offers the possibility of examining the effects of the common agricultural policy on such a fragile region as the Alps in an extensive, integrated and interdisciplinary way. What is unusual and exciting about this project is analysing (according to the suggestions in the 4th framework) not that much the consequences for agriculture, but those for the environment. This approach, namely, implicitly embraces the assumption that the "side-effects" of agricultural policy can, under certain circumstances, play the main role. Such an approach is of utmost importance for the survival of agriculture in the peripheral and fragile regions, as represented by great areas in the Alps. In these areas agriculture can only be considered as multifunctional, whereby a substantial part of its labour out-put consists of hitherto uncompensated external services.

This study relates to different regions of the Alps, but the results can be generalised, at least concerning methods, far beyond this framework. This can be said, of course, for other European mountain regions, but just as well of other ecologically fragile regions in which agriculture plays an important role. Without claiming to be comprehensive, a list of such examples would include the arid regions of Southern Europe, the marshlands of the North and Baltic Sees, the Scottish Highlands, and sensitive regions of Scandinavia.

This study has entered new ground in a wide range of subjects, and the newly developed approaches and methods can and should be understood as prototypes that should deliver important thought stimuli, but at the same time are definitely in need of modification and fine tuning. The results of the study can be organised in three levels:

1. Insights for scientific work, regarding methodical approaches and as a stimulus for further investigation and projects. These results are aimed above all at the branch of the scientific community that concerns itself with the problems of agricultural, environmental, and regional policies.
2. Insights of a technical or practical nature, that should deliver input for local decision-makers, interest representatives, and counselling institutions in accordance to the subsidiarity principle.
3. Insights of a relatively high degree of abstraction, which provide guidance in the strategical planning of agricultural and environmental policies, and which are mainly meant to represent stimuli for the political decision-makers at the over-national level.

5.1 Insights into methods

During preparations for this project, it became apparent that this topic was only weakly structured and had never been dealt with in any depth. It possessed a few well developed components (ecology, regional economics, agro-economics, cycle analysis, political science), but they stood in no real relationship to one another. We have deduced from the experience we gathered during the project the following stimuli for further research:

1. It stands without question that regional conditions have a decisive influence on the effectivity of political measures and that an efficient policy must take this fact into consideration. It is completely open, however, which type of regions these are. It is very probable that the optimal region in this sense will not coincide with the Nuts-Classifications.

For the aim of this project and for the alpine region, this study delivers a good approach, but how must it be expanded, if one is to extend the concept of regionally efficient intervention to the whole present and future region? Which set of variables should serve as the basis for such a comprehensive task? How many regional types are to be discerned and which generally recognised quality criteria are to be considered? How can a data set be created, that is so homogenous in the definition of its central elements, that it could be used throughout Europe? And finally, can one classification for all projects be found, or at least for large project groups, or are different classifications necessary for every problem?

These are questions that cannot be theoretically or politically answered, but can only be decided on the basis of reproducible criteria that in turn are based on empirical findings.

2. The results of this project show that a good explanation content for the actions of farm managers can only be found if the regional conditions and the farm parameters are integrated. For the combination of such differing aggregational levels, there is only little experience.

In this project ten model regions were prototypically investigated, and were tested by means of variance analysis. This is a useful approach for a small number of regions. If it could succeed in analysing a substantially larger number of regions (also of the same regional type), considerably more extensive results could be attained.

3. Almost all of the existing models are limited to either the regional or the farm level. When a study is concerned with a farming operation, it is viewed exclusively as an agro-technical, economical, or more seldom as a social or cultural system. The results of this study stress the fact that far-reaching farm decisions are determined simultaneously by the economical setting, the value systems of the participating decision-makers, and by the course of group-dynamical processes within the social system of agriculture.

The SUSTALP Project undertook only a very rudimentary attempt at an integration. Long-term studies on the dynamics of strategical decisions in agriculture would not only be an agro-political gain, but also a considerably far-reaching gain for culture analysis.

4. Most existing models understand actions and decisions as single phenomenon within the context of an optimising strategy. This is a very limited view, because decisions are usually not related to single actions, but to whole action complexes, which are referred to in this study as strategies.

The results of the farmer survey show that one can identify such strategies, but they also show that not everything that is classified by the

experts as a strategy is empirically supported as such. Especially the relationship of single strategies to each other (complementary, competing, neutral) are in need of investigation, because this is the basis of an efficient employment of means, as well known from econo-political theory.

5. Literature research and the collected opinions of the experts on the effects of the parameter blocks (region, policy, farm) on farm strategies, and the effects of the farm strategies on environmental parameters show that very few research results pertaining to this theme exist, that the expert opinions are ambivalent in many points, and that a good many unified expert opinions are not empirically supported.

Because these causal chains are of central importance, even when limited to qualitative analyses, their precise, theoretically founded, and empirically supported investigation is an urgent necessity. The results of the empirical single analyses of this study (see Appendices 3 and 4) can serve as a provisional starting point.

6. The short, middle, and long-term impacts of different farm strategies on environmental parameters and finally on the quality of environmental component and of environmentally relevant structural characteristics has been empirically investigated only in its rudiments. Even in the present study, this link in the chain of arguments could only be supplied by expert opinions. The transition from farm strategies to environmental parameters is, at the same time, an interdisciplinary docking point (between the economical and social sciences and the natural sciences) and is urgently in need of clarity.

A widely planned cross-section analysis could be fast at bringing first results. A sound analysis can only be based on a very extensive long-term study with continuously observed farm operations (analogous to the continuous observation sites of the natural sciences). For a European research co-operation, this would be a genuine challenge.

All these approaches show that, for the European challenge of a unified policy with efficiency improving regional differentiation, a great need for research exists. This must give the impetus to a real interdisciplinary regional research, which is not existing up to now.

5.2 Technical results of the SUSTALP Project

Next to the "general" results for an efficient implementation of the European agricultural policy listed in the last section, the investigations brought implications that could be useful in the integration of European and local measures according to the subsidiarity principle. These results are more side effects of the project and therefore not as systematic as would be possible in a study aimed expressly at this problem complex. The most important points are:

1. In agriculturally favourable areas, the goals of agricultural and environmental politics rival each other strongly. In such areas, it will not be possible to make good environmental politics indirectly through an acceptable agricultural policy.

It is important to recognise this, because the attempt to combine both goals in such areas is futile. If ecological goals are to be followed in a region favourable for agriculture, then this must be achieved through a direct environmental policy; whereby, it will undoubtedly need a few regulations and prohibitions.

These naturally favoured areas, that are being managed under most likely inefficient indirect environmental policies, can only be identified within a small spatial scale, which makes this a matter of local agencies.

2. The advisory aspect plays a big roll in the choice of farm strategies. The results of the farm manager survey gives rise to the assumption that to a considerable extent strategies were chosen, which from neither the environmental nor the economical points of view represented optimal choices (mainly in the case of the modernisors).

Both economical and ecological goals could be equally well served by the availability of an intensive advisory agency, which is in the position to assess an operation's situation in its entirety, as well as relevant training for counsellors. Where such services are available, they should be further developed, and where they do not exist yet, creating them represents a considerable potential for development.

3. Many environmentally significant agricultural operations operate on the brink or under the long-term profitability margin. They survive by self exploitation and infrastructure consumption (shown by the relationship of income from agriculture to number of labour hours). Because strategical changes are often connected to a generation change, extremely unstable situations can develop during these transitions. At the European level, this could be compensated by a more appropriate emuneration of the external effects, and at the local level by the creation of additional benefit potentials. Such potentials exist in the regional planning, which can raise the value of the farm as "family residence" by the present quality of life. Generous regulations for the possibility of residence for a second family would simplify the change of generations in the Alps much more than early retirement regulations. Additional benefits are created with good road systems and by a decentralised infrastructure. If this infrastructure should break down, irreversible situations result, that cannot be absorbed even by intensive regional development.
4. Co-operative marketing is for many farm managers the main connection to the market. The results show that a high proportion of co-operative marketing is coupled with intensification measures, a high degree of specialisation, and a neglect of other marketing tracks. This is an indicator that the co-operations for the most part have a very classical agrarian understanding that can be a problem for marginal suppliers.

The intensive discussion of a model for co-operations in the peripheral regions could help to find a more adequate position for this important consultancy and marketing institution.

5. An important reason for the high rate of farm abandonment is an undersizing of structures, or more precisely, the division of land into extremely small patches with uncertain ownership.

In disadvantaged areas one or the other farm abandonment is unavoidable. A comparison of Carnia with the model regions in Switzerland shows that the results, though, can be very different, according to whether the management of these abandoned lands is mobile (through leasing or purchase, as in Switzerland) or if this is not the case (as in Italy). Central to the stability of agriculture is a functional agrarian real estate market.

5.3 Results with strategical relevance for European committees

As a result of the SUSTALP Project a whole list of correlations between agro-political instruments and observed changes in environmental parameter was formulated, theoretically justified, and empirically supported. Not all single results are to be listed in detail, only some findings and their consequences that are of strategic importance to European agricultural, environmental, and regional policy are outlined. This division was chosen because the findings can be intersubjectively tested at any time and are therefore in accordance with classical scientific understanding. However closely oriented to the findings as they are, though, the consequences demand a critical value judgement that must be left to the reader.

Findings:

1. A consistent agricultural policy is effective. This finding is not at all obvious, since financial incentives provided by agricultural policy are frequently suspected of not being put to their intended use and of not leading to any relevant changes within the basic structure. By the way, other fields of policy are exposed to these suspicions as well.

The claim of effectiveness for agricultural policy is based on proven structural differences between the Agro-regional Types 6 and 7 and Type 3. Types 6 and 7 are mainly found in Switzerland. Although Type 3 is characterised by similar features in terms of its topographical and natural setting, it shows very unique distinctions concerning its overall structure.

The differences, particularly those found in the percentage of full-time farmers, are of such importance that they should be considered as permanent, and not as temporary deviations from the equilibrium line uniformly determined by the market.

Section 4.9 shows that statistically significant impacts that emanate from European agro-political measures are having an effect on farm strategy choices. This substantiates the above mentioned results from the regional and farm level.

2. The alpine region can be divided into various region types, within which the same agro-political instruments lead to effects which differ greatly in intensity and direction.

To a large degree, the regions are spatially connected. Consequently, they form a good basis for regionally differentiated approaches in terms of economic and environmental policy. However, as expected these regions do not coincide with the classical administration units, but are oriented to their natural settings as well as to the social and cultural characteristics of the region.

3. The effectiveness of agro-political instruments depends mainly on the overall socio-economic context and the interrelations of regional cycles. Among others, these facts make up the importance of the regions.

Essential to the efficiency and sustainability of the agricultural sector is the stability of the non-agricultural sectors (tourism, trade and industry, services) as the agricultural sector is closely interrelated with these sectors. This results in opportunities for the local market and changes in opportunity

costs of various farm strategies, which in turn influence the agricultural sector.

Which products can be produced and marketed, as well as if there are opportunities for part-time farming, is clearly defined by the region and its economical development. This regional influence was confirmed in all five of the main strategies described in Section 4.9.

4. Only after a long period of time, can it be proven that certain sustainable environmental alterations were caused by structural changes in agriculture. This finding can be deduced from the questioning of the farm managers in the regions and is universally valid for all regions: i.e. fundamental changes in crops, land abandonment, or a change in livestock density can hardly be proven within five years. That such long-term alterations do exist, is demonstrated in this study by the observed structural differences between the regions.
5. If financial incentives influence a farm manager in his choice of strategy is dependent on a threshold value. This means, that the relation between the financial incentives and the achieved effects is not linear but phased. Support within the critical threshold value is likely to be misused and might lead to "fictitious behaviour". Only when the threshold is exceeded can "genuine" changes be observed. The threshold value is remarkably similar in all investigated regions.

Conclusions

The above-mentioned findings lead to some direct conclusions for agricultural policy.

1. It is possible to shape the countryside and the farming operations established there, as well as it is to influence the impact this farming has on the quality of the environment. Desired or undesired developments cannot be blamed on an anonymous market. They are rather the result of explicit or implicit political actions and omissions, or both, and therefore, policy-makers must accept responsibility for it.

In order to fulfil this task effectively, clear political aims are necessary, differentiated according to the respective situation. These aims need to be standardised and integrated, and cannot be formulated autonomously for specific sectors or functions (environmental policy, agricultural policy, competition policy, regional policy). Such an integration and the establishment of the associated priorities is most urgent in the interface between agricultural and environmental policy. A general orientation towards principles such as efficiency, economy, and sustainability without establishing priorities and without discussing the conflicting fields of interest is a futile exercise.

2. Agro-political instruments have very differing effects on the various agricultural region types. This means that an efficient policy must combine differently its instruments to correspond to each region type, while following the same aims for all (which would not be very sensible). This can be achieved either by a centrally defined and complicated casuistic approach or by a liberal application of the principle of subsidiarity. It is obvious that only the latter approach could meet the political requirements of the European Union.

In order to implement this principle without waiving the necessary uniform basic orientation of the European policy, standardised regional classifications need to be established for the entire area. This is the basis on which local political governments could develop their programs which is comparable to present practices within the framework of the Structural Fund.

The parameters meant to stabilise policy uniformity and market conformity (e.g. the maximal subsidy for services that profit the environment) should not be absolutely expressed in monetary units, but rather oriented to the regionally differing core parameters (e.g. labour investment per hectare necessary for sustainable cultivation).

3. In such disadvantaged regions as the Alps, the agricultural sector can only survive in an intense integration with the other economic sectors. At the same time, due to its mere existence and the external effects it causes, the agricultural sector is, in turn, a stabilising factor for the other economic fields, as well as for the entire social structure.

This strong inter-dependence is rarely found in agro-industrial regions with Europe-wide export markets, but is typical for the alpine region. Consequently, all political measures focusing on the development of such rural regions must contain the widest possible interfaces for the realisation of inter-sectorial measures. In general, local governments are also organised in sectors, which by nature puts inter-sectorial projects at a disadvantage. Therefore, the European Union should consider supporting such hybrid-programs with first priority; ideally and financially. In any case, this investigation shows that the external effects desired for agriculture in problematic settings cannot be achieved by agro-political instruments alone.

4. The farm strategies of the farm managers react relatively slowly to political incentives. This is especially true of strategy changes with long-term positive environmental impacts. Within time windows of only 5 – 10 years, only weak results are visible. The decisive period is presumably the change of generation at the farm.

If environmental and agricultural policy is to be efficient and sustainable, it needs to be long-term, reliable and stable. These are difficult demands; seeing as dynamic frameworks and altering values necessitate constant corrections. But policy must be realistically oriented to the reaction horizons of the strategical points of reference (i.e. farm manager, environment).

5. To be successful, financial incentives must be transparent and must be set above a certain threshold. Findings show that subsidies above ca. 800 Euro/ha can influence the choice of farm strategy.

It is obvious that a very differentiated subsidisation system (many accumulative, but not integrated types of aid) leads to the fact, that a single subsidy would hardly reach the critical threshold, resulting in a steering factor of about zero, which in effect turns a "subsidy" into a simple "transfer of finances". At best, such support puts an operation into the position of subsidy optimiser with moderate environmental orientation.

This undesirable consequence can be avoided by means of subsidy strategies which exclude each other, but provide a relatively high support on their own. This not only facilitates administrative handling, but also represents a genuine incentive for the farm managers to thoroughly consider the future development of their farm operations.

The high subsidisation intensity in certain single areas is problematic from two points of view, namely the aspect of expenses and the aspect of "market neutrality". Concerning the first argument, it must be made clear that it is not a matter of a general raise in subsidy funding, but rather a concentration of funds within the single farm, which can be carried out cost neutrally.

The current practice of general price limiting is inadequate to ensure market neutrality. Much more, it is the difference between average production costs in the global market compared to the so-called "normal" average costs in an agricultural region that is decisive. Only if these gaps are essentially filled by subsidisation are quantity effects and market distortions to be expected. This means that the leeway for subsidisation in genuinely disadvantaged areas, even from the standpoint of the WTO, is distinctly

greater than in a normal situation. This leeway could be used for a more environmentally orientation of agricultural politics.

All these points demonstrate that the positive intentions of agricultural policy cannot be fulfilled by means of a few cleverly designed, piecemeal regulations, but rather by creating and implementing a wholistic strategical approach. To summarise:

1. What is necessary are simply formulated regulations with clearly defined goals, that the majority of all farm managers are capable to comprehend as regards content and according to their intention.
2. After a necessary trial phase, regulations and their remuneration, as well as the rules of implementation must stay transparent and planable.
3. Policy changes must be communicated early enough (about 3 years before enforcement) and so specifically that farm managers can adjust their own farm strategies accordingly. Long discussion processes with great uncertainties, such as those that developed in the framework of Agenda 2000, are extremely dangerous. Therefore, fundamental re-orientations should keep the status of rare exceptions.
4. Agricultural policy cannot be made with exclusively the farmer in mind, and neither can it suffice to attempt a stabilisation of agriculture with exclusively agro-political instruments.
5. Subsidisation should be structured, so that a farmer who manages his operation according to a clear strategy receives payments from at most 2 – 3 subsidies. At the same time such commitment to a clear farm strategy should result in the highest possible grants.
6. A commitment to "profitability" in the classical sense is an extremely counter-productive approach for farms located in disfavoured areas where a high degree of ecological responsibility is called for. The model for such zones must rather be a sufficient income (satisfaction strategy) in exchange for environmentally responsible farming. Here, EU-documents could be formulated much more clearly.

Finally, "land responsibility" in the Alps falls upon a large number of farm operations, the majority of which will never reach an economically acceptable size. A subsidy system graded according to the proportion of livelihood that comes from farming (full-time, part-time, supplemental, hobby farming) is extremely dangerous. Subsidies must be measured on the quantitative and qualitative fulfilment of their purpose (e.g. the environmentally sustainable cultivation of fields), instead being doled out according to parameters that have nothing to do with that purpose.

It is notable that these points have been implemented to a much higher degree within EU programs than in national and regional programs. The European Union should really aim to keep this position by further developing its approaches.

6 Application and Dissemination of Scientific Results of SUSTALP

Application and dissemination of scientific results of SUSTALP include the contribution of SUSTALP in context with LEONARDO and ERASMUS-Programmes, contributions of SUSTALP to scientific conferences, the presentation of results to decision-makers, as well as dissemination in public media. Publications resulting from SUSTALP are listed up in the consecutive chapter.

The dissemination policy, pursued by the SUSTALP project team, with lectures at various international meetings contributed successfully to the presentation of the project SUSTALP. As the project has been considered as scientific/technological excellent it was presented at the FP5-Launch Conference on 25th - 26th February 1999, in Essen, Germany. Among others this stems from the project being practically most relevant and using a comprehensible, inter-disciplinary approach considering mountain farming together with its economic, ecological and social surroundings.

6.1 General meetings of all SUSTALP partners

	Place	Time
General meetings of all SUSTALP partners		
1 st SUSTALP workshop	Bozen	06.12.1997
2 nd SUSTALP workshop	Innsbruck	22.01.1998
3 rd SUSTALP workshop	Augsburg	28.05.1998
4 th SUSTALP workshop	Augsburg	11.08.1998
5 th SUSTALP workshop	Bozen	30.10.1998
6 th SUSTALP workshop	Innsbruck	09.01.1999
7 th SUSTALP workshop	Innsbruck	13.03.1999
8 th SUSTALP workshop	Goldrain	5.- 7. 7.1999
9 th SUSTALP workshop	Innsbruck	15.10.1999

6.2 Dissemination

6.2.1 Information of the general public

- Internet Homepage: <http://www.eurac.edu/SUSTALP>
- Leaflet
- Radio interview at the Bayrischer Rundfunk

6.2.2 Press reports

"EurAk in Essen ausgezeichnet; Alpine Umwelt: Projekte Ecomont und Sustalp auf Forschungsmesse vorgestellt", Dolomiten, 28. February 1999, Bozen.

"Südtirol in der ersten Reihe", Zett, 10. January 1999, Bozen.

"Auswirkungen der EU-Agrarpolitik auf die Berglandwirtschaft werden untersucht - Bauernbefragungen der Europäischen Akademie Bozen", Landwirt, 30. April 1999, Bozen

6.2.3 Posters

Kienzl, H.; Tappeiner, U.; Vigl, C. (1998): SUSTALP - Evaluation von Instrumenten der Europäischen Union hinsichtlich deren Beitrag zur umweltgerechten Gestaltung der Landwirtschaft im Alpenraum. Mitgliederversammlung der Europäischen Akademie Bozen, 14.05.1998, Bozen

Tappeiner, U.; Tasser, E.; (1998): Sustainable development in mountain agriculture. 5th ECOMONT WORKSHOP, 26-28 March 1998, Switzerland

Kienzl, H.; Tappeiner, U.; Vigl, C. (1998): SUSTALP - Wirkung der EU-Verordnungen auf die Umwelt und die Berglandwirtschaft; Internationales Alpenforum '98; 31.8. - 4.9.1998; Garmisch Partenkirchen;

Tappeiner, U.; Eggensberger, P.; Mattanovich, D.; Dietrich, R.; Vigl, C. (1999): SUSTALP - Effects of EU - instruments on mountain farming; FP5-Launch Conference, 25. - 26. February 1999, Essen, Germany

Tappeiner, G.; Hilbert, A.; Eggensberger, P.; Kals, R.; Steininger, K.; Kienzl, H.; Tappeiner, U.; (1999): SUSTALP - Structure of agriculture within the alpine region; FP5-Launch Conference, 25. - 26. February 1999, Essen, Germany

Hilbert, A.; Opitz, O.; (1999): SUSTALP - Innovative methodological research; FP5-Launch Conference, 25. - 26. February 1999, Essen, Germany

6.2.4 Oral presentations

Kienzl, H. (1998): *SUSTALP - Effects of the EU-instruments on environment and on mountain farming*; International expert forum "Mountain agriculture and the environment" - presentation and discussion of the results of the European research project "*Integration of Environmental Concerns into Mountain Agriculture*", commissioned by the European Commission Directorate-General XI, Environment, Nuclear Safety and Civil Protection, 3rd July 1998, Vienna

Tappeiner, U.; (1998): *Landscape-Diversity-Scenarios in context with land-use changes in the Alps*; Intecol, VII International Congress of Ecology 1998; 19 - 25. July 1998; Florence;

- Eggensberger, P.; (1998): Presentation of SUSTALP at the secretary of state of the Bayerisches Staatsministerium für Landentwicklung und Umweltfragen and the Bayerisches Staatsministerium für Ernährung, Landwirtschaft und Forsten
- Tappeiner, G.; Tappeiner, U.; (1999): *"Simulation workshop for regional development"*; Interdisciplinary workshop for ecologists and economists at the University of Innsbruck; 15-16 January 1999; Innsbruck.
- Tappeiner, U.; (1999): Presentation of *SUSTALP- methodological approach and first results* within the framework of the workshop *"Sustainable development of mountain farming"* at the Swiss Federal Institute of Technology Zurich (ETH); 12 March 1999; Zurich.
- Tappeiner, U.; (1999): Presentation of results of SUSTALP for the official of the provincial government Berger Hans, responsible for agriculture, 24. March 1999, Bolzano.
- Tappeiner, U. (1999): *SUSTALP - Effects of EU - instruments on environment and mountain farming - methodological approach and first results*; SUSTALP meeting between the research team and interested Commissions Services, 12. April 1999, Brussels.
- Kienzl, H.; Vigl, C.: (1999): *SUSTALP - Effects of EU - instruments on environment and mountain farming - methodological approach and first results*; SUSTALP presentation for students from the University of Göttingen, 27. May 1999, Bolzano.
- Eggensberger, P.; (1999): Presentation of SUSTALP vis-à-vis a representative of the European Commission, DG VI, February 1999, Brussels
- Eggensberger, P. (1999): *SUSTALP - Effects of EU - instruments on environment and mountain farming - methodological approach and first results*; SUSTALP presentation for representatives of the European Commission, DG VI, February, Brussels.
- Hilbert, A. (1999): *"Klassifikation großer Datensätze"* at the 23rd Annual Conference of the Gesellschaft für Klassifikation e.V. to the topic "Classification and Information Processing at the Turn of the Millennium" at the University of Bielefeld, 10th to 12th March, 1999, Bielefeld.
- Eggensberger, P.; (1999); Presentation of SUSTALP on a symposium on mountain agriculture in the frame of the pilot action program for the Eastern Alpine Space following Art. 10 EFRE-regulation in Brandberg, October, 8th, 1999.
- Tappeiner, G. (1999): Die demographische Entwicklung im Alpenraum - Jung und Alt am Scheideweg; CIPRA Jahreskonferenz, 28. - 30. October 1999, Benediktbeuern, Germany
- Hilbert, A. (1999): Klassifikation großer Datensätze (Classification of huge data sets) at the 23rd Annual Conference of the Gesellschaft für Klassifikation e.V. to the topic "Classification and Information Processing at the Turn of the Millennium" at the University of Bielefeld, March, 10th to 12th, 1999

6.2.5 Computer presentation

- Tappeiner, U.; Vigl, C. (1999): SUSTALP - Effects of EU - instruments on environment and mountain farming - methodological approach and first results; FP5-Launch Conference, 25. - 26. February 1999, Essen, Germany

6.2.6 Presentation of results in the framework of training courses

- Tappeiner, U., Tasser, E. (1998): Presentation of results of SUSTALP in the framework of the ERASMUS-course "Training on sustainable development in mountain regions", 03.06.1998. Innsbruck - Waltner Mähder (EU-programme ERASMUS, No. 29267-IC-1-AT-ERASMUS-EPS-1)

Tappeiner. U. (1998): Presentation of results of SUSTALP in the framework of the summer-academy "Brennpunkt Alpen", 24.-25.08.1998, Schaan (Lichtenstein) (EU-programme LEONARDO, No. FL/96/2/1426/PI/II.1.1.a/FPC)

Training on Sustainable Development in Mountain Regions



1. OBJECTIVES

In order to promote fast and effective application of the results of ECOMONT and SUSTALP, close co-operation with the transfer- and mobility programmes of the EU is being implemented. The EU-TMR-programme SOCRATES opens the possibility of exchanging teachers and diploma-students between the research partner teams and universities; the LEONARDO-programme is used for exchange of experts between the EU research projects and institutions in applied fields. Three SOCRATES intensive courses, which interrelate fields of knowledge important for concepts of sustainable development, are being carried out. Local communities, students, scientists and policy-makers are invited to collaborate on the conception, implementation and monitoring of sustainability in the project areas.

2. COURSES AND PROJECT AREAS

The intensive courses are related to the specific situation of the project areas, which have been selected to exemplify topics of high relevance in context with sustainable development in European mountain regions.

- ➔ **Course 1:** June 1998, Monte Bondone (I), Pyrenees (E)
Training on sustainable development in mountain regions of Europe
- ➔ **Course 2:** June 1999, Stubai Valley (A)
Training on integrated ecosystem and landscape ecology in alpine areas of Europe
- ➔ **Course 3:** August 1999, Scottish Highlands (GB)
Training on environmental monitoring and decision making modelling in European mountain areas.

PROJECT AREA STUBAI VALLEY (A)



3. COURSE PROGRAMME

The intensive courses last for 20 days each and are carried out as field courses in the project areas. They offer a thorough training in areas important for professional practice:

- Analysis of status and functioning of mountain ecosystems, incl. remote sensing and GIS;
- Theory and practice of Environmental Impact Assessment for projects in mountain areas;
- Methods of research and evaluation of environmental economic parameters in alpine areas;
- Methods for the realisation of a sustainable, ecologically oriented development, incl. decision making models.

Based on analysis and evaluation of ecological effects, the courses define indicators and develop concepts for sustainable development. Acquisition of the newest research results and of the most modern analysis and evaluation methods are ensured due to an efficient collaboration between SOCRATES and the EU research projects ECOMONT and SUSTALP.

4. TEACHING STAFF

The courses are taught by an interdisciplinary body of 14 lecturers from 7 partner universities, as well as by experts and decision-makers from another 5 institutes:

University of Innsbruck (A)	ATTAC, Innsbruck (A)
Centro di Ecologia Alpina (I)	University of Bayreuth (D)
European Academy Bozen (I)	Inst. of Terrest. Ecol. (UK)
University of Trento (I)	Univ. of Aberdeen (UK)
University of Padova (I)	University of Lisbon (P)
Inst. Pirenaico de Ecologia (E)	University of Evora (P)
University of Lleida (E)	Univ. of Thessaloniki (GR)

5. TARGET GROUPS

Target groups consist of advanced graduate and postgraduate students, experts and decision makers in the fields „Applied Ecology“, „Landscape Planning“, „Agriculture and Forest Sciences“, „Environmental Engineering“ and „Environmental Economics“.



6. COORDINATION

University of Innsbruck; Institute of Botany, A-6020 Innsbruck, Sternwartestr. 15; Austria
Telephone: +43-512-507/5922; Telefax: +43-512-507/2715; E-mail: Alexander.Cernusca@uibk.ac.at

Presented at FP5 Launch Conference on 25-26 February 1999,
Essen, Germany



SUSTALP: Effects of EU - instruments on mountain farming

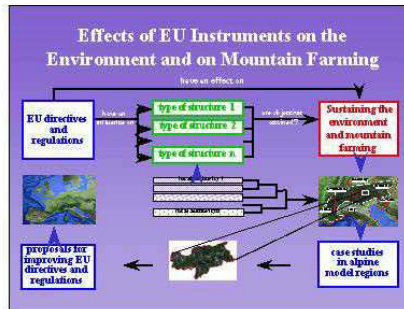
Background

With the reform of the **Common Agricultural Policy** in 1992 a new course was set, focusing on the **sustainable development of rural areas**. The reorientation of the **EU Agricultural Policy** believes in a comprehensive conservation of the environment, support of low input farming systems, a control of depopulation and a protection of the cultural heritage. This reform represents an important step towards the sustainable development of agriculture in all mountain areas in Europe.



Objectives

- **Evaluation of the recent EU directives** on mountain farming regarding the regional diversity and the particular economic and ecological situation inherent in the Alps;
- Examination of influence of new development strategies suggested within the **Agenda 2000** for these sensitive rural areas;
- **Formulation of recommendations** which are decisive for the maintenance of agri-culture and the protection of the rural environment in all European mountain areas.



ENERGY,
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DEVELOPMENT



The EU-Project SUSTALP is carried out in co-operation of five European research institutes. (Homepage: www.eurac.edu/sustalp)

SUSTALP (ENV4-CT97-0442) has been set up for two years and is financed through the EU Environment and Climate RTD Programme „Theme 4: Human Dimensions of Environmental Change“.



Co-ordinator

European Academy Bolzano/Bozen, Area „Alpine Environment“
Domplatz 3, 39100 Bozen, Italy; e-mail:Ulrike.Tappeiner@eurac.edu



Presented at FP5 Launch Conference on 25-26 February 1999, Essen, Germany



SUSTALP: Innovative methodological research

The project involves **innovative research** by linking the basic methods of research of **numerical classification** with **application oriented questions** from the area of **EU agrarian and environmental** politics. This allows knowledge to be transferred to other locations within the EU, as well as throughout different scientific disciplines.

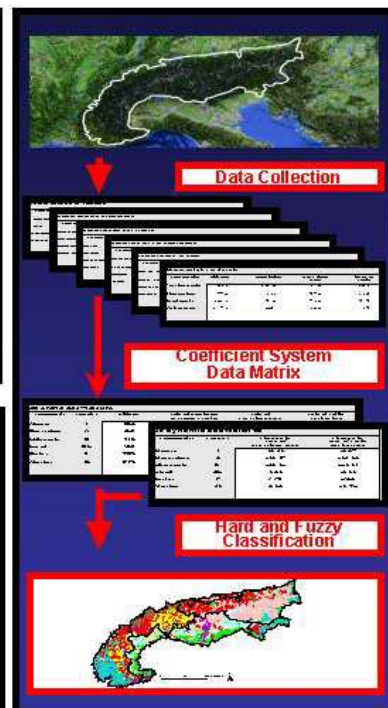
For the first time the **whole Alpine area**, in terms of communities, has been **standardised** with a large number of variables. Firstly this allows a **differentiated description** of the examined space. This could allow the **transfer of results to other locations** within the EU. Furthermore, it would be possible to orient the **supporting measures of the EU** more accurately in terms of their **specific needs and structures**.

1. Data Processing

- ✓ **Collection** of 5600 data sets with 75 variables from six countries of the Alps
- ✓ Organisation of a **central data base**
- ✓ Check on **incorrect data** and **missing values**
- ✓ Application of **imputation techniques**
- ✓ Definition of **30 static** and **13 dynamic coefficients**
- ✓ Standardization of a **coefficient system**
- ✓ Construction of **data matrix**

2. Classification of communities

- ✓ Different **hard classifications** with **large data sets**
- ✓ Development of **k-medoid algorithm**
- ✓ **Fuzzy classification**
- ✓ Calculation by **fuzzy-c-means algorithm**
- ✓ Eight **connected classes** of communities with an index number of **community-membership** s to classes



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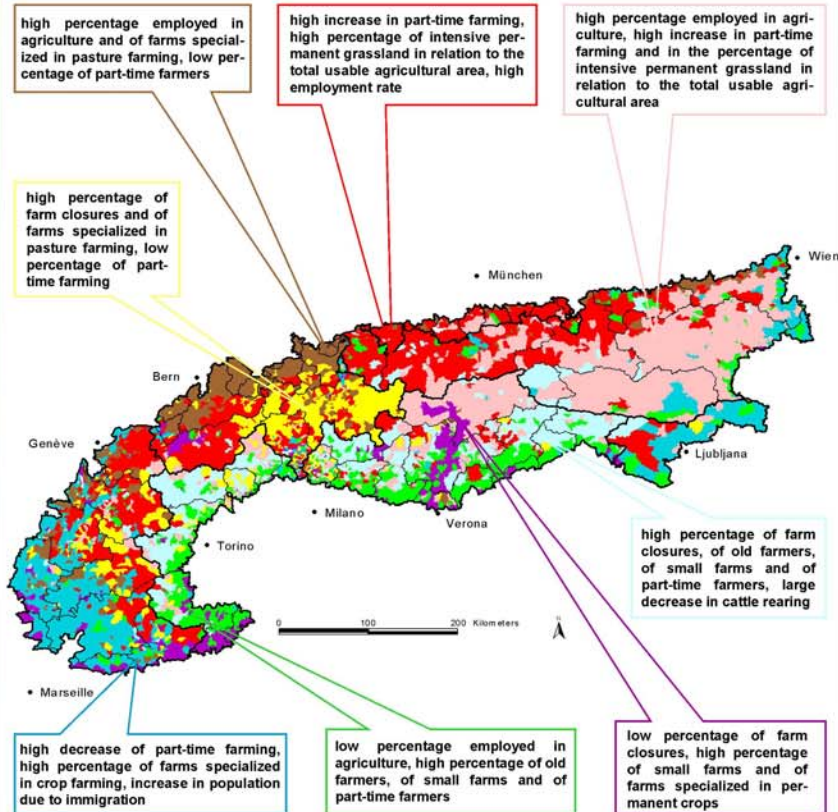


Presented at FP5 Launch Conference on 25-26 February 1999, Essen, Germany



SUSTALP: Structure of agriculture within the alpine region

A crucial result of SUSTALP is the classification of the alpine region into various structural types of agriculture, all of which are affected differently by EU directives and regulations. The analysis of these effects leads to a set of clear recommendations for the future Common Agricultural Policy in order to ensure the sustainable development of agriculture in mountain areas and to protect the environment.



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Presented at FP5 Launch Conference on 25-26 February 1999, Essen, Germany

7 Publications resulting from SUSTALP

7.1 Publications in books

7.1.1 Publications in SUSTALP volume

- Tappeiner, U., Tappeiner G. (eds.), (2000): SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps. Blackwell Science Ltd., Berlin, in press.
- Tappeiner, U., 2000: Aims and tasks of SUSTALP. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.
- Tappeiner, G., Eggenberger, P., Agethle, A. and Tappeiner, U., 2000: An integrated approach to analysing the effects of agro-political instruments on the environment. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.
- Hilbert, A. and Steininger, K., 2000: The development of homogenous region types. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps. (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.
- Tappeiner, G. and Hilbert, A., 2000: Characteristic agricultural regions in the Alps. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.
- Dietrich, R., Eggenberger, P., Ercolani, A., Gasser, M., Kals, R., Kienzl, H. J., Siegloch, J., Staub, R., Steininger, K. and Vigl, C., 2000: Typical representatives of the characteristic agricultural region types in the Alps. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.
- Kienzl, H. J. and Vigl, C., 2000: A typology of agricultural EU-instruments. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.
- Agethle, A. and Eggenberger, P., 2000: Coherence of political objectives and EU regulations and directives. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.
- Staub, R. and Steininger, K., 2000: Essential differences of objectives and instruments of Swiss agricultural policy in comparison to those of the EU. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.
- Kals, R., Dietrich, R., Agethle, A., Eggenberger, P., Kienzl H. J., Ruffini, F., Staub, R., Tasser, E. and Vigl, C., 2000: Further analysis of the model regions of SUSTALP: Relevant instruments, farm strategies, environmental impacts. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.

- Vigl, C., Kienzl, H. J., Steininger, K. and Hilbert, A., 2000: Farm-specific influences within the interrelationship of effects of EU-agricultural instruments on the environment. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.
- Steininger, K., Mattanovich, E., Agethler, A. and Tasser, E., 2000: Elements of the complex "Agricultural Policy - environment" and explanation of the effects. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.
- Tappeiner, G. and Hilbert, A., 2000: The quantification of the influence of agricultural policy on the environmental quality of the alpine region. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.
- Tappeiner, U., Tappeiner G., Dietrich, R., Kals, R. and Vigl, C., 2000: Results and conclusions. In: SUSTALP. Evaluation of EU-Instruments: Their Contribution to a Sustainable Agriculture and Environment in the Alps (ed. by Tappeiner U., Tappeiner G.). Blackwell Science Ltd., Berlin, in press.

7.1.2 Publications in conference proceedings

- Tappeiner, G. (1999): "Die demographische Entwicklung im Alpenraum - Jung und Alt am Scheideweg" in "Jung sein - alt werden im Alpenraum. Zukunftsperspektiven und Generationendialog; CIPRA - Grosse Schriften 17/99, herausgegeben von CIPRA-International, Schaan 1999; S. 10-16.

7.2 Other publications

- Tappeiner, U. (1997): SUSTALP - Valutazione degli strumenti dell'Unione Europea in riguardo al loro contributo per un'agricoltura ecologica nell'arco alpino. *Academia*, 12: 5-6.
- Kienzl, H.; Vigl, C. (1998): SUSTALP - Evaluation von Instrumenten der Europäischen Union hinsichtlich deren Beitrag zur umweltgerechten Gestaltung der Landwirtschaft im Alpenraum. *Academia*, 15: 5-6.
- Tappeiner, U.; (1999): "EU-Projekte par excellence", *Academia* 18, June 1999, Bozen.

7.3 Publications in preparation

- Tappeiner et al. (2000): Sensitivity of classification procedures of agricultural structures.
- Tappeiner et al. (2000): Regional cluster as a basis of evaluation of the European agricultural policy.
- Steininger, K. (2000): Agricultural statistical data in the Community Member States with a territory possessiveness in the Alps. In: *Ländlicher Raum, Mitteilungen des Arbeitskreises Ländlicher Raum; Medieninhaber und Herausgeber: Österreichisches Kuratorium für Landtechnik und Landentwicklung (ÖKL)*.
- Mattanovich, E. and Steininger K. (2000): Acceptance and strain on alpine specific measurements based on agrarian policy regulations. In: *RAUM, Medieninhaber: Österreichisches Institut für Raumplanung (ÖIR)*.
- Hilbert, A. (2000): Classification of huge data sets.

7.4 Diploma theses

Siegloch, J. (1999): Umweltgerechte Gestaltung der Landwirtschaft im Alpenraum - Eine Evaluation von Instrumenten der Europäischen Union. Diploma Thesis, Universität Konstanz, Fakultät für Verwaltungswissenschaften, 89 p.

Gasser, M. (1999): Valutazione di strumenti dell'Unione Europea con riguardo al loro apporto al rispetto dell'ambiente nell'agricoltura alpina. Diploma Thesis, Università di Firenze, Facoltà di scienze politiche, 132 p.

Appendix 1

Grobanalyse der Modellregion (Checkliste zur Landschaftsstrukturanalyse)

- a) Allgemeine Beschreibung des Landschaftscharakters in der Modellregion
- b) Ergänzende Hinweise aus der Literatur (z. B. Besonderheiten der Landschaftsgenese, prägende historische Ereignisse, etc.)
- c) Strukturierte Analyse

Vorgangsweise:

Die Modellregion ist in ihrem Gesamtcharakter zu beurteilen. Es handelt sich um eine deskriptiv-qualitative Erfassungsmethode, die eine gewisse Erfahrung bei der Ansprache von Landschaftsstrukturen voraussetzt.

Es wird davon ausgegangen, daß die Region mit vertretbarem Aufwand nicht flächendeckend erfaßt werden kann. Es ist daher darauf zu achten, daß zumindest größere, für die Region repräsentative Landschaftskompartimente (wie z. B. Talboden, Hangschultern, Hochebenen) oder geschlossene Landschaftskammern in ihrem Zusammenhang beurteilt werden. (Beobachtungsstandorte: Aussichtspunkte, Berggipfel, höhere Gebäude, etc.). Aus arbeitstechnischen Gründen wird sich die Erfassung auf den Dauersiedlungsraum beschränken müssen. Die analysierten Bereiche sollten sinnvollerweise in einer Karte M 1:100.000 markiert werden, wobei gleichzeitig auch besondere "Highlights" eingetragen werden können.

d) Formblatt für Landschaftsanalyse

Landschaftsraum / *Landschaftskammer*: (Bezeichnung, Koordinaten / Gitternetznummer, Nr. der topographischen Karte)

Geologie	<input type="checkbox"/> Kalk (Dolomit, Kalk, Mergelkalk,...)	<input type="checkbox"/> Silikat (Gneis, Schiefer,...)	<input type="checkbox"/> Lockergestein (Schotter, Kies)

Flurform (vorherrschender Typ lt. Typenblatt I)	großflächig / ausgeräumt			kleinteilig / reich strukturiert	
	A	B	C	D	

Siedlungsform (vorherrschender Typ lt. Typenblatt II)	Streusiedlung	aufgelockerte Haufensiedlung	geschlossene Siedlungen	städtisch	

nichtlandwirtschaftliche Neubautätigkeit (ca. letzte 10 Jahre – aktuell)	gering	mäßig	stark	

	1	2	3	4	5	Beschreibung
Boden						
Erosionsherde (Plaiken, Murenanrisse, Lawinenschäden, etc.)	keine		vereinzelt		häufig bzw. dominant auftretende "stumme Zeugen" im Kulturland	
flächenhafte Bodenabspülung	keine		vereinzelt		häufig	

Wasser						
wahrnehmbare Eutrophierung / Verschmutzung fließender und stehender Gewässer	keine		vereinzelt		häufig	
extensiv genutzte Puffer zwischen Agrarfläche und Gewässerkante (z. B. Ufergehölze, Streuwiesen)	überwiegend oder Regelfall		mäßige Ausstattung		keine / sehr selten	
Gewässerverbauung (z.B. starke Kanalisierung bzw. noch frei fließend)	Frei fließend - mäandrierend		wechselnd		kanalisiert - linienhafte Verbauung	Verbauungen überwiegend neu <input type="checkbox"/> alt <input type="checkbox"/>

1

2

3

4

5

Beschreibung

Flora/Fauna (Habitate)

geschützte Habitate (Naturschutzgebiet oder gleichzuhaltende Gebiete)	größerer Flächen- zusammen- hang		kleinflächi- g / isoliert		keine	
Moore - Feuchtbiotope	keine		vereinzelt		großflächi- g	
Zerschneidungsgrad durch Infrastruktureinrichtungen (Straßennetz, Energieversorgung, Aufstiegshilfen)	gering		mäßig		stark	
Aufbau der Waldränder	verbreitet: gestufter Aufbau / Vorwald- bereiche				"harte Waldkant- e" ohne Unterwuc- hs	
Anteil extensiv genutzter Agrarflächen (Streuwiesen, Trockenrasen)	häufig				selten, keine	

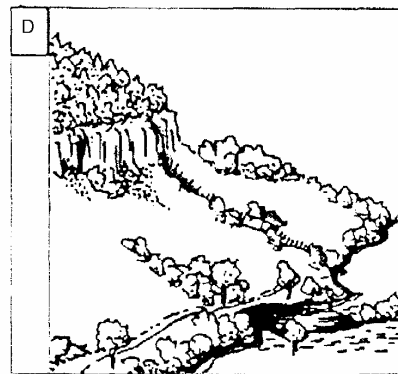
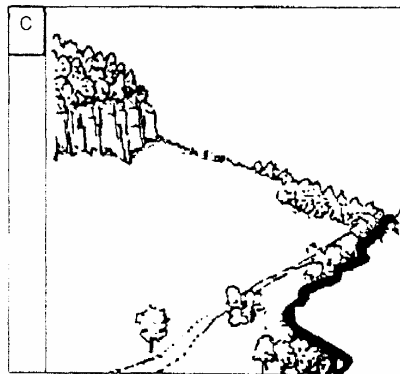
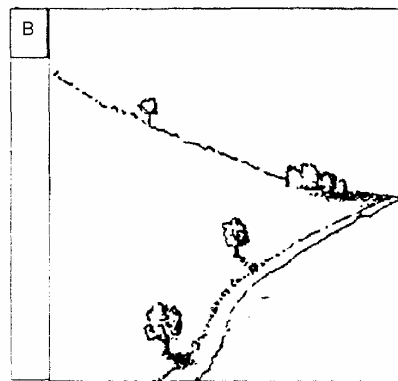
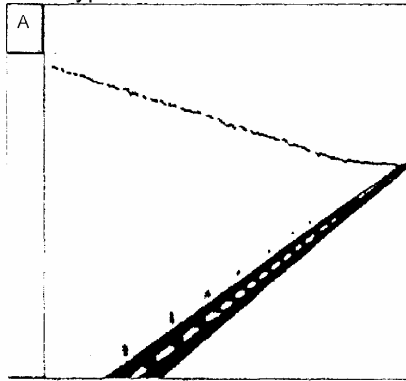
	1	2	3	4	5	Beschreibung
Landschaftsbild						
Ausstattung mit Kleinstrukturen (Hecken, Raine, Trockenmauern, Feuchtflächen, Altwässer), vgl. Musterblatt	reich		mäßig		selten / ausgeräumt	
junge Aufforstungstendenzen	keine / vereinzelt		mäßig		häufig / verbreitet	
Großkahlhiebe	keine		vereinzelt		häufig	
Dauerbrachen	keine		vereinzelt		häufig	
landschaftliche Einbindung von Bauten und Anlagen ("Harmonie")	gut / keine oder kaum störende Elemente		mäßiges Auftreten störender Elemente, od. einzelne Landschaftsdominanten		häufige Störwirkungen	
spezielle Agrartechniken mit landschaftsbildlicher Auswirkung (z. B.	keine / selten		mäßig		häufig	

	1	2	3	4	5	Beschreibung

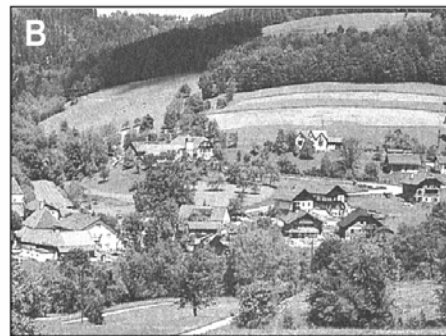
Sicherung der Bewirtschaftung

landwirtschaftliche Bautätigkeit (Modernisierung und / oder Neubauten)	stark / häufig		vereinzelt / mäßig		keine / bzw. Verfall	
ländliches und forstliches Wegenetz	modern / LKW-tauglich				Unzureichend / veraltet / schlecht erhalten	
Nutzungskonflikte zw. landwirtschaftlicher / nichtlandwirtschaftlicher Nutzung (z. B. eingezwängte land- u. forstwirtschaftliche Betriebsstätten, agrarisch genutzte Restflächen zwischen Siedlungskörpern)	kaum vorhanden		vereinzelt		häufig	

Typenblatt I: Flurformen



Typenblatt II: Siedlungsformen



Appendix 2

Bauern - Befragung

"In der folgenden $\frac{3}{4}$ Stunde werde ich Ihnen einige Fragen zu Ihrem Betrieb stellen. All Ihre Aussagen werden streng vertraulich behandelt, und sie dienen vor allem dazu, die Situation der Landwirtschaft in Südtirol besser kennenzulernen."

Frage 1) "Wieviele Personen leben bei Ihnen am Hof, wie alt sind sie und welcher Tätigkeit gehen sie nach?"

Interviewer füllt gemeinsam mit der befragten Person die Tabelle mit der Frage 1) aus!

INTERVIEWER legt dem Befragten das Bildblatt "Maßnahmen der letzten Jahre" vor!

Frage 2) "Geben Sie uns bitte einige Angaben zu Ihrer Betriebsgröße und zu den angebauten Kulturen im Jahr 1998! Gehen Sie dabei die Flächen in Ihrem Betrieb einzeln durch.

Achtung: Auch Wald und Privatalmen müssen angeführt werden; aber die aufgelassenen und verpachteten Flächen sind hier **nicht** anzugeben!"

Interviewer füllt gemeinsam mit der befragten Person die Tabelle mit der Frage 2) aus!

Frage 3) "Geben Sie uns bitte kurz einige Angaben zu Ihrem Viehbestand!"

Interviewer füllt gemeinsam mit der befragten Person die Tabelle mit der Frage 3) aus!

Frage 4) "Bitte geben Sie uns auch kurz einige Angaben zum zugekauften Futter!"

Interviewer füllt gemeinsam mit der befragten Person die Tabelle mit der Frage 4) aus!

Frage 5) "Bitte geben Sie uns einige Angaben zu den im Jahr 1998 verkauften Betriebserzeugnissen sowie über die Art der Vermarktung!"

Interviewer füllt gemeinsam mit der befragten Person die Tabelle mit der Frage 5) aus!

Frage 6) "Welche der folgenden Maschinen kommen in Ihrem Betrieb zum Einsatz?"

Gemeint sind dabei nicht nur jene Maschinen, die in Ihrem Eigentum sind, sondern auch Maschinen im Miteigentum und Maschinen, die von Dritten zur Verfügung gestellt werden!"

Interviewer füllt gemeinsam mit der befragten Person die Tabelle mit der Frage 6) aus!

Frage 7) "Bitte machen Sie uns einige Angaben zu Ihren Gebäuden!"

Interviewer füllt gemeinsam mit der befragten Person die Tabelle mit der Frage 7) aus!

Frage 8) "Nehmen Sie externe Dienstleistungen [Beratung] für Ihren Betrieb in Anspruch?"

Gemeint sind hier effektive Dienstleistungen für Ihren Betrieb, nicht aber Fort- und Weiterbildungskurse!"

Interviewer füllt gemeinsam mit der befragten Person die Tabelle mit der Frage 8) aus!

Frage 9) "Bieten Sie 'Urlaub auf dem Bauernhof' an?"

ja*

nein

Falls ja*: "Wie viele Betten vermieten Sie bzw. wie viele Buschenschank-Sitzplätze oder Sitzplätze auf der Almhütte haben Sie?"

_____ Betten

_____ Buschenschank-Sitzplätze bzw. Sitzplätze auf der Almhütte

Frage 10) "Wie hoch ist bzw. war Ihr ursprüngliches Milchkontingent?"

_____ Liter

Frage 11) "Haben Sie in den vergangenen 5 Jahren Milchkontingente vermietet, verkauft bzw. gemietet, eingekauft?"

Ich habe ein Kontingent von _____ Liter vermietet.

Ich habe ein Kontingent von _____ Liter verkauft.

Ich habe ein Kontingent von _____ Liter gemietet.

Ich habe ein Kontingent von _____ Liter eingekauft.

Ich bekam vom Land ein Kontingent von _____ Liter zugewiesen.

INTERVIEWER legt dem Befragten das Bildblatt "Bisher verfolgte Betriebsstrategien" vor!

Frage 12) "Welche Betriebsstrategien haben Sie in den letzten Jahren verfolgt?"

- Umstieg vom Haupterwerb zum Nebenerwerb
- Umstieg vom Nebenerwerb zum Haupterwerb
- Erwerbskombination [z.B. Urlaub auf dem Bauernhof, Arbeiten für die Gemeinde auf eigene Rechnung]
- Modernisierung des Betriebes [z.B. Mechanisierung, Bauten]
- Spezialisierung des Betriebes: *Konzentration auf Milchwirtschaft, Obstbau, Weinbau ...*
- Eigene Produktverarbeitung, Direktvermarktung
- Flächenankauf, Zupacht von Flächen
- Intensivierung der verfügbaren Flächen [Bewässerung, mehr Düngereinsatz, höhere Schnitzzahl]
- Extensivierung der verfügbaren Flächen
- Umstieg auf Bioproduktion
- Sortenerneuerung im Obst- und Weinbau
- Intensivierung der Fütterung
- Extensivierung der Fütterung
- Futtermittelverkauf
- Verstärkte Mahd von Steiflächen
- Andere _____

Frage 12a) "Was waren die Gründe hierfür?"

INTERVIEWER legt dem Befragten das Bildblatt mit der LEITER vor!

Frage 13) "Wenn Sie einmal alles in allem nehmen, wie beurteilen Sie **IHRE** derzeitige Einkommenssituation in der Land- und Forstwirtschaft – gegebenenfalls inklusive Förderungen –?"

Sagen Sie es mir bitte anhand dieser **LEITER**. Null bedeutet >sehr schlecht< und 10 >sehr gut<. Bitte nennen Sie die entsprechende Stufe."

10
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0

Frage 14) "Was schätzen Sie, wie wird sich Ihr Einkommen aus dem landwirtschaftlichen Betrieb inklusive Förderungen in den nächsten 5 Jahren durchschnittlich verändern?"

- erhöhen
- gleich bleiben
- sinken

INTERVIEWER legt dem Befragten das Bildblatt "Zukünftige Betriebsstrategien" vor!

Frage 15) "Welche Betriebsstrategien werden Sie in Zukunft verfolgen?"

- Keine Veränderung [weiter mit Frage 16]
- Umstieg vom Haupterwerb zum Nebenerwerb
- Umstieg vom Nebenerwerb zum Haupterwerb
- Erwerbsskombination [z.B. Urlaub auf dem Bauernhof, Arbeiten für die Gemeinde auf eigene Rechnung]
- Modernisierung des Betriebes [z.B. Mechanisierung, Bauten]
- Spezialisierung des Betriebes: Konzentration auf Milchwirtschaft, Obstbau, Weinbau ...
- Einstieg in neue Betriebszweige _____
- Auflassen von Flächen, Brache
- Eigene Produktverarbeitung, Direktvermarktung
- Flächenankauf, Zupacht von Flächen
- Weitere Intensivierung der verfügbaren Flächen [Bewässerung, mehr Düngereinsatz, höhere Schnitzzahl]
- Extensivierung der verfügbaren Flächen
- Umstieg auf Bioproduktion
- Sortenerneuerung im Obst- und Weinbau
- Intensivierung der Fütterung
- Extensivierung der Fütterung
- Verpachtung der Kulturflächen
- Kündigung des Pachtvertrages – wieder eigene Bewirtschaftung
- Futtermittelverkauf
- Verstärkte Mahd von Steilflächen
- Auflassen des Betriebes
- Andere _____

Frage 15a) "Was sind die Gründe hierfür?"

Interviewer-Einstufung: Frage wird nur an die Betriebe gestellt, die Dauerriesen bewirtschaften!

Frage 16) "Haben Sie in den letzten 5 Jahren die Schnitthäufigkeit auf der Dauerriese geändert?"

- ja*

nein

Falls ja*: "Wurde die Schnitthäufigkeit erhöht oder gesenkt?"

- erhöht
 gesenkt

Frage 17) "Haben Sie den Einsatz von Fungiziden, Insektiziden, Akariziden bzw. Unkrautbekämpfungsmitteln in den letzten 5 Jahren erhöht, unverändert belassen oder reduziert?"

Fungizide, Insektizide, Akarizide

- erhöht
 unverändert belassen
 reduziert

Unkrautbekämpfung

- erhöht
 unverändert belassen
 reduziert

Interviewer-Einstufung: Frage wird nur an die Personen gestellt, die im Besitz von eigenen Grundstücken sind!

Frage 18) "Hat in Ihrem Betrieb in den letzten 5 Jahren eine Hofübergabe stattgefunden?"

- ja
 nein*

Falls nein*: "Ist die Hofnachfolge in Ihrem Betrieb gesichert?"

- ja
 nein
 weiß nicht

Frage 19) "Wieviel Geld haben Sie im Jahr 1998 vom Land bzw. der EU erhalten?"

Ich habe im Jahr 1998 vom Land bzw. der EU _____ Mio. Lire erhalten.

Falls die befragte Person im Jahr 1998 vom Land bzw. der EU kein Geld erhalten hat, weiter mit Frage 22!

INTERVIEWER legt dem Befragten das Bildblatt "Erhaltene Beiträge" vor!

Frage 20) "Können Sie uns bitte sagen, wofür Sie vom Land bzw. der EU die Gelder erhalten haben?"

- Ich weiß es nicht genau
 Integrierte Produktion
 Ausgleichszulage, Grünlandbeitrag
 2078: Ökocompatible Viehwirtschaft
 2078: Beitrag für die Zucht der vom Aussterben bedrohten bzw. rückläufigen Viehrassen
 2078: Beihilfen zur Erhaltung des Getreideanbaues im Berggebiet in traditioneller Anbauweise
 2078: Beihilfe für umweltschonenden Weinbau

- 2078: Beihilfe für Betriebe mit ökologischer Wirtschaftsweise
- 2078: Beihilfe für die Alpeng
- 2078: Landschaftspflege
- Stallbau, Stallumbauten
- Beerenobstanbau
- Maschinenankauf
- Schaf- und Ziegenprämie
- Mutterkuhprämie
- Stiermastprämie
- Silomaisprämie
- Andere Flächenprämie im Getreideanbau
- Aufzuchtprämie
- Jungbauernförderung
- Aufforstung
- Sonstiges: _____

Frage 21) "Bewirken diese Förderungen eine Bewirtschaftungsänderung?"

- ja*
- nein

Falls ja*: "Welche Bewirtschaftungsänderung bewirken diese Förderungen?"

INTERVIEWER legt dem Befragten das Bildblatt mit der LEITER vor!

Frage 22) "Wenn Sie einmal alles in allem nehmen, wie beurteilen Sie die derzeitige Stimmung der Bauern im Südtiroler Berggebiet?"

Sagen Sie es mir bitte anhand dieser **LEITER**. Null bedeutet, die Stimmung der Bauern im Südtiroler Berggebiet ist auf dem Tiefpunkt und 10 bedeutet, die Stimmung der Bauern ist sehr sehr gut! Bitte nennen Sie die entsprechende Stufe."

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0

Nachfrage: Bei Einstufung zwischen 0 und 5:

Frage 22a) "Wieso ist die Stimmung nicht so gut?"

Appendix 3

Appendix 4